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# TMS 2025

**154<sup>th</sup> Annual Meeting & Exhibition**

**March 23–27, 2025**

MGM Grand Las Vegas Hotel & Casino  
Las Vegas, Nevada, USA

**#TMSAnnualMeeting | [www.tms.org/TMS2025](http://www.tms.org/TMS2025)**



## FINAL TECHNICAL PROGRAM

**THE CONTENT IN THIS FINAL TECHNICAL PROGRAM  
WAS GENERATED ON MARCH 11, 2025.**

Please refer to the online session sheets for the most up-to-date information. All times listed in this final technical program are in **Pacific Daylight Time (PDT)**.



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See page 6 of the TMS 2025 Conference Guide for details.



# PROGRAM AT-A-GLANCE

PROGRAM AT-A-GLANCE		MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Symposium Name	ROOM										
Additive Manufacturing											
A Career in Powder Processing and Additive Manufacturing: A MPMD Symposium Honoring David Bourell	309				✖	✖	✖				
Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials	311				✖	✖	✖				
Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials	315	✖			✖	✖	✖	✖			
Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials	350								✖		
Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction	317	✖			✖	✖	✖				
Additive Manufacturing Keynote Session	120		✖								
Additive Manufacturing Materials in Energy Environments II	109	✖									
Additive Manufacturing Materials in Energy Environments II	301				✖	✖	✖				
Additive Manufacturing Modeling, Simulation and Machine Learning	311						✖	✖	✖	✖	✖
Additive Manufacturing of Refractory Metallic Materials	316	✖			✖	✖	✖	✖			
Additive Manufacturing: Incorporating Breakthrough Functionalities for Building Large Scale Components	301							✖	✖	✖	
Additive Manufacturing: Length-Scale Phenomena in Mechanical Response	310	✖			✖	✖	✖	✖	✖		
Additive Manufacturing: Marine Materials and Structures	315						✖		✖	✖	
Additive Manufacturing: Microstructural and Mechanical Long-term Stability of AM Materials	302						✖		✖	✖	✖
Designing Complex Microstructures through Additive Manufacturing	317						✖	✖	✖	✖	✖
Nano and Micro Additive Manufacturing	310							✖			
Nano and Micro Additive Manufacturing	316						✖		✖	✖	✖
Advanced Characterization Methods											
Advanced Characterization Techniques for Quantifying and Modeling Deformation	122	✖	✖		✖	✖	✖	✖			
Advanced Characterization Techniques for Quantifying and Modeling Deformation	170								✖	✖	
Advanced Real Time Imaging	156	✖	✖		✖		✖				
Characterization of Materials through High Resolution Coherent Imaging	157	✖	✖		✖						
Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques	109								✖	✖	
Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques	121	✖	✖		✖	✖	✖	✖			
Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties	155	✖	✖		✖	✖	✖	✖	✖		

# PROGRAM AT-A-GLANCE

Symposium Name	ROOM										
		MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Neutron and X-ray Scattering in Materials Science and Engineering	156						×	×	×	×	×
Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques	157						×	×	×	×	×
Biomaterials											
Advanced Biomaterials for Biomedical Implants	308			×				×	×	×	
Advances in Biomaterials for Bioink Formulation and 3D Printing of Scaffolds	307			×							
Bio-Nano Interfaces and Engineering Applications	307			×				×	×	×	×
Biological Materials Science	306	×	×	×	×	×		×	×		
Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues	308	×	×		×						
Natural Fibers and Biocomposites: A Sustainable Solution	307		×	×	×						
Porous Materials for Biomedical Applications	306									×	×
Data-Driven and Computational Material Design											
AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification	320	×	×		×	×	×	×	×	×	×
Algorithm Development in Materials Science and Engineering	319	×	×		×	×	×	×	×	×	
Artificial Intelligence Applications in Integrated Computational Materials Engineering	351						×	×	×	×	×
Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence	353	×	×		×	×	×	×	×		
Chemistry and Physics of Interfaces	304	×	×		×	×	×	×	×		
Computational Thermodynamics and Kinetics	305	×	×		×	×	×	×	×	×	×
Dilute Alloying and Impurity Effects on Phase Transformations	310		×								
High Performance Steels	302	×	×		×	×	×	×			
Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion	316		×								
Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion	352					×	×	×	×	×	×
Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions	308					×	×				
Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions	309	×	×								
Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett	303				×	×	×	×	×		
Thermodynamics and Kinetics of Alloys III	352	×	×		×						
Thermodynamics and Phase Diagrams Applied to Materials Design and Processing: An FMD/SMD Symposium Honoring Rainer Schmid-Fetzer	350	×	×		×	×					
Validation of Computational Tools - Industrial Perspectives	311	×	×								

# PROGRAM AT-A-GLANCE

Symposium Name	ROOM	MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials	354	✗	✗		✗	✗	✗				
Electronic, Magnetic, and Energy Materials											
2D Materials – Preparation, Properties, Modeling & Applications	362	✗	✗	✗	✗	✗		✗	✗		
Advanced Materials for Energy Conversion and Storage 2025	356	✗	✗	✗	✗	✗		✗	✗		
Advances and Discoveries in Non-equilibrium Driven Nanomaterials and Thin Films	354			✗				✗	✗	✗	✗
Advances in Magnetism and Magnetic Materials	363	✗	✗	✗	✗	✗		✗	✗		
Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII	355	✗	✗	✗	✗	✗		✗	✗		
Electronic Packaging and Interconnection Materials II	360	✗	✗	✗	✗	✗		✗	✗		
Energy Technologies and CO2 Management	364	✗	✗	✗	✗	✗					
Functional Nanomaterials	365			✗		✗		✗	✗	✗	✗
Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution	357	✗	✗		✗	✗		✗			
Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments	358	✗	✗	✗	✗	✗					
Materials for Sustainable Hydrogen Energy	169					✗					
Materials for Sustainable Hydrogen Energy	359							✗	✗	✗	✗
Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV	359	✗	✗	✗	✗	✗					
Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications	361	✗	✗		✗	✗		✗			
Revitalization of Materials through Upcycling: The 2025 Student-Led Symposium	315		✗								
Light Metals											
2025 Light Metals Keynote Session	120	✗									
Advances in Titanium Technology	108	✗	✗		✗	✗	✗	✗	✗		
Alumina & Bauxite	111		✗		✗		✗				
Aluminum Alloys: Development and Manufacturing	114		✗			✗	✗	✗	✗	✗	✗
Aluminum Alloys: Development and Manufacturing Supplier Forum	114				✗						
Aluminum Cast Shop Supplier Forum	109				✗						
Aluminum Primary Processing - Decarbonization and Sustainability in Aluminum Primary Processing: Joint Session of Aluminum Reduction, Electrode Technology, and REWAS 2025	112								✗		
Aluminum Reduction Technology	113		✗		✗	✗		✗	✗	✗	✗
Bauxite Residue Valorization and Best Practices	111					✗		✗	✗		
Electrode Technology for Aluminum Production	112		✗					✗		✗	

# PROGRAM AT-A-GLANCE

Symposium Name	ROOM	MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Electrode Technology for Aluminum Production Supplier Forum	112				✕						
Light Elements Technology	110					✕					
Magnesium Technology 2024	115	✕	✕		✕	✕	✕	✕	✕	✕	
Melt Processing, Casting and Recycling	109		✕			✕	✕	✕			
Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2025	116									✕	✕
Scandium Extraction and Use in Aluminum Alloys	110							✕	✕		
Materials Degradation and Degradation by Design											
Environmental Degradation of Additively Manufactured Materials	169	✕	✕	✕	✕						
Environmental Degradation of Multiple Principal Component Materials	169			✕				✕	✕	✕	
Environmentally Assisted Cracking: Theory and Practice	167	✕	✕		✕	✕		✕			
Materials and Chemistry for Molten Salt Systems	165	✕	✕	✕	✕	✕		✕	✕	✕	✕
Nanostructured Materials in Extreme Environments II	166	✕	✕		✕	✕		✕	✕		
Refractory Metals 2024	168			✕				✕	✕	✕	✕
Steels in Extreme Environments	168	✕	✕	✕	✕	✕					
Materials Synthesis and Processing											
Advanced Laser Manufacturing of High-Performance Materials	105	✕		✕							
Advances in Bcc-Superalloys	102	✕	✕	✕	✕	✕					
Advances in Ceramic Materials and Processing	106	✕	✕	✕	✕	✕		✕			
Advances in Materials Deposition by Cold Spray and Related Technologies	103	✕	✕		✕	✕					
Advances in Surface Engineering VII	107	✕	✕	✕	✕						
Composite Materials: Sustainable and Eco-Friendly Material Development and Applications	116	✕	✕	✕	✕	✕					
Drying, Roasting, Calcining and Agglomeration of Feedstocks	104		✕		✕						
Electrical Steels	104	✕		✕							
Friction Stir Welding and Processing XIII	123			✕					✕	✕	✕
Friction Stir Welding and Processing XIII	124					✕		✕	✕	✕	✕
Innovative Hydrometallurgical Technologies for Environmentally Benign Processing and Remediation: An EPD Symposium Honoring Fiona Doyle	101	✕	✕								
Materials Processing Fundamentals: Thermodynamics and Rate Phenomena	103			✕				✕	✕	✕	
Phase Transformations and Microstructural Evolution	123	✕	✕	✕	✕	✕		✕			
Phase Transformations and Microstructural Evolution	167								✕	✕	✕
Powder Materials Processing and Fundamental Understanding	105			✕	✕	✕		✕	✕	✕	✕

# PROGRAM AT-A-GLANCE

Symposium Name	ROOM	MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Rare Metal Extraction & Processing	104							X	X	X	
Recent Advances in Titanium Science and Technology: MPMD/SMD Symposium Honoring Professor Dipankar Banerjee	107							X	X	X	X
REWAS 2025: Automation and Digitalization in Recycling Processes	117							X			
REWAS 2025: Sustainable End-of-Life Management and Recycling Solutions for Batteries, Wind Turbines, and Photovoltaics	117	X	X	X	X						
REWAS 2025: Sustainable Practices in Strategic and Critical Raw Materials: Exploring Supply Chain Resilience and Recycling Innovations	117					X		X			
Sustainability of High Temperature Alloys	102			X				X	X	X	
Thin Films and Coatings: Properties, Processing and Applications	101			X		X		X	X	X	X
Mechanics of Materials											
Accelerated Discovery and Insertion of Next Generation Structural Materials	364							X	X	X	
Advances in Multi-Principal Element Alloys IV: Mechanical Behavior	368	X	X	X	X	X		X	X	X	X
Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas	370	X	X		X	X		X	X	X	
Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling	318	X	X	X	X			X	X	X	
Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling	317					X					
Mechanical Behavior Related to Interface Physics IV	369	X	X	X	X	X		X	X	X	X
Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling	366	X	X	X	X	X		X	X	X	
Solid-State Diffusion Bonding of Metals and Alloys	301	X	X	X							
Spatially Tailored Materials: Processing-Structure-Properties	351	X	X	X	X	X					
Structure-Property Relationships in Molecular Crystal Deformation	365	X	X		X						
Structure and Dynamics of Metallic Glasses	367	X	X	X	X	X		X	X	X	X
Nuclear Materials											
Composite Materials for Nuclear Applications III	164							X	X	X	X
Elucidating Microstructural Evolution Under Extreme Environments	162	X	X	X	X	X		X	X	X	
Materials Corrosion Behavior in Advanced Nuclear Reactor Environments II	164	X	X								
Mechanical Behavior of Nuclear Reactor Materials and Components IV	160	X	X	X	X	X		X	X	X	X
Meeting Materials Challenges for the Future of Fusion Energy	158	X	X	X	X	X		X	X	X	X



# PROGRAM AT-A-GLANCE

Symposium Name	ROOM	MON AM	MON PM	MON POSTER	TUE AM	TUE PM	TUE POSTER	WED AM	WED PM	THU AM	THU PM
Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II	159	x	x	x	x	x		x	x	x	x
Seaborg Institutes: Emerging Topics in Actinide Sciences	163	x	x		x	x		x	x		
Solid-state Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations	161	x	x	x							
Special Topics in Nuclear Materials: Lessons Learned; Non-Energy Systems; and Coupled Extremes	161							x	x	x	
Spectroscopic Methods and Analysis for Nuclear Energy Related Materials	161			x	x						
Spectroscopic Methods and Analysis for Nuclear Energy Related Materials	163									x	
Special Topics											
TMS2025 All-Conference Plenary	120					x					
2025 Technical Division Student Poster Contest	Marquee Ballroom			x			x				
Acta Materialia Symposium	170					x					
Bladesmithing 2025	164				x						
DMMM5: A Decade of Creating Inclusion and Belonging for Diversity in the Minerals, Metals, and Materials Professions	150					x		x	x	x	
Frontiers of Materials Award Symposium: Manufacturing Structural and Functional Materials with Complexity: Lessons from Nature	116							x			
Looking Outside Materials Science: Lessons Learned for and from Materials Discovery - A Student-Led Symposium	170				x						
Nix Award and Lecture Symposium VI: Recent Developments in Investigating the Flow Mechanisms of Crystalline Solids	170							x			
Preparing Undergraduate and Graduate Students - And the Faculty Who Prepare Them - For Materials Careers (A Symposium Held in the Memory and Honor of Elizabeth Judson)	170	x	x								

LIGHT METALS

**2025 Light Metals Keynote Session — Growing Pains: Advancing Aluminum Recycling, Decarbonization, and Circular Innovations**

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizer:** Samuel Wagstaff, Oculatus Consulting

**Monday AM | March 24, 2025**  
**120 | MGM Grand**

**Session Chair:** Samuel Wagstaff, Oculatus Consulting

**8:30 AM** Introductory Comments

**8:35 AM** Light Metals Subject Awards Presentation

**8:45 AM** Keynote

Integration of Aluminum Recycling Facility into EGA's Current Aluminum Portfolio: *Abdulaziz Sarhan*<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

**9:15 AM** Keynote

Innovating Toward Net-Zero Emissions and Circular Aluminum: *Christian Schmidt*<sup>1</sup>; <sup>1</sup>Hydro

**9:45 AM** Break

**10:00 AM** Keynote

Navigating the Aluminum Scrap Squeeze: Challenges and Solutions: *Michael Hamm*<sup>1</sup>; <sup>1</sup>Constellium

**10:30 AM** Panel Discussion

ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**2D Materials – Preparation, Properties, Modeling & Applications — Carbon Related Materials - Processing, Properties & Applications**

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nuggehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Monday AM | March 24, 2025**  
**362 | MGM Grand**

**Session Chairs:** Ramana Chintalapalle, University of Texas at El Paso; Nuggehalli Ravindra, New Jersey Institute of Technology

**8:30 AM** Introductory Comments

**8:40 AM**

Enhancement of Electrical Conductivity in Copper-Graphene Multilayer System: *Chaochao Pan*<sup>1</sup>; Anand Gaur<sup>2</sup>; Jun Cui<sup>1</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University

**9:00 AM** Keynote

Flexible Nanocomposite Films Based on Carbon Nanotubes/MXene/Cobalt Nanowires for Enhanced EMI Shielding Applications: *Daniel Choi*<sup>1</sup>; Syed Sajl<sup>1</sup>; <sup>1</sup>Khalifa University of Science & Technology

**9:25 AM** Invited

Laser Expansion of Intercalated Graphite for the Production of High Quality Liquid Phase Exfoliated Graphene: Yarjan Abdul Samad<sup>1</sup>; Rami Elkaffas<sup>1</sup>; Haider Butt<sup>1</sup>; <sup>1</sup>Khalifa University of Science & Technology

**9:45 AM**

Effect of Orientation of Cobalt Nanowires in Carbon Nanotube Matrix on Electromagnetic Interference Shielding Effectiveness: *Syed Sajl*<sup>1</sup>; <sup>1</sup>Khalifa University

**10:05 AM** Break

**10:15 AM** Invited

Phase Transformation of Diamond from Layered Graphene with Tilt Grain Boundaries: *Kasra Momeni*<sup>1</sup>; Nuruzzaman Sakib<sup>1</sup>; Md Rashidul Alam<sup>1</sup>; <sup>1</sup>University of Alabama

**10:35 AM**

Spatial-Selective Electrostatic Doping of Graphene Through Metal Atom Precipitation at Substrate Heterointerface: *Ke Ma*<sup>1</sup>; Matthew Sherburne<sup>1</sup>; Zakaria Al Balushi<sup>1</sup>; Jiayun Liang<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**10:55 AM** Invited

Sustainable Synthesis of Reduced Graphene Oxide from Sugarcane Dry Leaves and Onion Peel Waste by Pyrolysis Process for Antibacterial Activity: Baskar Thangaraj<sup>1</sup>; Pravin Solomon<sup>2</sup>; Jamal Hassan<sup>1</sup>; Sufian Abedrabbo<sup>1</sup>; <sup>1</sup>Khalifa University; <sup>2</sup>Madurai Kamaraj University

**11:15 AM**

Novel Technique to Fabricate Thick Carbon Nanotube-Based Buckypaper for Electromagnetic Interference Shielding Applications: *Syed Sajl*<sup>1</sup>; <sup>1</sup>Khalifa University

**11:35 AM**

Tuning Mechanical and Electronic Properties of Bilayer Graphene by Strain Engineering: *Soumya Sarangi*<sup>1</sup>; Gary Cheng<sup>1</sup>; <sup>1</sup>Purdue University

ADDITIVE MANUFACTURING

**Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Shape Memory Alloys**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

**Monday AM | March 24, 2025**  
**315 | MGM Grand**

**Session Chair:** Daniel Salazar, BCMaterials

**8:30 AM**

Multi-Material AM of Shape Memory Alloys for Tunable Mechanical Responses: *Nerea Abando*<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

**8:50 AM**

Integrated Mechanical Working Assisted Directed Energy Deposition Process: Improving Structural Integrity by Modifying Microstructure in Iron-Based Shape Memory Alloy: *Soumyajit Koley*<sup>1</sup>; Supriyo Ganguly<sup>2</sup>; <sup>1</sup>Tata Steel; <sup>2</sup>Cranfield University



**9:10 AM Invited**

**Powder-Blown Laser-Based Directed Energy Deposition of Ni-Mn-Ga Magnetic Shape Memory Alloy:** *Ville Laitinen*<sup>1</sup>; Anastassia Milleret<sup>2</sup>; Mahsa Namvari<sup>1</sup>; Pierangeli Rodriguez De Vecchis<sup>3</sup>; Moataz Attallah<sup>4</sup>; Markus Chmielus<sup>3</sup>; Kari Ullakko<sup>1</sup>; <sup>1</sup>LUT University; <sup>2</sup>University College London; <sup>3</sup>University of Pittsburgh; <sup>4</sup>University of Birmingham

**9:40 AM**

**In Situ Synchrotron Imaging of Ni-Mn-Ga During Laser Powder Bed Fusion:** *Anastassia Milleret*<sup>1</sup>; Samy Hocine<sup>1</sup>; Kwan Kim<sup>1</sup>; Ville Laitinen<sup>2</sup>; Alexander Rack<sup>3</sup>; Peter Lee<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>LUT university; <sup>3</sup>European Synchrotron Radiation Facility

**10:00 AM Break****10:20 AM**

**Laser Powder Bed Fusion (L-PBF) of NiTi Shape Memory Alloys: Effect of Deposition Parameters and Rescanning on the Microstructure, Texture, and Thermomechanical Behavior:** *Naiyer Shokr*<sup>1</sup>; Sayed Sagahaian<sup>2</sup>; Thomas Berfield<sup>1</sup>; <sup>1</sup>University of Louisville; <sup>2</sup>Florida Institute of Technology

**10:40 AM**

**Additive Manufacturing of Ni-Ti-Hf Shape Memory Alloys:** *Philipp Krooss*<sup>1</sup>; Christian Lauhoff<sup>1</sup>; Seyedvahid Sajjadifar<sup>1</sup>; Thomas Niendorf<sup>1</sup>; <sup>1</sup>University Of Kassel

**11:00 AM**

**Additive Manufacturing of Magnetic Shape Memory Alloys for Solid-State Refrigeration:** *Daniel Salazar*<sup>1</sup>; <sup>1</sup>BCMaterials

**ADDITIVE MANUFACTURING**

## Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction — Process-Structure-Properties Relationships I

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Nik Hrabe, National Institute of Standards and Technology; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Monday AM | March 24, 2025**  
**317 | MGM Grand**

**Session Chair:** John Lewandowski, Case Western Reserve University

**8:30 AM Invited**

**The Effect of Build Parameters on the Environmentally Assisted Cracking Behavior in AM 316L:** *James Burns*<sup>1</sup>; Michael Roach<sup>1</sup>; <sup>1</sup>University of Virginia

**8:50 AM**

**Effects of Process Parameters on the Mechanical Behavior of Wire Arc Additively Manufactured (WAAM) AISI 316LSi:** *Vishnu Ramasamy*<sup>1</sup>; Brett Ley<sup>1</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University

**9:10 AM**

**Fatigue Criticality Assessment of Volumetric Defects in Notched Specimens: A Non-Destructive Approach:** *Arun Poudel*<sup>1</sup>; *Jonathan Pegues*<sup>1</sup>; Matthew Kelly<sup>2</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University; <sup>2</sup>U.S. Army DEVCOM Ground Vehicles System Center

**9:30 AM Invited**

**Impact of Micro and Mesostructure on the Failure Resistance of Laser Powder Bed Fusion-Processed Materials:** *Bernd Gludovatz*<sup>1</sup>; Moses Paul<sup>2</sup>; Jamie Kruzic<sup>1</sup>; Christopher Hutchinson<sup>3</sup>; Upadrasta Ramamurthy<sup>2</sup>; <sup>1</sup>University of New South Wales Sydney; <sup>2</sup>Nanyang Technological University; <sup>3</sup>Monash University

**9:50 AM Break****10:10 AM**

**On the Structural Integrity of Fe-36Ni Invar Alloy Processed by Different Additive Manufacturing Techniques:** *Thomas Wegener*<sup>1</sup>; Thomas Niendorf<sup>1</sup>; Johannes Günther<sup>2</sup>; <sup>1</sup>University of Kassel; <sup>2</sup>Günter-Köhler Institute for Joining and Materials Testing

**10:30 AM**

**Improving the Fatigue Resistance of Laser Powder Bed Fusion Components by Cavitation Abrasive Waterjet Finishing: Surface Texture and Residual Stress:** *Rohin Petram*<sup>1</sup>; Conall Wisdom<sup>1</sup>; Alex Montelione<sup>1</sup>; Cole Nouwens<sup>1</sup>; Dan Sanders<sup>1</sup>; Mamidala Ramulu<sup>1</sup>; *Dwayne Arola*<sup>1</sup>; <sup>1</sup>University of Washington

**10:50 AM**

**NDE for Fatigue Assessment: a Study on the Anomaly Detection by X-CT:** *Stefano Beretta*<sup>1</sup>; Shaharyar Baig<sup>1</sup>; Alireza Jam<sup>1</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

**11:10 AM**

**Microstructure, Defect, Mechanical Properties of Binder Jet Printed 17-4 PH Stainless Steel:** *Meisam Khademitab*<sup>1</sup>; Amir Mostafaei<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

**11:30 AM**

**Predicting Creep for AM Alloys Using the Larson-Miller Method: Limitation and Next Step:** *Yu-Tsen Y?*<sup>1</sup>; Nicholas Lamprinakos<sup>1</sup>; Xiang Chen<sup>2</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Oak Ridge National Laboratory

**ADDITIVE MANUFACTURING**

## Additive Manufacturing Materials in Energy Environments II — Joint Session: Accelerated Discovery and Insertion of Next Generation Structural Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Pacific Northwest National Laboratory; Subhashish Meher, Pacific Northwest National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Purdue University; Yi Xie, Peking University; Michael Kirka, Oak Ridge National Laboratory; Mohan Sai Kiran Nartu, Pacific Northwest National Laboratory

**Monday AM | March 24, 2025**  
**109 | MGM Grand**

**Session Chairs:** Kumar Sridharan, University of Wisconsin-Madison; Isabella Van Rooyen, Pacific Northwest National Laboratory

**8:30 AM**

**Heterogeneity in Stainless Steel 316 Fabricated Using Laser Powder Bed Fusion:** *Peeyush Nandwana*<sup>1</sup>; Selda Nayir<sup>1</sup>; Caleb Massey<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Geeta Kumari<sup>1</sup>; Chase Joslin<sup>1</sup>; Fred List III<sup>1</sup>; Xuan Zhang<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

8:50 AM

**Time Dependence of 600°C Post-Weld Heat Treatment on the Microstructure and Mechanical Properties of Austenitic Stainless Steel Claddings on Low Carbon Steel Via Laser-Wire Directed Energy Deposition:** *Scott Bozeman*<sup>1</sup>; Lukas Daut<sup>1</sup>; Brian Bay<sup>1</sup>; O Isgor<sup>1</sup>; Julie Tucker<sup>1</sup>; <sup>1</sup>Oregon State University

9:10 AM

**Effect of Hydrogen Blended Natural Gas on Additive Manufactured 316L Stainless Steel in Pressure Regulator Environments:** *Gerardo Gamboa*<sup>1</sup>; Ali Babak<sup>1</sup>; Marcus Young<sup>2</sup>; <sup>1</sup>Emerson; <sup>2</sup>University of North Texas

9:30 AM

**Microstructural Evolution of Additively-Manufactured 316H Stainless Steel During High-Temperature Creep and Its Effects on Irradiation Resistance:** *John Snitzer*<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Argonne National Lab

9:50 AM

**Post Irradiation Examination of Neutron-Irradiated AM 316L Stainless Steel:** *Timothy Lach*<sup>1</sup>; Stephen Taller<sup>1</sup>; Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

10:10 AM Break

10:20 AM

**Creating Processing-Microstructure-Properties Libraries for Additive Manufacturing of Complex Concentrated Alloys:** *Venkata Bhuvaneshwari Vukkum*<sup>1</sup>; Tingkun Liu<sup>1</sup>; Hari Harilal<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

10:40 AM

**Development and Additive Manufacturing of Oxide Dispersion Strengthened IN625 ALLOY for Gen. IV Nuclear Reactors:** *Kadir Tugrul Demirci*<sup>1</sup>; Eda Aydogan<sup>2</sup>; Selen Nimet Gurbuz Guner<sup>1</sup>; Erhan Aksu<sup>1</sup>; Ilhan Bukulmez<sup>1</sup>; <sup>1</sup>Turkish Energy, Nuclear and Mineral Research Agency; <sup>2</sup>Middle East Technical University

11:00 AM

**Nitride and Oxide Dispersion Strengthened of Fe12Cr6Al Alloys During Laser Powder Bed Fusion for Nuclear Applications:** *Omer Cakmak*<sup>1</sup>; Seong Gyu Chung<sup>1</sup>; Seung-Hoon Lee<sup>1</sup>; Hwasung Yeom<sup>1</sup>; Jung-Wook Cho<sup>1</sup>; <sup>1</sup>POSTECH

11:20 AM

**Microstructure Control of Ferritic-Martensitic Steels During Wire-Arc Direct Energy Deposition Process:** *Yukinori Yamamoto*<sup>1</sup>; Wei Tang<sup>1</sup>; Saket Thapliyal<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; Riley Wallace<sup>1</sup>; William Carter<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Ben Schaeffer<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Lincoln Electric

11:40 AM

**The Effects of Process Parameters and Heat Treatment on the High-Temperature Creep Properties of Additively Manufactured 316H Stainless Steel:** *John Snitzer*<sup>1</sup>; Ben Sutton<sup>2</sup>; John Shingledecker<sup>2</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>EPRI

## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Nb-Alloy and High Temperature Mechanical Properties

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Faramarz Zarandi, RTX Corporation; Jeffrey Sowards, NASA Marshall Space Flight Center; Antonio Ramirez, Ohio State University; Eric Brizes, NASA Glenn Research Center; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias; Ian Mccue, Northwestern University; Zachary Sims, Small Business Consulting Corporation

**Monday AM | March 24, 2025  
316 | MGM Grand**

**Session Chairs:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory

8:30 AM Invited

**A Comparison of Niobium Alloys C103 and Nb521:** *Eric Brizes*<sup>1</sup>; Justin Milner<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

9:00 AM

**Hot-fire Testing of C103 Nozzle Extensions:** *Fernando Reyes Tirado*<sup>1</sup>; Carly Romnes<sup>1</sup>; Colton Katsarelis<sup>1</sup>; Joseph Hernandez McCloskey<sup>1</sup>; Thomas Teasley<sup>1</sup>; <sup>1</sup>Nasa Marshall Space Flight Center

9:20 AM

**Understanding the Elevated Temperature Properties of Niobium-Based Alloys Relevant to Aerospace Applications:** Lauren Bowling<sup>1</sup>; Noah Philips<sup>2</sup>; Daniel Matejczyk<sup>3</sup>; James Fitz-Gerald<sup>1</sup>; William Riffe<sup>1</sup>; Patrick Hopkins<sup>1</sup>; *Sean Agnew*<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>ATI Materials; <sup>3</sup>Aerojet Rocketdyne - L3 Harris

9:40 AM

**Elevated Temperature Mechanical Performance of Historical Niobium Alloys:** Eric Brizes<sup>1</sup>; *Justin Milner*<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

10:00 AM Break

10:20 AM

**Impact of Multi-Scale Microstructural Heterogeneities on the Mechanical Behavior of Additively Manufactured and Post-Processed Nb-Based C103 Alloy:** *Advika Chesetti*<sup>1</sup>; Tirthesh Ingale<sup>1</sup>; Sucharita Banerjee<sup>1</sup>; Madhavan Radhakrishnan<sup>1</sup>; Narendra Dahotre<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas

10:40 AM

**Uncovering the Ultra-High Temperature Deformation Mechanisms of Novel Refractory Alloys:** *Sharon Park*<sup>1</sup>; Mo-Rigen He<sup>1</sup>; Syed I.A. Jalali<sup>1</sup>; Michael Patullo<sup>1</sup>; Noah Philips<sup>2</sup>; Abdelmoez Hussein<sup>3</sup>; Moataz Attallah<sup>3</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>ATI Specialty Alloys; <sup>3</sup>University of Birmingham

11:00 AM

**Laser Powder Bed Fusion of C103 and Refractory-Based Alloys - Material Development Using Ultrasonic Atomization:** *Jakub Ciftci*<sup>1</sup>; Tomasz Choma<sup>1</sup>; Bartosz Morończyk<sup>1</sup>; ukasz rodowski<sup>1</sup>; <sup>1</sup>Amazemet

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Micromechanics and Ti-Based Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Sezer Ozerinc, University of Illinois at Urbana-Champaign; Yu Zou, University of Toronto; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Pacific Northwest National Laboratory; Keivan Davami, University of Alabama

**Monday AM | March 24, 2025**  
**310 | MGM Grand**

**Session Chairs:** Yu Zou, University of Toronto; Keivan Davami, University of Alabama

#### 8:30 AM Invited

**Exploring Complex Microstructures in Additively Manufactured Alloys with Micro Mechanical Testing:** *Subin Lee*<sup>1</sup>; Nagamani Balila<sup>2</sup>; Pyuck-Pa Choi<sup>3</sup>; Christoph Kirchlechner<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology; <sup>2</sup>IIT Bombay; <sup>3</sup>Korea Advanced Institute of Science and Technology

#### 9:10 AM

**Compositionally Graded Titanium Alloys: Correlation Between Local Microstructures and Mechanical Properties:** *Soumya Dash*<sup>1</sup>; Zhiying Liu<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

#### 9:30 AM

**Indentation Size Effects on Hardness of Ti-6Al-4V Made by Laser Directed Energy Deposition:** *Janelle Hobbs*<sup>1</sup>; *Kaka Ma*<sup>1</sup>; <sup>1</sup>Colorado State University

#### 9:50 AM

**The Automated Quantification of Alpha Laths and Tensile Behavior in Ti-6Al-4V Processed With Laser Powder Bed Fusion:** *Matthew Schreiber*<sup>1</sup>; Garrison Hommer<sup>1</sup>; Craig Brice<sup>1</sup>; Josh Norman<sup>2</sup>; Jenna Krynicki<sup>2</sup>; Joy Gockel<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>RTX Technology Center

#### 10:10 AM Break

#### 10:30 AM

**Size Effects, Mechanical Properties, and Yield Surface Evolution in Multiaxial Loading of Ti5553, Ti6Al4V alloys:** *Seyyed Danial Salehi*<sup>1</sup>; Mehrdad Pourjam<sup>1</sup>; Thomas Voisin<sup>2</sup>; Kavan Hazeli<sup>1</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Lawrence Livermore National Laboratory

#### 10:50 AM

**Precipitation Hardening of Laser Powder Bed Fusion Ti-6Al-4V:** *Nicholas Derimow*<sup>1</sup>; Jake Benzing<sup>1</sup>; Jacob Garcia<sup>1</sup>; Howie Joress<sup>1</sup>; Ping Lu<sup>2</sup>; Newell Moser<sup>1</sup>; Chad Beamer<sup>3</sup>; Frank DelRio<sup>2</sup>; Nik Hrabe<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>Quintus Technologies

#### 11:10 AM

**Additive Manufacturing of Titanium Alloys: Microstructure-Mechanical Properties Relationship:** *Amir Hadadzadeh*<sup>1</sup>; <sup>1</sup>University of Memphis

## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — EBSD

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

**Monday AM | March 24, 2025**  
**122 | MGM Grand**

**Session Chairs:** Wolfgang Pantleon, Technical University of Denmark; Gregory Thompson, University of Alabama

#### 8:30 AM

**Imaging Defects at the Mesoscale Using a Direct EBSD Detector:** *McLean Echlin*<sup>1</sup>; Nicolò Maria della Ventura<sup>1</sup>; William Lenthe<sup>2</sup>; Kalani Moore<sup>3</sup>; James Lamb<sup>1</sup>; Fulin Wang<sup>4</sup>; Wyatt Witzten<sup>1</sup>; Irene Beyerlein<sup>1</sup>; Tresa Pollock<sup>1</sup>; Marc De Graef<sup>5</sup>; Dan Gianola<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>Gatan / EDAX; <sup>3</sup>Direct Electron; <sup>4</sup>Shanghai Jiao Tong University; <sup>5</sup>Carnegie Mellon University

#### 8:50 AM

**Evaluating the Precursors of Particle Fracture in Al Alloys Via High-Resolution EBSD:** *Philip Noell*<sup>1</sup>; Laura Vietz<sup>1</sup>; William Gilliland<sup>1</sup>; Timothy Ruggles<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 9:10 AM

**Dislocation Analysis in Fatigue Tested AISI 316L Stainless Steel:** *Johan Westraadt*<sup>1</sup>; Luchian Pullen<sup>2</sup>; Robert Knutsen<sup>3</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Nelson Mandela University; <sup>3</sup>University of Cape Town

#### 9:30 AM

**Application of an Iterative Optimization Algorithm on Residual Strain Extraction from Electron Backscatter Diffraction Patterns:** *Crestienne Dechaine*<sup>1</sup>; Marc De Graef<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 9:50 AM

**Assessing Local Deformation in Polycrystalline Materials Using HR-EBSD, ECCI and HR-DIC:** *Xinrui Huang*<sup>1</sup>; Phani Karamched<sup>1</sup>; Angus Wilkinson<sup>1</sup>; <sup>1</sup>University of Oxford

#### 10:10 AM Break

#### 10:30 AM

**Multi-Scale Characterization of 3D Printable CrCoNi-Based ODS-MPEAs by Methods of Advanced Stereo-STEM Cross-Correlated with EDS – Resourcing Experimental Data to Act as Potential Input into the Quantitative Models:** *Milan Heczko*<sup>1</sup>; Timothy Smith<sup>2</sup>; Christopher Kantzos<sup>2</sup>; Antonín Dlouhý<sup>1</sup>; Michael Mills<sup>3</sup>; <sup>1</sup>Institute of Physics of Materials, Czech Academy of Sciences; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>The Ohio State University

#### 10:50 AM

**Rationalizing Multiple Characterization Approaches for Determining Active Slip Systems in Ti-6-4:** *Brigham Stacey*<sup>1</sup>; Tyson Neville<sup>1</sup>; Blake Jensen<sup>1</sup>; David Fullwood<sup>1</sup>; Michael Miles<sup>1</sup>; Talukder Oishi<sup>2</sup>; Marko Knezevic<sup>2</sup>; Brad Kinsey<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

11:10 AM

**Study of Strain Localization and Crystal Reorientation at the Early Stage of Plastic Deformation Using Laser Confocal Microscopy, EBD and DCT-6D:** *Damien Texier*<sup>1</sup>; Sylvain Vallot<sup>1</sup>; Julien Genée<sup>1</sup>; Malo Jullien<sup>1</sup>; Henry Proudhon<sup>2</sup>; Wolfgang Ludwig<sup>3</sup>; Jean-Charles Stinville<sup>4</sup>; <sup>1</sup>Institut Clement Ader - Umr Cnrs 5312; <sup>2</sup>Centre des Matériaux Mines Paris PSL; <sup>3</sup>MATEIS - UMR CNRS 5510; <sup>4</sup>UIUC

11:30 AM

**The Application of Digital Image Correlation to In Situ TEM Deformation Investigations:** *Gregory Thompson*<sup>1</sup>; Accalia Robinson<sup>1</sup>; Thomas Koenig<sup>2</sup>; Alicia Koenig<sup>2</sup>; Eric Homer<sup>3</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Lehigh University; <sup>3</sup>Brigham Young University

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## MATERIALS SYNTHESIS AND PROCESSING

### Advanced Laser Manufacturing of High-Performance Materials — Laser Metal Forming and Advanced Laser Manufacturing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Adam Hicks, Air Force Research Laboratory; Jared Speltz, University of Dayton Research Institute

**Monday AM | March 24, 2025**  
**105 | MGM Grand**

**Session Chairs:** Adam Hicks, Air Force Research Laboratory; Jared Speltz, University of Dayton Research Institute

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**8:30 AM Introductory Comments:** Advanced Laser Manufacturing for Aerospace Applications

9:00 AM

**In-Space Laser Forming Simulated Under Thermal Vacuum Conditions:** *Andrew O'Connor*<sup>1</sup>; Jonathan Bonebrake<sup>1</sup>; Thomas Bryan<sup>1</sup>; Ellis Crabtree<sup>2</sup>; William Evans<sup>1</sup>; John Ivester<sup>1</sup>; Emma Jaynes<sup>1</sup>; Louise Littles<sup>1</sup>; Benjamin Rupp<sup>1</sup>; Zachary Courtright<sup>1</sup>; <sup>1</sup>NASA/MSFC; <sup>2</sup>NASA Postdoctoral Program

9:20 AM

**Controlling the Pre-Bending Delay During Laser Sheet Metal Forming:** *Nathan Fripp*<sup>1</sup>; Tianchen Wei<sup>1</sup>; Benjamin Begley<sup>1</sup>; Benjamin Anthony<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

9:40 AM

**Leveraging Advances in Additive Manufacturing Thermal Models to Predict Behavior During Laser Sheet Metal Forming:** *Benjamin Begley*<sup>1</sup>; Zoe Lipton<sup>1</sup>; Daniel Bolden<sup>1</sup>; Tianchen Wei<sup>1</sup>; Nathan Fripp<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

10:00 AM Break

10:20 AM

**Microstructural Evolution in Austenitic Stainless Steels During Laser Sheet Metal Forming:** *Tianchen Wei*<sup>1</sup>; Nathan Fripp<sup>1</sup>; Benjamin Begley<sup>1</sup>; Benjamin Anthony<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

10:40 AM

**Blue Laser Welding of Copper Foil:** *Jonah Duch*<sup>1</sup>; Jeffrey Rodelas<sup>1</sup>; Peter Kinney<sup>1</sup>; Jack Herrmann<sup>1</sup>; <sup>1</sup>Sandia National Lab

11:00 AM

**Ultrafast Laser Dicing of Fused Silica Filled Epoxy Molding Compound (EMC): Process Mechanisms:** *Sijie Zhang*<sup>1</sup>; *Yung Shin*<sup>1</sup>; <sup>1</sup>Purdue University

11:20 AM

**Wear Characteristics of AL2O3 Ceramic Coatings Manufactured by Laser Cladding and Selective Laser Melting:** *Sumin Song*<sup>1</sup>; Yeonghwan Song<sup>1</sup>; Taebum Kim<sup>1</sup>; Jeongho Han<sup>2</sup>; Kyuntaek Cho<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Hanyang University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Engineering of Electrode Materials

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

**Monday AM | March 24, 2025**  
**356 | MGM Grand**

**Session Chairs:** Soumendra Basu, Boston University; Eric Detsi, University of Pennsylvania

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8:30 AM Invited

**Oxygen Electrodes for Reversible Solid Oxide Cells:** *Ayesha Akter*<sup>1</sup>; Jillian Mulligan<sup>1</sup>; John-In Lee<sup>1</sup>; Soumendra Basu<sup>1</sup>; Uday Pal<sup>1</sup>; *Srikanth Gopalan*<sup>1</sup>; <sup>1</sup>Boston University

8:55 AM

**Enhancing Capacity of Cobalt-Free Lithium-Ion Batteries via Aerosol Jet Deposited Ultra Thick Micro Architected Electrode Structures:** *Michael Stefanov*<sup>1</sup>; Chunshan Hu<sup>1</sup>; Sandra Ritchie<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

9:15 AM

**Enhancement of the Electrochemical Performance of LiFePO<sub>4</sub> Cathode Material by Nanosecond Laser Annealing:** *Siba Sundar Sahoo*<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Xiao-Guang Sun<sup>2</sup>; Parans Paranthaman<sup>2</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Oak Ridge National Laboratory

9:35 AM Invited

**Relationship Between Microstructural Changes in Reversible Solid Oxide Cells and Their Performance:** *Emily Ghosh*<sup>1</sup>; Jillian Mulligan<sup>1</sup>; John-In Lee<sup>1</sup>; Ayesha Akter<sup>1</sup>; Uday Pal<sup>1</sup>; *Srikanth Gopalan*<sup>1</sup>; *Soumendra Basu*<sup>1</sup>; <sup>1</sup>Boston University

10:00 AM Break

10:15 AM

**First-Principles Study on the Interfacial Stability Between Potential Anode Materials and Cubic LLZO Solid Electrolyte for Li-Ion Batteries:** *Ngoc Thanh Thuy Tran*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

10:35 AM

**Enhanced H<sup>+</sup> Storage of a MnO<sub>2</sub> Cathode Via a MnO<sub>2</sub> Nanolayer Interphase Transformed from Manganese Phosphate:** *Danxuan Zhao*<sup>1</sup>; You Zuo<sup>1</sup>; <sup>1</sup>Northeastern University

10:55 AM

**Exploring Electrodeposition Kinetics in Magnesium Metal Anodes:** *Vahid Attari*<sup>1</sup>; Sarbajit Banerjee<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University



11:15 AM

**Copper and Sulfur Codoped NiCo-LDH for High-Performance Supercapacitor Electrode Materials:** *Sudhir Kumar<sup>1</sup>; Debabrata Pradhan<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur*

## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging — Additive Manufacturing & Energy Materials

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Jinichiro Nakano, MatterGreen; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Noritaka Saito, Kyushu University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webber, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; Pranjal Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

**Monday AM | March 24, 2025**  
**156 | MGM Grand**

**Session Chair:** Pranjal Nautiyal, Oklahoma State University

8:30 AM Invited

**Beam Control in LPBF and High-Speed Visualization:** *Anthony Rollett<sup>1</sup>; Guannan Tang<sup>1</sup>; Nicholas Lamprinakos<sup>1</sup>; Ziheng Wu<sup>1</sup>; <sup>1</sup>Carnegie Mellon University*

8:50 AM

**Revealing Weld Bead Dynamics: High-Speed Imaging of Wire Arc DED Process:** *Tyler Dolmetsch<sup>1</sup>; Sohail Mohammed<sup>1</sup>; Blanca Palacios<sup>1</sup>; Tanaji Paul<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University*

9:10 AM

**Study of Cracking Initiation and Evolution Dynamics with In-Situ X-Ray Imaging and Automated Machine Learning:** *M Matsive Ali<sup>1</sup>; Nick Calta<sup>2</sup>; Christopher Tassone<sup>3</sup>; Sen Liu<sup>1</sup>; <sup>1</sup>University of Louisiana at Lafayette; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>SLAC National Accelerator Laboratory*

9:30 AM

**Using Lock-in Thermography to Rapidly Screening Thermal Property of Additive Manufacturing Components:** *Zilong Hua<sup>1</sup>; Patrick Merighe<sup>2</sup>; Jorgen Rufner<sup>1</sup>; Arin Preston<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Asa Monson<sup>1</sup>; William Chuirazzi<sup>1</sup>; Michael McMurtrey<sup>1</sup>; David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Utah State University*

9:50 AM

**Operando X-Ray Imaging of Solute Redistribution in Functionally Graded Materials:** *Steve Gaudez<sup>1</sup>; Zhilang Zhang<sup>2</sup>; Andaç Özsoy<sup>1</sup>; William Hearn<sup>1</sup>; Yunhui Chen<sup>3</sup>; Alexander Rack<sup>4</sup>; Mohamadreza Afrasiabi<sup>5</sup>; Steven Van Petegem<sup>1</sup>; <sup>1</sup>Paul Scherrer Institut; <sup>2</sup>ETH Zurich; <sup>3</sup>Royal Melbourne Institute of Technology; <sup>4</sup>European Synchrotron Radiation Facility; <sup>5</sup>ETH Zurich*

10:10 AM Break

10:30 AM Invited

**Real-Time Optical Visualization of Battery Reactions and Processes:** *Nian Liu<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

10:50 AM

**Real-Time Imaging and Analysis of Electroconvection Using Advanced Fluorescence Microscopy and Cloud Algorithms:** *Duhan Zhang<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

11:10 AM

**Operando Study of the Exfoliation Dynamics of 2D Materials by X-Ray Free Electron Laser MHz Imaging and Multiphysics Modelling:** *Kang Xiang<sup>1</sup>; Ling Qin<sup>2</sup>; Jiawei Mi<sup>1</sup>; <sup>1</sup>University of Hull; <sup>2</sup>University of Wyoming*

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Bcc-Superalloys — Refractory High Entropy Superalloys (RSAs)

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Alexander Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Howard Stone, University of Cambridge; Oleg Senkov, Air Force Research Laboratory; Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

**Monday AM | March 24, 2025**  
**102 | MGM Grand**

**Session Chairs:** Sandy Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

8:30 AM Invited

**Design and Deformation of BCC – B2 Refractory Multiprincipal Element Alloys:** *Carolina Frey<sup>1</sup>; Sebastian Kube<sup>2</sup>; Ben Neumann<sup>1</sup>; Justin Mayer<sup>1</sup>; Patrick McNutt<sup>1</sup>; Irene Beyerlein<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California - Santa Barbara; <sup>2</sup>University of Wisconsin*

9:00 AM

**Advancing High-Temperature Structural Applications: Design and Manufacturing of BCC Refractory MPEAs Via Additive Manufacturing Technologies:** *Julia Chmielewska<sup>1</sup>; Christian Leinenbach<sup>1</sup>; <sup>1</sup>Empa*

9:20 AM

**Challenges Facing the Design of Refractory BCC-B2 Alloys for 3D Printing:** *Kaitlyn Mullin<sup>1</sup>; Carolina Frey<sup>1</sup>; Syed I. A. Jalali<sup>2</sup>; Michael Patullo<sup>3</sup>; Kevin Hemker<sup>2</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>Johns Hopkins University*

9:40 AM

**Investigation of Nano-Scale Phase Separation in Refractory High Entropy Alloys Using Complementary Techniques:** *Sudip Sarkar<sup>1</sup>; Advika Chasetti<sup>1</sup>; Nachiket Keskar<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Vishal Soni<sup>1</sup>; Tirthesh Ingale<sup>1</sup>; Narendra Dahotre<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas*

10:00 AM Break

10:20 AM Invited

**Evolution of the BCC + B2 Microstructure and Its High Temperature Stability in Refractory High Entropy Alloys:** *Vishal Soni<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Zachary Kloenne<sup>2</sup>; Jean-Philippe Couzinie<sup>3</sup>; Oleg Senkov<sup>4</sup>; Daniel Miracle<sup>4</sup>; Srinivasan Srivilliputhur<sup>1</sup>; Hamish Fraser<sup>2</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>The Ohio State University; <sup>3</sup>Univ Paris Est Creteil, CNRS, ICMPE; <sup>4</sup>Air Force Research Laboratory*

10:50 AM

**High-Temperature Evolution of Irradiation Defects in WTaCrV Refractory High-Entropy Alloy for Nuclear Fusion Applications:** *Damian Kalita<sup>1</sup>; Iwona Jóźwik<sup>1</sup>; Katarzyna Mulewska<sup>1</sup>; Amin Esfandiarpour<sup>1</sup>; Łukasz Kurpaska<sup>1</sup>; Yanwen Zhang<sup>2</sup>; William J. Weber<sup>2</sup>; Jacek Jagielski<sup>1</sup>; <sup>1</sup>National Centre for Nuclear Research; <sup>2</sup>University of Tennessee*

MONDAY AM

11:10 AM

**Identification of the B2 Phase in the TaRe Binary BCC Phase Field Via Multiscale Characterization Techniques and Neutron Diffraction:** *Bryan Crossman*<sup>1</sup>; Junxin Wang<sup>1</sup>; Loic Perriere<sup>2</sup>; Jean-Philippe Couzinie<sup>2</sup>; Maryam Ghazisaeidi<sup>1</sup>; Michael Mills<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>East Paris Institute of Chemistry and Materials

11:30 AM

**Superconductivity in the New Titanium-Rich BCC High-Entropy Alloy:** *Piotr Sobota*<sup>1</sup>; Daniel Gnida<sup>2</sup>; Bartosz Rusin<sup>1</sup>; Wojciech Nowak<sup>1</sup>; Adam Pikul<sup>2</sup>; Rafal Idczak<sup>1</sup>; <sup>1</sup>University of Wrocław; <sup>2</sup>Polish Academy of Sciences

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — High Entropy Ceramics

**Sponsored by:** TMS Extraction and Processing Division, TMS; Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

Monday AM | March 24, 2025  
106 | MGM Grand

**Session Chairs:** Alexander Dupuy, University of Connecticut; Faqin Dong, Southwest University of Science and Technology

8:30 AM Invited

**High-Entropy Oxides: Data and Discovery:** *Corey Oses*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

8:50 AM

**Monoclinic Phase Stabilization with the High Entropy Ceramics Approach in the Pseudobinary System In<sub>3</sub>Ti<sub>2</sub>AlO<sub>10</sub> – In<sub>6</sub>Ti<sub>6</sub>BO<sub>22</sub> (A: Al, Ga; B: Mg, Zn):** *Victor Emmanuel Alvarez Montano*<sup>1</sup>; Subhash Sharma<sup>2</sup>; Miguel Olivas Martínez<sup>3</sup>; Francisco Brown<sup>3</sup>; Ofelia Hernández Negrete<sup>3</sup>; Javier Hernandez Paredes<sup>3</sup>; Alejandro Durán<sup>2</sup>; <sup>1</sup>Universidad De Sonora; <sup>2</sup>Universidad Nacional Autónoma de México; <sup>3</sup>Universidad de Sonora

9:10 AM

**Reaction Pathways in the Formation and Decomposition of Rocksalt Entropy-Stabilized Oxides:** *John Heron*<sup>1</sup>; <sup>1</sup>University of Michigan

9:30 AM

**Enhancing the Interfacial Activity of Zirconia Using Mg-Al-Si-Zr Microcrystalline Glass with Magnesium Olivine Crystalline Phase:** *Yun Song*<sup>1</sup>; Xiang Wang<sup>2</sup>; Yanru Shen<sup>2</sup>; Qiaomin Wei<sup>2</sup>; Wenhua Tong<sup>2</sup>; Jinhong Li<sup>2</sup>; Yuchun Sun<sup>2</sup>; <sup>1</sup>Peking University School and Hospital of Stomatology; <sup>2</sup>Peking University School and Hospital of Stomatology

9:50 AM

**Refractory High Entropy Metal-Borides (Hf, Ta, Nb, Zr, W)B<sub>x</sub> – Microstructure, Crystal Structure And Phase Evolution:** *Sercan Cetinkaya*<sup>1</sup>; Edward G. Obbard<sup>1</sup>; Kevin J. Laws<sup>1</sup>; Patrick A. Burr<sup>1</sup>; Jamie J. Kruzic<sup>1</sup>; Vanessa K. Peterson<sup>2</sup>; <sup>1</sup>University of New South Wales Sydney; <sup>2</sup>ANSTO

10:10 AM Break

10:20 AM Invited

**Local Structure Dynamics in High Entropy Oxide Thin Films:** *Christina Rost*<sup>1</sup>; Gabriela Niculescu<sup>2</sup>; Gerald Bejger<sup>1</sup>; John Barber<sup>1</sup>; Joshua Wright<sup>3</sup>; Saeed Almishal<sup>4</sup>; Matthew Webb<sup>5</sup>; Sai Venkata Gayathri Ayyagari<sup>4</sup>; Jon-Paul Maria<sup>4</sup>; Nasim Alem<sup>4</sup>; John Heron<sup>5</sup>; <sup>1</sup>Virginia Tech; <sup>2</sup>James Madison University; <sup>3</sup>Illinois Tech; <sup>4</sup>Penn State; <sup>5</sup>University of Michigan

10:40 AM

**Novel Multi-Functional Low Temperature Fabricated Porous Si<sub>3</sub>N<sub>4</sub>-SiC Composites for High-Temperature Applications:** *Siddharth Siddharth*<sup>1</sup>; Prasanta Jana<sup>1</sup>; Siddhartha Roy<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

11:00 AM

**Microstructural Engineering of the Mechanical Behavior in (Co,Cu,Mg,Ni,Zn)O:** *Jacob Norman*<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of Connecticut

11:20 AM

**Phase Equilibria and Thermodynamic Modeling of CaO-SiO<sub>2</sub>-MgO-Al<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub> System:** *Mengjiao Jiao*<sup>1</sup>; Guishang Pei<sup>2</sup>; Zhuoyang Li<sup>1</sup>; Xuwei Lv<sup>1</sup>; <sup>1</sup>Chongqing University; <sup>2</sup>Seoul National University

11:40 AM

**Quasi High Entropy 3D Alumina Based Glasses: Sintering, Structural Relaxation, and Nano-Crystallization:** *Angshuman Gupta*<sup>1</sup>; Ashutosh Gandhi<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay Mumbai

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — Materials Discovery for Reducing Supply Chain Criticality

**Sponsored by:** TMS Functional Materials Division, TMS; Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

Monday AM | March 24, 2025  
363 | MGM Grand

**Session Chairs:** Eric Theisen, Energy & Environmental Research Center; Kinjal Gandha, Mp Materials

8:30 AM Invited

**Developing Domestic Supply Chains for Permanent Magnet Manufacturing:** *Kinjal Gandha*<sup>1</sup>; <sup>1</sup>MP Materials

9:00 AM Invited

**Discovering New Functional Magnetic Materials Through High-Throughput Methods:** *Heike Herper*<sup>1</sup>; Alena Vishina<sup>1</sup>; Rafael Vieira<sup>1</sup>; Madhura Marathe<sup>2</sup>; Olle Eriksson<sup>1</sup>; <sup>1</sup>Uppsala University; <sup>2</sup>KTH

9:30 AM

**Linking Quantum Mechanical Features to Structural Phase-Transformation in Inorganic Solids:** *Prashant Singh*<sup>1</sup>; Anis Biswas<sup>1</sup>; Yaroslav Mudryk<sup>1</sup>; <sup>1</sup>Ames National Laboratory

9:50 AM Break

10:10 AM Invited

**Influencing Phase Development in Ferromagnetic Materials: Theory versus Practice:** *Laura Lewis*<sup>1</sup>; <sup>1</sup>Northeastern University



10:40 AM

**Magnetic and Mechanical Hardening of Nano-Lamellar Magnets Using a Thermo-Magnetic Field:** *Liuliu Han*<sup>1</sup>; Ruth Schwaiger<sup>2</sup>; Kovács András<sup>2</sup>; Dierk Raabe<sup>1</sup>; Nicolas Peter<sup>2</sup>; Jin Wang<sup>2</sup>; Oliver Gutfleisch<sup>3</sup>; Fernando Maccari<sup>3</sup>; <sup>1</sup>Max Planck Institute For Iron Research; <sup>2</sup>Forschungszentrum Julich; <sup>3</sup>Technical University of Darmstadt

11:00 AM

**Fabrication of Alnico Permanent Magnets with Optimized Microstructures via Magnetic-Field-Assisted Direct Energy Deposition:** Anthony Duong<sup>1</sup>; Ian Smitch<sup>1</sup>; Maanav Patel<sup>1</sup>; Omar Bishop<sup>1</sup>; Kyle Snyder<sup>2</sup>; Everett Carpenter<sup>1</sup>; *Radhika Barua*<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University; <sup>2</sup>Commonwealth Center for Advanced Manufacturing

11:20 AM

**Powder Consolidation of Ce-Based Permanent Magnets:** *Alfred Amon*<sup>1</sup>; Eunjeong Kim<sup>1</sup>; Alexander Wilson-Heid<sup>1</sup>; Ashley Lee<sup>1</sup>; Joseph Boro<sup>1</sup>; Alexander Baker<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Materials Deposition by Cold Spray and Related Technologies — Process Development and Optimization I

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Materials Characterization Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Tanaji Paul, Florida International University; Yu Zou, University of Toronto; Maniya Aghasibeig, National Research Council Canada; Aaron Nardi, Vrc Metal Systems, LLC; Pin Lu, Solvus Global

Monday AM | March 24, 2025  
103 | MGM Grand

**Session Chairs:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Aaron Nardi, Vrc Metal Systems, LLC

8:30 AM Introductory Comments

8:35 AM Invited

**Cold Spray Materials Deposition Technology for Nuclear Energy Systems:** *Kumar Sridharan*<sup>1</sup>; Benjamin Maier<sup>2</sup>; Tyler Dabney<sup>1</sup>; Evan Willing<sup>1</sup>; Nicholas Pocquette<sup>2</sup>; Carson Lukas<sup>1</sup>; Noah Anderson<sup>1</sup>; Hwasung Yeom<sup>3</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Westinghouse Electric Company; <sup>3</sup>Pohang University of Science and Technology

9:05 AM

**Advances in Toolpath Planning for Cold Spray Additive:** *Christopher Roper*<sup>1</sup>; Michael Kracum<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

9:25 AM

**Developing Hydrophilic Teflon via Cold Spray:** *Bahareh Marzbanrad*<sup>1</sup>; Hamid Jahed<sup>1</sup>; <sup>1</sup>University of Waterloo

9:45 AM

**Investigation of Dynamic Contact and Adhesion Mechanism Between Zinc Cold Spray Particles and AZ91 Substrate Using SPH Method:** *Lei Li*<sup>1</sup>; Sridhar Niverty<sup>1</sup>; Tanvi Anil Ajantiwalay<sup>1</sup>; Rajib Kalsar<sup>1</sup>; Vineet Joshi<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

10:05 AM Break

10:25 AM

**Functionally Graded Al/SiC Composite Prepared by Cold Spray Deposition for Energy Absorption Applications:** *Amir Mansouri*<sup>1</sup>; Ahmad Nourian Avval<sup>1</sup>; Sinan Muftu<sup>1</sup>; <sup>1</sup>Northeastern University

10:45 AM

**Effect of Turbulence on Particle Dynamics of Cold Spray Systems:** *Bikash Mahato*<sup>1</sup>; Jay Yoder<sup>1</sup>; Gloyd Simmons<sup>1</sup>; Nathan Huft<sup>1</sup>; Isaac Nault<sup>2</sup>; Peter Lucon<sup>1</sup>; <sup>1</sup>Montana Technological University; <sup>2</sup>DEVCOM Army Research Laboratory ARD, Manufacturing Science and Technology Branch

11:05 AM Concluding Comments

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Alloy Development and Application I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Monday AM | March 24, 2025  
368 | MGM Grand

**Session Chairs:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory

8:30 AM Keynote

**Damage Tolerance in bcc vs. fcc High-Entropy Alloys:** *Robert Ritchie*<sup>1</sup>; Andrew Minor<sup>1</sup>; Mark Asta<sup>1</sup>; Punit Kumar<sup>1</sup>; David Cook<sup>1</sup>; Madelyn Payne<sup>1</sup>; Wenqing Wang<sup>1</sup>; Pedro Borges<sup>1</sup>; <sup>1</sup>University of California, Berkeley

9:00 AM Invited

**Computational Design of Cost-Effective High-Entropy Thermal/Environmental Barrier Coatings:** Shiqiang Hao<sup>1</sup>; Richard Oleksak<sup>1</sup>; Ömer Doğan<sup>1</sup>; *Michael Gao*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

9:20 AM Invited

**Intermetallic Alloys: Ductility, Structural Order, and High Entropy or Not:** *Joseph Poon*<sup>1</sup>; Jie Qi<sup>1</sup>; Diego Hoyos<sup>1</sup>; Xuesong Fan<sup>1</sup>; Nathan Grain<sup>1</sup>; Peter Connors<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; Michael Widom<sup>1</sup>; Peter Liaw<sup>1</sup>; Sean Agnew<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

9:40 AM Invited

**Design of High Performance Fe-Based Superalloys for Elevated Temperature Applications:** *C. Tasan*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

10:00 AM Break

10:20 AM Invited

**Deformation Induced Transformation in Metastability Engineered Alloys:** *Rajiv Mishra*<sup>1</sup>; <sup>1</sup>University of North Texas

10:40 AM Invited

**Material Design for Nuclear Applications, High Entropy Alloys in Extreme Environments:** *Peter Hosemann*<sup>1</sup>; Thomas Astecker<sup>1</sup>; Daryl Chrzan<sup>1</sup>; wen Chen<sup>1</sup>; Kavin Ram<sup>1</sup>; Joseph McKeown<sup>1</sup>; <sup>1</sup>University of California, Berkeley

11:00 AM

**Superior High-Temperature Strength in a Supersaturated Refractory High-Entropy Alloy:** Lia Amalia<sup>1</sup>; Rui Feng<sup>2</sup>; Bojun Feng<sup>3</sup>; Michael Gao<sup>2</sup>; Chuan Zhang<sup>4</sup>; Joerg Neuefeind<sup>5</sup>; Jonathan Poplawsky<sup>6</sup>; Yang Ren<sup>6</sup>; Ke An<sup>5</sup>; Michael Widom<sup>3</sup>; *Peter Liaw*<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>National Energy Technology Laboratory; <sup>3</sup>Carnegie Mellon University; <sup>4</sup>Computherm, LLC; <sup>5</sup>Oak Ridge National Laboratory; <sup>6</sup>Advanced Photon Source, Argonne National Laboratory

11:20 AM

**Strain-Rate and Temperature Effects on Deformation Behaviors in Body-Centered-Cubic (BCC) Phase Refractory High-Entropy Alloys (RHEAs):** Deva Neelakandan<sup>1</sup>; Dongyue Xie<sup>2</sup>; Juntan Li<sup>3</sup>; Chia-Yi Wu<sup>4</sup>; Aomin Huang<sup>5</sup>; Marc Meyers<sup>5</sup>; Haixuan Xu<sup>3</sup>; Peter Liaw<sup>3</sup>; Yi-Chia Chou<sup>4</sup>; Ke An<sup>6</sup>; George Gray III<sup>2</sup>; Nan Li<sup>2</sup>; Gian Song<sup>7</sup>; Saryu Fensin<sup>2</sup>; Chanhoo Lee<sup>1</sup>; <sup>1</sup>Auburn University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>The University of Tennessee, Knoxville; <sup>4</sup>National Yang Ming Chiao Tung University; <sup>5</sup>University of California, San Diego; <sup>6</sup>Oak Ridge National Laboratory; <sup>7</sup>Kongju National University

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VII — Advances in Surface Engineering: Session I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Ning Zhu, Baylor University

Monday AM | March 24, 2025  
107 | MGM Grand

**Session Chairs:** Bharat Jasthi, South Dakota School of Mines & Technology; Ning Zhu, Baylor University

8:30 AM Introductory Comments

8:35 AM

**Enhancing Corrosion Resistance in Multimaterial Joints for Automotive Lightweighting Applications:** Sridhar Niverty<sup>1</sup>; Rajib Kalsar<sup>1</sup>; Yucheng Fu<sup>1</sup>; Yucheng Fu<sup>1</sup>; Vilayanur Viswanathan<sup>1</sup>; Benjamin Schuessler<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

8:55 AM

**Enhancement of Fatigue Enhancing Fatigue Performance of Pre-Damaged High-Strength Steel Using Ultrasonic Surface Modification:** Md Shamsujjoha<sup>1</sup>; Shirley Ruano<sup>1</sup>; Michael Thurston<sup>1</sup>; <sup>1</sup>Rochester Institute of Technology

9:15 AM

**Microstructural Evolution and High Temperature Tribology of Wrought and Additively Manufactured Nickel-based Superalloy Subjected to Surface Enhancement Processes:** Ali Beheshti<sup>1</sup>; Manisha Tripathy<sup>2</sup>; Lloyd Hackel<sup>3</sup>; <sup>1</sup>George Mason University; <sup>2</sup>Bruker; <sup>3</sup>Curtiss Wright Surface Technology

9:35 AM

**High-Temperature Surface Nitridation of 316H Stainless Steel: Formation of Nanolayered Nitride- Metal Composites:** Kenneth Cooper<sup>1</sup>; William Simon II<sup>1</sup>; Kyle Williams<sup>1</sup>; Anthony Cecchini<sup>1</sup>; Trevor Parker<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

9:55 AM

**Diffusion-Induced Recrystallization Associated with Heterogeneous Elemental Distributions During Carburization of Ni-Cr-Fe Alloys:** Farahnaz Haftlang<sup>1</sup>; Mark B. Davis<sup>2</sup>; Deepak Kumar<sup>2</sup>; Robin Ziebarth<sup>2</sup>; Sandeep Dhingra<sup>2</sup>; Robert D. Morgan<sup>2</sup>; Peter W. Voorhees<sup>1</sup>; David N. Seidman<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Dow Chemical Company

10:15 AM Break

10:25 AM

**Unraveling Roughness Effects to Enable Indentation-Based Microstructure Prediction:** Mingwei Xu<sup>1</sup>; Cemal Tasan<sup>1</sup>; Michela Geri<sup>1</sup>; <sup>1</sup>MIT

10:45 AM

**Micro-Mechanical Study of Surface Finish Effects on the Sealing Capacity of Aluminum Gaskets:** You Na Lee<sup>1</sup>; Alex Wang<sup>1</sup>; Satoshi Nakazato<sup>2</sup>; Cemal Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Valqua, LTD.

11:05 AM

**Cold Spray and Peening Surface Treatment Technologies for Mitigating Corrosion and SCC in Stainless Steel Containments for Used Nuclear Fuel Storage:** Carson Lukas<sup>1</sup>; Evan Willing<sup>1</sup>; JP Lacy<sup>2</sup>; Nicholas Pocquette<sup>3</sup>; Kasturi Sasidhar<sup>1</sup>; Jonathon Tatman<sup>2</sup>; Hwasung Yeom<sup>4</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>EPRI; <sup>3</sup>Westinghouse; <sup>4</sup>Pohang University of Science and Technology (POSTECH)

11:25 AM

**Surface Finishing of AM Metallic Parts by Electrochemical Polishing:** Mary Louise Gucik<sup>1</sup>; Kasandra Escarcega Herrera<sup>1</sup>; Michael Melia<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

## LIGHT METALS

### Advances in Titanium Technology — Metastable Beta Titanium Alloys I

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

Monday AM | March 24, 2025  
108 | MGM Grand

**Session Chair:** Abhishek Sharma, University of North Texas

8:30 AM Invited

**Determination of the Influence of the Scale of Alpha Plates on the Mechanical Properties of Metastable Beta Titanium Alloys:** Brian Welk<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Yufeng Zheng<sup>2</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University of North Texas

9:00 AM

**Stabilising the Transformation Behaviour of Superelastic Metastable  $\beta$  Ti Alloys:** Nicole Church<sup>1</sup>; Nicholas Jones<sup>1</sup>; <sup>1</sup>University of Cambridge

9:20 AM

**Achieving High Yield Strength and Strain Hardening in a Strain Transformable Ti-Cr-Sn-Fe Based Beta-Ti Alloy:** Nachiket Keskar<sup>1</sup>; Yolaine Danard<sup>2</sup>; Srinivas Mantri<sup>3</sup>; Lola Liliensten<sup>2</sup>; Tirthesh Ingale<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Fan Sun<sup>2</sup>; Frederic Prima<sup>2</sup>; Raj Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>CHIMIE PARISTECH - PSL; <sup>3</sup>Argonne National Laboratory

9:40 AM

**Novel Deformation Behavior and Strain Accommodation Mechanism in a Selective Laser Melted Metastable  $\beta$ -Ti Alloy:** Sydney Fields<sup>1</sup>; Dian Li<sup>1</sup>; Deepak Pillai<sup>1</sup>; Yiliang Liao<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas

10:00 AM Break

10:20 AM Invited

**Microstructure and Mechanical Properties Evolution during the  $\beta$ -to- $\alpha$  and  $\beta$ -to- $\omega$  Transformations of Iron and Aluminum Modified Ti-11Cr(at.%):** Joann Ballor<sup>1</sup>; Jonathan Poplawsky<sup>2</sup>; Arun Devaraj<sup>3</sup>; Scott Misture<sup>4</sup>; *Carl Boehlert*<sup>1</sup>; <sup>1</sup>Michigan State University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Alfred University

10:50 AM

**Achieving High Strength Coupled with High Work Hardening and Uniform Tensile Elongation in Titanium Alloys via Additive Manufacturing:** *Tirthesh Ingale*<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Advika Chesetti<sup>1</sup>; Srinivas Aditya Mantri<sup>1</sup>; Junhui Tang<sup>2</sup>; Fan Sun<sup>2</sup>; Fred Prima<sup>2</sup>; Narendra Dahotre<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Chimie-ParisTech

11:10 AM

**The Evolution of Athermal  $\omega$ -Phase in Titanium Alloys Stabilized by Iron Additions:** *Paraic O'Kelly*<sup>1</sup>; Abhishek Sharma<sup>2</sup>; Maheswari Meesa<sup>2</sup>; Alexander Knowles<sup>3</sup>; Srinivasan Srivilliputhur<sup>2</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>University of North Texas; <sup>3</sup>University of Birmingham

11:30 AM

**Evolution of  $\omega$ -Phase in Metastable  $\beta$  Ti-V Alloys During Electric Current Treatment:** *Yijae Kim*<sup>1</sup>; Howook Choi<sup>1</sup>; Yanghoo Kim<sup>2</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Korea Institute of Industrial Technology

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Microstructure-Property Relationships

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

Monday AM | March 24, 2025  
320 | MGM Grand

**Session Chair:** Darren Pagan, Pennsylvania State University

8:30 AM

**GrainPaint - A Multi-Scale Diffusion-Based Generative Model for Microstructure Reconstruction of Large-Scale Objects:** *Nathan Hoffman*<sup>1</sup>; Cashen Diniz<sup>1</sup>; Dehao Liu<sup>2</sup>; Theron Rodgers<sup>3</sup>; Anh Tran<sup>3</sup>; <sup>1</sup>University of Maryland; <sup>2</sup>Binghamton University; <sup>3</sup>Sandia National Laboratories

8:50 AM

**A Machine Learning Approach to Optimize T5 Heat Treatment Conditions for Al-Si Alloys:** *Dongwon Shin*<sup>1</sup>; Tomas Grejtak<sup>1</sup>; Sun Yong Kwon<sup>1</sup>; James Haynes<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:10 AM

**Predicting Microstructure-Property Linkage in Alloys Using Graph Neural Network:** *Abigail Hogue*<sup>1</sup>; Benjamin Rhoads<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi

9:30 AM

**Representativeness of Experimentally Observed Microstructures for Validation and Uncertainty Propagation:** *Arulmurugan Senthilnathan*<sup>1</sup>; Pranav Karve<sup>1</sup>; Sankaran Mahadevan<sup>1</sup>; <sup>1</sup>Vanderbilt University

9:50 AM Break

10:10 AM

**A Generalizable, Accelerated, and Interpretable Artificial Intelligence Framework for Predicting Evolution of Materials Microstructure:** *Benjamin Rhoads*<sup>1</sup>; Abigail Hogue<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi

10:30 AM

**Sensitivity Analysis and Uncertainty Quantification in Process-Structure-Property of IN718:** *Hasan Al Jame*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

10:50 AM

**Bayesian Prediction and Optimization of Al-Ce-La-Nd-Mg-Ni Alloys' Mechanical Properties Post Heat Treatment:** *Jie Qi*<sup>1</sup>; Pablo Luna Falcon<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Advances in Phase-Field Simulations

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

Monday AM | March 24, 2025  
319 | MGM Grand

**Session Chairs:** Douglas Spearot, University of Florida; Remi Dingreville, Sandia National Laboratories

8:30 AM

**A Multiphase-Field Formulation of the Sharp Phase Field Method:** *Alphonse Finel*<sup>1</sup>; <sup>1</sup>Onera

8:50 AM

**AMMBER: The AI-Enabled Microstructure Model Builder:** *Alexander Mensah*<sup>1</sup>; W. Beck Andrews<sup>1</sup>; Shibo Tan<sup>1</sup>; Joshua Willwerth<sup>1</sup>; Wenhao Sun<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

9:10 AM

**Data Assimilation System Using Phase-Field Simulation for Polycrystalline Equiaxed Dendrite Growth:** *Shunsuke Kanki*<sup>1</sup>; Ayano Yamamura<sup>1</sup>; Shinji Sakane<sup>1</sup>; Hideyuki Yasuda<sup>2</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology; <sup>2</sup>Kyoto University

9:30 AM

**Surrogate Models for Accelerating CALPHAD-Informed Materials Simulations in MOOSE:** Parikshit Bajpai<sup>1</sup>; Daniel Schwen<sup>1</sup>; *Sourabh Bhagwan Kadambi*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

9:50 AM

**Phase Field Modeling of the Impact of the Sub-Grain Structure on the Kinetics of Recrystallization:** *Anter El-Azab*<sup>1</sup>; Shiwei Fu<sup>1</sup>; Sreekar Rayaprolu<sup>1</sup>; <sup>1</sup>Purdue University

10:10 AM Break

10:30 AM

**Crystallographic Orientation Dependence on Intragranular Void Evolution and Failure in Aluminum Alloy: A Case Study of Coupled Phase Field Damage and Crystal Plasticity Modeling:** *Aashique Rezwani<sup>1</sup>; Nicole Aragon<sup>1</sup>; Hojun Lim<sup>1</sup>; <sup>1</sup>Sandia National Laboratories*

10:50 AM

**Critical Cross Slip Stresses in Several FCC Metals Uncovered via Phase Field Dislocation Dynamics:** *Ian Wise<sup>1</sup>; Abigail Hunter<sup>2</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>Los Alamos National Laboratory*

11:10 AM

**High Fidelity Phase-Field Models of Zr Corrosion with Experimental Validation:** *Scott Monismith<sup>1</sup>; Sean Li<sup>2</sup>; Preet Singh<sup>2</sup>; Chaitanya Deo<sup>2</sup>; Remi Dingreville<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Georgia Institute of Technology*

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII – Advancements in Thermoelectric Materials and Device Engineering

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

Monday AM | March 24, 2025

355 | MGM Grand

**Session Chairs:** Franck Gascoin, CNRS Crismat Unicaen; Hsin-Jay Wu, National Taiwan University

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8:30 AM Invited

**Controlling Defects in Epitaxial Thin Film Growth of Mg<sub>2</sub>Sn<sub>1-x</sub>Gex for Thermoelectric Device Applications:** *Takeaki Sakurai<sup>1</sup>; Senados Magallon<sup>1</sup>; Takashi Aizawa<sup>2</sup>; Isao Ohkubo<sup>2</sup>; Akira Uedono<sup>1</sup>; Takao Mori<sup>2</sup>; <sup>1</sup>University of Tsukuba; <sup>2</sup>National Institute for Materials Science (NIMS)*

8:50 AM Invited

**Bismuth Telluride: Performant Se Free n-Type:** *Franck Gascoin<sup>1</sup>; Amélie Galodé<sup>1</sup>; Tristan Barbier<sup>2</sup>; Chloe Forget<sup>3</sup>; <sup>1</sup>CNRS Crismat Unicaen; <sup>2</sup>ENSICAEN; <sup>3</sup>UNICAEN*

9:10 AM

**Decoupling of Electrical and Thermal Transport in CoSb<sub>3</sub> Skutterudites by Compositing Effect:** *Krushna Raut<sup>1</sup>; Andrei Novitskii<sup>1</sup>; Cédric Bourguès<sup>1</sup>; Takao Mori<sup>1</sup>; <sup>1</sup>National Institute for Materials Science*

9:30 AM Invited

**Enhancing the Stability and Efficiency of Environmental-Friendly Phonon-Glass Electron-Crystal Thermoelectric Materials:** *Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Taiwan University*

9:50 AM Break

10:10 AM Invited

**Thermoelectric Power Generation Module Made of Emerging Materials:** *Michihiro Ohta<sup>1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology (AIST)*

10:30 AM Invited

**Phonon-Drag-Driven Thermopower Enhancement in Oxide Thin-Film Heterostructure:** *Takayoshi Katase<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology*

10:50 AM

**Tuning Conduction Behavior in Valence-Balanced Half-Heusler Alloys Through Synthesis Conditions:** *Illia Serhiienko<sup>1</sup>; Michael Parzer<sup>2</sup>; Fabian Garmroudi<sup>2</sup>; Ernst Bauer<sup>2</sup>; Takao Mori<sup>1</sup>; <sup>1</sup>NIMS; <sup>2</sup>TU Wien*

11:10 AM Invited

**Study of the Thermoelectric Properties of MnFe<sub>2</sub>O<sub>4</sub> Thin Films Prepared by Pulsed Laser Deposition:** *Paolo Mele<sup>1</sup>; Alberto Giribaldi<sup>2</sup>; Anoop Divakaran<sup>3</sup>; Giovanna Latronico<sup>4</sup>; Hannes Rijckaert<sup>5</sup>; Marco Antonio Lopez de la Torre<sup>6</sup>; Kazumasa Iida<sup>7</sup>; Tsunehiro Takeuchi<sup>3</sup>; Cristina Artini<sup>2</sup>; <sup>1</sup>Shibaura Institute of Technology; <sup>2</sup>University of Genoa; <sup>3</sup>Toyota Technological Institute; <sup>4</sup>CNR-ICMATE; <sup>5</sup>Ghent University; <sup>6</sup>University of Castilla La Mancha; <sup>7</sup>Nihon University*

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## MECHANICS OF MATERIALS

### Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas – Fundamentals

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

Monday AM | March 24, 2025

370 | MGM Grand

**Session Chairs:** Chelsey Hargather, Los Alamos National Laboratory; Diana Farkas, Virginia Polytechnic Institute

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8:30 AM Introductory Comments

8:40 AM Invited

**Simulation vs. Experiment: The Limits of Predictive Models for Microstructural Evolution:** *Elizabeth Holm<sup>1</sup>; Meizhong Lyu<sup>1</sup>; <sup>1</sup>University of Michigan*

9:10 AM

**Understanding the Fundamental Fracture Behavior in NbMoTaW and NbTaTiHf:** *Wenqing Wang<sup>1</sup>; Diana Farkas<sup>2</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Virginia Tech*

9:30 AM

**Development of an Analytical Surface Energy Model for Arbitrary (hkl) Surfaces in FCC and BCC Metals and Alloys:** *Axel Seoane<sup>1</sup>; Xian-Ming Bai<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University*

9:50 AM Break

10:10 AM Invited

**Multimodal Characterization to Uncover Complex Phase Evolution and Order in High Entropy Alloys:** *Mitra Taheri<sup>1</sup>; <sup>1</sup>University of California, Berkeley*

10:40 AM Invited

**Experimental Evidence and First-Principles Verification of the Deformation Behavior of Basal Twist Grain Boundaries in Ti:** *Biaobiao Yang<sup>1</sup>; Samuel Hémery<sup>2</sup>; Wei Shao<sup>1</sup>; Victoria A. Tucker<sup>3</sup>; Michael Titus<sup>3</sup>; Miguel A. Monclús<sup>4</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>Ecole Nationale Supérieure de Mécanique et d'Aérotechnique; <sup>3</sup>Purdue University; <sup>4</sup>IMDEA Materials Institute*



11:10 AM Invited

**Local Phase Transformation Strengthening in Ni-Base Superalloys:** Michael Mills<sup>1</sup>; Ashton Egan<sup>2</sup>; Andreas Bezold<sup>1</sup>; Longsheng Feng<sup>3</sup>; Timothy Smith<sup>3</sup>; Maryam Ghazisaeidi<sup>1</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg; <sup>3</sup>Lawrence Livermore Laboratory

11:40 AM

**High Strength and Deformable Intermetallics:** Ke Xu<sup>1</sup>; Anand Mathew<sup>2</sup>; Chao Shen<sup>1</sup>; Yifan Zhang<sup>1</sup>; Xuanyu Sheng<sup>1</sup>; Anyu Shang<sup>1</sup>; Haiyan Wang<sup>1</sup>; Yashashree Kulkarni<sup>2</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue; <sup>2</sup>University of Houston

## BIOMATERIALS

### Biological Materials Science — Mechanics of Hierarchical Materials I

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

Monday AM | March 24, 2025  
306 | MGM Grand

**Session Chairs:** Yuxiao Zhou, Texas A&M University; Steven Naleway, University of Utah

8:30 AM

**A Natural and Cultural Fabric from the Amazon Rainforest:** Henry Colorado<sup>1</sup>; Sheron Tavares<sup>2</sup>; Marc Meyers<sup>2</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>University of California San Diego

8:50 AM

**Deeply Hierarchical Ceramic Materials with Outstanding Structural and Thermal Properties Manufactured from Diatom Frustules:** Aidan Lucas<sup>1</sup>; Hannes Schniepp<sup>1</sup>; <sup>1</sup>William & Mary

9:10 AM Invited

**Octopus-Inspired Adhesives for Intelligent and Rapidly Switchable Underwater Adhesion:** Michael Bartlett<sup>1</sup>; Chanhong Lee<sup>1</sup>; <sup>1</sup>Virginia Tech

9:40 AM Invited

**Catheter-Directed Endovascular Drug Delivery:** Jingjie Hu<sup>1</sup>; <sup>1</sup>North Carolina State University

10:10 AM Break

10:30 AM

**The Effect of Metastasis on Mechanical Competence of Human Trabecular Bone:** Hanwen Fan<sup>1</sup>; Hutomo Tanato<sup>1</sup>; Yuxiao Zhou<sup>1</sup>; <sup>1</sup>Texas A&M University

10:50 AM

**Nanomechanical Characterization of the Hierarchical Structure in Developing Teeth:** Hutomo Tanato<sup>1</sup>; Hanwen Fan<sup>1</sup>; Yuxiao Zhou<sup>1</sup>; <sup>1</sup>Texas A&M University

11:10 AM

**Mucosa-Interfacing Capsule Robot for In Situ Sensing the Elasticity of Biological Tissues:** Xiaoguang Dong<sup>1</sup>; <sup>1</sup>Vanderbilt University

11:30 AM Invited

**Structure and Mechanics of Bone and the Impact of Aging and Cancer:** Rizhi Wang<sup>1</sup>; <sup>1</sup>University of British Columbia

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Bridging Length Scales Starting From First-Principles Calculations

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

Monday AM | March 24, 2025  
353 | MGM Grand

**Session Chair:** Liang Qi, University of Michigan

8:30 AM Invited

**Surrogate Models in First-Principles Statistical Mechanics Methods:** Anton Van der Ven<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

9:00 AM

**AI-Enabled Upscaling of Ab Initio Thermodynamics for 3C-SiC(100) Surface Reconstructions:** Salil Bavdekar<sup>1</sup>; Michael MacIsaac<sup>2</sup>; Douglas Spearot<sup>2</sup>; Ghatu Subhash<sup>2</sup>; Richard Hennig<sup>2</sup>; <sup>1</sup>Illinois State University; <sup>2</sup>University of Florida

9:20 AM Invited

**Efficient High-Throughput Ab Initio Prediction of Liquidus Curves:** Wenhao Sun<sup>1</sup>; <sup>1</sup>University of Michigan

9:50 AM

**Developing On-Demand, Highly Efficient Digital Twins with DFT Accuracy for Iterative Alloy Discovery Frameworks:** Doguhan Saritürk<sup>1</sup>; Guillermo Vazquez Tovar<sup>1</sup>; Daniel Saucedo<sup>1</sup>; Raymundo Arróyave<sup>1</sup>; <sup>1</sup>Texas A&M University

10:10 AM Break

10:30 AM Invited

**First-Principles Models of Solute-Defect Interactions in Alloys:** Anirudh Raju Natarajan<sup>1</sup>; <sup>1</sup>École Polytechnique Fédérale de Lausanne

11:00 AM

**Machine Learning for the Efficient Identification of High-Performance Metal-Doped Transition Metal Compounds for Hydrogen Evolution Catalysis:** Lu Xue<sup>1</sup>; Jie Dang<sup>1</sup>; <sup>1</sup>Chongqing University

MONDAY AM

ADVANCED CHARACTERIZATION METHODS

Characterization of Materials through High Resolution Coherent Imaging — Scientific Applications of Coherent Imaging I

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Xianghui Xiao, Brookhaven National Laboratory; Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institute; Mathew Cherukara, Argonne National Laboratory

Monday AM | March 24, 2025  
157 | MGM Grand

**Session Chair:** Ross Harder, Argonne National Laboratory

8:30 AM

**High-Resolution X-Ray Imaging of Integrated Circuits:** *Tomas Aidukas*<sup>1</sup>; Nicholas Phillips<sup>2</sup>; Ana Diaz<sup>1</sup>; Emiliya Poghosyan<sup>1</sup>; Elizabeth Muller<sup>1</sup>; A. F. J. Levi<sup>3</sup>; Gabriel Aeppli<sup>1</sup>; Manuel Guizar-Sicairos<sup>4</sup>; Mirko Holler<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>CSIRO; <sup>3</sup>University of Southern California; <sup>4</sup>EPFL

9:00 AM

**Three-Dimensional Hard X-Ray Ptychographic Reflectometry Imaging on Extended Mesoscopic Surface Structures:** *Peco Myint*<sup>1</sup>; Ashish Tripathi<sup>1</sup>; Jin Wang<sup>1</sup>; Miaoqi Chu<sup>1</sup>; Zhang Jiang<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

9:20 AM

**Simultaneous Reciprocal and Real Space X-Ray Imaging for Hierarchical Characterization of 3D Nano-Architected Metamaterials:** *Matias Kagias*<sup>1</sup>; Seola Lee<sup>2</sup>; Dula Parkinson<sup>3</sup>; Nicholas Phillips<sup>4</sup>; Julia Greer<sup>2</sup>; <sup>1</sup>Lund University; <sup>2</sup>California Institute of Technology; <sup>3</sup>Lawrence Berkeley National Laboratory; <sup>4</sup>Paul Scherrer Institute

9:40 AM

**Direct Reciprocal Space Detection of Microelectronic Defects Using Coherent X-Ray Diffraction and Unsupervised Machine Learning:** *Jack Griffiths*<sup>1</sup>; Yuan Gao<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory

10:00 AM Break

10:20 AM

**Real-Time Imaging of Subsurface Dislocation Dynamics:** *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University

10:50 AM

**Physics-Informed Self-Supervised Learning of Structural Morphology Imaged by Scanning X-Ray Diffraction Microscopy:** *Aileen Luo*<sup>1</sup>; Tao Zhou<sup>2</sup>; Ming Du<sup>2</sup>; Martin Holt<sup>2</sup>; Andrej Singer<sup>1</sup>; Mathew Cherukara<sup>2</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Argonne National Laboratory

11:10 AM

**Single-Shot X-Ray Imaging of Density in Laser Shocked Materials for Fusion Energy Studies:** *Daniel Hodge*<sup>1</sup>; Andrew Leong<sup>2</sup>; Silvia Pandolfi<sup>3</sup>; Kélin Kurzer-Ogul<sup>4</sup>; David Montgomery<sup>2</sup>; Paweł Kozłowski<sup>2</sup>; Bob Nagler<sup>5</sup>; Hae Ja Lee<sup>5</sup>; Eric Galtier<sup>5</sup>; Hussein Aluie<sup>4</sup>; Jessica Shang<sup>4</sup>; Cindy Bolme<sup>2</sup>; Kyle Ramos<sup>2</sup>; Arianna Gleason<sup>5</sup>; Richard Sandberg<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Sorbonne University; <sup>4</sup>University of Rochester; <sup>5</sup>SLAC National Accelerator Laboratory

11:30 AM

**Single-Exposure Elemental Differentiation and Texture-Sensitive Phase-Retrieval Imaging with a Neutron-Counting Microchannel-Plate Detector:** *Brian Abbey*<sup>1</sup>; Benedicta Arhatar<sup>2</sup>; David Paganin<sup>3</sup>; Henry Kirkwood<sup>4</sup>; Anton Tremsin<sup>5</sup>; Timur Gureyev<sup>6</sup>; Alexander Korsunsky<sup>7</sup>; Winfried Kockelmann<sup>8</sup>; Felix Hofmann<sup>7</sup>; Eric Huwald<sup>1</sup>; Shu-Yan Zhang<sup>9</sup>; Joe Kelleher<sup>8</sup>; <sup>1</sup>La Trobe University; <sup>2</sup>ANSTO; <sup>3</sup>Monash University; <sup>4</sup>European XFEL; <sup>5</sup>SSL, University of California, Berkeley; <sup>6</sup>The University of Melbourne; <sup>7</sup>University of Oxford; <sup>8</sup>STFC-Rutherford Appleton Laboratory; <sup>9</sup>Center of Excellence for Advanced Materials, Songshan Lake Industrial Park

ADVANCED CHARACTERIZATION METHODS

Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Advanced Characterization Methods I

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

Monday AM | March 24, 2025  
121 | MGM Grand

**Session Chairs:** Zhiwei Peng, Central South University; Sergio Monteiro, Instituto Militar de Engenharia

8:30 AM

**A New Technology Innovation for Material Thermal Conductivity Measurements: Thermo-Optical Plane Source (TOPS):** *Ron Fisher*<sup>1</sup>; *Jeffrey Braun*<sup>1</sup>; <sup>1</sup>Laser Thermal Analysis

8:50 AM

**Advancing In-Situ Characterization and Processing With Raman Spectroscopy in Self-Driving Labs - Proof of Concept With Chocolate as Frugal Twin:** *Kinston Acköfl*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

9:10 AM

**Characterizing Battery Materials with a New Mass Spectrometry Technique:** *Ellen Williams*<sup>1</sup>; Peyton Willis<sup>1</sup>; Jeff Williams<sup>1</sup>; Fergus Keenan<sup>2</sup>; <sup>1</sup>Exum Instruments; <sup>2</sup>Exum Instruments

9:30 AM

**Correlating Grain Boundary Character with Ionic Conductivity via EIS and 3D Diffraction Tomography:** *Christopher Nyborg*<sup>1</sup>; Oliver Johnson<sup>1</sup>; <sup>1</sup>Brigham Young University

9:50 AM

**Deep Learning Based Reconstruction From Sparse 2D Projection Datasets for In Situ Tensile Experiments:** *Nathan Johnson*<sup>1</sup>; Orion Kafka<sup>2</sup>; Hrishikesh Bale<sup>1</sup>; Steve Kelly<sup>1</sup>; Newell Moser<sup>2</sup>; Jake Benzing<sup>2</sup>; Jason Kilgore<sup>2</sup>; <sup>1</sup>Carl Zeiss Research Microscopy Solutions; <sup>2</sup>National Institute of Standards and Technology

10:10 AM Break

10:20 AM

**Developing In-Situ Diagnostics for Evaluation of Incipient Electrochemical Nucleation and Growth:** *Courtney Clark*<sup>1</sup>; Daniel Hooks<sup>2</sup>; Janelle Wharry<sup>1</sup>; David Bahr<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Los Alamos National Laboratory



10:40 AM

**Development of Axlebox Bearing Temperature Monitoring System to Ensure the Operation Safety of Railway Vehicle:** *Jeongguk Kim*<sup>1</sup>; <sup>1</sup>Korea Railroad Research Institute

11:00 AM

**Enabling Advances in Electron Backscatter Diffraction With Direct Electron Detectors (DED):** *Tianbi Zhang*<sup>1</sup>; *Thomas Britton*<sup>1</sup>; <sup>1</sup>University of British Columbia

11:20 AM

**Estimation of Elastic Constants in Low Symmetry Materials With In-Situ Neutron Diffraction:** *Nathan Peterson*<sup>1</sup>; *Daniel Savage*<sup>2</sup>; *Donald Brown*<sup>2</sup>; *Bjorn Clausen*<sup>2</sup>; *Aaron Stebner*<sup>3</sup>; *Elena Garlea*<sup>4</sup>; *Sean Agnew*<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Georgia Institute of Technology; <sup>4</sup>Y-12 National Security Complex

11:40 AM

**Implementing Transmission X-Ray Microscopy at X-Ray Free Electron Lasers for In-Situ Studies of Laser Powder Bed Fusion:** *Zane Taylor*<sup>1</sup>; *Tharun Reddy*<sup>1</sup>; *Lichao Fang*<sup>1</sup>; *Matthew Seaberg*<sup>1</sup>; *Matthieu Chollet*<sup>2</sup>; *Tim van Driel*<sup>2</sup>; *Philip Hart*<sup>2</sup>; *Franz-Josef Decker*<sup>2</sup>; *Frank Seiboth*<sup>3</sup>; *Patrick Oppermann*<sup>2</sup>; *Patrick Kramer*<sup>2</sup>; *Aliaksei Halavanau*<sup>2</sup>; *Matthew Dayton*<sup>2</sup>; *Christopher Tassone*<sup>2</sup>; *Adrian Lew*<sup>1</sup>; *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>SLAC; <sup>3</sup>DESY

12:00 PM

**Deployment and Testing of a Fiber-Based Instrument for In-Reactor Thermal Property Measurements at MIT Research Reactor:** *Zilong Hua*<sup>1</sup>; *Caleb Picklesimer*<sup>1</sup>; *Alex Pomo*<sup>1</sup>; *Robert Schley*<sup>1</sup>; *Colby Jensen*<sup>1</sup>; *Austin Fleming*<sup>1</sup>; *Weiyue Zhou*<sup>2</sup>; *Michael Short*<sup>2</sup>; *David Carpenter*<sup>2</sup>; *David Hurley*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>MIT

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Structure and Chemistry of Grain Boundary Phases

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

Monday AM | March 24, 2025  
304 | MGM Grand

**Session Chairs:** Flynn Walsh, Lawrence Livermore National Laboratory; Ian Winter, Sandia National Laboratories

8:30 AM Invited

**A Model of Thermodynamic Stabilization of Grain Boundaries:** *Omar Hussein*<sup>1</sup>; *Yuri Mishin*<sup>1</sup>; <sup>1</sup>George Mason University

9:00 AM Invited

**The Enumeration of Grain Boundary Microstates:** *Nikhil Chandra Admal*<sup>1</sup>; *Giacomo Po*<sup>2</sup>; *Enrique Martinez*<sup>3</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>University of Miami; <sup>3</sup>Clemson University

9:30 AM

**Exploring Trends of Computed Grain Boundary Properties Within the EAM Space:** *Yasir Mahmood*<sup>1</sup>; *Murray Daw*<sup>1</sup>; *Michael Chandross*<sup>2</sup>; *Fadi Abdeljawad*<sup>3</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>Lehigh University

9:50 AM Break

10:10 AM Invited

**Direct Atomic-Scale Observations of Grain Boundary Phase and Segregation Transitions:** *Christian Liebscher*<sup>1</sup>; <sup>1</sup>Ruhr University Bochum

10:40 AM Invited

**Grain Boundary Diffusion: Interplay of Segregation, Precipitation and Interface Structures:** *Sergii Divinsky*<sup>1</sup>; <sup>1</sup>University of Munster

11:10 AM

**Critical Point Ferroelectricity: Grain Boundary Complexion Transitions:** *Catherine Bishop*<sup>1</sup>; <sup>1</sup>University of Canterbury

11:30 AM

**Cyclical Restructuring of Emergent Grain Boundaries During Polycrystalline Thin Film Growth:** *Moneesh Upmanyu*<sup>1</sup>; *Hailong Wang*<sup>2</sup>; *Mengyuan Wang*<sup>2</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>University of Science and Technology

11:50 AM

**Disconnection Mobility and Grain Boundary Doping:** *Spencer Thomas*<sup>1</sup>; *Jason Trelewicz*<sup>1</sup>; <sup>1</sup>Stony Brook University

## MATERIALS SYNTHESIS AND PROCESSING

### Composite Materials: Sustainable and Eco-Friendly Material Development and Applications — Sustainable and Eco-Friendly Materials: Advanced Composites for High-Temperature and Structural Applications

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Yahya Al-Majali, Ohio University; Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)

Monday AM | March 24, 2025  
116 | MGM Grand

**Session Chair:** Natasha Smith, CONSOL Innovations

8:30 AM

**Achieving High Hardness in Metal-Ceramic Composites and Multilayers:** *Ramasis Goswami*<sup>1</sup>; *Alex Moser*<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

8:50 AM

**Double Spray Forming Machine for In-Situ Production of Layered Composites:** *Dmitri Louzguine*<sup>1</sup>; <sup>1</sup>WPI-AIMR, Tohoku University

9:10 AM

**Innovative Processing of Ni-Based Superalloy Composites Reinforced With Graphite:** *Manoel Kasalo*<sup>1</sup>; *Sebastian Suarez*<sup>2</sup>; *Andrea Bachmaier*<sup>1</sup>; <sup>1</sup>Erich-Schmid Institute of Materials Science, Austrian Academy of Sciences; <sup>2</sup>Saarland University

9:30 AM

**Systematic Study of the Effect of K<sub>2</sub>TiF<sub>6</sub> Flux Content on the Microstructure and Mechanical Properties of Al–B<sub>2</sub>C Composites:** *Chandan Kumar*<sup>1</sup>; *Sukanta Sarkar*<sup>1</sup>; *Indrani Sen*<sup>1</sup>; *Siddhartha Roy*<sup>1</sup>; <sup>1</sup>IIT Kharagpur

9:50 AM Break

10:10 AM

**The Effect of the TiC Particle Pushing-Engulfment Phenomenon on the Mechanical Properties of In-Situ Al-Based Cast Composites:** *Ewa Olejnik*<sup>1</sup>; *Pawe Kurtyka*<sup>2</sup>; *Agnieszka Czajka*<sup>1</sup>; *Robert Chulist*<sup>3</sup>; *Karol Janus*<sup>1</sup>; *Wojciech Maziarz*<sup>3</sup>; <sup>1</sup>AGH University of Krakow; <sup>2</sup>Innerco Sp. z o.o.; <sup>3</sup>Institute of Metallurgy and Materials Science, Polish Academy of Science

10:30 AM

**Metal Matrix Composites by Solid Stir Manufacturing Routes:** *Farhan Ishrak<sup>1</sup>; Aniruddha Malakar<sup>1</sup>; Md Jasim Uddin<sup>1</sup>; Pankaj Kulkarni<sup>1</sup>; Kumar Kandasamy<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University*

10:50 AM

**Mechanisms of Al Matrix Grains Refinement in the In-Situ Cast Al/TiC Metal Matrix Composite:** *Wojciech Maziarz<sup>1</sup>; Robert Chulist<sup>1</sup>; Anna Wójcik<sup>1</sup>; Akradiusz Szewczyk<sup>1</sup>; Nikodem Poręba<sup>1</sup>; Maciej Szlezynger<sup>1</sup>; Pawe Kurtyka<sup>2</sup>; Ewa Olejnik<sup>3</sup>; <sup>1</sup>Polish Academy of Sciences; <sup>2</sup>Innerco; <sup>3</sup>AGH University of Science and Technology*

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Grain Boundary Fundamentals

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Monday AM | March 24, 2025**  
**305 | MGM Grand**

**Session Chairs:** Timofey Frolov, Lawrence Livermore National Laboratory; Daniel Moore, Lehigh University

8:30 AM Invited

**Grain Boundary Segregation: From Quantum-Accurate Spectra to CALPHAD for Polycrystalline Materials:** *Christopher Schuh<sup>1</sup>; <sup>1</sup>Northwestern University*

9:10 AM Invited

**Computational Studies of Grain Boundary Segregation and Solute Drag in Multicomponent Alloys:** *Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University*

9:40 AM

**An Open-Source Tool for Automated, High-Throughput Grain Boundary Structure Prediction:** *Enze Chen<sup>1</sup>; Mark Asta<sup>2</sup>; Timofey Frolov<sup>3</sup>; <sup>1</sup>Stanford University; <sup>2</sup>University of California, Berkeley; <sup>3</sup>Lawrence Livermore National Laboratory*

10:00 AM Break

10:20 AM

**Migration of GB Phases in Tungsten:** *Daniel Moore<sup>1</sup>; Enze Chen<sup>2</sup>; Mark Asta<sup>3</sup>; Timofey Frolov<sup>4</sup>; Fadi Abdeljawad<sup>1</sup>; Rob Rudd<sup>4</sup>; <sup>1</sup>Lehigh University; <sup>2</sup>Stanford University; <sup>3</sup>University of California Berkeley; <sup>4</sup>Lawrence Livermore National Laboratory*

10:40 AM Invited

**Grain Boundary Phase Transformations in Segregated Metallic Alloys:** *Timofey Frolov<sup>1</sup>; Enze Chen<sup>2</sup>; Vivek Devulapalli<sup>3</sup>; Tobias Brink<sup>3</sup>; Christian Liebscher<sup>4</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Stanford University; <sup>3</sup>Max-Planck-Institut für Eisenforschung GmbH; <sup>4</sup>Ruhr University Bochum*

11:10 AM Invited

**Quantifying the Microscopic Degrees of Freedom of Grain Boundaries:** *Ian Winter<sup>1</sup>; Timofey Frolov<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Lawrence Livermore National Laboratory*

11:40 AM

**Three-Dimensional Interface Random Walk Method and Intrinsic Grain Boundary Shear Coupling Tensor:** *Xinyuan Song<sup>1</sup>; Chuang Deng<sup>1</sup>; <sup>1</sup>University of Manitoba*

## MATERIALS SYNTHESIS AND PROCESSING

### Electrical Steels — Electrical Steels: Alloy Design, Processing, and Properties

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Magnetic Materials Committee, TMS: Steels Committee

**Program Organizers:** Youliang He, CanmetMATERIALS, Natural Resources Canada; Kester Clarke, Los Alamos National Laboratory; Jun Cui, Iowa State University

**Monday AM | March 24, 2025**  
**104 | MGM Grand**

**Session Chairs:** Jun Cui, Iowa State University; Clodualdo Aranas, University of New Brunswick; Gaoyuan Ouyang, Ames Laboratory; Youliang He, CanmetMATERIALS, Natural Resources Canada

8:30 AM Invited

**Design of High Silicon Steel With Improved Physical Properties:** *Gaoyuan Ouyang<sup>1</sup>; Nakyoung Oh<sup>2</sup>; Ben Hilliard<sup>1</sup>; Iver Anderson<sup>2</sup>; Matthew Kramer<sup>1</sup>; Jun Cui<sup>2</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>Iowa State University*

9:00 AM

**Alloy Development and Process Optimisation for High Performance Processable Electrical Steels:** *Carl Slater<sup>1</sup>; <sup>1</sup>University of Warwick*

9:20 AM

**Uniform Distribution of the Magnetic Easy Axis on the Lamination Sheet Plane:** *Nam Hoon Goo<sup>1</sup>; <sup>1</sup>POSTECH*

9:40 AM

**Quasi-In-Situ EBSD Tracking of the Evolution of Microstructure and Microtexture During Hot Band Annealing of a 2.8 wt% Si Non-Oriented Electrical Steel:** *Youliang He<sup>1</sup>; Mehdi Mehdi<sup>1</sup>; <sup>1</sup>CanmetMATERIALS, Natural Resources Canada*

10:00 AM Break

10:20 AM

**Effects of Laser Treatment on the Magnetic Properties of FeSiB Amorphous Foil:** *Michael McKinstry<sup>1</sup>; Sameehan Joshi<sup>1</sup>; K.V. Mani Krishna<sup>1</sup>; Madhavan Radhakrishnan<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas*

10:40 AM Invited

**Crystallographic Texture of Electrical Steels After Hot Torsion Tests:** *Clodualdo Aranas<sup>1</sup>; Youliang He<sup>2</sup>; Samuel Rodrigues<sup>3</sup>; Jubert Pasco<sup>1</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>CanmetMATERIALS, Natural Resources Canada; <sup>3</sup>Federal Institute of Education, Science and Technology of Maranhão*

11:10 AM

**Thermophysical Properties of Ladle Slag With Different SiO<sub>2</sub> Content:** *Anton Yehorov<sup>1</sup>; Olena Volkova<sup>1</sup>; <sup>1</sup>Technical University Bergakademie Freiberg*

11:30 AM

**Subsurface Microstructure for Silicon Steel With Ultra-Low Iron Loss:** *So-Hyeon Lee<sup>1</sup>; Jiheon Jeon<sup>1</sup>; Seong hyeon Yoo<sup>2</sup>; Yongkeun Ahn<sup>2</sup>; Chun Ku Kang<sup>2</sup>; Ju-Young Kim<sup>1</sup>; <sup>1</sup>UNIST (Ulsan National Institute of Science and Technology); <sup>2</sup>Hyundai Steel R&D Center*

11:50 AM

**Improved Magnetic Properties of a Non-Oriented Electrical Steel Through Hot Dipping Process:** Gyanaranjan Mishra<sup>1</sup>; Youliang He<sup>2</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>CanmetMaterials, Natural Resources Canada

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Microstructural Analysis and Mechanical Properties

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**Monday AM | March 24, 2025**  
**360 | MGM Grand**

**Session Chairs:** Kazuhiro Nogita, University of Queensland; Yu-An Shen, Feng Chia University

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#### 8:30 AM Introductory Comments

8:35 AM

**Temperature and Strain Rate Dependence of Mechanical Properties in Sn-Bi Alloys:** Kazuhiro Nogita<sup>1</sup>; Xin Fu Tan<sup>1</sup>; Xiaozhou Ye<sup>2</sup>; Kazuhiro Yasuda<sup>2</sup>; Stuart McDonald<sup>1</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>Kyushu University

8:55 AM

**Influence of Minor Alloying Elements on the Properties of Sn-Bi Alloys:** Yu-Hsin Lin<sup>1</sup>; Fu-Ling Chang<sup>1</sup>; Pei-Kang Wu<sup>1</sup>; Meng-Chi Chuang<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

9:15 AM

**The Mechanisms for Enhancing Mechanical Properties Through Trace Element Addition in Sn-Bi Solder:** Meng-Chi Chuang<sup>1</sup>; Fu-Ling Chang<sup>1</sup>; Yu-Hsin Lin<sup>1</sup>; Pei-Kang Wu<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

9:35 AM

**Sn-Bi Solder Alloys With Sb and Ag Additions: Effect of Microstructure on Mechanical Properties:** Lijia Xie<sup>1</sup>; Hannah Fowler<sup>2</sup>; Sean Lai<sup>1</sup>; Ganesh Subbarayan<sup>1</sup>; John Blendell<sup>1</sup>; Carol Handwerker<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Sandia National Laboratories

9:55 AM

**Nanoindentation Study of Sn and Bi Phases in Sn-Bi Alloys:** Xin Tan<sup>1</sup>; Viola Paul<sup>2</sup>; Takahito Ohmura<sup>2</sup>; Kazuhiro Nogita<sup>1</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>National Institute for Materials Science (NIMS)

10:15 AM Break

10:35 AM

**Enhancement of Strength and Aging Resistance in Sn-9Zn Alloys With Minor Bi Addition:** Yu-An Shen<sup>1</sup>; Hao-Zhe Kao<sup>1</sup>; Chih-Ming Liang<sup>1</sup>; <sup>1</sup>Feng Chia University

10:55 AM

**Microstructures of Ag-In Transient Liquid Phase Bonding Using In-Coated Ag Sheet:** Xunda Liu<sup>1</sup>; Hiroaki Tatsumi<sup>1</sup>; Zhi Jin<sup>1</sup>; Hiroshi Nishikawa<sup>1</sup>; <sup>1</sup>Osaka University

11:15 AM

**A New Method for High Precision Work of Adhesion Measurements of Micron-Scale Copper Bonds:** Alex Wang<sup>1</sup>; Carl Thompson<sup>1</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

11:35 AM

**Indentation Rate Response to Enable Property Mapping in Multiphase Solders:** Jia-Huei Tien<sup>1</sup>; Lijia Xie<sup>1</sup>; John Blendell<sup>1</sup>; Carol Handwerker<sup>1</sup>; David Bahr<sup>1</sup>; <sup>1</sup>Purdue University

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## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Emulating Radiation Effects Using Heavy Ions and Protons

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**Monday AM | March 24, 2025**  
**162 | MGM Grand**

**Session Chair:** Janelle Wharry, University of Illinois

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#### 8:30 AM Introductory Comments

8:35 AM Keynote

**2025 Institute of Metals Lecture/Robert Franklin Mehl Award: Answering the Challenge to Rapid Qualification of Core Materials for Advanced Reactor Designs:** Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan

9:15 AM Invited

**Accelerating Nuclear Material Discovery: Integrating Machine Learning With In-Situ Ion Irradiation Experiments:** Kevin Field<sup>1</sup>; Hangyu Li<sup>2</sup>; Ian Steigerwald<sup>1</sup>; Ethan Poselli<sup>2</sup>; Robert Renfrow<sup>3</sup>; T.M. Kelsy Green<sup>4</sup>; Boopathy Kombaiiah<sup>5</sup>; Charles Hirst<sup>6</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Michigan Ann Arbor; <sup>3</sup>University of Michigan, Radiant Industries, Inc.; <sup>4</sup>University of Michigan, Antares Industries; <sup>5</sup>Idaho National Laboratory; <sup>6</sup>University of Michigan, University of Wisconsin-Madison

9:45 AM Invited

**Using Ion Irradiation as a Surrogate for Neutron Radiation: Credibility, Issues, and Mitigation:** Lin Shao<sup>1</sup>; Frank Garner<sup>1</sup>; <sup>1</sup>Texas A&M University

10:15 AM Break

10:30 AM

**Development of Techniques to Explore Materials in Coupled Extreme Environments at Tennessee Ion Beam Materials Laboratory:** Khalid Hattar<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

10:50 AM

**Hydrogen Transport During Proton Irradiation:** Richard Smith<sup>1</sup>; Bruce Kammenzind<sup>1</sup>; <sup>1</sup>Naval Nuclear Laboratory

11:10 AM

**Emulation of Microchemical Evolution at High Doses in Neutron Irradiated 800H Using Dual Ion Irradiation:** Xingyu Liu<sup>1</sup>; Antoine Waegaert<sup>1</sup>; Xing Wang<sup>1</sup>; Arthur Motta<sup>1</sup>; <sup>1</sup>Pennsylvania State University

MONDAY AM

## Energy Technologies and CO2 Management — Sustainable Production & Carbon Management

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Onuralp Yucel, Istanbul Technical University; Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Finland Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Alafara Baba, University of Ilorin; Tuan Nguyen, University of Queensland; Adam Powell, Worcester Polytechnic Institute; Thomas Battle, Duhan Zhang, Massachusetts Institute of Technology

**Monday AM | March 24, 2025**  
**364 | MGM Grand**

**Session Chairs:** Onuralp Yucel, Istanbul Technical University; Fiseha Tesfaye, Metso Finland Oy, Åbo Akademi University; Adam Powell, Worcester Polytechnic Institute

### 8:30 AM Introductory Comments

#### 8:40 AM Keynote

**EPD Distinguished Award Lecture: Energy-Intensive Metal Processing in the Age of Low-Cost Intermittent Renewables:** *Adam Powell*<sup>1</sup>; Isaak Olson<sup>1</sup>; Johanna Castillo<sup>1</sup>; Matvei Shreshtapalov<sup>1</sup>; Nathan Hastings<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### 9:20 AM

**Life Cycle Assessment for the Energy Technologies: Issues and Challenges for Conventional and Hydrogen Energy:** *Avash Kumar Saha*<sup>1</sup>; Nawshad Haque<sup>1</sup>; <sup>1</sup>Commonwealth Scientific and Industrial Research Organization

#### 9:40 AM

**Net Zero 2040: Navigating Economic and Environmental Challenges:** *Alexander Wimmer*<sup>1</sup>; <sup>1</sup>Constantia Teich

#### 10:00 AM Break

#### 10:20 AM

**Benchmarking Energy, Emissions, and Resource Sustainability in Semiconductor Manufacturing:** *Cassidy Holdeman*<sup>1</sup>; John Howarter<sup>1</sup>; <sup>1</sup>Purdue University

#### 10:40 AM

**Environmental Benefits of Reusing Automotive Parts:** *Hyunsoo Jin*<sup>1</sup>; Michael Cohen<sup>2</sup>; Brajendra Mishra<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Automotive Dismantlers and Recyclers Association

#### 11:00 AM

**Combined Evaluation of EAF Steel and Aluminum Smelting Wastes:** *Onuralp Yucel*<sup>1</sup>; Ahmet Turan<sup>2</sup>; Kağan Benzeşik<sup>3</sup>; Selçuk Kan<sup>1</sup>; Simay May<sup>1</sup>; Yusuf Kendir<sup>1</sup>; Kağan Kırılı<sup>1</sup>; Zeynep Çancı<sup>1</sup>; <sup>1</sup>Istanbul Technical University; <sup>2</sup>Yeditepe University

#### 11:20 AM Concluding Comments

## Environmental Degradation of Additively Manufactured Materials — Additive Manufacturing: Material Behavior in Extreme Temperature and Environmental Conditions

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Kinga Unocic, North Carolina State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Purdue University; Emma White, DECHEMA Forschungsinstitut; Benjamin Adam, Oregon State University; Mark Stoudt, National Institute of Standards and Technology; Xiaolei Guo, Colorado School of Mines

**Monday AM | March 24, 2025**  
**169 | MGM Grand**

**Session Chairs:** Kinga Unocic, North Carolina State University; Michael Kirka, Oak Ridge National Laboratory; Sebastien Dryepondt, Oak Ridge National Laboratory

### 8:30 AM Invited

**On the Irradiation-Assisted Stress Corrosion Cracking of 316L Stainless Steel Made by Laser Additive Manufacturing:** *Xiaoyuan Lou*<sup>1</sup>; Jingfan Yang<sup>2</sup>; Evan Mcdermott<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory

### 9:00 AM Invited

**The effect of Microstructure and Heat Treatment on the Oxidation Behavior of Additively Manufactured 316H Alloy:** Sebastien Dryepondt<sup>1</sup>; *Juho Lehmusto*<sup>2</sup>; Peeyush Nandwana<sup>1</sup>; Selda Nayir<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Abo Akademi University

### 9:30 AM

**High Temperature Oxidation of Ni-Based Superalloy 247 Processed by Electron Beam-Powder Bed Fusion Additive Manufacturing:** *Karthikeyan Hariharan*<sup>1</sup>; Oswaldo Luengas<sup>1</sup>; Christopher Zenk<sup>1</sup>; Sannakaisa Virtanen<sup>1</sup>; <sup>1</sup>Friedrich Alexander University, Erlangen-Nuremberg

### 9:50 AM Invited

**Accelerated Additive Manufacturing Synthesis, Testing, and Characterization of High-Temperature Alloys for High-Throughput Environmental Degradation Resistance:** *Adrien Couet*<sup>1</sup>; Dan Thoma<sup>1</sup>; Lianyi Chen<sup>1</sup>; Nathan Curtis<sup>1</sup>; Caleb Hatler<sup>1</sup>; Rohan Mishra<sup>2</sup>; Nick Crnkovich<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Washington University in St. Louis

### 10:20 AM Break

### 10:35 AM Invited

**High Temperature Oxidation of an ODS NiCr Additive Manufactured Alloy:** *Fernando Pedraza*<sup>1</sup>; A. Duval<sup>1</sup>; G. Bonnet<sup>1</sup>; <sup>1</sup>La Rochelle Université. LaSIE UMR 7356- CNRS

### 11:05 AM

**Metal Dusting of Additively Manufactured Ni-Cu Alloys:** Beyza Öztürk<sup>1</sup>; Emma White<sup>1</sup>; Clara Schlereth<sup>1</sup>; Till König<sup>1</sup>; Jan-Philipp Roth<sup>1</sup>; Anke Silvia Ulrich<sup>1</sup>; Katrin Jahns<sup>2</sup>; *Mathias Galetz*<sup>1</sup>; <sup>1</sup>DECHEMA-Forschungsinstitut; <sup>2</sup>University Osnabrück

### 11:25 AM

**Utilizing a Hot-Isostatic Pressing Controlling Pore Defect in Direct Energy Deposited CoCrNi Medium-Entropy Alloy and Its Mechanical Stability at Liquid Helium Temperature:** *Sang-Hun Shim*<sup>1</sup>; Seong-June Youn<sup>1</sup>; Ka Ram Lim<sup>1</sup>; Young-Kyun Kim<sup>1</sup>; Young-Sang Na<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science (KIMS)



11:45 AM

**Ablation Characterization of a Novel Additively Manufactured AlCeMo Alloy:** *Daniel Baker*<sup>1</sup>; Anthony Koumpias<sup>1</sup>; Kareem Ahmed<sup>2</sup>; Amberlee Haselhuhn<sup>1</sup>; <sup>1</sup>LIFT; <sup>2</sup>UCF

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmentally Assisted Cracking: Theory and Practice — Hydrogen Embrittlement

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Jenifer Locke, Ohio State University

Monday AM | March 24, 2025  
167 | MGM Grand

**Session Chairs:** C. Tasan, Massachusetts Institute of Technology; Xavier Feaugas, LaSIE, La Rochelle University, UMR CNRS 7356

8:30 AM Invited

**Surface and Microstructure Design Solutions in Titanium Alloys to Limit Hydrogen Embrittlement:** *C. Tasan*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

9:00 AM

**About the Implication of Grain Boundaries and Precipitates on the Hydrogen Embrittlement Mechanisms of Nickel Base Alloys:** *Abdelali Oudriss*<sup>1</sup>; Yasmine Ben Jedidia<sup>1</sup>; Siva Murugan<sup>1</sup>; Xavier Feaugas<sup>1</sup>; <sup>1</sup>Lasie Cnrs Umr 7356

9:20 AM

**Hydrogen Concentration Effects on Monotonic and Cyclic Plasticity of Pure Nickel:** *Mohammad Imroz Alam*<sup>1</sup>; Leonidas Zisis<sup>2</sup>; Joseph Ronevich<sup>3</sup>; Michael Sangid<sup>2</sup>; Zachary Harris<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Purdue University; <sup>3</sup>Sandia National Laboratories

9:40 AM

**Hydrogen Embrittlement Behavior of an Additive Friction Stir Deposition Processed aa7075 Aluminum Alloy:** *Ebenezer Acquah*<sup>1</sup>; Nilesh Kumar<sup>1</sup>; <sup>1</sup>The University of Alabama

10:00 AM Break

10:20 AM

**A Review About the Influence of Metallurgical States on Hydrogen Embrittlement Mechanisms in High-Strength Carbon Steels:** *Abdelali Oudriss*<sup>1</sup>; Xavier Feaugas<sup>2</sup>; <sup>1</sup>La Rochelle University, LaSIE CNRS UMR 7356; <sup>2</sup>LaSIE, La Rochelle University, UMR CNRS 7356

10:40 AM

**Sub-Stoichiometry and Vacancy Structures in Carbide Precipitates in Steels, and Implications to Hydrogen Embrittlement:** *Jun Song*<sup>1</sup>; Xiaohan Bie<sup>1</sup>; <sup>1</sup>McGill University

11:00 AM

**Some Like it Soft: Understanding the Role of Dislocation Density on Hydrogen Embrittlement of Pure Aluminum:** *Adam Freund*<sup>1</sup>; Josh Edwards<sup>1</sup>; Ruben Ochoa<sup>1</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines

11:20 AM Invited

**New Advances of the Impact of Hydrogen on the Plasticity of Nickel Alloys Based on Nano-Indentation Investigations:** Yasmine Ben Jedidia<sup>1</sup>; Siva Prasad Murugan<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; *Xavier Feaugas*<sup>1</sup>; <sup>1</sup>LaSIE, La Rochelle University, UMR CNRS 7356

## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Properties in Extreme Environments

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

Monday AM | March 24, 2025  
318 | MGM Grand

**Session Chair:** J.C. Stinville, University of Illinois Urbana-Champaign

8:30 AM

**High Cycle Fatigue Behavior of Haynes 282 Subjected to Accelerated Ageing:** *Amey Parnaik*<sup>1</sup>; Pavan A. H. V.<sup>2</sup>; Lakshmi Narayan Ramasubramanian<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi; <sup>2</sup>Bharat Heavy Electricals Limited

8:50 AM

**Effect of Sensitization on Corrosion and Fatigue Response of AA5086 Weld Joints:** *Rajneesh Jaisawal*<sup>1</sup>; Vidit Gaur<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

9:10 AM

**Crack Behaviour of Hydrogen Embrittled Stainless Steel Analysed Through Thermoelasticity:** *Pasquale Cavaliere*<sup>1</sup>; Francesco Panella<sup>1</sup>; Claudia Barile<sup>2</sup>; Paramasamy Kannan Vimalathithan<sup>2</sup>; <sup>1</sup>University of Salento; <sup>2</sup>Politecnico di Bari

9:30 AM

**Hydrogen and Metallurgical State Impact on Cyclic Creep of an Austenitic Stainless Steel:** *Xavier Feaugas*<sup>1</sup>; Gildas Gachot<sup>1</sup>; Hisao Matsunaga<sup>1</sup>; Sungacheol Park<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Gouenou Girardin<sup>1</sup>; Pierre Osmond<sup>1</sup>; Marion Risbet<sup>1</sup>; <sup>1</sup>Lasie Cnrs Umr73

9:50 AM

**Hydrogen Impact on Cyclic Behaviour of Pure Alpha Titanium Alloy:** Larissa Martins Moreira<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Aude Mathis<sup>2</sup>; Cyril Berziou<sup>1</sup>; Guillaume Lotte<sup>1</sup>; Jamaa Bouhattate<sup>1</sup>; Simon Frappart<sup>2</sup>; Stéphane Cohendoz<sup>1</sup>; Thierry Millot<sup>2</sup>; *Xavier Feaugas*<sup>1</sup>; <sup>1</sup>LaSIE, La Rochelle University, UMR CNRS 7356; <sup>2</sup>Naval Group

10:10 AM Break

10:30 AM

**How Can the Non-Metallic Inclusions Distribution Lead to an Anisotropy in the Fatigue Life Durability of Forged  $\gamma/\gamma$  Ni-Based Disks Alloys?** *Adèle Govaere*<sup>1</sup>; Moubine Al Kotob<sup>1</sup>; Xavier Baudequin<sup>1</sup>; Romain Lambert<sup>1</sup>; Caitline Lasne<sup>1</sup>; Alexia Wu<sup>1</sup>; Azdine Nait-Ali<sup>2</sup>; Cormier Jonathan<sup>2</sup>; Malo Prié<sup>2</sup>; <sup>1</sup>Safran Aircraft Engines; <sup>2</sup>Prime Institute

10:50 AM

**In-Situ Fatigue Cracking at Room and Elevated Temperatures of a Dual-Phase High Entropy Alloy:** *Yuanbo Tang*<sup>1</sup>; Qinan Han<sup>1</sup>; <sup>1</sup>University of Birmingham

11:10 AM

**Isothermal and Thermomechanical Fatigue of Additively Manufactured Nickel-Based Superalloy IN939:** *Ivo Kubena*<sup>1</sup>; Markéta Gálíková<sup>1</sup>; Ivo Šulák<sup>1</sup>; <sup>1</sup>Institute of Physics of Materials

#### ADVANCED CHARACTERIZATION METHODS

### Heterostructured and Gradient Materials (HGM VII): Principle, Processing and Properties — Fundamentals

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoung Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

**Monday AM | March 24, 2025**  
**155 | MGM Grand**

**Session Chairs:** Dmytro Orlov, Lund University; Liming Xiong, North Carolina State University/Iowa State University; Tomotsugu Shimokawa, Kanazawa University

#### 8:30 AM Invited

**Origins of High Strength and Dislocation Density in a Gradient Microstructure Revealed by a Simple Function:** *Darcy Hughes*<sup>1</sup>; <sup>1</sup>Sandia National Labs (ret.)

#### 8:55 AM

**Some Misconceptions on Heterostructured Materials:** *Yuntian Zhu*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

#### 9:15 AM Invited

**Harmonic-Structure Material Design: What is Truly Special to Deliver Unique Properties?:** *Dmytro Orlov*<sup>1</sup>; Yan Beygelzimer<sup>2</sup>; <sup>1</sup>Lund University; <sup>2</sup>Donetsk Institute for Physics and Engineering, NASU

#### 9:40 AM Invited

**An Atomistic-to-Mesoscale Computational Analysis of the Internal Stress and Its Role in Controlling the Deformation Mechanisms of Gradient Structured Metallic Materials:** *Liming Xiong*<sup>1</sup>; Thanh Phan<sup>1</sup>; <sup>1</sup>North Carolina State University/Iowa State University

#### 10:05 AM Break

#### 10:25 AM Invited

**Influence of Gradient Direction on the Mechanical Properties of Gradient Ni:** *Yi Li*<sup>1</sup>; <sup>1</sup>Shenyang National Laboratory For Materials Science

#### 10:50 AM Invited

**Mechanism for Both High Strength and High Ductility in Hetero-Structured Materials: Insight From Atomic Simulations:** *Tomotsugu Shimokawa*<sup>1</sup>; <sup>1</sup>Kanazawa University

#### 11:15 AM

**Gradient Structure Guided Optimal Deformation and Stress Partition in Engineering Steels:** *Yujie Wei*<sup>1</sup>; <sup>1</sup>LNM Institute of Mechanics CAS

#### 11:35 AM

**Internal Length Gradient / ILG Material Mechanics – An Update:** *Elias Aifantis*<sup>1</sup>; <sup>1</sup>Aristotle University of Thessaloniki and Michigan Technological University

#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Properties and Performance

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

**Monday AM | March 24, 2025**  
**302 | MGM Grand**

**Session Chairs:** Adriana Eres-Castellanos, Colorado School of Mines; Benjamin Adam, Oregon State University

#### 8:30 AM Invited

**Engineering Yield Strength by Tailoring the Nano-Precipitation Sequence in Novel Mn-Stabilized Austenitic Steel:** *Colin Stewart*<sup>1</sup>; Edwin Antillon<sup>1</sup>; Keith Knipling<sup>1</sup>; Patrick Callahan<sup>1</sup>; David Rowenhorst<sup>1</sup>; Paul Lambert<sup>2</sup>; <sup>1</sup>US Naval Research Laboratory; <sup>2</sup>Johns Hopkins Applied Physics Laboratory

#### 9:00 AM

**Fatigue Design Curve and Creep-Fatigue Interaction for Alloy 709 at 816 °C:** *Xuesong Fan*<sup>1</sup>; Brad Hall<sup>1</sup>; Yanli Wang<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 9:20 AM

**Tribological Performance of Lightweight Steel Alloys in Rolling-Sliding Contact:** *Wenbo Wang*<sup>1</sup>; Chanaka Kumara<sup>1</sup>; David Pienta<sup>1</sup>; Harry Meyer<sup>1</sup>; Dean Pierce<sup>1</sup>; Jun Qu<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 9:40 AM

**Influence of Chemical Composition on the Fracture Behavior of Advanced High Strength Steels:** *Nhu Ngo*<sup>1</sup>; Bryan Webler<sup>1</sup>; Petrus Pistorius<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 10:00 AM Break

#### 10:20 AM

**Influence of Low Temperature Treatments on Mechanical Behavior of a Press Hardened 22MnB5 Steel Grade:** *Eliseo Hernandez*<sup>2</sup>; Jun Hu<sup>1</sup>; Grant Thomas<sup>1</sup>; <sup>1</sup>Cleveland-Cliffs Inc.

#### 11:00 AM

**New Insight of Hole Expansion Ratio in Advanced High Strength Steels:** *Seungho Lee*<sup>1</sup>; Heung Nam Han<sup>1</sup>; Woojin Cho<sup>1</sup>; Deunbom Chung<sup>1</sup>; Jewoong Lee<sup>2</sup>; Sung-Il Kim<sup>2</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>POSCO Technical Research Lab

#### 10:40 AM

**Assessing the Variability in Mechanical Properties of a Martensitic Ultra-High Strength Steel for Performance Optimizations:** *Joydeep Kundu*<sup>1</sup>; Caelan Kennedy<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Steel Founders' Society of America

#### 11:20 AM

**Nanoindentation and Machine Learning, it's all About the Features!:** *Claus Trost*<sup>1</sup>; Stanislav Žák<sup>1</sup>; Megan Cordill<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science



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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution — Phase Field Modeling and Strain Effects on Phase Transformations

**Sponsored by:** TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Yunzhi Wang, Ohio State University; Wei Xiong, University of Pittsburgh; Jiamian Hu, University of Wisconsin Madison; Chuan Zhang, CompuTherm LLC

**Monday AM | March 24, 2025**  
**357 | MGM Grand**

**Session Chairs:** Yunzhi Wang, Ohio State University; Alain Karma, Northeastern University

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**8:30 AM Introductory Comments**

**8:40 AM Keynote**

**William Hume-Rothery Award Lecture: Thermodynamic Basis for the Phase-Field Method of Microstructure Stability and Evolution:** *Long Qing Chen*<sup>1</sup>; <sup>1</sup>The Pennsylvania State University

**9:10 AM Invited**

**Phase-Field Modeling of Far-From-Equilibrium Solidification Microstructures:** *Alain Karma*<sup>1</sup>; Kaihua Ji<sup>2</sup>; Mingwang Zhong<sup>1</sup>; Amy Clarke<sup>3</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>LLNL; <sup>3</sup>LANL and CSM

**9:35 AM Invited**

**Connecting the Atomic Scale to Phase Field Models:** *Anton Van der Ven*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**10:00 AM Break**

**10:20 AM Invited**

**Strain-Induced Phase Separation and Mesocrystal Formation in Refractory HEAs:** *Shalini Koneru*<sup>1</sup>; Jongjie Hu<sup>2</sup>; Jian-Feng Nie<sup>3</sup>; Hamish Fraser<sup>1</sup>; *Yunzhi Wang*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Drexel University; <sup>3</sup>Monash University

**10:45 AM Invited**

**An Integrated Simulation and Experimental Framework for Investigating Deformation Mechanisms in Alloys:** *John Allison*<sup>1</sup>; <sup>1</sup>University of Michigan

**11:10 AM Invited**

**Thermodynamics of Strain Phase Equilibria and Phase Diagrams:** *Bo Wang*<sup>1</sup>; Long-Qing Chen<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Penn State University

**11:35 AM Invited**

**First-Principles Calculations of the Mg-Al Phase Diagram Under Hydrostatic Pressure:** *Sha Liu*<sup>1</sup>; Wei Shao<sup>2</sup>; Zhijie Wang<sup>1</sup>; Jun Hu<sup>3</sup>; *Javier Llorca*<sup>2</sup>; <sup>1</sup>Yanshan University; <sup>2</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>3</sup>Northeastern University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments — Computational Tools and Materials Informatics

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Energy Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Composite Materials Committee

**Program Organizers:** Paolo Mele, Shibaura Institute of Technology; Julio Gutierrez Moreno, Barcelona Supercomputing Center; Hussein Assadi, RIKEN (The Institute of Physical and Chemical Research); Esmail Doustkhah, Istinye University; Marco Fronzi, The University of Sydney; Donna Guillen, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Tuan Nguyen, University of Queensland

**Monday AM | March 24, 2025**  
**358 | MGM Grand**

**Session Chairs:** Marco Fronzi, The University of Sydney; Prashun Gorai, Rensselaer Polytechnic Institute

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**8:30 AM Introductory Comments**

**8:35 AM Keynote**

**Coordination Engineering in Nanomaterials Design for Energy Applications:** *Ting Liao*<sup>1</sup>; <sup>1</sup>Queensland University of Technology

**9:15 AM Invited**

**A Journey From Atoms to Materials: Designing Functional Materials for Energy and Microelectronics:** *Prashun Gorai*<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute

**9:40 AM Invited**

**Standards for Meaningful Evaluations of Machine Learning Interatomic Potentials Software:** *Rika Kobayashi*<sup>1</sup>; Emily Kahl<sup>2</sup>; Roger Amos<sup>3</sup>; <sup>1</sup>Australian National University; <sup>2</sup>Pawsey Supercomputing Research Centre; <sup>3</sup>UNSW Canberra

**10:05 AM Break**

**10:25 AM**

**Beyond the Linear Scaling Relation: Novel Strategies:** *Kihyun Shin*<sup>1</sup>; <sup>1</sup>Hanbat National University

**10:45 AM**

**Development of Kinetic Lattice Monte Carlo Model to Study Ionic Diffusion at Misfit Dislocations in Oxide Heterostructures:** *William Ebmeyer*<sup>1</sup>; Peter Hatton<sup>2</sup>; Blas Uberuaga<sup>2</sup>; *Pratik Dholabhai*<sup>1</sup>; <sup>1</sup>Rochester Institute of Technology; <sup>2</sup>Los Alamos National Laboratory

## MATERIALS SYNTHESIS AND PROCESSING

### Innovative Hydrometallurgical Technologies for Environmentally Benign Processing and Remediation: An EPD Symposium Honoring Fiona Doyle — Honorary Session I

**Sponsored by:** TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

**Program Organizers:** Christina Meskers, SINTEF; Michael Free, University of Utah; Kerstin Forsberg, KTH Royal Institute of Technology; Gisele Azimi, University of Toronto; Hani Henein, University of Alberta

**Monday AM | March 24, 2025**  
**101 | MGM Grand**

**Session Chair:** Kerstin Forsberg, KTH Royal Institute of Technology

**8:30 AM Invited**

**Innovative Environmentally Benign Ion Separations Using Electrical and Centrifugal Forces Rather Than Chemicals:** *Michael Free*<sup>1</sup>; <sup>1</sup>University of Utah

**8:50 AM Invited**

**Innovative Environmentally Benign Hydrometallurgical Rare Earth Elements Separations Using a Magnetic Force Rather Than Chemical Reactions:** *Michael Free*<sup>1</sup>; <sup>1</sup>University of Utah

**9:10 AM Invited**

**Advanced Absorber Materials for Sustainable Extraction of Critical Metals: Innovations and Applications:** *Prashant Sarswat*<sup>1</sup>; <sup>1</sup>University of Utah

**9:30 AM Invited**

**Hydro/Biohydrometallurgical Innovations for Copper Extraction from Primary Copper Sulfides:** *Jaeheon Lee*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**9:50 AM Invited**

**Sustainable Hydrometallurgical Processes for Hazardous Element Control and Li-Ion Cathode Material Synthesis and Recycling:** *George Demopoulos*<sup>1</sup>; <sup>1</sup>McGill University

**10:10 AM Break**

**10:30 AM**

**Extraction of Lithium From Brine by Electrodialysis:** *Amilton Botelho Junior*<sup>1</sup>; Kristen Abels<sup>1</sup>; William Tarpeh<sup>1</sup>; <sup>1</sup>Stanford University

**10:50 AM**

**Hydrometallurgical Treatment of Nickel Saprolite Ores Using the Atlas Materials Process for Sustainable Critical Material Supply:** *David Dreisinger*<sup>1</sup>; <sup>1</sup>University of British Columbia

**11:10 AM**

**Total Recycling of Valuable Constituents in Black Mass of Spent Lithium-Ion Batteries (LIBs) via Environmentally Friendly Methods:** Kurniawan Kurniawan<sup>1</sup>; Sookyung Kim<sup>2</sup>; Mooki Bae<sup>2</sup>; Hyunju Lee<sup>2</sup>; *Jae-chun Lee*<sup>2</sup>; <sup>1</sup>Korea University of Science and Technology; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources (KIGAM)

**11:30 AM**

**Supported Liquid Membranes for Separation of Critical Raw Metals:** *Amilton Botelho Junior*<sup>1</sup>; Guilherme Dalvi<sup>2</sup>; Vinicius Cavalcante<sup>2</sup>; Ana Carolina Miyashita<sup>2</sup>; Jorge Tenório<sup>2</sup>; Denise Espinosa<sup>2</sup>; <sup>1</sup>Stanford University; <sup>2</sup>University of São Paulo

**11:50 AM Concluding Comments**

## LIGHT METALS

### Magnesium Technology 2025 — Computational Methods

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Monday AM | March 24, 2025**  
**115 | MGM Grand**

**Session Chairs:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies

**8:30 AM Presentation of Magnesium Technology Awards and Introductory Comments**

**8:45 AM**

**Bob Brown -A Great Friend to Worldwide Magnesium Production Industry & Insights for Magnesium Metal Producers:** *Neale Neelameggham*<sup>1</sup>; Randy Beals<sup>2</sup>; Onuralp Yucel<sup>3</sup>; <sup>1</sup>IND LLC; <sup>2</sup>Magna Inc; <sup>3</sup>Istanbul Technical University

**9:05 AM Keynote**

**Computational Modelling of Mg Alloy Biodegradation and Bone Growth:** *Berit Zeller-Plumhoff*<sup>1</sup>; Tamadur AlBaraghteh<sup>1</sup>; Domenik Priebe<sup>1</sup>; Nik Pohl<sup>1</sup>; Sascha Trostorf<sup>2</sup>; Ralf Köhl<sup>2</sup>; Regine Willumeit-Römer<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon; <sup>2</sup>Kiel University

**9:45 AM**

**Recapturing and Reusing Published Mg Alloy Texture Data:** Benjamin Begley<sup>1</sup>; *Victoria Miller*<sup>1</sup>; <sup>1</sup>University of Florida

**10:05 AM Break**

**10:25 AM**

**Crystal Plasticity Analysis of Extension Twin Activity in Mg-7Y Alloy Using PRISMS-Plasticity Framework:** *Chaitali Patil*<sup>1</sup>; Qianying Shi<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan

**10:45 AM Invited**

**Experimental and Computational Studies of Recrystallization in the Mg-Zn-Ca Alloy System:** *Tracy Berman*<sup>1</sup>; Supriyo Chakraborty<sup>1</sup>; David Montiel<sup>1</sup>; Chaitali Patil<sup>1</sup>; Michael Pilipchuk<sup>1</sup>; Abdulhamit Sarac<sup>1</sup>; Qianying Shi<sup>1</sup>; Ashley Bucsek<sup>1</sup>; Elizabeth Holm<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan

**11:15 AM**

**The Role of Geometry in Mg Implant Design:** *Norbert Hort*<sup>1</sup>; Björn Wiese<sup>1</sup>; Petra Maier<sup>2</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon; <sup>2</sup>University of Applied Sciences Stralsund

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions — Aging and Compatibility of Metals I

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bishnu Khanal, Sandia National Laboratories; Michael Melia, Sandia National Laboratories; Coby Davis, Sandia National Laboratories; Kerri Blobaum, Lawrence Livermore National Laboratory; Anthony Van Buuren, Lawrence Livermore National Laboratory; Nan Butler, Sandia National Laboratories

**Monday AM | March 24, 2025**  
**309 | MGM Grand**

**Session Chair:** Michael Melia, Sandia National Laboratories

#### 8:30 AM Invited

**Modeling Corrosion: Efficient Models and Validation for Long Term Degradation:** *Ryan Katona<sup>1</sup>; David Montes de Oca Zapain<sup>1</sup>; Matthew Roop<sup>1</sup>; Aditya Venkatraman<sup>1</sup>; Philip Noell<sup>1</sup>; Rebecca Schaller<sup>1</sup>;* <sup>1</sup>Sandia National Laboratories

#### 9:10 AM

**Accelerated Aging of Aluminum Alloys for Long-Term Predictions of Corrosion Under Atmospheric Conditions of Temperature and Relative Humidity:** *David Chen<sup>1</sup>; Steven Buchsbaum<sup>1</sup>; Warren York<sup>1</sup>; Tian Li<sup>1</sup>; Sarah Matt<sup>1</sup>; Savanna Richardson<sup>2</sup>; Benjamin Pham<sup>1</sup>; Susan Carroll<sup>1</sup>; Siping Qiu<sup>1</sup>;* <sup>1</sup>Lawrence Livermore National Lab; <sup>2</sup>University of Oregon

#### 9:30 AM

**Characterization of Localized Oxidation in Tantalum and Cracking Susceptibility at High Temperatures Using Auger Electron Spectroscopy:** *Mila Nhu Lam<sup>1</sup>;* <sup>1</sup>Sandia National Labs

#### 9:50 AM Break

#### 10:10 AM Invited

**Bimodal Microstructure Modeling due to Non-Isothermal Loading in Ni-Based Single-Crystal Superalloys via Phase-Field Method:** *Emily Dunn<sup>1</sup>; Jose Dominic<sup>2</sup>; Jean-Briac le Graverend<sup>2</sup>;* <sup>1</sup>Duke University; <sup>2</sup>Texas A&M University

#### 10:50 AM

**High-Throughput Creep Characterization for Use in Accelerated Aging Prediction:** *Samuel Inman<sup>1</sup>; Kevin Garber<sup>1</sup>; Andrew Slezak<sup>1</sup>; Brad Boyce<sup>1</sup>;* <sup>1</sup>Sandia National Labs

#### 11:10 AM

**Environmentally Assisted Corrosion Testing of 7xxx Series Aluminum to Create an SCC Susceptibility Profile for Temperature, Humidity, and Stress Through Accelerated Testing:** *Paul Paradise<sup>1</sup>; Zachary Harris<sup>2</sup>; Steven Buchbaum<sup>1</sup>; David Chen<sup>1</sup>; Sylvie Aubry<sup>1</sup>; Greg Nyce<sup>1</sup>; Roger Qiu<sup>1</sup>;* <sup>1</sup>Lawrence Livermore National Lab; <sup>2</sup>University of Pittsburgh

#### 11:30 AM

**Accelerating Computational Calculations of Galvanic Corrosion Using Machine Learning:** *David Montes De Oca Zapain<sup>1</sup>;* Aditya Venkatraman<sup>1</sup>; Matthew Roop<sup>1</sup>; Demetri Maestas<sup>1</sup>; Michael Melia<sup>1</sup>; Philip Noell<sup>1</sup>; Ryan Katona<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Experimental Investigations of Metals/Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Monday AM | March 24, 2025**  
**165 | MGM Grand**

**Session Chair:** Yu-Chen Karen Chen-Wiegart, Stony Brook University/ Brookhaven National Lab.

#### 8:30 AM Introductory Comments

#### 8:35 AM Invited

**In-Situ Synchrotron X-Ray Absorption Spectroscopy of Ni-20Cr and High-Entropy Alloys Molten Salt Corrosion:** *Adrien Couet<sup>1</sup>; Kailee Buttice<sup>1</sup>; Jagadeesh Sure<sup>1</sup>; Changkyu Kim<sup>1</sup>; Shea McCarthy<sup>1</sup>; Karen Chen-Wiegart<sup>2</sup>; Bobby Lane<sup>3</sup>; Bruce Ravel<sup>4</sup>;* <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Stony Brook University; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>Brookhaven National Laboratory

#### 9:00 AM

**Development of Molten Salt Corrosion Resistant Material:** *Rongjie Song<sup>1</sup>; Xinchang Zhang<sup>1</sup>; Qiufeng Yang<sup>1</sup>; Jia-Hong Ke<sup>1</sup>; Jingfan Yang<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; Michael McMurtrey<sup>1</sup>;* <sup>1</sup>Idaho National Laboratory

#### 9:20 AM Invited

**Corrosion and Microstructural Dynamics in Nuclear Reactor Alloys Exposed to Fluoride Molten Salts: Insights From 4D-STEM Analysis:** *Andrew Minor<sup>1</sup>; Sean Mills<sup>1</sup>; Dongye Liu<sup>1</sup>; Yang Yang<sup>2</sup>;* <sup>1</sup>University of California Berkeley; <sup>2</sup>Penn State University

#### 9:45 AM

**Corrosion and Deposition in Flowing Molten Salt Experiments:** *Stephen Raiman<sup>1</sup>;* <sup>1</sup>University of Michigan

#### 10:05 AM Break

#### 10:25 AM

**Microstructural Stability, Hardness Change, and Helium Behavior of Dual Ion-Irradiated Ni-Base Alloys for Molten Salt Reactor Applications:** *Ryan Thier<sup>1</sup>; Jaimie Tiley<sup>2</sup>; Bruce Pint<sup>2</sup>; Ryan Gordon<sup>3</sup>; Kumar Sridharan<sup>3</sup>; Steven Zinkle<sup>1</sup>;* <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Wisconsin, Madison

#### 10:45 AM Invited

**Molten Salt Corrosion of Additively Manufactured Stainless Steels:** *Lingfeng He<sup>1</sup>;* <sup>1</sup>North Carolina State University

#### 11:10 AM

**Interaction Between Irradiation-Induced Heterogeneity and Corrosion Dealloying in Ni20Cr (wt.%) Alloy:** *Sean Mills<sup>1</sup>; Ho Lun Chan<sup>2</sup>; Matthew Chancey<sup>3</sup>; Benjamin Derby<sup>3</sup>; Elena Romanovskaia<sup>2</sup>; Nathan Bieberdorf<sup>1</sup>; Harjot Singh<sup>2</sup>; Valentin Romanovski<sup>2</sup>; Mark Asta<sup>1</sup>; Yongqiang Wang<sup>3</sup>; Peter Hosemann<sup>1</sup>; John Scully<sup>2</sup>; Andrew Minor<sup>1</sup>;* <sup>1</sup>University of California, Berkeley; <sup>2</sup>University of Virginia; <sup>3</sup>Los Alamos National Laboratory

11:30 AM

**In-Situ Corrosion Monitoring of Alloy-625 in the Flowing Molten Salt Using Natural Convection Microloop by Radioactive Isotope Tracking:** Jagadeesh Sure<sup>1</sup>; Aeli Olson<sup>1</sup>; Cole Evered<sup>1</sup>; Ivan Mitchell<sup>2</sup>; Yafei Wang<sup>1</sup>; Cody Falconer<sup>2</sup>; Jonathan Engle<sup>1</sup>; *Adrien Couet*<sup>1</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>TerraPower, LLC

## NUCLEAR MATERIALS

### Materials Corrosion Behavior in Advanced Nuclear Reactor Environments II — Corrosion in Liquid Metal Coolants

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison

Monday AM | March 24, 2025  
164 | MGM Grand

**Session Chairs:** Xin Pang, Canmetmaterials; Osman Anderoglu, University of New Mexico

8:30 AM

**Influence of Proton Irradiation on Corrosion in Liquid Lead:** *Weiyue Zhou*<sup>1</sup>; Wande Cairang<sup>1</sup>; Paola Amadeo<sup>1</sup>; Kevin Woller<sup>1</sup>; Michael Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

8:50 AM

**In-Situ Characterization of Heavy Liquid Metal Eutectic During Corrosion Using Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-ICPMS):** *Nicole Virgili*<sup>1</sup>; <sup>1</sup>University of Rome Tor Vergata

9:10 AM

**Thermomechanical, Lead Corrosion and Thermal Stability Assessment of Innovative Alumina Forming Austenitic Alloys for LFRs:** *Enrico Virgillito*<sup>1</sup>; Daniele De Caro<sup>1</sup>; Antonino Meli<sup>1</sup>; Davide Loiacono<sup>1</sup>; Francisco Ferrè<sup>1</sup>; <sup>1</sup>newcleo

9:30 AM

**Effects of Sodium Exposure on Tensile Properties of Advanced Reactor Materials:** *Yiren Chen*<sup>1</sup>; Zuotao Zeng<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; Meimei Li<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

9:50 AM

**Microstructural Evolution in 316L Stainless Steel Under Lead-Bismuth Eutectic Corrosion:** *Zhiyu Zhang*<sup>1</sup>; Sarah Wang<sup>2</sup>; Peter Hosemann<sup>2</sup>; Yang Yang<sup>1</sup>; Andrew Minor<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of California at Berkeley

## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — In Situ and Small Scale Mechanical Testing

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

Monday AM | March 24, 2025  
160 | MGM Grand

**Session Chairs:** Eda Aydogan, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida

8:30 AM Invited

**Failure Behavior of Nuclear Composite Materials Revealed Through In-Situ Testing:** *Tianyi Chen*<sup>1</sup>; Spencer Doran<sup>1</sup>; Pierre-Alexandre Juan<sup>2</sup>; Brandon Haugh<sup>2</sup>; David Frazer<sup>3</sup>; George Jacobsen<sup>3</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Kairos Power; <sup>3</sup>General Atomics

9:00 AM

**Bridging Microscale to Macroscale Mechanical Property Measurements and Predication of FeCrAl Alloys Under Extreme Reactor Applications:** *Jian Wang*<sup>1</sup>; Xinghang Zhang<sup>2</sup>; Lin Shao<sup>3</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>Purdue University; <sup>3</sup>Texas A&M University

9:20 AM

**Deformation Behavior of Irradiated Metallic Materials Using In-Situ Mechanical Test With SEM-EBSD:** *Soyoung Kang*<sup>1</sup>; Maxim Gussev<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:40 AM

**Effect of Processing on the Nanomechanical Properties of 14YWT ODS Steels:** *Kevin Jacob*<sup>1</sup>; Sid Pathak<sup>1</sup>; Jordan Tiarks<sup>2</sup>; Nicolas Argibay<sup>2</sup>; Iver Anderson<sup>2</sup>; Hyosim Kim<sup>3</sup>; Stuart Maloy<sup>4</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Ames National Laboratory; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pacific Northwest National Lab

10:00 AM Break

10:20 AM

**Microstructure Evolution in Alloy 709 Following Proton Irradiation:** *Abhishek Kc*<sup>1</sup>; Caleb Massey<sup>2</sup>; Khalid Hattar<sup>3</sup>; Eric Lang<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>Oak Ridge National Lab; <sup>3</sup>University of Tennessee Knoxville

10:40 AM

**Recent Innovation in Scanning Electron Microscope (SEM) In-Situ Extreme Mechanical Testing in Nuclear Environments:** *Nicholas Randall*<sup>1</sup>; Renato Pero<sup>1</sup>; <sup>1</sup>Alemnis

11:00 AM

**Machine Learning-Based Correlation of Tensile Properties for Sub-Sized and Standard-Sized Specimens of SS316:** Longze Li<sup>1</sup>; John Merickel<sup>2</sup>; Yalei Tang<sup>2</sup>; *Rongjie Song*<sup>2</sup>; Joshua Rittenhouse<sup>2</sup>; Aleksandar Vakanski<sup>1</sup>; Fei Xu<sup>2</sup>; <sup>1</sup>University of Idaho; <sup>2</sup>Idaho National Laboratory



## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Interfacial Characterization and Structure/ Property Relationships

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

**Monday AM | March 24, 2025**  
**369 | MGM Grand**

**Session Chairs:** André Clausner, Fraunhofer IKTS; Stanislav Zak, Austrian Academy of Sciences

**8:30 AM**

**Influence of Local Melting on the Strength of 316L/7075 Dissimilar Metal Bonding Interface in Ultrasonic Spot Welding:** *Jheyu Lin<sup>1</sup>; Hsiang-Yu Chiu<sup>1</sup>; <sup>1</sup>National Taipei University of Technology*

**8:50 AM**

**An Improved Technique for Accurate Mechanical Characterization of Free-Standing Films and Its Applications:** *Gang Feng<sup>1</sup>; Henna Khosla<sup>1</sup>; Bo Li<sup>1</sup>; <sup>1</sup>Villanova University*

**9:10 AM**

**Quantifying Superlubricity of Heterostrained Bilayer Graphene From the Mobility of Interface Dislocations:** *Md Tusher Ahmed<sup>1</sup>; Harley T Johnson<sup>1</sup>; Nikhil Chandra Admal<sup>1</sup>; Moon-ki Choi<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign*

**9:30 AM Invited**

**Interface Mechanics of Metallic Nanomultilayers:** *Vladyslav Turlo<sup>1</sup>; <sup>1</sup>Empa*

**10:00 AM Break**

**10:20 AM**

**In Situ Nanoindentation of a Soft Three Phase Eutectic Exhibiting Non-Uniform Pile-Up:** *Forrest Wissuchek<sup>1</sup>; Didem Kaplan<sup>2</sup>; Aye Ecem Yürük<sup>2</sup>; Melis erefolu<sup>2</sup>; Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Marmara University*

**10:40 AM**

**Superelastic Dissipation of Energy in Monazite Ceramics From Twin Boundary Interfaces:** *Henry Afful<sup>1</sup>; Corinne Packard<sup>1</sup>; <sup>1</sup>Colorado School of Mines*

**11:00 AM Invited**

**Mechanical Behavior of Epitaxial Thin Film Exfoliation:** *Corinne Packard<sup>1</sup>; Anna Braun<sup>2</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>SRI International*

## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — High Temperatures

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

**Monday AM | March 24, 2025**  
**366 | MGM Grand**

**Session Chair:** Robert Wheeler, Microtesting Solutions LLC

**8:30 AM Invited**

**Contribution of Slip, Twinning and De-Twinning to the Mechanical Deformation of Haynes 244® Alloy at 23°C and 650°C:** *Biabiao Yang<sup>1</sup>; Miguel A. Monclús<sup>2</sup>; Victoria Ann Tucker<sup>3</sup>; Michael Titus<sup>3</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>IMDEA Materials Institute; <sup>3</sup>Purdue University*

**9:00 AM**

**Advancing High-Temperature Image Analysis and Physical Property Measurements With Ultra-Violet Imaging:** *Syed Idrees Afzal Jalali<sup>1</sup>; Michael Patullo<sup>1</sup>; Sharon Park<sup>1</sup>; Carolina Frey<sup>2</sup>; Leah Mills<sup>3</sup>; Kaitlyn Mullin<sup>3</sup>; Colin Goodman<sup>1</sup>; Mark Foster<sup>3</sup>; Tresa Pollock<sup>3</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California, Santa Barbara; <sup>3</sup>University of California, Santa Barbara*

**9:20 AM**

**Billion-Cycle Fatigue Endurance Enabled via Grain Boundary Stabilization:** *Manish Jain<sup>1</sup>; Daniel Vizoso<sup>1</sup>; Alejandro Hinojos<sup>1</sup>; Alejandro Barrios<sup>2</sup>; Kyle Dorman<sup>1</sup>; Yichen Yang<sup>3</sup>; David Adams<sup>1</sup>; Douglas Medlin<sup>1</sup>; Olivier Pierron<sup>3</sup>; Remi Dingreville<sup>1</sup>; Brad Boyce<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Colorado School of Mines; <sup>3</sup>Georgia Institute of Technology*

**9:40 AM**

**High Temperature Profilometry-Based Indentation Plastometry (HT-PIP) – Influence of Creep on Experimental Outcomes:** *James Miller<sup>1</sup>; Philip McKeown<sup>1</sup>; Chizhou Fang<sup>1</sup>; Bill Clyne<sup>1</sup>; <sup>1</sup>Plastometrex*

**10:00 AM**

**Hydrogen Assisted Vacancy Production and Its Effects on Creep in Structural Steels:** *Yash Pachaury<sup>1</sup>; Aaron Kohnert<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Lab*

**10:20 AM Break**

**10:40 AM**

**In Situ Digital Imaging Correlation Analysis of Ultrasonic Effects on Dynamic and Static Strain Aging:** *Xun Liu<sup>1</sup>; <sup>1</sup>The Ohio State University*

**11:00 AM**

**Influence of Unimodal and Bimodal  $\gamma'$  Precipitate Size Distributions on the Deformation Mechanisms in ATI 718Plus:** *Geeta Kumari<sup>1</sup>; M. Sundararaman<sup>2</sup>; Carl Boehlert<sup>3</sup>; Chanchal Ghosh<sup>4</sup>; Mythili R<sup>4</sup>; Arup Dasgupta<sup>4</sup>; Jonathan Powlawsky<sup>5</sup>; S. Sankaran<sup>2</sup>; <sup>1</sup>Michigan State University; <sup>2</sup>Indian Institute of Technology, Madras; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Indian Institute of Technology, Madras; <sup>5</sup>Michigan State University; <sup>6</sup>Indira Gandhi Centre for Atomic Research; <sup>7</sup>Oak Ridge National Laboratory*

11:20 AM

**Kindling of Burning Particles to Metallic Substrates in High-Pressure Oxygen:** *Spencer Taylor*<sup>1</sup>; Suhas Eswarappa Prameela<sup>2</sup>; Zachary Cordero<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Utah

11:40 AM

**Stochastic Direct Modeling of Mechanical and Thermal Properties of Polycrystals:** *Matthew Beck*<sup>1</sup>; <sup>1</sup>University of Kentucky

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## BIOMATERIALS

### Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues — Mineralized Tissues

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Bernd Gludovatz, UNSW Sydney; Elizabeth Zimmermann, McGill University; Steven Naleway, University of Utah; Sunita Ho, University of California, San Francisco

Monday AM | March 24, 2025  
308 | MGM Grand

**Session Chair:** Sunita Ho, University of California, San Francisco

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8:30 AM Introductory Comments

8:35 AM Keynote

**Advances in Bone Research – 60 Years of Progress:** *David Burr*<sup>1</sup>; <sup>1</sup>Indiana University School of Medicine

9:20 AM

**Multi-Scale Adaptation of Bone in Health and Disease:** *Elizabeth Zimmermann*<sup>1</sup>; <sup>1</sup>McGill University

9:40 AM

**Insights to Enhance Toughness of Human Bone Through Nanoscale Deformation and Fracture Analysis:** *John Howarter*<sup>1</sup>; Thomas Siegmund<sup>1</sup>; Elizabeth Montagnino<sup>1</sup>; Glynn Galloway<sup>1</sup>; <sup>1</sup>Purdue University

10:00 AM Break

10:20 AM Invited

**Multi-Scale Fracture Resistance of Young Brittle Bones Treated With Bisphosphonates:** *Alessandra Carriero*<sup>1</sup>; <sup>1</sup>The City College of New York

10:50 AM Invited

**Impact of Type 2 Diabetes on the Lacunar Canalicular Network in Cortical Bone: A Connectomic Analysis:** *Claire Acevedo*<sup>1</sup>; <sup>1</sup>University of California San Diego

11:20 AM

**Exploring the Effects of Disease on Teeth: Mouse Models of Type 1 and Type 2 Diabetes:** *Katherine Tang*<sup>1</sup>; Sophie Ceteznik<sup>1</sup>; May Kim<sup>1</sup>; Karin Bornfeldt<sup>1</sup>; Jenny Kanter<sup>1</sup>; Hai Zhang<sup>1</sup>; Dwayne Arola<sup>1</sup>; <sup>1</sup>University of Washington

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## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Ceramic & Functional Materials I

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusioneering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

Monday AM | March 24, 2025  
158 | MGM Grand

**Session Chairs:** Taishi Sugiyama, Kyoto Fusioneering; Kun Wang, Alfred University

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8:30 AM Keynote

**Transmutations in Advanced Nuclear Ceramics Exposed to Fusion Environments:** *James Wade-Zhu*<sup>1</sup>; Alex Leide<sup>1</sup>; Hazel Gardner<sup>1</sup>; Max Rigby-Bell<sup>1</sup>; Max Emmanuel<sup>1</sup>; Douglas Andrews<sup>1</sup>; <sup>1</sup>UK Atomic Energy Authority

9:00 AM Invited

**Functional Coating Development for Fusion Reactors:** *Takumi Chikada*<sup>1</sup>; <sup>1</sup>Shizuoka University

9:30 AM

**Tungsten Boride Shielding Material for Fusion Reactors:** *David Jarvis*<sup>1</sup>; Rosanna van den Blik-Jarvis<sup>1</sup>; Rosie Mellor<sup>1</sup>; Max Rigby-Bell<sup>2</sup>; <sup>1</sup>VSCA; <sup>2</sup>UKAEA

9:50 AM

**Micromechanical Investigation of WC for Shielding Applications in Compact Fusion Devices:** *Max Chester Jude Emmanuel*<sup>1</sup>; Max Rigby-Bell<sup>1</sup>; James Wade-Zhu<sup>1</sup>; <sup>1</sup>UK Atomic Energy Authority

10:10 AM Break

10:30 AM Invited

**Current R&Ds on Advanced Breeding Functional Materials for JA DEMO Activities:** *Jae-Hwan Kim*<sup>1</sup>; Taehyun Hwang<sup>1</sup>; Yutaka Sugimoto<sup>1</sup>; Suguru Nakano<sup>1</sup>; Hiroyasu Tanigawa<sup>1</sup>; <sup>1</sup>National Institutes for Quantum Science and Technology

11:00 AM

**Processing and Irradiation Damage in Novel Tritium Breeding Ceramics with High Lithium Content:** *David Armstrong*<sup>1</sup>; <sup>1</sup>University of Oxford

11:20 AM

**Innovative Lithium-Based Tritium Breeder Material with Promising Microstructure:** *Saurabh Sharma*<sup>1</sup>; Chase Taylor<sup>2</sup>; Dong Zhao<sup>1</sup>; Kevin Yan<sup>1</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>Idaho National Laboratory

11:40 AM

**Phase Field Fracture Modeling to Investigate the Integrity of Lithium Aluminate Pellets Used for Tritium Breeding:** *Kranthi Balusu*<sup>1</sup>; Andrew Casella<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab



## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Oxide Fuels I: Fundamental Behaviors of Fission Products and Defects

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

Monday AM | March 24, 2025  
159 | MGM Grand

**Session Chairs:** Michael Tonks, University of Florida; Pierre-Clement Simon, Idaho National Laboratory

#### 8:30 AM Invited

**Fission Gas Behavior Modeling at High Burnup in UO<sub>2</sub>:** *Pierre-Clement Simon*<sup>1</sup>; Larry Aagesen<sup>1</sup>; David Andersson<sup>2</sup>; Sudipta Biswas<sup>1</sup>; Nathan Capps<sup>3</sup>; Michael Cooper<sup>2</sup>; Stephen Novascone<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

#### 9:00 AM

**Recent Transient Fission Gas Results from High Burnup UO<sub>2</sub> Under Severe Accident Conditions:** *Jason Harp*<sup>1</sup>; Yong Yan<sup>1</sup>; Peter Doyle<sup>1</sup>; Matthew Jones<sup>1</sup>; Nathan Capps<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 9:20 AM

**Irradiation-Induced Formation of High- and Low-Angle Grain Boundaries, Microcracking, and Fission Gas Release:** *Charles Lieou*<sup>1</sup>; Nathan Capps<sup>2</sup>; Pierre-Clement Simon<sup>3</sup>; Michael Cooper<sup>4</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Los Alamos National Laboratory

#### 9:40 AM

**Phase-Field Modeling of Fission Fragment Track Effects on Nucleation and Re-Solution of Fission Gas Bubbles in UO<sub>2</sub>:** *Albert Lin*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison

#### 10:00 AM Break

#### 10:20 AM

**Oxygen Potential and Uranium Diffusion in UO<sub>2+x</sub>: Density Functional Theory Calculations Including Spin-Orbit Coupling Effect and Dispersion Interactions:** *William Neilson*<sup>1</sup>; Jason Rizk<sup>1</sup>; Michael Cooper<sup>1</sup>; David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 10:40 AM

**Pipe Diffusion Along Edge Dislocation in UO<sub>2</sub> and UN Nuclear Fuels:** *Romain Perriot*<sup>1</sup>; Conor Galvin<sup>1</sup>; Anton Schneider<sup>1</sup>; Michael Cooper<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 11:00 AM

**Faulted Loop Formation by Rapid 1D Migration of Interstitial Clusters in ThO<sub>2</sub>: Insights from Molecular Dynamics Simulations:** *Lin-Chieh Yu*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

#### 11:20 AM

**Cluster Dynamics Modeling of Interstitial Loop Evolution and Unfailing Process in Proton-Irradiated Single Crystal ThO<sub>2</sub>:** *Md Minaruzzaman*<sup>1</sup>; Marat Khafizov<sup>1</sup>; Anshul Kamboj<sup>2</sup>; Kaustubh Bawane<sup>2</sup>; Miaomiao Jin<sup>3</sup>; Lin Shao<sup>4</sup>; Lingfeng He<sup>5</sup>; David Hurley<sup>2</sup>; Boopathy Kombaiiah<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Penn State University; <sup>4</sup>Texas A&M University; <sup>5</sup>North Carolina State University

#### 11:40 AM

**Effect of FIB Damage on the Defect Evolution in Ceramic Fuels Under In-Situ TEM Annealing:** *Anshul Kamboj*<sup>1</sup>; Kaustubh Bawane<sup>1</sup>; J. Matthew Mann<sup>2</sup>; Marat Khafizov<sup>3</sup>; David H. Hurley<sup>1</sup>; Boopathy Kombaiiah<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>Ohio State University

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments III — Radiation Environment I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

Monday AM | March 24, 2025  
166 | MGM Grand

**Session Chair:** Youxing Chen, University of North Carolina Charlotte

#### 8:30 AM Invited

**Global Self-Organization Induced by Ion Irradiation in Alloy Nanocrystalline Films:** *Pascal Bellon*<sup>1</sup>; Sourav Das<sup>1</sup>; Amit Verma<sup>1</sup>; Yen-Ting Chang<sup>1</sup>; Gabriel Bouobda Moladje<sup>1</sup>; Nicholas Saunders<sup>1</sup>; Marie-Agathe Charnagne<sup>1</sup>; Robert Averback<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

#### 8:55 AM Invited

**Enthalpy as a Driver of Irradiation-Induced Amorphization and Crystallization in Nanostructured Materials:** *Janelle Wharry*<sup>1</sup>; Soumita Mondal<sup>1</sup>; Md. Ali Muntaha<sup>1</sup>; Nicole Keninger<sup>1</sup>; Sooyeon Hwang<sup>2</sup>; Arya Chatterjee<sup>1</sup>; Tristan Olsen<sup>3</sup>; Cyrus Koroni<sup>3</sup>; Sarah Pooley<sup>3</sup>; Hui (Claire) Xiong<sup>3</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Boise State University

#### 9:20 AM

**Competition Between Radiation-Induced Segregation and Grain Growth in Dilute Nanocrystalline Ni-Zr:** *Yen Ting Chang*<sup>1</sup>; Pascal Bellon<sup>1</sup>; Robert Averback<sup>1</sup>; Marie Charnagne<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign

#### 9:40 AM Invited

**Nanostructure Development of Localized Helium Implanted Materials and Property Implications:** *Peter Hosemann*<sup>1</sup>; Mehdi Balooch<sup>1</sup>; Thomas Astecker<sup>1</sup>; Kooknoh Yoon<sup>1</sup>; <sup>1</sup>University of California, Berkeley

10:05 AM Break

10:25 AM Invited

**Instability of Single-Phase Nanocrystalline Materials Versus Stability of Dual-Phase Nanocomposites Under Ion Irradiation at Elevated Temperatures:** *Kelvin Xie*<sup>1</sup>; Digvijay Yadav<sup>1</sup>; Kenneth Cooper<sup>1</sup>; Benjamin Derby<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Jon Kevin Baldwin<sup>2</sup>; Yaqiao Wu<sup>3</sup>; Jiaqi Dong<sup>1</sup>; JungHun Park<sup>4</sup>; Sunkyung Lee<sup>4</sup>; Gi-Dong Sim<sup>4</sup>; Lin Shao<sup>1</sup>; Michael Demkowicz<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Los Alamos National Lab; <sup>3</sup>Boise State University, Idaho; <sup>4</sup>KAIST

10:50 AM

**Effect of Grain Size on Radiation-Induced Segregation in Fe-Based Alloys:** *Marie Thomas*<sup>1</sup>; Daniele Fatto Offidani<sup>2</sup>; Emmanuelle Marquis<sup>2</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>University of Michigan

11:10 AM

**Radiation Resistance of Nanocrystalline Fe-Ti and Fe-Ta Systems Under Ion Irradiation:** *Alice Perrin*<sup>1</sup>; Erik Herbert<sup>1</sup>; Amrita Anand<sup>2</sup>; Wei Tang<sup>1</sup>; Miguel Crespo<sup>3</sup>; Matt Boebinger<sup>1</sup>; Khalid Hattar<sup>3</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Penn State University; <sup>3</sup>University of Tennessee

11:30 AM Invited

**Self-Organization of Void and Gas Bubble Superlattices in Metals Under Irradiation - The Impacts of Irradiation Condition and Material Properties:** *Yongfeng Zhang*<sup>1</sup>; *Anton Schneider*<sup>2</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>Los Alamos National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV — Characterization and Modeling

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Yu-Chen Liu, National Cheng Kung University; Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Yee-wen Yen, National Taiwan University of Science and Technology; Chih-Ming Chen, National Chung Hsing University; Chao-hong Wang, National Chung Chung University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, Korea Institute of Industrial Technology; Ping-Chuan Wang, Suny New Paltz; Yu-An Shen, Feng Chia University

**Monday AM | March 24, 2025**  
**359 | MGM Grand**

**Session Chairs:** Yu-Chen Liu, National Cheng Kung University; Shih-kang Lin, National Cheng Kung University

8:30 AM Keynote

**Advanced Characterization and Analysis for Improved Stable Material Structures:** *Roland Brunner*<sup>1</sup>; <sup>1</sup>Materials Center Leoben Forschung GmbH

9:05 AM Invited

**The Effect of Temperature on the Microstructure, Lattice, Mechanical and Electrical Properties of Sn-Bi Alloys:** *Xin Tan*<sup>1</sup>; Stuart McDonald<sup>1</sup>; Keith Sweatman<sup>2</sup>; Kazuhiro Nogita<sup>1</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>Nihon Superior Co., Ltd.

9:35 AM

**Interfacial Reactions between Sn and Ru for EUV Photolithography Applications:** *Hsiu-Mei Yang*<sup>1</sup>; Tzu-hsuan Huang<sup>1</sup>; *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University

9:55 AM

**Exploring Low-Temperature Soldering with Good Soldering Strength: Investigating Soldering Behavior:** *Yu-An Shen*<sup>1</sup>; <sup>1</sup>Feng Chia University

10:15 AM Break

10:35 AM

**Exploring Solder Wetting Angle by Using Machine Learning Approach:** *Yu-Chen Liu*<sup>1</sup>; Bing-Xi Lee<sup>1</sup>; <sup>1</sup>National Cheng Kung University

10:55 AM

**Growth of Cu<sub>6</sub>Sn<sub>5</sub> in a Cu/Sn/Cu Micro-Joint with a TFMG/Cu Dual Diffusion Barrier Layer During Thermocompression Bonding:** *Ren-Jie Wu*<sup>1</sup>; Chi-Hang Lin<sup>1</sup>; Yu-Qian Zhang<sup>1</sup>; Ya-Han Ye<sup>1</sup>; Zhu-Yuan Zhao<sup>1</sup>; Kai-An Yang<sup>1</sup>; Ming-Tzer Lin<sup>1</sup>; <sup>1</sup>National Chung Hsing University

11:15 AM

**In-situ Characterization of Electrical Current Induced Structural Changes in Single-Phase -Cu<sub>6</sub>Sn<sub>5</sub> Using Synchrotron Radiation:** *Shubhayan Mukherjee*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

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## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — High Entropy Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

**Monday AM | March 24, 2025**  
**123 | MGM Grand**

**Session Chairs:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati

8:30 AM

**Compositionally Optimising the Volumetric Contraction of the Liquid-To-Solid Phase Transformation in Multi-Component Alloys – the Minimisation of Solidification Shrinkage:** *Kevin Laws*<sup>1</sup>; Henchel Guo<sup>1</sup>; Audrey Thiessen<sup>2</sup>; Aurora Pribram-Jones<sup>3</sup>; Lori Bassman<sup>2</sup>; <sup>1</sup>UNSW; <sup>2</sup>Harvey Mudd College; <sup>3</sup>University of California, Merced

8:50 AM

**Modeling the Effects of Initial Grain Size, Martensitic Transformation Induced Dynamic Grain Refinement, Phases, and Texture on Strength of a High Entropy Alloy Using Crystal Plasticity:** *Marko Knezevic*<sup>1</sup>; <sup>1</sup>University of New Hampshire

9:10 AM

**Alloying Effects and Mechanical Behavior of FCC Multi-Principal Element Alloys Containing Sigma Precipitates:** *Bibhu Prasad Sahu*<sup>1</sup>; Wenle Xu<sup>1</sup>; Daniel Salas<sup>1</sup>; Mrinalini Mulukutla<sup>1</sup>; Trevor Hastings<sup>1</sup>; Raymundo Arróyave<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

9:30 AM

**Tailoring Mechanical Properties of a Multi-Principle-Element Alloy by a Multi-Length-Scale Approach:** Chang-Yu Hung<sup>1</sup>; Milan Heczko<sup>2</sup>; Chenyang Li<sup>3</sup>; Dallin Barton<sup>4</sup>; Paul Jablonski<sup>1</sup>; Wei Chen<sup>3</sup>; Arun Devaraj<sup>4</sup>; Michael Mills<sup>2</sup>; Martin Detrois<sup>1</sup>; *Stoichko Antonov*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>The Ohio State University; <sup>3</sup>University at Buffalo; <sup>4</sup>Pacific Northwest National Laboratory

9:50 AM

**Testing Compositionally Complex Alloys for Phase Stability in High Radiation Environments:** *Sydney Copp*<sup>1</sup>; Siwei Chen<sup>1</sup>; Yajie Zhao<sup>1</sup>; Sicilia Christadore<sup>2</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

10:10 AM Break

10:20 AM

**Decomposition of the B2 Phase Following Isothermal Annealing, and a Study of the Interface Characteristics of the Product Phase in a High Entropy Alloy:** *Paraic O'Kelly*<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Brian Welk<sup>1</sup>; Shalini Roy Koneru<sup>2</sup>; Yunzhi Wang<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>TCS Limited

10:40 AM

**Deformation Induced Transformation: Alloy Design with FCC-HCP-BCC Burgers Transformation Triangle as the Framework:** *Priyanka Agrawal*<sup>1</sup>; Amit Singh<sup>1</sup>; Roopam Jain<sup>1</sup>; Supreeth Gaddam<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

11:00 AM

**Influence of Si on Solidification Microstructure and Mechanical Properties of CrFeCoNi High Entropy Alloy:** *Toru Maruyama*<sup>1</sup>; Ritsuki Mizukami<sup>1</sup>; <sup>1</sup>Kansai University

11:20 AM

**Microstructure and Texture of Heavily Cold-Rolled and Annealed Al-Modified Extremely Low Stacking Fault Energy Cr<sub>1.3</sub>Co<sub>1</sub>Fe<sub>1</sub>Mn<sub>1</sub>Ni<sub>0.7</sub> High Entropy Alloy:** *Krishna Nuli*<sup>1</sup>; Suvra Paul<sup>1</sup>; Pankaj Ojha<sup>1</sup>; Saha Rajib<sup>2</sup>; Mayur Vaidya<sup>1</sup>; Pinaki Bhattacharjee<sup>2</sup>; <sup>1</sup>IITH Hyderabad; <sup>2</sup>R&D tata Steel

## SPECIAL TOPICS

**Preparing Undergraduate and Graduate Students - And the Faculty Who Prepare Them - For Materials Careers (A Symposium Held in the Memory and Honor of Elizabeth Judson) — Innovations in Course Design and Assessment**

**Sponsored by:** TMS: Education Committee

**Program Organizers:** Marian Kennedy, Clemson University; Alison Polasik, Campbell University; Jeffrey Fergus, Old Dominion University; Jennifer Carter, Case Western Reserve University

Monday AM | March 24, 2025

170 | MGM Grand

**Session Chairs:** Marian Kennedy, Clemson University; Jennifer Carter, Case Western Reserve University

8:30 AM Introductory Comments

8:35 AM

**Expanding the List of Materials Properties to Add Depth and Challenge to Standard Engineering Classes:** *Alison Polasik*<sup>1</sup>; <sup>1</sup>Campbell University

9:00 AM

**Integrating So-Called "Soft-Skills" in a Formal Way into a Materials Science and Engineering Class:** *Peter Collins*<sup>1</sup>; <sup>1</sup>Iowa State University

9:25 AM

**Assessing Student Learning with Oral Exams in a Graduate Thermodynamics Course:** *Susan Gentry*<sup>1</sup>; <sup>1</sup>University of California, Davis

9:50 AM Break

10:10 AM

**Student Attitudes and Beliefs Around Computational Work in MSE:** *Timothy Chambers*<sup>1</sup>; Alison Polasik<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Campbell University

10:35 AM

**Visual Communication and Representations in Materials Science and Engineering:** *Enze Chen*<sup>1</sup>; <sup>1</sup>Stanford University

11:00 AM

**Intro to Materials Course Design Using Concepts from Grading for Growth:** *Steven Yaliso*<sup>1</sup>; <sup>1</sup>University of Michigan

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics I - Ink Development**

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, Rice University; Konstantinos Sierras, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ethan Secor, Iowa State University

Monday AM | March 24, 2025

361 | MGM Grand

**Session Chairs:** Tolga Aytug, Oak Ridge National Laboratory; Ethan Secor, Iowa State University

8:30 AM Invited

**Printed Electronics for Cultivating Plants in Space:** *Ying Diao*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign

8:55 AM Invited

**Liquid Metal Printed Ultraconductive Transparent Two-Dimensional Oxides for Wearable Bioelectrodes:** *William Scheideler*<sup>1</sup>; <sup>1</sup>Dartmouth College

9:20 AM Invited

**Conductive, Additive-Free MXene Inks to Replace Metals and Carbons in Printed Electronics:** *Yury Gogotsi*<sup>1</sup>; <sup>1</sup>Drexel University

9:45 AM

**Discovery and Optimization of Conductive Nanoparticle Inks for Printed Electronics Using an Autonomous Ecosystem:** *Alison Roth*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

10:05 AM Break

10:25 AM Invited

**MXene-Based Inks for Direct Ink Writing of 3D Energy Storage Devices:** *Majid Beidaghi*<sup>1</sup>; <sup>1</sup>University of Arizona

10:50 AM Invited

**Nanomaterial-Based Material Extrusion: Printability and Applications:** *Bo Li*<sup>1</sup>; <sup>1</sup>Villanova University

11:15 AM Invited

**NonSLED<sup>2</sup>=SLED:** *Jonathan Singer*<sup>1</sup>; <sup>1</sup>Rutgers University

11:40 AM

**Development of a Ceramic Ink for Stereolithography Based 3D Printing:** *Hrudaya Jyoti Biswal*<sup>1</sup>; Cristina Stefanescu<sup>1</sup>; Janice Lucon<sup>1</sup>; Peter Lucon<sup>1</sup>; <sup>1</sup>Montana Technological University

## MATERIALS SYNTHESIS AND PROCESSING

### REWAS 2025: Sustainable End-of-Life Management and Recycling Solutions for Batteries, Wind Turbines, and Photovoltaics — Circularity in Li-Ion Batteries Technologies I

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Christina Meskers, SINTEF; Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Elsa Olivetti, Massachusetts Institute of Technology

**Monday AM | March 24, 2025**  
**117 | MGM Grand**

**Session Chair:** Cathrine Solem, SINTEF

#### 8:30 AM Introductory Comments

#### 8:35 AM Plenary

**Recycling of Lithium-Ion Batteries Cathode Material Using Supercritical Fluid Extraction:** *Gisele Azimi*<sup>1</sup>; <sup>1</sup>University of Toronto

#### 9:05 AM

**Leaching Studies of LiCoO<sub>2</sub> Cathode Powder in Phosphoric Acid Medium:** *Sadia Ilyas*<sup>1</sup>; Rajiv Srivastava<sup>2</sup>; <sup>1</sup>Luleå University of Technology; <sup>2</sup>Duy Tan University

#### 9:25 AM

**Optimizing Early-Stage Lithium Recovery: Investigating Oxalic Acid Leaching of Black Mass from End-of-Life NMC 622 Batteries:** *Luka Nils Mettke*<sup>1</sup>; Bengi Yagmurlu<sup>1</sup>; <sup>1</sup>Clausthal University of Technology

#### 9:45 AM Break

#### 10:00 AM Invited

**Upcycling Spent Battery Cathodes into Steel with Green Hydrogen:** *Ming Chen*<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

#### 10:30 AM

**Opportunities and Challenges in Lithium-Ion Battery Recycling: Emphasis on Pretreatment and Pyrometallurgical Processing:** *Guozhu Ye*<sup>1</sup>; Xianfeng Hu<sup>1</sup>; Elsayed Mousa<sup>1</sup>; <sup>1</sup>Swerim

#### 10:50 AM

**Reductive Leaching Investigation of Li-NMC Cathode Material Related to Spent Battery Recycling:** *Gokce Kilic*<sup>1</sup>; Krystal Davis<sup>2</sup>; George Demopoulos<sup>1</sup>; <sup>1</sup>McGill University; <sup>2</sup>National Research Council of Canada

#### 11:10 AM

**Synergistic Processing of Mixed LFP-NMC Black Mass for Improved Recycling Operations:** *Marius Mueller*<sup>1</sup>; Bengi Yagmurlu<sup>1</sup>; <sup>1</sup>Technical University Clausthal

#### 11:30 AM

**Reductive Leaching of Cathode Active Material from Li-Ion Batteries and Recovery of Copper Reductant:** *Arundhati Jena*<sup>1</sup>; Sreeya Chidre<sup>1</sup>; Chenna Borra<sup>1</sup>; Mehmet Recai Onal<sup>2</sup>; Shaikh Said<sup>1</sup>; Prakash Venkatesan<sup>3</sup>; <sup>1</sup>IT Kharagpur; <sup>2</sup>Genomines; <sup>3</sup>Universite libre de Bruxelles

## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Actinide Physics I

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Monday AM | March 24, 2025**  
**163 | MGM Grand**

**Session Chairs:** Krzysztof Gofryk, Idaho National Laboratory; Eteri Svanidze, Max Planck Institute for Chemical Physics of Solids

#### 8:30 AM Invited

**Itineracy Versus Localization in f-Electron Systems:** *Gertrud Zwicknagel*<sup>1</sup>; <sup>1</sup>Institute for Mathematical Physics, TU Braunschweig

#### 9:00 AM Invited

**New Insights into f-Electron Interactions in Superconductor UTe<sub>2</sub>:** *Nicholas Butch*<sup>1</sup>; <sup>1</sup>NIST Center For Neutron Research

#### 9:30 AM Invited

**Emergence of Complex Magnetism and Protected Topologies in LnTAl<sub>4</sub>Ge<sub>2</sub> (Ln = lanthanide and T = transition metal):** *Ryan Baumbach*<sup>1</sup>; <sup>1</sup>UCSC

#### 10:00 AM Break

#### 10:20 AM Invited

**Magnetoelastic Interactions in Uranium-Based Compounds Probed by Magnetostriction and Thermal Expansion Measurements:** *Volodymyr Buturlin*<sup>1</sup>; Sabin Regmi<sup>2</sup>; Dominik Legut<sup>3</sup>; Alexander Andreev<sup>4</sup>; Ladislav Havela<sup>5</sup>; Krzysztof Gofryk<sup>1</sup>; <sup>1</sup>Glenn T. Seaborg Institute, Idaho National Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>IT4Innovations, VŠB - Technical University of Ostrava; <sup>4</sup>FZU Institute of Physics, Czech Academy of Sciences; <sup>5</sup>Charles University

#### 10:50 AM Invited

**Lattice Distortions and Swelling Resilience in Aged  $\alpha$ -Phase Plutonium:** *Jason Jeffries*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 11:20 AM

**Exploring Complex Electronic and Magnetic Behaviors in Actinide Binary Oxides and Chalcogenides:** *Binod Rai*<sup>1</sup>; Rosalie Greer<sup>1</sup>; Krzysztof Gofryk<sup>2</sup>; Hanno Zur Loye<sup>3</sup>; <sup>1</sup>Savannah River National Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of South Carolina Columbia



## MECHANICS OF MATERIALS

### Solid-State Diffusion Bonding of Metals and Alloys — Diffusion Bonding of High Temperature Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Mohamed Elbakhshwan, University of Wisconsin Madison; Peng Wang, University of Michigan; Tate Patterson, Idaho National Laboratory; Fei Gao, University of Michigan; Todd Allen, University of Michigan; Mark Anderson, University of Wisconsin Madison

**Monday AM | March 24, 2025**  
**301 | MGM Grand**

**Session Chair:** Peng Wang, University of Michigan

#### 8:30 AM Introductory Comments

**8:35 AM**

**The Basic Research on Plastic Bonding of Zr-Based Metallic Glasses:** *Peng Jia*<sup>1</sup>; <sup>1</sup>Northeastern University

**9:00 AM**

**Microstructural Characteristics, Mechanical Properties, and Corrosion Behavior of Field-Assisted Diffusion Welded Alloy 617:** *Xinchang Zhang*<sup>1</sup>; Jorgen Rufner<sup>1</sup>; Michael McMurtrey<sup>2</sup>; Tate Patterson<sup>1</sup>; Qiufeng Yang<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**9:25 AM**

**Exploring Scalable Solutions for Scrap Metal Consolidation:** *Abhi Sharda*<sup>1</sup>; Onur Guvenç<sup>1</sup>; Gillian Roeder<sup>1</sup>; Cemal Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:50 AM Break**

**10:10 AM**

**Advancing the Understanding of Mechanical Properties of Diffusion-Bonded 316H and A617 for High-Temperature Nuclear Compact Heat Exchanger Applications:** *Mahmud Hasan Ovi*<sup>1</sup>; Tamim Hossain<sup>1</sup>; Intisher Al-Tahmid Omi<sup>1</sup>; Hoon Lee<sup>1</sup>; James Stubbins<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

**10:35 AM**

**Ultrasonic Metal Welding of Interlayers to Improve Joint Performance of Aluminum to Steel Resistance Spot Welds in Automotive Applications:** *Rakhi Bawa*<sup>1</sup>; Antonio Ramirez<sup>2</sup>; Kelly Osborn<sup>1</sup>; Kaue Riffel<sup>1</sup>; <sup>1</sup>The Ohio State University

**11:00 AM**

**Diffusion Bonding of an AA7075 Aluminium Alloy:** *Yan Huang*<sup>1</sup>; <sup>1</sup>Brunel University London

**11:25 AM**

**Diffusion Bonding of Nickel-Based Alloy 617 and 316H Stainless Steel:** *Mohamed Elbakhshwan*<sup>1</sup>; Lukas Desorcy<sup>1</sup>; Ian Jentz<sup>1</sup>; Mark Anderson<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison

## NUCLEAR MATERIALS

### Solid-state Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations — Solid-State Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations: Session I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Priyanka Agrawal, University of North Texas; Hang Yu, Virginia Polytechnic Institute and State University; Boopathy Kombariah, Idaho National Laboratory; Joao Oliveira, Faculdade Ciencias Tecnologias; Tianhao Wang, Pacific Northwest National Laboratory; Mukesh Bachhav, Idaho National Laboratory; John Shelton, Northern Illinois University; Shivakant Shukla, Pacific Northwest National Laboratory; Efthymios Polatidis, University of Patras; Lakshmi Narayan Ramasubramanian, Indian Institute of Technology; Sanya Gupta, Cummins Inc.

**Monday AM | March 24, 2025**  
**161 | MGM Grand**

**Session Chairs:** Semanti Mukhopadhyay, Pacific Northwest National Laboratory; Priyanka Agrawal, University of North Texas

#### 8:30 AM Invited

**Considerations in Process Related Microstructural Evolution:** *Mark Patterson*<sup>1</sup>; Robert Amaro<sup>2</sup>; <sup>1</sup>Kratos Defense and Rocket Support Services; <sup>2</sup>Advanced Materials Testing and Technologies

**9:00 AM**

**High Strength and Wear Resistance Al-TiB<sub>2</sub> Composite Fabricated via Friction Consolidation:** *Xiao Li*<sup>1</sup>; Hrishikesh Das<sup>1</sup>; Mayur Pole<sup>1</sup>; Lei Li<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Glenn J Grant<sup>1</sup>; Darrell Herling<sup>1</sup>; Mert Efe<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**9:20 AM**

**Cold Spray Coating Technology to Enhance Accident Tolerance of Control Rods in LWRs:** *Noah Anderson*<sup>1</sup>; Bennett LaSalle<sup>1</sup>; William Ward<sup>1</sup>; Hakan Ozaltun<sup>2</sup>; Evan Willing<sup>1</sup>; Kasturi Sasidhar<sup>1</sup>; Hwasung Yeom<sup>3</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin, Madison; <sup>2</sup>Nuclear Regulatory Commission; <sup>3</sup>Pohang University of Science and Technology

**9:40 AM**

**Near Net Shape PM HIP Technology of Large Parts for Critical Applications:** *Victor Samarov*<sup>1</sup>; Evgeny Khomyakov<sup>1</sup>; Alexandr Bisikalov<sup>1</sup>; <sup>1</sup>Synertech Pm Inc.

**10:00 AM Break**

**10:15 AM Invited**

**Ion Irradiation Effects on High Entropy Alloy and Additively Manufactured Materials:** *Bibhudutta Rout*<sup>1</sup>; Lutfun Nipa<sup>1</sup>; Mohin Sharma<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Hector Siller<sup>1</sup>; Reza Mirshams<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas

**10:40 AM**

**A Hybrid Additive and Field-Assisted Sintering Process for Novel Refractory Metal Compact Heat Exchanger Manufacturing:** *Xinchang Zhang*<sup>1</sup>; Jorgen Rufner<sup>1</sup>; Michael McMurtrey<sup>1</sup>; Arin Preston<sup>1</sup>; Stephen Raiman<sup>2</sup>; Yanliang Zhang<sup>3</sup>; Kaidong Song<sup>3</sup>; Raymond Weitekamp<sup>4</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>University of Michigan; <sup>3</sup>University of Notre Dame; <sup>4</sup>polySpectra

MONDAY AM

11:00 AM

**Dissimilar Metal Joint by Hot Isostatic Pressing (HIP) – Design, Optimization, and Properties:** *Evan McDermott<sup>1</sup>; Chenglu Tang<sup>1</sup>; Victor Samarov<sup>1</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University*

11:20 AM

**A New Route for Fabricating Oxide Dispersion Strengthened (ODS) Alloy Cladding With Friction Extrusion and Pilgering:** *Dalong Zhang<sup>1</sup>; Xiang Wang<sup>2</sup>; Jens Darsell<sup>2</sup>; Xiao Li<sup>2</sup>; Curt Lavender<sup>2</sup>; Mark Rhodes<sup>2</sup>; Justin Olson<sup>2</sup>; Kayla Yano<sup>2</sup>; Tingkun Liu<sup>2</sup>; Ramprashad Prabhakaran<sup>2</sup>; Iver Anderson<sup>3</sup>; Eda Aydogan<sup>2</sup>; Stuart Maloy<sup>2</sup>; <sup>1</sup>Baylor University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Ames Laboratory*

11:40 AM

**ICME-Based Modeling and Design of Cermet Composite for Extreme Environment Applications:** *Qiaofu Zhang<sup>1</sup>; Supreeth Gaddam<sup>2</sup>; Rajiv Mishra<sup>2</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>University of North Texas*

## MECHANICS OF MATERIALS

### Spatially Tailored Materials: Processing-Structure-Properties – Designing and Characterizing Gradients

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois; Ian McCue, Northwestern University; J.C. Stinville, University of Illinois Urbana-Champaign

Monday AM | March 24, 2025  
351 | MGM Grand

**Session Chairs:** Gianna Valentino, University of Maryland; Ian McCue, Northwestern University

8:30 AM Invited

**Tools for Tailoring Properties in Functionally Graded Materials:** *Allison Beese<sup>1</sup>; <sup>1</sup>Pennsylvania State University*

9:00 AM

**Optimizing The Kinetic Properties of Materials Gradients:** *Samuel Price<sup>1</sup>; Zhaoxi Cao<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University*

9:20 AM

**Gradient Alloy Design Guidelines via High-Throughput CALPHAD-Based ICME Simulations With Machine Learning:** *Jixuan Dong<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University*

9:40 AM

**Production and Validation of Refractory Functionally Graded Materials Using CALPHAD-Assisted Path Planning for Property Predictions:** *Jennifer Glerum<sup>1</sup>; Nicholas Ury<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Michael Juhasz<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Raiyan Seede<sup>1</sup>; Scott Peters<sup>1</sup>; Aurelien Perron<sup>1</sup>; Kaila Bertsch<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory*

10:00 AM Break

10:20 AM Invited

**Updated High-Throughput Rapid Experimental Alloy Development:** *Kenneth Vecchio<sup>1</sup>; <sup>1</sup>University of California, San Diego*

10:50 AM

**Integrated Computational-Experimental Framework for Production of Additively Manufactured Functionally Graded Materials From Structural to Refractory Alloys:** *Kaila Bertsch<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Jennifer Glerum<sup>1</sup>; Michael Juhasz<sup>1</sup>; Scott Peters<sup>1</sup>; Raiyan Seede<sup>1</sup>; Nicholas Ury<sup>1</sup>; Aurelien Perron<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory*

11:10 AM

**Diffusion Gradients to Rapidly Explore Composition Space & Precipitation Behaviour of Bcc-Superalloys and Refractory High Entropy Alloys:** *Alexander Knowles<sup>1</sup>; Paraic O'Kelly<sup>2</sup>; Vincent Gagneur<sup>1</sup>; Adam Cretton<sup>3</sup>; Matthew Lloyd<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>The Ohio State University; <sup>3</sup>Technical University of Denmark*

11:30 AM

**High Throughput Design of Refractory High Entropy Alloys With Improved Oxidation Resistance:** *Sebastian Lech<sup>1</sup>; David Beaudry<sup>1</sup>; Loïc Perrière<sup>2</sup>; Jean Philippe Couzinie<sup>2</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Univ Paris Est Creteil, CNRS*

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Steels in Extreme Environments – Opening Presentations / Steels Under Hydrogen Environments I

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Hyunseok Oh, University of Wisconsin - Madison; Lawrence Cho, Colorado School of Mines; Jeongho Han, Hanyang University; Motomichi Koyama, Tohoku University; Peeyush Nandwana, Oak Ridge National Laboratory; Fnu Kasturi Narasimha Sasidhar, University of Wisconsin - Madison

Monday AM | March 24, 2025  
168 | MGM Grand

**Session Chairs:** Hyunseok Oh, University of Wisconsin - Madison; Jeongho Han, Hanyang University

8:30 AM Introductory Comments

8:35 AM Keynote

**Steel Degradation in Energy Technologies with Extreme Environments:** *May Martin<sup>1</sup>; Emma Coatney<sup>2</sup>; Ross Rentz<sup>1</sup>; Lawrence Cho<sup>2</sup>; Kip Findley<sup>2</sup>; Andrew Slifka<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Colorado School of Mines*

9:05 AM Keynote

**Effect of Microalloying on the Hydrogen Embrittlement in Press Hardened Steel:** *Seokhwan Ju<sup>1</sup>; Seawoong Lee<sup>2</sup>; Dong-Woo Suh<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>POSCO*

9:35 AM Invited

**Intense Hydrogen-Related Acceleration of Fatigue Crack Growth in High-Strength Steels: the Mechanism and Solution:** *Motomichi Koyama<sup>1</sup>; Tingshu Chen<sup>2</sup>; Yuhei Ogawa<sup>3</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>CNPC Tubular Goods Research Institute; <sup>3</sup>National Institute for Materials Science*

9:55 AM Invited

**Metallurgical Design to Enhance Strength and Hydrogen Embrittlement Resistance of Steels:** *Lawrence Cho<sup>1</sup>; Yuran Kong<sup>1</sup>; Pawan Kathayat<sup>1</sup>; John Speer<sup>1</sup>; Kip Findley<sup>1</sup>; <sup>1</sup>Colorado School of Mines*

10:15 AM Break

10:35 AM Invited

**Electrochemical Control of Hydrogen: From Hydrogen Embrittlement to Hydrogen Storage:** *Kyung-Shik Kim<sup>1</sup>; Ju Li<sup>1</sup>; Bilge Yildiz<sup>1</sup>; C. Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

10:55 AM Invited

**Hydrogen Segregation to Dislocations in Austenitic Stainless Steels:** *Fernando Daniel Leon Cazares<sup>1</sup>; Xiaowang Zhou<sup>1</sup>; Coleman Alleman<sup>1</sup>; Chris San Marchi<sup>1</sup>; <sup>1</sup>Sandia National Laboratories*

11:15 AM Invited

**Impact of Hydrogen on the Microstructure Changes in Steels: Ab Initio Based Multiscale Approaches:** *Tilman Hicke<sup>1</sup>; Ali Tehrani<sup>2</sup>; Jorg Neugebauer<sup>2</sup>; <sup>1</sup>Bam Federal Institute For Materials Research and Testing; <sup>2</sup>MPI for Sustainable Materials*

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## MECHANICS OF MATERIALS

### Structure-Property Relationships in Molecular Crystal Deformation — Deformation Across Time and Length Scales I

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Daniel Bufford, Sandia National Laboratories; Sushmita Majumder, University of Minnesota-Twin Cities; Paul Ryan, Atomic Weapons Establishment; Judith Brown, Sandia National Laboratories; Nathan Mara, University of Minnesota; Raimundo Ho, AbbVie Inc.

**Monday AM | March 24, 2025**  
**365 | MGM Grand**

**Session Chairs:** Daniel Bufford, Sandia National Laboratories; Changquan Sun, University of Minnesota

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8:30 AM Invited

**Elucidating Tabletability of Pharmaceutical Solids Based on Plasticity Quantified by Nanoindentation:** *Changquan Sun<sup>1</sup>; <sup>1</sup>University of Minnesota*

9:00 AM

**Understanding the Correlation Between Mechanical Properties, Crystal Structure and Tabletability of Pharmaceutical Cocrystals:** *Sushmita Majumder<sup>1</sup>; Vikram Chandrashekar Joshi<sup>1</sup>; Changquan Calvin Sun<sup>1</sup>; Nathan A. Mara<sup>1</sup>; <sup>1</sup>University of Minnesota-Twin Cities*

9:20 AM

**Mechanical Properties in Pharmaceutical Solid Oral Dosage Form Development: Bridging Molecular Interactions and Performance:** *Raimundo Ho<sup>1</sup>; <sup>1</sup>AbbVie Inc.*

9:40 AM

**Understanding Milling Behavior of Pharmaceutical Crystals Through Quasistatic and Dynamic Mechanical Testing:** *Soumyadeep Sen<sup>1</sup>; Jamshid Ochilov<sup>1</sup>; Peter Yip<sup>1</sup>; Tianyi Xiang<sup>1</sup>; Nick Seaton<sup>1</sup>; Geoffrey Rojas<sup>1</sup>; Suraj Ravindran<sup>1</sup>; Changquan Sun<sup>1</sup>; Nathan Mara<sup>1</sup>; <sup>1</sup>University of Minnesota*

10:00 AM Break

10:15 AM Invited

**Crystal Structure Prediction of Energetic Materials Using Genarris and GAtor:** *Noa Marom<sup>1</sup>; <sup>1</sup>Carnegie Mellon University*

10:45 AM

**Impact of Nanoindentation Tip Geometry on Orientation-Dependent Nanomechanical Behavior of PETN:** *Morgan Chamberlain<sup>1</sup>; Alexandra Burch<sup>2</sup>; David Bahr<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Los Alamos National Laboratory*

11:05 AM

**Dislocation Mediated Plasticity in PETN: Indentation and High-Rate Deformation:** *Milovan Zecevic<sup>1</sup>; Alexandra Burch<sup>1</sup>; Morgan Chamberlain<sup>2</sup>; David Bahr<sup>2</sup>; Marc Cawkwell<sup>1</sup>; Virginia Manner<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Purdue University*

11:25 AM

**A Shocking Look into the Large Single Crystal Energetics and Their Analogues:** *Alice Mintoff<sup>1</sup>; <sup>1</sup>Cranfield University*

11:45 AM Invited

**Interconnections Between High Explosive Mechanical Strength and Reactivity in the Buildup to Detonation:** *Matthew Kroonblawd<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory*

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## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Atomic Structure and Dynamics

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Sopu, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Monday AM | March 24, 2025**  
**367 | MGM Grand**

**Session Chair:** A. Lindsay Greer, University of Cambridge

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8:30 AM Introductory Comments: Sebastian Kube on behalf of organizer team.

8:40 AM Invited

**Lorentz 4D-STEM: Correlative Imaging of Magnetic & Strain Fields and Atomic Packing in Metallic Glasses:** *Sangjun Kang<sup>1</sup>; Di Wang<sup>2</sup>; Xiaoke Mu<sup>3</sup>; Christian Kuebel<sup>2</sup>; <sup>1</sup>TU Darmstadt; <sup>2</sup>Karlsruhe Institute of Technology; <sup>3</sup>Lanzhou University*

9:05 AM Invited

**Medium-Range Order in Metallic Glasses Probed by 4D-STEM:** *Birte Riechers<sup>1</sup>; Robert Maass<sup>2</sup>; <sup>1</sup>Federal Institute of Materials Research And Testing (BAM); <sup>2</sup>Federal Institute of Materials Research and Testing (BAM); University of Illinois at Urbana-Champaign; Technical University of Munich*

9:30 AM

**Relation Between Structural and Dynamical Heterogeneities Analyzed by 5 Dimensional Scanning Transmission Electron Microscopy:** *Katsuaki Nakazawa<sup>1</sup>; Kazutaka Mitsuishi<sup>1</sup>; Shinji Kohara<sup>1</sup>; Koichi Tsuchiya<sup>1</sup>; <sup>1</sup>National Institute For Materials Science*

9:50 AM

**Enhanced Structural Ordering Within Shear Bands of Zr-Based Metallic Glasses Probed by 4D-STEM:** *Minhazul Islam<sup>1</sup>; Gabriel Calderon Ortiz<sup>1</sup>; Birte Riechers<sup>2</sup>; Robert Maas<sup>2</sup>; Jinwoo Hwang<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Federal Institute of Materials Research and Testing (BAM)*

10:10 AM Break

10:30 AM Invited

**Two-Stage, Non-Classical Crystal Nucleation from the Supercooled Liquid of a Metallic Glass Alloy:** *Carter Francis<sup>1</sup>; Shuoyuan Huang<sup>1</sup>; Paul Voyles<sup>1</sup>; <sup>1</sup>University of Wisconsin*

10:55 AM

**Local Structure and Atomic Mobility in a Zr-Based Bulk Metallic Glass:** *Olivia Vaerst<sup>1</sup>; Harald Rösner<sup>1</sup>; Oliver Gross<sup>2</sup>; Gerhard Wilde<sup>2</sup>; <sup>1</sup>University of Münster, Institute of Materials Physics; <sup>2</sup>Amorphous Metal Solutions GmbH*

11:15 AM

**Experimentally Identifying Stable Metal Clusters in Binary (Bulk) Metallic Glasses:** *Kevin Laws<sup>1</sup>; Rebekah Kim<sup>1</sup>; <sup>1</sup>UNSW*

11:35 AM

**Observation of the Three-Dimensional Nanostructure of Medium-Range Order Clusters in Bulk Metallic Glasses by Atom Probe Microscopy:** *Jamie Kruzic*<sup>1</sup>; Keita Nomoto<sup>2</sup>; Huma Bilal<sup>2</sup>; Bosong Li<sup>3</sup>; Christoph Gammer<sup>3</sup>; Jürgen Eckert<sup>4</sup>; Bernd Gludovatz<sup>1</sup>; Simon Ringer<sup>2</sup>; <sup>1</sup>University of New South Wales (UNSW Sydney); <sup>2</sup>The University of Sydney; <sup>3</sup>Erich Schmid Institute of Materials Science; <sup>4</sup>Montanuniversität Leoben

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#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Kinetics of Alloys III — Phase Transition and Diffusion

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Dilpuneet Aidhy, Clemson University; Bin Ouyang, Florida State University; Jicheng Zhao, University of Maryland

**Monday AM | March 24, 2025**  
**352 | MGM Grand**

**Session Chairs:** Chuan Zhang, CompuTherm LLC; Andrew Hoffman, Catalyst Science Solutions

**8:30 AM Invited**

**Improved Understanding of the Time-Temperature-Transformation (TTT) Characteristics of the CrMnFeCoNi High-Entropy Alloy:** *Easo George*<sup>1</sup>; <sup>1</sup>University of Tennessee

**9:00 AM Invited**

**The Interplay of Defects and Recovery in High Entropy Alloys:** *Bharat Gwalani*<sup>1</sup>; <sup>1</sup>North Carolina State University

**9:30 AM**

**Mechanisms of Tribolayer Breakdown During Frictional Ignition in High-Pressure Oxygen:** *Andres Garcia Jimenez*<sup>1</sup>; Zachary Cordero<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:50 AM Invited**

**Contributions to Diffusion in Complex Materials Quantified with Machine Learning:** *Dallas Trinkle*<sup>1</sup>; Soham Chattopadhyay<sup>2</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>Los Alamos National Laboratory

**10:20 AM Break**

**10:40 AM Invited**

**The Language of Metals: Understanding the Interplay Between Data, Scientists, and Materials Design:** *Andrew Hoffman*<sup>1</sup>; <sup>1</sup>Catalyst Science Solutions

**11:10 AM**

**Global Stability Models of Multi-Principal Element Alloys:** *Lin Wang*<sup>1</sup>; Zhengda He<sup>1</sup>; Bin Ouyang<sup>1</sup>; <sup>1</sup>Florida State University

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#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Phase Diagrams Applied to Materials Design and Processing: An FMD/SMD Symposium Honoring Rainer Schmid-Fetzer — Thermodynamics, Phase Diagrams and Applications of the CALPHAD Method

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Shuanglin Chen, CompuTherm LLC; Ji-Cheng Zhao, University of Connecticut; Ursula Kattner, National Institute of Standards and Technology; Greta Lindwall, KTH Royal Institute of Technology; Alan Luo, Ohio State University; Arthur Pelton, Ecole Polytechnique; John Agren, Royal Institute of Technology; Sinn-wen Chen, National Tsing Hua University

**Monday AM | March 24, 2025**  
**350 | MGM Grand**

**Session Chairs:** Fan Zhang, CompuTherm LLC; Ursula Kattner, National Institute of Standards and Technology

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**8:30 AM Introductory Comments - Fan Zhang**

**8:35 AM Invited**

**Thermodynamics and Phase Diagrams Applied to Materials Design and Processing:** *Rainer Schmid-Fetzer*<sup>1</sup>; <sup>1</sup>Clausthal University of Technology

**9:05 AM Invited**

**Evolution of the Calphad Method and Its Application:** *Ursula Kattner*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**9:30 AM Invited**

**Hillert-Style Irreversible Thermodynamics and the Entropy Production:** *John Agren*<sup>1</sup>; <sup>1</sup>Royal Institute of Technology

**9:55 AM Break**

**10:15 AM Invited**

**Designing Lightweight Alloys Based on CALPHAD Modeling and Machine Learning:** *Alan Luo*<sup>1</sup>; Renhai Shi<sup>1</sup>; Jianyue Zhang<sup>1</sup>; <sup>1</sup>Ohio State University

**10:40 AM Invited**

**Application of the CALPHAD Method to Alloy Design and Processing Optimization:** *Fan Zhang*<sup>1</sup>; Chuan Zhang<sup>1</sup>; Weisheng Cao<sup>1</sup>; Kamalnath Kadirvel<sup>1</sup>; Songmao Liang<sup>1</sup>; Jun Zhu<sup>1</sup>; Shuanglin Chen<sup>1</sup>; <sup>1</sup>CompuTherm LLC

**11:05 AM Invited**

**Phase Stability Through Machine Learning:** *Raymundo Arroyave*<sup>1</sup>; <sup>1</sup>Texas A&M University

**11:30 AM Invited**

**The Application of Phase Diagram in Materials Science and Engineering:** *Yee-wen Yen*<sup>1</sup>; Mavindra Ramadhani<sup>1</sup>; Ssu-Chi Huang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology



## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Validation of Computational Tools - Industrial Perspectives — Validation of Computational Tools I

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Qiaofu Zhang, University of Alabama; Michael Titus, Purdue University; Stephane Forsik, Carpenter Technology Corporation; Govindarajan Muralidharan, Oak Ridge National Laboratory; Jonathan Priedeman, GE Aerospace

**Monday AM | March 24, 2025**  
**311 | MGM Grand**

**Session Chairs:** Muralidharan Govindarajan, Oak Ridge National Laboratory; Stephane Forsik, Carpenter Technology Corporation; Qiaofu Zhang, University of Alabama

#### 8:30 AM Invited

**The Evolution of ICME in the Aerospace Industry: Past, Present, and Future:** *Adam Pilchak*<sup>1</sup>; Vasisht Venkatesh<sup>1</sup>; Manish Kamal<sup>1</sup>; Lee Semiatin<sup>2</sup>; David Furrer<sup>1</sup>; <sup>1</sup>Pratt & Whitney; <sup>2</sup>Materials Resources LLC

#### 9:05 AM

**Accelerating Materials Innovation in Industry Using ICME:** David Linder<sup>1</sup>; Savya Sachin<sup>2</sup>; Fuyao Yan<sup>1</sup>; John Aristeidakis<sup>1</sup>; Ida Berglund<sup>1</sup>; <sup>1</sup>Questek Europe AB

#### 9:25 AM

**Microstructure-Informed Multiscale Structural Analysis and Design Software for Additively Manufactured Metal Alloys:** *Chamara Herath*<sup>1</sup>; Evan Pineda<sup>2</sup>; Trenton Ricks<sup>2</sup>; Brett Bednarczyk<sup>2</sup>; Steven Arnold<sup>2</sup>; Ioannis Mastorakos<sup>1</sup>; Ajit Achuthan<sup>1</sup>; <sup>1</sup>Clarkson University; <sup>2</sup>NASA Glenn Research Center

#### 9:45 AM Invited

**Process Modeling for Predicting Microstructure and Properties of Investment-Cast Ni-Based Superalloy:** Jiten Shah<sup>1</sup>; *Govindarajan Muralidharan*<sup>1</sup>; <sup>1</sup>Product Development and Analysis (PDA) LLC

#### 10:20 AM Break

#### 10:40 AM

**Validation of Microstructure Evolution and Strength Prediction Models on Two Commercial Gamma-Prime Strengthened Ni-base Superalloys:** *Michael Fahrman*<sup>1</sup>; Owen Appel<sup>1</sup>; Erin Kiss<sup>1</sup>; Thomas Mann<sup>1</sup>; <sup>1</sup>Haynes Intl.

#### 11:00 AM

**Numerical Simulation and Experimental Validation of the Vacuum Arc Remelting Process:** *Zilong Zhang*<sup>1</sup>; Elaheh Dorari<sup>2</sup>; Ramesh Minisandram<sup>3</sup>; Shankarjee Krishnamoorthi<sup>3</sup>; Lang Yuan<sup>4</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>Ati Specialty Materials; <sup>3</sup>ATI Specialty Materials; <sup>4</sup>University of South Carolina

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials — UQ & Plasticity I

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates; Saikumar Reddy Yeratapally, Science and Technology Corporation; Kirubel Tefera, Naval Research Laboratory; Diwakar Naragani, Cornell University

**Monday AM | March 24, 2025**  
**354 | MGM Grand**

**Session Chairs:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates

#### 8:30 AM Invited

**Computational Materials for Qualification and Certification Steering Group and Community Vision Roadmap:** *Edward Glaesgen*<sup>1</sup>; Michael Gorelik<sup>2</sup>; <sup>1</sup>NASA Langley Research Center; <sup>2</sup>Federal Aviation Administration

#### 9:00 AM Invited

**Uncertainty Quantified Parametrically Upscaled Constitutive Models for Fatigue Nucleation in Polycrystalline Metallic Materials:** *Somnath Ghosh*<sup>1</sup>; Deniz Ozturk<sup>1</sup>; Shravan Kotha<sup>1</sup>; Kishore Nair<sup>1</sup>; Tawqeer Tak<sup>1</sup>; <sup>1</sup>Johns Hopkins University

#### 9:30 AM Invited

**Quantifying Uncertainties Using Crystal Plasticity Modeling of Microstructural Clones:** *Hojun Lim*<sup>1</sup>; Kaitlynn Fitzgerald<sup>1</sup>; Nicole Aragon<sup>1</sup>; Tim Ruggles<sup>1</sup>; Jay Carroll<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 9:50 AM Invited

**Bayesian Calibration and Validation of a Physics-Based Crystal Plasticity and Damage Model for Shock Compression and Spall:** *Justin Wilkerson*<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 10:10 AM Break

#### 10:30 AM Invited

**Predicting the Variability in Performance of Zircaloy in Nuclear Reactors:** *Andrea Rovinelli*<sup>1</sup>; Jobin Joy<sup>1</sup>; Anjana Talapatra<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 10:50 AM Invited

**Experiment and Crystal Plasticity Model-Based Investigation of Surface Roughness Influence in the Fatigue Life of Additive Manufactured Nickel-Superalloys:** *Jiahao Cheng*<sup>1</sup>; Daniel Ryan<sup>2</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Brandon Kemerling<sup>2</sup>; Sudhakar Bollapragada<sup>2</sup>; Michael Kirka<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Solar Turbines Inc.

#### 11:10 AM

**Non-Uniqueness in Crystal Plasticity Fitting Parameters: Effects on Intragranular Mechanical Behavior:** *Harry Smith*<sup>1</sup>; William Musinski<sup>1</sup>; <sup>1</sup>University of Wisconsin-Milwaukee

#### 11:30 AM

**Strain-Gradient Crystal Plasticity Finite Element Modeling of Phenomena Pertaining to the Sequential Strain Path Changes in AA6016-T4:** *Sajjad Izadpanah*<sup>1</sup>; Sarah Sanderson<sup>2</sup>; Asher Webb<sup>2</sup>; Michael Miles<sup>2</sup>; David Fullwood<sup>2</sup>; Marko Knezevic<sup>1</sup>; <sup>1</sup>University of New Hampshire; <sup>2</sup>Brigham Young University

ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**2D Materials – Preparation, Properties, Modeling & Applications — Processing, Characterization & Applications I**

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nugehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Monday PM | March 24, 2025**  
**362 | MGM Grand**

**Session Chairs:** Mengqiang Zhao, New Jersey Institute Of Technology; Hesam Askari, University of Rochester

**2:00 PM Introductory Comments**

**2:10 PM**

**Atomic Structure and Mechanical Properties of Grain Boundaries in MoS<sub>2</sub>:** *Daniel Moore*<sup>1</sup>; Ian Winter<sup>2</sup>; Scott Bobbitt<sup>2</sup>; Michael Chandross<sup>2</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University; <sup>2</sup>Sandia National Laboratories

**2:30 PM Invited**

**3D Complex and Hierarchical Architectures Titanium Carbide (MXene) Nanosheets into for Energy Applications:** *Rahul Panat*<sup>1</sup>; Mert Arslanoglu<sup>1</sup>; Bin Yuan<sup>1</sup>; Burak Ozdoganlar<sup>1</sup>; Chunshan Hu<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**2:50 PM Keynote**

**3D Printed Nanomaterials-Based Electronics:** *Yong Lin Kong*<sup>1</sup>; <sup>1</sup>Rice University

**3:15 PM Invited**

**3D Integration of 2D Devices for Advanced Memory, Logic, and Bio-Inspired Computing:** *Saptarshi Das*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**3:35 PM Break**

**3:45 PM Invited**

**A Mechanistic Study of MXene Current Collectors for Lithium-Metal-Based Batteries:** *Ruocun Wang*<sup>1</sup>; Ray Unocic<sup>2</sup>; Jaehoon Choi<sup>3</sup>; Yan Burets<sup>3</sup>; Mark Anayee<sup>4</sup>; Geetha Valurouthu<sup>1</sup>; Wan-Yu Tsai<sup>5</sup>; Yury Gogotsi<sup>5</sup>; <sup>1</sup>Drexel University; <sup>2</sup>Oak Ridge National Lab; <sup>3</sup>Karlsruhe Institute of Technology; <sup>4</sup>Air Force Research Laboratory; <sup>5</sup>University of Lille

**4:05 PM Invited**

**Advanced ORR Electrocatalyst from Physicochemical Integration of N-doped Graphene, MOF, and MXene by Wet Ball Milling:** *Eon Soo Lee*<sup>1</sup>; Niladri Talukder<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

**4:25 PM Invited**

**Amorphous-to-Crystalline Phase Transition Behavior a Quasi-One Dimensional Van Der Waals Material:** *Yi Shuang*<sup>1</sup>; Yuta Saito<sup>1</sup>; Shogo Hatayama<sup>2</sup>; Paul Fons<sup>3</sup>; Ando Daisuke<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>National Institute of Advanced Industrial Science and Technology (AIST); <sup>3</sup>Keio University

ADDITIVE MANUFACTURING

**Additive Manufacturing Keynote Session — Additive Manufacturing Keynote Session**

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizer:** Joy Gockel, Colorado School of Mines

**Monday PM | March 24, 2025**  
**120 | MGM Grand**

**Session Chair:** Joy Gockel, Colorado School of Mines

**2:00 PM Introductory Comments**

**2:05 PM Keynote**

**America Makes Accelerating AM Technology Maturation and Integration:** *Brandon Ribic*<sup>1</sup>; <sup>1</sup>America Makes

**2:35 PM Keynote**

**Electron Beam Powder Bed Fusion: Past, Present, and Future Directions in Microstructure Control and Refractory Metal Processing:** *Tim Horn*<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:05 PM Keynote**

**Physics-Based AI-Assisted Design and Control in Metal Additive Manufacturing:** *Jian Cao*<sup>1</sup>; <sup>1</sup>Northwestern University

**3:35 PM Highlight:** Dave Bourell Honorary Symposia

**3:45 PM Break**

**4:05 PM Highlight:** Anthony Rollett Honorary Symposia

**4:15 PM Keynote**

**Reinventing Industrial Workhorse Alloys Through Additive Manufacturing with Break Through Performance:** *Youping Gao*<sup>1</sup>; <sup>1</sup>Castheon, Inc

**4:45 PM Keynote**

**TMS Young Innovator in the Materials Science of Additive Manufacturing Award: Unlocking the Hidden Potential of Additive Manufacturing: Microstructure Control and Material Innovation:** *Atieh Moridi*<sup>1</sup>; <sup>1</sup>Cornell University

ADVANCED CHARACTERIZATION METHODS

**Advanced Characterization Techniques for Quantifying and Modeling Deformation — Dislocations and TKD**

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tسان, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

**Monday PM | March 24, 2025**  
**122 | MGM Grand**

**Session Chairs:** Ben Britton, University of British Columbia; Marc De Graef, Carnegie Mellon University

**2:00 PM**

**Revealing Dislocations Using Electron Channeling Contrast Imaging and Diffraction in Olivine:** Muhammad Qaisar<sup>1</sup>; Jessica White<sup>2</sup>; David Wallis<sup>2</sup>; *Thomas Britton*<sup>1</sup>; <sup>1</sup>University of British Columbia; <sup>2</sup>University of Cambridge

2:20 PM

**The Influence of Yttrium Segregation on the Grain Boundary Plasticity of Polycrystalline Mg Alloys Using Nanoindentation and In Situ SEM Tensile Testing Combined with HR-EBSD:** *Eunji Song<sup>1</sup>; Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan*

2:40 PM

**Transmission Electron Microscopy Characterization of Deformation Features in Refractory High Entropy Alloys:** *Madelyn Payne<sup>1</sup>; David Cook<sup>1</sup>; Punit Kumar<sup>1</sup>; Pedro Borges<sup>1</sup>; Wenqing Wang<sup>1</sup>; Mingwei Zhang<sup>1</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; Andrew Minor<sup>1</sup>; <sup>1</sup>University of California Berkeley/LBNL*

3:00 PM

**An Integrated Experimental - PRISMS-Plasticity Study of Geometrically Necessary Dislocation Density Development in Mg Alloys:** *Michael Pilipchuk<sup>1</sup>; Tracy Berman<sup>1</sup>; John Allison<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; <sup>1</sup>University of Michigan*

3:20 PM

**Three-Dimensional Discrete Dislocation Dynamics Simulations in Pure Titanium:** *Ruidong Mei<sup>1</sup>; Jaafar EL-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University*

3:40 PM Break

4:00 PM

**In-Situ TKD Nano-tensile Testing: Unveiling Nanoscale Crystal Plasticity, TWIP, and TRIP:** *Tijmen Vermeij<sup>1</sup>; Amit Sharma<sup>1</sup>; Johann Michler<sup>1</sup>; Xavier Maeder<sup>1</sup>; <sup>1</sup>EMPA*

4:20 PM

**Observation of As-Quenched DU-6wt%Nb Microstructure by Transmission Kikuchi Diffraction:** *Christian Walters<sup>1</sup>; Rodney McCabe<sup>2</sup>; Matthew Schneider<sup>2</sup>; Daniel Savage<sup>2</sup>; Donald Brown<sup>2</sup>; Elena Garlea<sup>3</sup>; Sean Agnew<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Y-12 National Security Complex*

4:40 PM

**Texture Based Reference Frame Alignment:** *Will Lenthe<sup>1</sup>; James Lamb<sup>2</sup>; McLean Echlin<sup>1</sup>; Stuart Wright<sup>1</sup>; Matt Nowell<sup>1</sup>; Tresa Pollock<sup>2</sup>; <sup>1</sup>Gatan / EDAX; <sup>2</sup>University of California, Santa Barbara*

5:00 PM

**How to Make Material Textures Amenable to Analysis by Neural Networks:** *Marc De Graef<sup>1</sup>; <sup>1</sup>Carnegie Mellon University*

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Engineering of Solid Oxide Cells (SOCs)

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

Monday PM | March 24, 2025  
356 | MGM Grand

**Session Chairs:** Adam Powell, Worcester Polytechnic Institute; Stephen Sofie, Montana State University

2:00 PM Keynote

**Materials Interfacial Stability In Solid Oxide Cells:** *Scott Barnett<sup>1</sup>; <sup>1</sup>Northwestern University*

2:30 PM Invited

**Direct Carbon Fuel Cell with Liquid Fe-Mn-Sn-Based Alloy Anode:** *Adam Powell<sup>1</sup>; Jacob Fleischer<sup>1</sup>; Casey LaMarca<sup>1</sup>; Eric Aimone<sup>1</sup>; Christopher Pandapas<sup>1</sup>; Matthew Ford<sup>1</sup>; Yu Zhong<sup>1</sup>; Uday Pal<sup>2</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Boston University*

2:55 PM Invited

**Unveiling the High-Temperature Degradation Mechanism of Solid Oxide Electrolysis Cells Through Direct Imaging of Nanoscale Interfacial Phenomena:** *Kyung Joong Yoon<sup>1</sup>; <sup>1</sup>Kist*

3:20 PM

**Enhanced Mechanical Toughness in LLZO Solid Electrolytes Through Phase Transformation:** *Stephen Heywood<sup>1</sup>; Matthew Lessmeier<sup>1</sup>; David Driscoll<sup>1</sup>; Stephen Sofie<sup>1</sup>; <sup>1</sup>Montana State University*

3:40 PM Break

3:55 PM

**Onto the Process of Scandium Doped Zirconia Phase Decomposition During Solid Oxide Fuel Cell Operation:** *Julian Escobar<sup>1</sup>; Matthew Olszta<sup>1</sup>; Danny Edwards<sup>1</sup>; Elango Elangovan<sup>2</sup>; Tyler Hafen<sup>2</sup>; Jenna Pike<sup>2</sup>; Mark Bowden<sup>1</sup>; Olga Marina<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>OxEn Energy*

4:15 PM

**In-Situ Formed Ni Conjugated Nanoparticles for the Anode of Ammonia Solid Oxide Fuel Cells:** *Jong-Eun Hong<sup>1</sup>; Keejung Kim<sup>1</sup>; Dong Woo Joh<sup>1</sup>; Hye-Sung Kim<sup>1</sup>; Tak-Hyoung Lim<sup>1</sup>; Seok-Joo Park<sup>1</sup>; Rak-Hyun Song<sup>1</sup>; <sup>1</sup>Korea Institute of Energy Research*

4:35 PM

**Local and Global Structural Effects of Doping on Ionic Conductivity in Na<sub>3</sub>SbS<sub>4</sub> Solid Electrolyte:** *Cheng-Wei Lee<sup>1</sup>; Mayu Maegawa<sup>2</sup>; Hirofumi Akamatsu<sup>2</sup>; Katsuro Hayashi<sup>2</sup>; Saneyuki Ohno<sup>3</sup>; Prashun Gorai<sup>4</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Kyushu University; <sup>3</sup>Tohoku University; <sup>4</sup>Rensselaer Polytechnic Institute*

4:55 PM

**Carbon Fiber Electrodes: A Scalable Solution for Nickel Recovery from Industrial Wastewater:** *Annu Pandey<sup>1</sup>; Richard Olsson<sup>1</sup>; <sup>1</sup>KTH – Royal Institute of Technology*

## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging — Emerging Imaging Techniques

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Jinichiro Nakano, MatterGreen; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Noritaka Saito, Kyushu University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; Pranjal Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

Monday PM | March 24, 2025  
156 | MGM Grand

**Session Chair:** Jinichiro Nakano, MatterGreen

2:00 PM Invited

**Exploring the Applications of Contact-Mode High-Speed AFM:** *Stacy Moore<sup>1</sup>; Tomas Martin<sup>1</sup>; Tom Scott<sup>1</sup>; Oliver Payton<sup>2</sup>; Loren Picco<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>Bristol Nano Dynamics*

#### 2:20 PM Invited

**Accelerating Plasma and Radiation Surface Science Using Transient Grating Spectroscopy:** *Angus Wylie<sup>1</sup>; Kevin Woller<sup>1</sup>; Max Rae<sup>1</sup>; Andrew Lanzrath<sup>1</sup>; Benjamin Dacus<sup>1</sup>; Sara Ferry<sup>1</sup>; Michael Short<sup>1</sup>*; <sup>1</sup>Massachusetts Institute of Technology

#### 2:40 PM

**Micropartic Impact and Ignition in High-Pressure Oxygen:** *Spencer Taylor<sup>1</sup>; Zachary Cordero<sup>1</sup>*; <sup>1</sup>Massachusetts Institute of Technology

#### 3:00 PM

**Ultra-High Strain Rate Impact Response of Polyethylene at Critical Transition Temperatures:** *Jacob Rogers<sup>1</sup>; Aniket Mote<sup>1</sup>; Sidney Davis<sup>1</sup>; Paul Mead<sup>1</sup>; Charles Pittman<sup>2</sup>; Edwin Thomas<sup>1</sup>; Justin Wilkerson<sup>1</sup>; Thomas Lacy Jr<sup>1</sup>*; <sup>1</sup>Texas A&M University; <sup>2</sup>Mississippi State University

### MATERIALS SYNTHESIS AND PROCESSING

#### Advances in Bcc-Super alloys — Modelling & Phase Stability

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Alexander Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Howard Stone, University of Cambridge; Oleg Senkov, Air Force Research Laboratory; Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

**Monday PM | March 24, 2025**  
**102 | MGM Grand**

**Session Chairs:** Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

#### 2:00 PM Invited

**Stability and Slip Mechanisms of B2 Phases in Refractory Alloys:** *Junxin Wang<sup>1</sup>; Maryam Ghazisaeidi<sup>1</sup>*; <sup>1</sup>Ohio State University

#### 2:30 PM

**Atomistic Simulation of Dislocation Behavior in a Model BCC-B2 Alloy Using Machine Learning Interatomic Potentials:** *Junxin Wang<sup>1</sup>; Maryam Ghazisaeidi<sup>1</sup>*; <sup>1</sup>Ohio State University

#### 2:50 PM

**Atomistic Simulations of Cr-Si Alloys:** *Thomas Hammerschmidt<sup>1</sup>*; <sup>1</sup>Ruhr University Bochum

#### 3:10 PM Invited

**Thermodynamics and Phase Transformation Pathways in BCC-B2 Refractory Super alloys:** *Eric Lass<sup>1</sup>*; <sup>1</sup>University of Tennessee-Knoxville

#### 3:40 PM Break

#### 4:00 PM Invited

**Interaction of Cr-Si-Base Alloys with Ceramics at High Temperatures:** *Lucas Pelchen<sup>1</sup>; Giulia Bianchi<sup>2</sup>; Maren Lepple<sup>2</sup>; Anke Ulrich<sup>1</sup>*; <sup>1</sup>University of Bayreuth; <sup>2</sup>Justus Liebig University Giessen

#### 4:20 PM

**Recent Improvements in BCC-Based Alloy Prediction Capabilities in Thermo-Calc Software and Databases:** *Carl-Magnus Lancelot<sup>1</sup>; Huahai Mao<sup>1</sup>; Reza Naraghi<sup>1</sup>; Paul Mason<sup>2</sup>*; <sup>1</sup>Thermo-Calc Software AB; <sup>2</sup>Thermo-Calc Software Inc

#### 4:40 PM

**Stability of Undesired Al<sub>x</sub>Zr<sub>y</sub> Ordered Omega Phases in Al-Containing Refractory High Entropy Super alloys:** *Vishal Soni<sup>1</sup>; Advika Chesetti<sup>1</sup>; SriSwaroop Dasari<sup>2</sup>; Abhishek Sharma<sup>1</sup>; Oleg Senkov<sup>3</sup>; Daniel Miracle<sup>4</sup>; Rajarshi Banerjee<sup>1</sup>*; <sup>1</sup>University of North Texas; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>MRL Materials Resources LLC; <sup>4</sup>Air Force Research Laboratory

#### 5:00 PM

**High Entropy Super alloys in Advanced Modular Reactors:** *Cameron Youssefian<sup>1</sup>; Alexander Knowles<sup>1</sup>; Alex Cackett<sup>2</sup>*; <sup>1</sup>University of Birmingham; <sup>2</sup>National Nuclear Laboratory

### MATERIALS SYNTHESIS AND PROCESSING

#### Advances in Ceramic Materials and Processing — Ultra-High Temperature Ceramics

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

**Monday PM | March 24, 2025**  
**106 | MGM Grand**

**Session Chairs:** Babak Anasori, Purdue University; Eugene Olevsky, San Diego State University

#### 2:00 PM Invited

**Advances in Synthesis, Assembly, and Performance of MXenes for Energy Storage Applications:** *Majid Beidaghi<sup>1</sup>*; <sup>1</sup>University of Arizona

#### 2:20 PM Invited

**Synthesis and Application of Two-Dimensional Transition Metal Carbo-Chalcogenides (TMCCs):** *Michael Naguib<sup>1</sup>*; <sup>1</sup>Tulane University

#### 2:40 PM

**Very High Cycle Fatigue of a SiC/SiC Ceramic Matrix Composite at 1000°C:** *Mathieu Calvat<sup>1</sup>; Jonathan Cormier<sup>2</sup>; Yannick Pannier<sup>2</sup>; Florent Maugé<sup>2</sup>*; <sup>1</sup>University of Illinois at Urbana Champaign; <sup>2</sup>Institut Pprime

#### 3:00 PM

**Pushing Performance With High Temperature Composite Material Solutions:** *Andrew Giles<sup>1</sup>; Christian Deck<sup>1</sup>; David Frazer<sup>1</sup>; Sean Gonderman<sup>1</sup>; Hesham Khalifa<sup>1</sup>; Alden Moore<sup>1</sup>*; <sup>1</sup>General Atomics

#### 3:20 PM Break

#### 3:30 PM Invited

**Gas-Phase MXene Synthesis via Dry Halide-Based Etching:** *Benjamin Davis<sup>1</sup>; Hyunho Kim<sup>1</sup>; Yury Gogotsi<sup>1</sup>*; <sup>1</sup>Drexel University

#### 3:50 PM Invited

**Synthesis of Cost-Effective and Environmentally Stable Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXenes for Various Practical Electronic Applications:** *Chong Min Koo<sup>1</sup>*; <sup>1</sup>Sungkyunkwan University

#### 4:10 PM

**MXenes as 2D Nanoceramic Additives in Silicon Carbide Matrices for High-Temperature Applications:** *Nithin Chandran<sup>1</sup>; S. Kartik Nemani<sup>1</sup>; Brian Wyatt<sup>1</sup>; Babak Anasori<sup>1</sup>*; <sup>1</sup>Purdue University



4:30 PM

**Challenges for the Refractory Industry by Usage of Hydrogen as Reductant in Industrial Processes: An Investigative Laboratory Test Study:** *Lukas Konrad*<sup>1</sup>; Efstathios Kyrilis<sup>1</sup>; Daniela Gavagnin<sup>1</sup>; Erick Estrada Ospino<sup>1</sup>; Philip Schantl<sup>1</sup>; <sup>1</sup>RHI Magnesita

4:50 PM

**The Morphological and Compositional Stability of Nanoporous UHTCs During Fabrication From Metallic Precursors:** *Catherine Ott*<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

5:10 PM

**Test Method for High-Throughput, 4 Point Bend Testing at Temperatures up to 2500C:** *Brian Allen*<sup>1</sup>; <sup>1</sup>Dynamic Systems Inc.

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — New Permanent Magnet Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

**Monday PM | March 24, 2025**  
**363 | MGM Grand**

**Session Chairs:** Frank Johnson, Niron Magnetics, Inc.; Laura Lewis, Northeastern University

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2:00 PM Invited

**High-Throughput Design and Discovery of Novel Magnetic Nitrides:** *Rebecca Smaha*<sup>1</sup>; <sup>1</sup>National Renewable Energy Lab

2:30 PM Invited

**Iron Nitride Permanent Magnets:** *Frank Johnson*<sup>1</sup>; <sup>1</sup>Niron Magnetics, Inc.

3:00 PM

**Magnetic Model Informed Design of Architected Permanent Magnets for Electric Machines:** *David Smith*<sup>1</sup>; Brennan Yahata<sup>1</sup>; Adam Gross<sup>1</sup>; Chris Henry<sup>1</sup>; Alireza Fatemi<sup>2</sup>; Thomas Nehl<sup>2</sup>; <sup>1</sup>HRL Laboratories; <sup>2</sup>General Motors

3:20 PM Break

3:40 PM Invited

**Sustainable Magnets for Green Energy:** *Pelin Tozman*<sup>1</sup>; Konstantin Skokov<sup>1</sup>; Alex Aubert<sup>1</sup>; Semih Ener<sup>1</sup>; Imants Dirba<sup>1</sup>; Fernando Maccari<sup>1</sup>; Oliver Gutfleisch<sup>1</sup>; <sup>1</sup>Technical University of Darmstadt

4:10 PM

**New Fe-rich Ferromagnets Without Critical Elements:** *Akila Raja*<sup>1</sup>; Olena Palasyuk<sup>1</sup>; Deborah Schlagel<sup>1</sup>; Andriy Palasyuk<sup>1</sup>; <sup>1</sup>Ames National Laboratory

4:30 PM

**Structural, Magnetic and Mechanical Characterization of Fe-Co-Ni-B-Ti Powder Medium-Entropy Alloys:** *Lukasz Hawelek*<sup>1</sup>; Krzysztof Pecak<sup>1</sup>; Anna Czech<sup>1</sup>; Anna Wojcik<sup>2</sup>; Robert Chulist<sup>2</sup>; Wojciech Maziarz<sup>2</sup>; Maciej Kowalczyk<sup>1</sup>; Tymon Warski<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals; <sup>2</sup>Institute of Metallurgy and Materials Science Polish Academy of Sciences

4:50 PM

**Investigation of Magnetron Sputtered Al<sub>0.25</sub>CrFeCoNi Thin Films for Enhanced Magnetic Properties:** *Md Imran Noor*<sup>1</sup>; Tibra Das Gupta<sup>1</sup>; Aastha Vasdev<sup>1</sup>; Michael Detisch<sup>1</sup>; Lance De Long<sup>1</sup>; William J. Gannon<sup>1</sup>; Thomas John Balk<sup>1</sup>; J. Todd Hastings<sup>1</sup>; Paul F. Rottmann<sup>1</sup>; <sup>1</sup>University of Kentucky

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Materials Deposition by Cold Spray and Related Technologies — Process Development and Optimization II

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Materials Characterization Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Tanaji Paul, Florida International University; Yu Zou, University of Toronto; Maniya Aghasibeig, National Research Council Canada; Aaron Nardi, Vrc Metal Systems, LLC; Pin Lu, Solvus Global

**Monday PM | March 24, 2025**  
**103 | MGM Grand**

**Session Chairs:** Tanaji Paul, Florida International University; Maniya Aghasibeig, National Research Council Canada

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2:00 PM

**Oil and Gas Pipelines Repair by High Pressure Cold Spray Technology:** Mehand Tebib<sup>1</sup>; Francesco Delloro<sup>1</sup>; Yazid Madi<sup>1</sup>; Abdenour Meddour<sup>1</sup>; Abdesslem Hayat<sup>2</sup>; Caminde Fabas<sup>3</sup>; Hervé Marchebois<sup>4</sup>; *Alain Reiser*<sup>5</sup>; <sup>1</sup>Ecole des Mines de Paris; <sup>2</sup>GRT Gaz; <sup>3</sup>Vallourec; <sup>4</sup>Totalenergies; <sup>5</sup>KTH Royal Institute of Technology

2:20 PM

**Cold-Spray Welding and Direction for Future Optimization:** *Muhammad Zia ud din Urf Umer*<sup>1</sup>; Ahmed Alade Tiamiyu<sup>1</sup>; <sup>1</sup>University of Calgary

2:40 PM Invited

**Properties of As-Sprayed and Thermally Processed Cold Spray Deposited Materials Using Multiple Gas Compositions:** *Aaron Nardi*<sup>1</sup>; Marius Ellingsen<sup>1</sup>; David Brennan<sup>1</sup>; Quentin Goley<sup>1</sup>; Quenten Dean<sup>1</sup>; <sup>1</sup>VRC Metal Systems, LLC

3:10 PM Break

3:30 PM

**Understanding Cr Cold Spray Coating Deposition on Zr-Alloy Substrate:** *Evan Willing*<sup>1</sup>; Tyler Dabney<sup>1</sup>; Kasturi Sasidhar<sup>1</sup>; Kumar Sridharan<sup>1</sup>; Ben Maier<sup>2</sup>; Nicholas Pocquette<sup>2</sup>; Katerina Frederick<sup>2</sup>; Hwasung Yeom<sup>3</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Westinghouse Electric Company; <sup>3</sup>Pohang University

3:50 PM

**Enhancement of Properties in Nitrogen-Based Cold-Sprayed Niobium Deposits:** Solomen Azu<sup>1</sup>; *Rajashekara Sarvesha*<sup>1</sup>; James Caudill<sup>1</sup>; Adolfo Blassino<sup>2</sup>; Isaac Nault<sup>2</sup>; Ibrahim Jawahir<sup>1</sup>; <sup>1</sup>University of Kentucky; <sup>2</sup>DEVCOM US Army Research Laboratory

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Alloy Development and Application II

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brecht, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Monday PM | March 24, 2025**  
**368 | MGM Grand**

**Session Chairs:** Eric Lass, University of Tennessee-Knoxville; Raymundo Arroyave, Texas A&M University

**2:00 PM Invited**

**Disordered Enthalpy-Entropy Descriptor for High-Entropy Ceramics Discovery:** *Stefano Curtarolo*<sup>1</sup>; <sup>1</sup>Duke University

**2:20 PM Invited**

**From High-Entropy Ceramics (HECs) to Compositionally Complex Ceramics (CCCs): A Review and New Perspective:** *Jian Luo*<sup>1</sup>; <sup>1</sup>University of California, San Diego

**2:40 PM Invited**

**100+ Fold Acceleration in Multi-Objective Alloy Development: Application of the BIRDSHOT Framework to the Efficient Exploration of FCC HEA Alloy Spaces:** *Raymundo Arroyave*<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:00 PM Invited**

**Large-Language Model-Assisted High Entropy Alloy Design: Knowledge Transfer and Hypothesis Generation:** Quanliang Liu<sup>1</sup>; Maciej Polak<sup>1</sup>; So Yeon Kim<sup>2</sup>; MD Al Amin Shuvo<sup>1</sup>; Hrishikesh Deodhar<sup>1</sup>; Jeongsoo Han<sup>1</sup>; Dane Morgan<sup>1</sup>; *Hyunseok Oh*<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison; <sup>2</sup>Massachusetts Institute of Technology

**3:20 PM**

**Achieving High Strength and Ductility in Single-Phase Refractory Multi-Principle-Element Alloys via DFT-Guided Tailoring of Chemical Short-Range Order:** *Hailong Huang*<sup>1</sup>; Prashant Singh<sup>1</sup>; Duane D Johnson<sup>2</sup>; Gaoyuan Ouyang<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Ryan Ott<sup>1</sup>; Rajarshi Banerjee<sup>3</sup>; Vishal Soni<sup>3</sup>; Thomas Scharf<sup>3</sup>; Nicolas Argibay<sup>1</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University; <sup>3</sup>University of North Texas

**3:40 PM Break**

**4:00 PM Invited**

**Composition Design of Refractory High-Entropy Alloys with Machine Learning Models:** *Haixuan Xu*<sup>1</sup>; <sup>1</sup>University of Tennessee

**4:20 PM Invited**

**Unexpected Intermetallic Plasticity Within Lightweight, Low Cost, and Corrosion-Resistant Compositionally Complex Alloys (CCAs) Containing FCC and L21 Heusler Phases:** *Sean Agnew*<sup>1</sup>; Mark Wischhusen<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; <sup>1</sup>University of Virginia

**4:40 PM Invited**

**The Thermodynamics of Mechanical Behavior in BCC Refractory Compositionally Complex Alloys:** *Eric Lass*<sup>1</sup>; <sup>1</sup>University of Tennessee-Knoxville

**5:00 PM**

**Design of L12 Precipitation-Strengthened Face-Centered-Cubic High-Entropy Alloys:** *Xuesong Fan*<sup>1</sup>; Michael Gao<sup>2</sup>; Jonathan Poplawsky<sup>3</sup>; Yan Chen<sup>3</sup>; Dunji Yu<sup>3</sup>; Ke An<sup>3</sup>; Chuan Zhang<sup>4</sup>; Lizhi Ouyang<sup>5</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>National Energy Technology Laboratory; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>CompuTherm, LLC; <sup>5</sup>Tennessee State University

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VII — Advances in Surface Engineering: Session II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Ning Zhu, Baylor University

**Monday PM | March 24, 2025**  
**107 | MGM Grand**

**Session Chair:** Avik Samanta, University of South Florida

**2:00 PM Introductory Comments**

**2:05 PM**

**Cleanability Testing of Fluoropolymer Linings to Combat Corrosion in Pharmaceutical Applications:** *Lucas Bolster*<sup>1</sup>; Drew Klaus<sup>2</sup>; George Fisher<sup>2</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Fisher Company

**2:25 PM**

**Pattern Formation via the Oriented Growth of Au-Si Thin Films on Si(001) Substrate:** *Rotem Zilberberg*<sup>1</sup>; Iryna Polishchuk<sup>1</sup>; Lotan Portal<sup>1</sup>; Silvia Milita<sup>2</sup>; Giuseppe Falini<sup>3</sup>; Alexander Katsman<sup>1</sup>; Boaz Pokroy<sup>1</sup>; <sup>1</sup>Technion - Israel Institute of Technology; <sup>2</sup>CNR-Institute for Microelectronic and Microsystems; <sup>3</sup>University of Bologna

**2:45 PM**

**Increase in Mechanical, Tribological, Anticorrosive and Bactericidal Properties in DLC Coatings with the Incorporation of Silver Nanoparticles:** Leidy Guamanga<sup>1</sup>; Jesús Gutiérrez<sup>2</sup>; Katia Conceição<sup>2</sup>; *Ariel Capote Sanchez*<sup>3</sup>; Gil Capote<sup>1</sup>; <sup>1</sup>Universidad Nacional de Colombia; <sup>2</sup>Universidade Federal de São Paulo; <sup>3</sup>University of Southern California

**3:05 PM**

**Harvesting Dislocations and Deformation Twin Traces for Auto-Catalytic Growth of Semiconductors on Surfaces of Gold Alloys and Gold Thin-Films:** Lotan Portal<sup>1</sup>; *Boaz Pokroy*<sup>1</sup>; <sup>1</sup>Technion Israel Institute of Technology

**3:25 PM**

**Graphene Nanocomposite Films on Carbon-Coated Metals: A Path to Macroscale Superlubricity:** *Tabiri Asumadu*<sup>1</sup>; Winston Soboyejo<sup>1</sup>; Nima Rahbar<sup>1</sup>; Desmond Klenam<sup>1</sup>; Mobin Vandadi<sup>1</sup>; Kwadwo Mensah-Darkwa<sup>1</sup>; Samuel Kwofie<sup>1</sup>; Emmanuel Gikunoo<sup>1</sup>; <sup>1</sup>SUNY Polytechnic Institute

**3:45 PM Break**

**4:00 PM**

**A Comparative Study of Surface Hardening Using WC-Co and WC-CrMnFeCoNi HEA Cemented Carbides Formed by the Multi-Beam Laser Directed Energy Deposition:** *Takahiro Kunimine*<sup>1</sup>; Kaito Ebihara<sup>1</sup>; Guo Wenheng<sup>1</sup>; Yorihiro Yamashita<sup>2</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>University of Fukui

**4:20 PM**

**Unlocking Tribological Performance of Silver-Infused Cu-AL2O3 Self-Lubricating Cermet:** *Subin Antony Jose*<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

## Advances in Titanium Technology — Metastable Beta Titanium Alloys II

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

**Monday PM | March 24, 2025**  
**108 | MGM Grand**

**Session Chair:** Zachary Kloenne, Imperial College London

### 2:00 PM Invited

**Microstructure Engineering in Metastable Beta Titanium Alloys:** Dian Li<sup>1</sup>; Sydney Fields<sup>1</sup>; Deepak Pillai<sup>1</sup>; Rongpei Shi<sup>2</sup>; Stoichko Antonov<sup>3</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Harbin Institute of Technology; <sup>3</sup>National Energy Technology Laboratory

### 2:30 PM Invited

**TWIP Effect in Beta Metastable Ti and Zr Alloys: Comparison of the Microstructures and the Deformation Mechanisms:** Fan Sun<sup>1</sup>; Bingnan Qian<sup>1</sup>; Junhui Tang<sup>1</sup>; Philippe Vermaut<sup>1</sup>; Frédéric Prima<sup>1</sup>; Rajarshi Banerjee<sup>2</sup>; Sucharita Banerjee<sup>3</sup>; Agata Sotniczuk<sup>4</sup>; Philippe Castany<sup>5</sup>; Witold Chrominski<sup>6</sup>; Nicolas Jobit<sup>5</sup>; Thierry Gloriant<sup>5</sup>; <sup>1</sup>Chimie-Paristech, IRCP, PSL University; <sup>2</sup>University of North Texas, Denton; <sup>3</sup>University of Texas, Austin; <sup>4</sup>NOMATEN Centre of Excellence, National Centre for Nuclear Research; <sup>5</sup>INSA-Rennes; <sup>6</sup>Warsaw University of Technology

### 3:00 PM

**The Role of Heat Treatment on Microstructure Evolution and Dynamic Compression Behavior of Additively Manufactured and Wrought Ti-5553:** Finn Bamrud<sup>1</sup>; Tulika Dixit<sup>1</sup>; Robin Montoya<sup>2</sup>; Erik Rogoff<sup>3</sup>; Kester Clarke<sup>4</sup>; Leslie Lamberson<sup>1</sup>; Amy Clarke<sup>4</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>ATI Speciality Materials; <sup>4</sup>Los Alamos National Laboratory; Colorado School of Mines

### 3:20 PM

**The Effect of Fe on the Nanoscale Inhomogeneities in Ti-Fe Alloy:** Deepak Pillai<sup>1</sup>; Sydney Fields<sup>1</sup>; Merbin John<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas

## AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Non-Metallic and Functional Materials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Monday PM | March 24, 2025**  
**320 | MGM Grand**

**Session Chair:** Kamal Choudhary, National Institute of Standards and Technology

### 2:00 PM Invited

**Accelerating Semiconductor Design with DFT and Deep Learning: Multiscale Modeling with Quantum Mechanical Accuracy:** Daniel Wines<sup>1</sup>; Brian DeCost<sup>1</sup>; Kamal Choudhary<sup>1</sup>; <sup>1</sup>NIST

### 2:40 PM

**A Materials Informatics Approach to Quantify Processing – Structure – Property Relationship in Boron Carbide Ceramics:** Omer Gokhan Tarman<sup>1</sup>; Irmak Sargin<sup>1</sup>; <sup>1</sup>Middle East Technical University

### 3:00 PM

**Minimizing Hysteresis in NiTi-Based Non-Platinum Group Metal (PGM) High Temperature Shape Memory Alloys via Experimentally Validated Neural Network Machine Learning:** Tayler Sundermann<sup>1</sup>; John Broucek<sup>2</sup>; Ben Brown<sup>3</sup>; Ibrahim Karaman<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Texas A&M University; <sup>3</sup>Kansas City National Security Campus

### 3:20 PM Break

### 3:40 PM

**A Complete AI-Accelerated Workflow for Superconductor Discovery:** Jason Gibson<sup>1</sup>; Ajinkya Hire<sup>1</sup>; Benjamin Geisler<sup>1</sup>; Phil Dee<sup>1</sup>; Peter Hirschfeld<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

### 4:00 PM

**Borides as Promising M2AX Phase Materials with High Elastic Modulus Using Machine Learning and Optimization:** Ashwin Mhadeshwar<sup>1</sup>; Trupti Mohanty<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

### 4:20 PM

**Data-Driven Assessment and Selection of Magnetocaloric Materials by Grey Relational Analysis:** Tanjore Jayaraman<sup>1</sup>; <sup>1</sup>United States Air Force Academy

### 4:40 PM

**Digital Twin Application for Carbon Fiber Reinforced Polymer Composite Manufacturing:** Yuksel Yabansu<sup>1</sup>; Tiffany Stewart<sup>1</sup>; David Shahan<sup>1</sup>; Gwen Gross<sup>2</sup>; Andrew Bauer<sup>2</sup>; <sup>1</sup>HRL Laboratories, LLC; <sup>2</sup>The Boeing Company

### 5:00 PM

**Novel Superhard Materials Synthesis Using Generative ML:** Lavanya Mohnnani<sup>1</sup>; Taylor Sparks<sup>1</sup>; Michael Alverson<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Google

## Algorithms Development in Materials Science and Engineering — Algorithms and Methods for Manufacturing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Monday PM | March 24, 2025**  
**319 | MGM Grand**

**Session Chairs:** Sam Reeve, Oak Ridge National Laboratory; Saaketh Desai, Sandia National Laboratories

### 2:00 PM

**Toucan: Revolutionizing Grain Growth Simulations with Parallel-in-Time Scalability:** *Benjamin Stump*<sup>1</sup>; Samuel Reeve<sup>2</sup>; Matthew Rolchigo<sup>3</sup>; Daniel Arndt<sup>4</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 2:20 PM

**Development of Interoperable Process-Structure-Property Simulation Workflows of Additive Manufacturing Using the "Materialize" Framework:** *Brodan Richter*<sup>1</sup>; Joshua Pribe<sup>2</sup>; George Weber<sup>3</sup>; Edward Glaessgen<sup>4</sup>; <sup>1</sup>NASA Langley Research Center; <sup>2</sup>Analytical Mechanics Associates

### 2:40 PM

**3D Surrogate Modeling of Elasto-Viscoplastic FFT Simulations for Porosity-Driven Fatigue Prediction in Additive Manufacturing:** *Daniel Diaz*<sup>1</sup>; Xingyang Li<sup>2</sup>; Elizabeth Holm<sup>3</sup>; Anthony Rollett<sup>4</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>University of Michigan

### 3:00 PM

**Elastic Strain Coupling in DFT-Informed Kinetic Monte Carlo Simulation of Multiphase Thin Film Growth:** *Anter El-Azab*<sup>1</sup>; Ahmad Ahmad<sup>2</sup>; <sup>1</sup>Purdue University

### 3:20 PM

**Leveraging Increasingly Complex Test Artifacts to Accelerate Materials Development: Additively Manufactured Aluminum Metal Matrix Composites:** *Jamila Khanfri*<sup>1</sup>; Alex Butler<sup>2</sup>; Aaron Stebner<sup>3</sup>; Animesh Chhotaray<sup>4</sup>; <sup>1</sup>Georgia Institute of Technology

### 3:40 PM Break

### 4:00 PM

**Optimizing Material Compositions Using an Ising Model-Based Annealing Method:** *Yoshishige Okuno*<sup>1</sup>; Suguru Sakaguchi<sup>2</sup>; <sup>1</sup>Resonac Corporation

### 4:20 PM

**Revealing Features in Kikuchi Patterns to Predict Plastic Deformation Localization Differences Between Wrought and Additively Manufactured Metallic Materials:** *Mathieu Calvat*<sup>1</sup>; Christopher Bean<sup>2</sup>; Jean-Charles Stinville<sup>3</sup>; <sup>1</sup>University of Illinois at Urbana Champaign

### 4:40 PM

**Phase Field Simulation of Crystal Facet Growth of Diamonds Using MFEM Software:** *Xiaotian Hua*<sup>1</sup>; Sergey Baryshev<sup>2</sup>; Rebecca Anthony<sup>3</sup>; Hui-Chia Yu<sup>4</sup>; <sup>1</sup>Michigan State University

## Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Innovations in Thermoelectric Materials and Device Design

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

**Monday PM | March 24, 2025**  
**355 | MGM Grand**

**Session Chairs:** Takao Mori, National Institute for Materials Science; Philippe Jund, Montpellier University

### 2:00 PM Invited

**Development of Various Forms of Thermoelectric Devices with Novel Materials:** *Takao Mori*<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

### 2:20 PM Invited

**Calcium-Manganate Oxides for Thermoelectric Energy Harvesting: Charge and Heat Transport Mechanisms:** *Yaron Amouyal*<sup>1</sup>; <sup>1</sup>Technion - Israel Institute of Technology

### 2:40 PM Invited

**Carbogel Based Vacuum Insulation Panels for Large Scale Thermoelectric Application:** *Shoeb Athar*<sup>1</sup>; Jérémy Guazzagaloppa<sup>2</sup>; Philippe Jund<sup>3</sup>; <sup>1</sup>Montpellier University; <sup>2</sup>Hutchinson

### 3:00 PM

**Unexpected Interfacial Reactions in Co/BiTe and Co/GeTe Couples:** *Cheng-Hsi Ho*<sup>1</sup>; Jia-Ruei Chang<sup>2</sup>; Hong-Dian Chiang<sup>3</sup>; Sinn-wen Chen<sup>4</sup>; <sup>1</sup>National Tsing Hua University

### 3:20 PM Break

### 3:40 PM Invited

**New Efficient Half-Heusler Compositions from Machine Learning, DFT Calculations and Experiments:** *Philippe Jund*<sup>1</sup>; Shoeb Athar<sup>1</sup>; <sup>1</sup>Montpellier University

### 4:00 PM Invited

**Novel Elaboration Route for Thermoelectric Legs Shaping: The Case of p-Type Higher Manganese Silicide and the Impact of the Geometry:** *Yohann Thimont*<sup>1</sup>; Alexia Mortagne Coderch<sup>1</sup>; Geoffroy Chevalier<sup>2</sup>; Benjamin Duployer<sup>3</sup>; Amélie Galodé<sup>2</sup>; David Berthebaud<sup>3</sup>; Franck Gascoin<sup>2</sup>; Lionel Presmanes<sup>1</sup>; <sup>1</sup>CIRIMAT UMR 5085 UPS-CNRS-INP, Institut Carnot, Université Toulouse III Paul SABATIER; <sup>2</sup>CRISMAT, ENSICAEN, UNICAEN, CNRS Normandie Université (UMR 6508); <sup>3</sup>Institut des Matériaux de Nantes Jean Rouxel, CNRS - Nantes Université

### 4:20 PM Invited

**Progress in Doping Mg<sub>3</sub>Sb<sub>2</sub> for P-Type Zintl Thermoelectrics:** *Nagendra Chauhan*<sup>1</sup>; Takao Mori<sup>2</sup>; <sup>1</sup>NIMS, Japan



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## LIGHT METALS

### Alumina and Bauxite — Bauxite and Alumina I

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Efthymios Balomenos, Metlen Energy and Metals; Les Edwards, Rain Carbon Inc.

**Monday PM | March 24, 2025**  
**111 | MGM Grand**

**Session Chair:** Jose Erik Araujo, Norsk Hydro

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#### 2:00 PM Keynote

**Pathways to Decarbonise the Alumina Industry:** Jordan Parham<sup>1</sup>; Graham Nathan<sup>1</sup>; Woei Saw<sup>2</sup>; Peter Ashman<sup>2</sup>; <sup>1</sup>HILT CRC; <sup>2</sup>University of Adelaide

#### 2:40 PM

**Sustainability Initiatives at Muri Alumina Refinery by Utilizing 100% Waste, Conservation of Natural Resources and Reduction of Carbon Emission:** Prasanta Bose<sup>1</sup>; Rohit Chourasia<sup>1</sup>; Navnit Srivastava<sup>1</sup>; Kenneth Dvaz<sup>1</sup>; <sup>1</sup>Prasanta

#### 3:05 PM

**Sustainable Green Application of Kaolin Ore for Alumina Recovery Based on Lower Temperatures Sintering Process:** Abdul-Majid Shamroukh<sup>1</sup>; Amr Eldeeb<sup>2</sup>; Salah Salman<sup>2</sup>; Mohamed Farghly<sup>3</sup>; <sup>1</sup>Aluminium Company of Egypt (Egyptalum); <sup>2</sup>AL-Azhar University - Cairo; <sup>3</sup>AL-Azhar University - Qena

#### 3:30 PM Question and Answer Period

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Alloy Development

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

**Monday PM | March 24, 2025**  
**114 | MGM Grand**

**Session Chairs:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

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#### 2:00 PM Introductory Comments

#### 2:05 PM Invited

**Towards the Design of Highly Heterogeneous Aluminum Alloys:** Dmitry Eskin<sup>1</sup>; Suwaree Chankitmongkorn<sup>2</sup>; Chengbo Zhu<sup>1</sup>; <sup>1</sup>Brunel University; <sup>2</sup>King Mongkut's Institute of Technology Ladkrabang

#### 2:30 PM

**Al-Ce-Based Alloys: Processing, Mechanical Properties and High Temperature Stability:** Humphrey Odhiambo<sup>1</sup>; Gaurav Singh<sup>2</sup>; Mohamad Tasneem<sup>2</sup>; Monica Soare<sup>3</sup>; Jason Leszczewicz<sup>3</sup>; Jun Cui<sup>1</sup>; Ralph Napolitano<sup>1</sup>; Gaoyuan Ouyang<sup>4</sup>; Catalin Picu<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Rensselaer Polytechnic Inst; <sup>3</sup>General Electric Global Research; <sup>4</sup>Ames National Laboratory

#### 2:55 PM

**A New Approach to the Design of Al Alloys with Low Cracking Susceptibility and High-Temperature Strength for Casting and Additive Manufacturing:** Chengbo Zhu<sup>1</sup>; Da Guo<sup>2</sup>; Kai Zhang<sup>2</sup>; Iakovos Tzanakis<sup>3</sup>; Alex Leung<sup>2</sup>; Peter Lee<sup>2</sup>; Dmitry Eskin<sup>1</sup>; <sup>1</sup>Brunel University London; <sup>2</sup>University College London; <sup>3</sup>Oxford Brookes University

#### 3:20 PM

**Effects of Cu on Microstructure of Al7SiMgFeMn-Based Thin-Wall High-Pressure Die Casting:** Fei Xue<sup>1</sup>; Yang Huo<sup>1</sup>; Joy Forsmark<sup>1</sup>; Mei Li<sup>1</sup>; <sup>1</sup>Ford Motor Company

#### 3:45 PM Break

#### 4:00 PM Keynote

**Dilute Eutectic Casting Aluminium (DECA) Alloys for Structural Shaped Castings:** Sumanth Shankar<sup>1</sup>; Xiaochun Zeng<sup>1</sup>; <sup>1</sup>McMaster University

#### 4:25 PM

**Rheological Behavior and Microstructural Evolution of AlMg5Si2Mn Alloy for Semi-Solid Casting:** Gihoon Moon<sup>1</sup>; Brajendra Mishra<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### 4:50 PM

**Al-Mg-Si Development Using Combinatorial Laser Directed Energy Deposition:** Aleena Masaeng<sup>1</sup>; Qingyu Pan<sup>1</sup>; Monica Kapoor<sup>2</sup>; John Carsley<sup>2</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Novelis Global Research and Technology Center

#### 5:15 PM

**Enhancing Thermal Stability of Al-Mg-Si-Cu Alloys through Ag and Sc Additions:** Hyeon-Woo Son<sup>1</sup>; Jae-Seok Lee<sup>1</sup>; Kwangjun Euh<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

#### 5:40 PM

**The Use of Artificial Intelligence When Planning the Composition and Production of Wrought Aluminum Alloys with a Majority Share of Post-Consumed Scrap:** Varuzan Kevorkjian<sup>1</sup>; <sup>1</sup>Impol Aluminium Industry

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## LIGHT METALS

### Aluminum Reduction Technology — Start-Up, Early Life and Advances in Cell Operation

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

**Monday PM | March 24, 2025**  
**113 | MGM Grand**

**Session Chair:** Trond Eirik Jentoftsen, Hydro Aluminium

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#### 2:00 PM Introductory Comments

#### 2:05 PM

**Ma'aden Reduction Potline Partial Failure Incident and Recovery:** Subah Alshammari<sup>1</sup>; Abdulrahman Al-Shammari<sup>1</sup>; Ali Al-Shami<sup>1</sup>; Brent Pekoba<sup>1</sup>; Sultan Al-Boqami<sup>1</sup>; Saad Al-Shammari<sup>1</sup>; Umakanta Nayak<sup>1</sup>; Yousef Alfarsi<sup>1</sup>; Kishor Pant<sup>1</sup>; Mohammed Al Hunaini<sup>1</sup>; <sup>1</sup>Maaden Aluminum

#### 2:30 PM

**Optimizing Aluminum Production: Overview of Semi-Partial Pot Reconstruction at PT Inalum:** Gratha Adhitya Putra<sup>1</sup>; Ivan Ermisyam<sup>1</sup>; Firman Ashad<sup>1</sup>; Edi Mugiono<sup>1</sup>; Juperisya Anas<sup>1</sup>; <sup>1</sup>PT. INALUM

2:55 PM

**Anode Change Resistance Addition Optimization:** Melissa Von Grapp<sup>1</sup>; Camila Rabelo da Silva<sup>2</sup>; Michel Pena<sup>1</sup>; Pierre Reny<sup>2</sup>; Valfredo Filho<sup>2</sup>; *Glauca da Costa Cesar*<sup>1</sup>; <sup>1</sup>Albras; <sup>2</sup>Hydro

3:20 PM Break

3:35 PM

**Task Cycle Transition Strategy at ALBRAS Potlines:** *Franciny Lobato*<sup>1</sup>; Camila Silva<sup>1</sup>; Michel Pena<sup>1</sup>; Vanderlei Fernandes<sup>1</sup>; <sup>1</sup>ALBRAS - Alumínio Brasileiro SA

4:00 PM

**Reducing Cell Voltage at ALBRAS:** *Glauca Pamela Da Costa Cesar*<sup>1</sup>; Camila da Silva<sup>1</sup>; Michel Pena<sup>1</sup>; Johnson Machado<sup>1</sup>; Pierre Reny<sup>2</sup>; <sup>1</sup>Albras; <sup>2</sup>Hydro

4:25 PM

**High End Robot for Reduction Cells Basement Cleaning In EGA Smelter:** Mohamed Aldhanhani<sup>1</sup>; Balakrishnan Palanisamy<sup>1</sup>; Satish Rajput<sup>1</sup>; Amit Dubey<sup>1</sup>; Syam Sudabattula<sup>1</sup>; Mohamed Alhammadi<sup>1</sup>; Jayaprakash Rajagopal<sup>1</sup>; Alya Alshamsi<sup>1</sup>; *Hashim Alhammadi*<sup>1</sup>; Mohammad Shahid<sup>1</sup>; Amiya Jena<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

4:50 PM Concluding Comments

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## MECHANICS OF MATERIALS

**Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — Fundamentals II**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

**Monday PM | March 24, 2025**  
**370 | MGM Grand**

**Session Chair:** Arun Nair, University of Arkansas

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2:00 PM

**Insights into the Soft Brittle-to-Ductile Transition in BCC Metals Using Multiscale Modeling:** Hunter Brumblay<sup>1</sup>; Gregory Thompson<sup>2</sup>; *Christopher Weinberger*<sup>1</sup>; <sup>1</sup>Colorado State University; <sup>2</sup>University of Alabama

2:20 PM Invited

**The Intrinsic Ductile-Brittle Transition in Metals and Alloys:** *William Curtin*<sup>1</sup>; <sup>1</sup>Brown University

2:50 PM Invited

**Role of Microstructure and Strength on the Development of Slip Localizations in Polycrystals:** Behnam Ahmadi<sup>1</sup>; Rembert White<sup>1</sup>; Jean-Charles Stinville<sup>2</sup>; Tresa Pollock<sup>3</sup>; *Irene Beyerlein*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>University of Illinois

3:20 PM Break

3:40 PM Invited

**Atomistic Insights into Microstructural Engineering of High Entropy and Ni-Based Superalloys Thin Films:** *Paulo Branicio*<sup>1</sup>; Aoyan Liang<sup>1</sup>; Mohammad Hadi Yazdani<sup>1</sup>; Daniel Goodelman<sup>1</sup>; Andrea Hodge<sup>1</sup>; Diana Farkas<sup>2</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Virginia Tech

4:10 PM

**Design of High-Performance Lightweight High Entropy Alloys Using High-Throughput Method:** Lia Amalia<sup>1</sup>; Rui Feng<sup>2</sup>; Chuan Zhang<sup>3</sup>; Michael Gao<sup>2</sup>; Zongrui Pei<sup>2</sup>; Fan Zhang<sup>3</sup>; Yan Chen<sup>4</sup>; Dong Ma<sup>5</sup>; Ke An<sup>4</sup>; Jonathan Poplawsky<sup>4</sup>; Lizhi Ouyang<sup>6</sup>; Yang Ren<sup>7</sup>; Jeffrey Hawk<sup>2</sup>; Michael Widom<sup>8</sup>; *Peter Liaw*<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>National Energy Technology Laboratory; <sup>3</sup>Computherm, LLC; <sup>4</sup>Oak Ridge National Laboratory; <sup>5</sup>Neutron Science Platform, Songshan Lake Materials Laboratory; <sup>6</sup>Tennessee State University; <sup>7</sup>Advanced Photon Source, Argonne National Laboratory; <sup>8</sup>Carnegie Mellon University

4:30 PM

**Virtual Diffraction as a Method to Bridge Atomistic and Mesoscale Simulations with Experiments:** Shawn Coleman<sup>1</sup>; Darshan Bamney<sup>2</sup>; Aaron Tallman<sup>3</sup>; Laurent Capolungo<sup>2</sup>; *Douglas Spearot*<sup>4</sup>; <sup>1</sup>US Army DEVCOM Army Research Laboratory; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Florida International University; <sup>4</sup>University of Florida

4:50 PM

**Characterizing Variants During Phase Transformation and Twinning in BCC Microstructures During Deformation and Unloading:** *Phillip Tsurkan*<sup>1</sup>; Evan Byers<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

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## BIOMATERIALS

**Biological Materials Science — Mechanics of Hierarchical Materials II**

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Monday PM | March 24, 2025**  
**306 | MGM Grand**

**Session Chairs:** Yuxiao Zhou, Texas A&M University; Xiaoguang Dong, Vanderbilt University

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2:00 PM Invited

**Multiscale Composition-Structure-Property Relationship of Bone:** Chenxu Yue<sup>1</sup>; Yichun Tang<sup>1</sup>; Dingchuan Xue<sup>1</sup>; Yuxiao Zhou<sup>2</sup>; Zian Jia<sup>3</sup>; Xin Tang<sup>4</sup>; Sulin Zhang<sup>1</sup>; *Jing Du*<sup>4</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Pennsylvania State University; Texas A&M University; <sup>3</sup>Princeton University; <sup>4</sup>Southern University of Science and Technology

2:30 PM

**Bioinspired Microstructural Alignment in Freeze-Cast Scaffolds via the Hall Effect:** *Maddie Schmitz*<sup>1</sup>; Steven Naleway<sup>1</sup>; <sup>1</sup>University of Utah

2:50 PM

**Structure-Property Relationships in Filamentous Fungi:** *Steven Naleway*<sup>1</sup>; James Gallagher<sup>1</sup>; Ihsan Elnunu<sup>1</sup>; Atul Agrawal<sup>1</sup>; Jessica Redmond<sup>1</sup>; <sup>1</sup>University of Utah

3:10 PM Invited

**Programmable and Flexible Optics with Hydrogels:** *Xinyue Liu*<sup>1</sup>; <sup>1</sup>Michigan State University

3:40 PM Break

4:00 PM Invited

**Material Strategies for Chronically-Stable, High-Precision Bioelectronic Interfaces:** *Yuanwen Jiang*<sup>1</sup>; <sup>1</sup>University of Pennsylvania

4:30 PM

**The 3D Structure of Dental Enamel: Synchrotron CT Insights and Property Relationships:** *Cameron Renteria<sup>1</sup>; Jack Grimm<sup>1</sup>; Carli Marsico<sup>1</sup>; Juliana Fernández-Arteaga<sup>2</sup>; Donna Guillen<sup>3</sup>; Viktor Nikitin<sup>4</sup>; Dula Parkinson<sup>5</sup>; Dwayne Arola<sup>1</sup>; <sup>1</sup>University of Washington; <sup>2</sup>Institución Universitaria Digital de Antioquia; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>Lawrence Berkeley National Laboratory*

4:50 PM Invited

**Stiff Morphing Beams Inspired from Fish Fins:** *Saurabh Das<sup>1</sup>; Prashant Kunjam<sup>1</sup>; Baptiste Moling<sup>1</sup>; Francois Barthelat<sup>1</sup>; <sup>1</sup>University of Colorado Boulder*

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Machine Learning Interatomic Potentials and Their Applications

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

Monday PM | March 24, 2025  
353 | MGM Grand

**Session Chairs:** Vaidehi Menon, University of Michigan; Eric Homer, Brigham Young University

2:00 PM Invited

**Machine Learning Potentials for Chemically Complex Alloys:** *Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

2:30 PM

**UF3: Fast and Interpretable MLIP for High-Performance Molecular Dynamics:** *Ajinkya Hire<sup>1</sup>; Hendrik Krass<sup>2</sup>; Stephen Xie<sup>3</sup>; Jason Gibson<sup>1</sup>; Michael MacIsaac<sup>1</sup>; Sung Hoon Jung<sup>4</sup>; Matthias Rupp<sup>5</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Konstanz; <sup>3</sup>NASA Ames Research Center; <sup>4</sup>University of Texas at Austin; <sup>5</sup>Luxembourg Institute of Science and Technology*

2:50 PM Invited

**Revealing the Impact of Hydrogen on Iron: Large-Scale Quantitative Atomistic Analysis with Highly Accurate and Transferrable Machine Learning Interatomic Potentials:** *Shigenobu Ogata<sup>1</sup>; <sup>1</sup>Osaka University*

3:20 PM

**Material-Agnostic Training Data Generation for Machine-Learning Interatomic Potentials:** *Aparna P. A. Subramanyam<sup>1</sup>; Danny Perez<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory*

3:40 PM Break

4:00 PM Invited

**Pathways to the 7 × 7 Surface Reconstruction of Si(111) Revealed by Machine-Learning Molecular Dynamics Simulations:** *Yidi Shen<sup>1</sup>; Kun Luo<sup>1</sup>; William Goddard<sup>2</sup>; Qi An<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Caltech*

4:30 PM

**Influence of Surface Structure on Graphene Formation via Thermal Decomposition of Silicon Carbide:** *Michael MacIsaac<sup>1</sup>; Salil Bavdekar<sup>2</sup>; Douglas Spearot<sup>1</sup>; Richard Hennig<sup>1</sup>; Ghatu Subhash<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Illinois State University*

## ADVANCED CHARACTERIZATION METHODS

### Characterization of Materials through High Resolution Coherent Imaging — Scientific Applications of Coherent Imaging II

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Xianghui Xiao, Brookhaven National Laboratory; Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institute; Mathew Cherukara, Argonne National Laboratory

Monday PM | March 24, 2025  
157 | MGM Grand

**Session Chair:** Xianghui Xiao, Brookhaven National Laboratory

2:00 PM

**Explanation of the High-Dielectric Constant of BaTiO<sub>3</sub> Used in Multilayer Capacitors:** *Ian Robinson<sup>1</sup>; <sup>1</sup>University College*

2:40 PM

**Probing Cryogenic Strain Evolution in SrTiO<sub>3</sub> Using Multi-Reflection Bragg Coherent Diffraction Imaging:** *David Yang<sup>1</sup>; Sung Soo Ha<sup>2</sup>; Sung Wook Choi<sup>2</sup>; Jialun Liu<sup>3</sup>; Daniel Treuherz<sup>3</sup>; Longlong Wu<sup>1</sup>; Ana Suzana<sup>4</sup>; Gareth Nisbet<sup>5</sup>; Dan Porter<sup>5</sup>; Hyunjung Kim<sup>2</sup>; Ian Robinson<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Sogang University; <sup>3</sup>University College London; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>Harwell Science and Innovation Campus*

3:00 PM

**Bragg Coherent Diffractive Imaging With Twisted X-Rays:** *Edwin Fohtung<sup>1</sup>; Dmitry Karpov<sup>2</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>ESRF*

3:20 PM

**Synchrotron Ptychographic X-Ray Computed Tomography (PXCT) to Study Micro-Fabricated Fully Hybrid 3D Metal-Ceramic Metamaterials:** *Alexander Groetsch<sup>1</sup>; Christopher Gunderson<sup>2</sup>; Peter Schweizer<sup>3</sup>; Ana Diaz<sup>4</sup>; Janne-Petteri Niemelä<sup>2</sup>; Helen Le Clézio<sup>5</sup>; Mirko Holler<sup>4</sup>; Ivo Utke<sup>2</sup>; Xavier Maeder<sup>2</sup>; Dennis Kochmann<sup>5</sup>; Johann Michler<sup>2</sup>; Jakob Schwiedrzik<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Empa - Swiss Federal Laboratories for Materials Science and Technology; <sup>3</sup>Lawrence Berkeley National Laboratory; <sup>4</sup>Paul Scherrer Institute; <sup>5</sup>ETH Zurich*

3:40 PM Break

4:00 PM

**Origin of Structural Degradation in Layered Oxide Cathode for Li-Ion Batteries:** *Tongchao Liu<sup>1</sup>; <sup>1</sup>Argonne National Laboratory*

4:30 PM

**Characterization of Crystalline Materials at the Atomic Scale with X-Ray Bragg Coherent Diffraction Imaging:** *Jason Meziere<sup>1</sup>; Abi Mae Hardy<sup>1</sup>; Anastasios Pateras<sup>2</sup>; Ross Harder<sup>3</sup>; Richard Sandberg<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>DESY Deutsches Elektronen-Synchrotron; <sup>3</sup>Argonne National Laboratory*

## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Advanced Characterization Methods II

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhamyies, The University of Jordan

**Monday PM | March 24, 2025**  
**121 | MGM Grand**

**Session Chairs:** Jiann-Yang Hwang, Michigan Technological University; John Carpenter, Los Alamos National Laboratory

**2:00 PM**

**In-Situ Characterization Methods for Thermophysical Property Measurements Using the Electro-Magnetic Levitator On-Board the International Space Station:** Marcelina Stasik<sup>1</sup>; Stephan Schneider<sup>2</sup>; *Wilhelmus Sillekens*<sup>1</sup>; <sup>1</sup>European Space Agency; <sup>2</sup>German Aerospace Center (DLR)

**2:20 PM**

**In-Situ Mechanical Property Measurement Using Laser Ultrasound:** *Zilong Hua*<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Stephen Reese<sup>1</sup>; William Chuirazzi<sup>1</sup>; Michael McMurtrey<sup>1</sup>; David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**2:40 PM**

**In-Situ Sensor Monitoring and Multiclass Porosity Defects Prediction for Laser Powder Bed Fusion With Machine Learning:** *Sandesh Giri*<sup>1</sup>; Sen Liu<sup>1</sup>; Nick Calta<sup>2</sup>; Christopher Tassone<sup>3</sup>; <sup>1</sup>University of Louisiana at Lafayette; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>SLAC National Accelerator Laboratory

**3:00 PM**

**Leveraging XRD, Total Scattering, and XAFS Techniques to Decipher Structure-Property-Performance Relationships in Ammonia Decomposition Catalysts:** *Tolga Han Ulucan*<sup>1</sup>; <sup>1</sup>SLAC National Accelerator Laboratory

**3:20 PM**

**Opening Pandora's Box: Addressing the Closed Nature of Post-Processing Methods for Computed Tomography (CT) Images With Application Perspectives for Energetic Materials:** *Stewart Youngblood*<sup>1</sup>; Sean Palmer<sup>1</sup>; Alan Williams<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**3:40 PM Break**

**3:50 PM**

**Low Voltage Electron Back-Scatter Diffraction: Enabling High Resolution Mapping of Early Stage Recrystallization:** *Zehua Liu*<sup>1</sup>; Marc DeGraef<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**4:10 PM**

**Phase Evolution of a Spinodal Copper Alloy, Characterized by In Situ Synchrotron X Ray Diffraction:** *James Hogg*<sup>1</sup>; Nicole Church<sup>1</sup>; Annie Andersson<sup>1</sup>; Catherine Dejoie<sup>2</sup>; Howard Stone<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>European Synchrotron Radiation Facility

**4:30 PM**

**Put a Gleeble in the Beam: Concepts for the Materials Oscilloscope:** *Klaus-Dieter Liss*<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

**4:50 PM**

**Microstructural Evolution of Fe-Bearing Intermetallic Particle After Thermo-Mechanical Processing Using X-Ray Microcomputed Tomography:** *Satyaroop Patnaik*<sup>1</sup>; Eshan Ganju<sup>1</sup>; XiaoXiang Yu<sup>2</sup>; Minju Kang<sup>2</sup>; Jaesuk(Jay) Park<sup>2</sup>; DaeHoon Kang<sup>2</sup>; Rajeev Kamat<sup>2</sup>; John Carsley<sup>2</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Novelis Global Research and Technology Center

**5:10 PM**

**In-Situ Multi-Scale Analysis of Local Deformation Behavior of Lath Martensite in Low-Carbon-Steel:** *Shuang Gong*<sup>1</sup>; Junya Inoue<sup>1</sup>; <sup>1</sup>The University of Tokyo

**5:30 PM**

**High Energy Diffraction Microscopy as a Tool for In-Situ Characterization of Materials:** *Hemant Sharma*<sup>1</sup>; Weijian Zheng<sup>1</sup>; Jun-Sang Park<sup>1</sup>; Peter Kenesei<sup>1</sup>; Rajkumar Kettimuthu<sup>1</sup>; Antonino Miceli<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Theory and Modeling of Grain Boundary Phases and Phase Transitions

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Monday PM | March 24, 2025**  
**304 | MGM Grand**

**Session Chairs:** Blas Uberuaga, Los Alamos National Laboratory; Ryan Sills, Rutgers University

**2:00 PM Invited**

**Structural Transitions in Grain Boundaries and the Role of Line Defects:** *Ian Winter*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**2:30 PM**

**Energetics of Disconnection Nucleation and Glide in Symmetric Tilt Grain Boundaries:** *Himanshu Joshi*<sup>1</sup>; Ian Chesser<sup>2</sup>; Brandon Runnels<sup>3</sup>; Nikhil Admal<sup>1</sup>; <sup>1</sup>University of Illinois, Urbana-Champaign; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of Iowa, Ames

**2:50 PM**

**Describe, Transform, Machine Learning: Feature Engineering for Grain Boundaries and Other Variable-Sized Atom Clusters:** *Eric Homer*<sup>1</sup>; Braxton Owens<sup>1</sup>; Gus Hart<sup>1</sup>; Tyce Olaveson<sup>1</sup>; Jacob Tavenner<sup>2</sup>; Edward Kober<sup>3</sup>; Garritt Tucker<sup>4</sup>; Nithin Mathew<sup>3</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>NASA; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Baylor University

**3:10 PM Invited**

**Everything is not Affine: How Non-Affine Transformations Enable a New State of Crystalline Interfacial Coherency:** *Ryan Sills*<sup>1</sup>; Alejandro Hinojos<sup>2</sup>; Trevor Murray<sup>1</sup>; Xiaowang Zhou<sup>2</sup>; Douglas Medlin<sup>2</sup>; <sup>1</sup>Rutgers University; <sup>2</sup>Sandia National Laboratories

**3:40 PM Break**

**4:00 PM Invited**

**Interfaces in Oxides:** *Blas Uberuaga*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:30 PM**

**Vacancy Segregation to Grain Boundaries in Diamond:** *Christian Brandl*<sup>1</sup>; <sup>1</sup>The University of Melbourne



4:50 PM

**Modification of Defects Dynamics in Ga(Al)As Heterostructures by Photo-Doping:** *Ella Pek*<sup>1</sup>; Chao Jiang<sup>1</sup>; Kevin Vallejo<sup>1</sup>; Brelon May<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Zilong Hua<sup>1</sup>; Kaustubh Bawane<sup>2</sup>; Anshul Kamboj<sup>1</sup>; Marat Khafizov<sup>2</sup>; David Hurley<sup>1</sup>; Farida Selim<sup>3</sup>; Trent Garrett<sup>4</sup>; Maddison Nordstrom<sup>4</sup>; Paul Simmonds<sup>4</sup>; Cody Dennett<sup>5</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Ohio State University; <sup>3</sup>Arizona State University; <sup>4</sup>Boise State University; <sup>5</sup>Massachusetts Institute of Technology

5:10 PM

**On the Origin of Finite-Size Effects in Atomistic Simulations of Grain Boundary Migration:** *Sanad Alturk*<sup>1</sup>; Nithin Mathew<sup>2</sup>; Enrique Martinez<sup>1</sup>; Jason Trelewicz<sup>3</sup>; Blas Uberuaga<sup>2</sup>; Spencer Thomas<sup>3</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Stony Brook University

## MATERIALS SYNTHESIS AND PROCESSING

### Composite Materials: Sustainable and Eco-Friendly Material Development and Applications — Sustainable and Eco-Friendly Materials: Nanocomposites and Nanomaterials for Environmental and Energy Applications

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Yahya Al-Majali, Ohio University; Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)

Monday PM | March 24, 2025  
116 | MGM Grand

**Session Chair:** Brian Wisner, Ohio University

2:00 PM

**Exploring the Potential of PVDF/CCB Composites in Energy Harvesting Technologies:** *Fawad Ali*<sup>1</sup>; Mohammad Albakri<sup>1</sup>; <sup>1</sup>Texas A&M University

2:20 PM

**Green Synthesis of Multifunctional Nanomaterials:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

2:40 PM

**High-Performance Nanoparticle-Mediated Surfaces for Bio-Medical Applications:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

3:00 PM

**Modelling of Ultrasonic Cavitation for Deagglomeration of Carbon Nanotubes in Water With or Without Surfactant:** *Catherine Tonry*<sup>1</sup>; Zhuocheng Xu<sup>2</sup>; Christopher Beckwith<sup>1</sup>; Andrew Kao<sup>1</sup>; Milo Shaffer<sup>2</sup>; Qianqian Li<sup>2</sup>; <sup>1</sup>University of Greenwich; <sup>2</sup>Imperial College London

3:20 PM Break

3:40 PM

**Nanomaterial-Engineered Surfaces for Decontamination of Water Resources:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

4:00 PM

**Adsorption of Low-Concentration Fluoride Ions from Simulated Metallurgical Wastewater by Zr-MOF:** *Hongfei Ma*<sup>1</sup>; Wenjuan Wang<sup>1</sup>; Zhan Chu<sup>1</sup>; Yanfang Huang<sup>1</sup>; Guihong Han<sup>1</sup>; <sup>1</sup>Zhengzhou University

4:20 PM

**Optimization of Mix Formulation and Compressive Strength Evaluation of Casted and 3D Printed Geopolymer Specimens:** *Demetris Nicolaides*<sup>1</sup>; Loucas Papadakis<sup>1</sup>; Ponsian Robert<sup>1</sup>; <sup>1</sup>Frederick University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Machine Learning and Artificial Intelligence in Material Design

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

Monday PM | March 24, 2025  
305 | MGM Grand

**Session Chairs:** Dilpuneet Aidhy, Clemson University; Yifan Cao, Massachusetts Institute of Technology

2:00 PM Invited

**Predicting Synthesis Outcomes With DFT Calculations and Literature Mining:** *Anubhav Jain*<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

2:30 PM Invited

**Understanding Materials Synthesis Using the Thermodynamics of Interfacial Reactions:** *Chris Bartel*<sup>1</sup>; <sup>1</sup>University of Minnesota

3:00 PM

**Cluster Expansion by Transfer Learning for Phase Stability Predictions:** *Amirreza Dana*<sup>1</sup>; Lingxiao Mu<sup>2</sup>; Simon Gelin<sup>2</sup>; Susan Sinnott<sup>2</sup>; Ismaila Dabo<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Pennsylvania State University

3:20 PM

**Machine-Learning Assisted Design of Hydrogen-Storage Materials:** Tanumoy Banerjee<sup>1</sup>; Kevin Ji<sup>1</sup>; *Prashant Singh*<sup>1</sup>; <sup>1</sup>Ames National Laboratory

3:40 PM Break

4:00 PM Invited

**Applying Computer Vision to Electron Micrography in AI-Supported Alloy Synthesis and Solidification:** *Kaelin Mittel*<sup>1</sup>; *Taylor Sparks*<sup>1</sup>; <sup>1</sup>University of Utah

4:30 PM Invited

**Predictive Models of Glass Formation for Design:** *James Saal*<sup>1</sup>; <sup>1</sup>Citrine Informatics

5:00 PM

**Leveraging In-Situ Raman Spectroscopy for Thermodynamic and Kinetic Studies in Self-Driving Lab by Using Chocolate As Frugal Twin:** *Kinston Ackölf*<sup>1</sup>; *Taylor Sparks*<sup>1</sup>; <sup>1</sup>University of Utah

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Dilute Alloying and Impurity Effects on Phase Transformations — Dilute Alloying and Impurity Effects on Phase Transformations

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Matthew Steiner, University of Cincinnati; Dinc Erdeniz, University of Cincinnati; Le Zhou, Marquette University

**Monday PM | March 24, 2025**  
**310 | MGM Grand**

**Session Chairs:** Matthew Steiner, University of Cincinnati; Dinc Erdeniz, University of Cincinnati; Le Zhou, Marquette University

#### 2:00 PM Invited

**Role of Impurities and Dilute Alloying Elements on Long-Range Order in Ni-Cr-Based Alloys:** *Julie Tucker*<sup>1</sup>; Jia-Hong Ke<sup>2</sup>; Noah Weible<sup>1</sup>; David Sprouster<sup>3</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Stony Brook University

#### 2:30 PM Invited

**Impact of Impurity Elements Introduced During Joining on the Properties of Superelastic Nitinol:** Zhaoxi Cao<sup>1</sup>; Samuel Price<sup>1</sup>; Ian Mccue<sup>1</sup>; <sup>1</sup>Northwestern University

#### 3:00 PM

**Effect of Silicon Addition on the Stability and Precipitation of Delta Phase in Inconel 718 and Associated Mechanical Properties:** *Amir Hasan*<sup>1</sup>; Manas Paliwal<sup>1</sup>; Debalay Chakrabarti<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

#### 3:20 PM

**Effects of Dilute Phosphorus Alloying on Phase Transformations in the Fe-Ni System:** Ugochukwu Ochieze<sup>1</sup>; *Matthew Steiner*<sup>1</sup>; <sup>1</sup>University of Cincinnati

#### 3:40 PM Break

#### 4:00 PM Invited

**The Role of Minor Alloying in the Plasticity of Bulk Metallic Glasses:** *Gerhard Wilde*<sup>1</sup>; <sup>1</sup>University of Muenster

#### 4:40 PM

**Phase Transformation in Al-Cu-Sc Alloy and Its Impact on Corrosion Performance:** *Bo Zhao*<sup>1</sup>; Jiashi Miao<sup>2</sup>; Alan Luo<sup>2</sup>; Shuaihang Pan<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>The Ohio State University

#### 5:00 PM

**In-Situ Formation of Lamellar  $\alpha+\beta$  Ti Alloys With Dilute Fast Diffusive Elements:** *Takuma Teramae*<sup>1</sup>; Ammarueda Issariyapat<sup>2</sup>; Shota Kariya<sup>2</sup>; Junko Umeda<sup>2</sup>; Katsuyoshi Kondoh<sup>2</sup>; <sup>1</sup>Osaka University; <sup>2</sup>Joining and Welding Research Institute, Osaka University

#### 5:20 PM Break

## MATERIALS SYNTHESIS AND PROCESSING

### Drying, Roasting, Calcining and Agglomeration of Feedstocks — Keynotes and Highlights

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

**Program Organizers:** Stuart Nicol, Glencore Technology; Dean Gregurek, RHI Magnesita; Jesse White, Kanthal AB; Allie Anderson, RHI Magnesita; Elmira Moosavi, Ecole De Technologie Supérieure; Kristian Mackowiak, Kingston Process Metallurgy Inc.

**Monday PM | March 24, 2025**  
**104 | MGM Grand**

**Session Chair:** Allie Anderson, RHI Magnesita

#### 2:00 PM Introductory Comments

#### 2:05 PM

**Agglomeration Processes at RHI Magnesita:** *Thomas Drnek*<sup>1</sup>; <sup>1</sup>RHI Magnesita GmbH

#### 2:35 PM

**Investigating Ferronickel Concentrate Oxidation Behavior During Drying After Wet Physical Upgrading:** *Wei Lv*<sup>1</sup>; Samuel Marcuson<sup>1</sup>; Mansoor Barati<sup>1</sup>; <sup>1</sup>University of Toronto

#### 2:55 PM

**Advancing Sustainability in Metallurgical Sectors Through Innovative Agglomeration and Biocarbon Utilization:** *Elsayed Mousa*<sup>1</sup>; Karthik Manu<sup>1</sup>; Ludvig Annhagen<sup>2</sup>; <sup>1</sup>Swerim; <sup>2</sup>Vargön Alloys

#### 3:15 PM Break

#### 3:35 PM

**Spinospheres – A Novel Technology Influencing Refractory Brick's Properties:** *Martin Geith*<sup>1</sup>; Roland Krischanitz<sup>1</sup>; <sup>1</sup>RHI Magnesita GmbH

#### 3:55 PM

**Research and Improvement on Quality Deviation of Belt Roaster:** *Dawei Sun*<sup>1</sup>; <sup>1</sup>Shougang Jingtang United Iron & Steel Co. Ltd

## LIGHT METALS

### Electrode Technology for Aluminum Production — Anode Production and Raw Materials

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Egil Skybakmoen, SINTEF Industry; Les Edwards, Rain Carbon Inc.

**Monday PM | March 24, 2025**  
**112 | MGM Grand**

**Session Chairs:** Viktorija Tomkute, Hydro Aluminium; Egil Skybakmoen, SINTEF Industry

#### 2:00 PM Introductory Comments

#### 2:05 PM Invited

**A Review of Technical Responses to Anode Production Challenges Encountered Since 2000 – With a Look Forward for the Next 10 Years:** *Barry Sadler*<sup>1</sup>; <sup>1</sup>Net Carbon Consulting Pty Ltd

#### 2:30 PM

**A Review of Coke Bulk Density Testing:** *Maia Hunt*<sup>1</sup>; Heather Riche<sup>1</sup>; Trey Neal<sup>1</sup>; Les Edwards<sup>1</sup>; <sup>1</sup>Rain Carbon Inc.

2:55 PM

**DENSICROSS - Intelligent Process Control:** *Edson Cruz*<sup>1</sup>; Andersen Dag Herman<sup>2</sup>; Emmily Fonseca<sup>1</sup>; André Ferraioli<sup>1</sup>; <sup>1</sup>Albras Alumínio Brasileiro S.A.; <sup>2</sup>Hydro Aluminium AS

3:20 PM

**Development of a Traceable Marker for Pitch Distribution Analysis in Baked Carbon Anodes:** *Nafiseh Shadvar*<sup>1</sup>; Guillaume Gauvin<sup>1</sup>; Simon Laliberté-Riverin<sup>1</sup>; Julien Lauzon-Gauthier<sup>2</sup>; Houshang Alamdari<sup>1</sup>; <sup>1</sup>Aluminium Research Centre-REGAL, Laval University; <sup>2</sup>Alcoa Corporation

3:45 PM Break

4:00 PM

**EGA Addresses Calcined Petroluem Coke (CPC) Quality Variation Impact on Anode Quality and Performance:** *Rawa Baraheem*<sup>1</sup>; Ravi Nanath<sup>1</sup>; Bienvenu Ndjom<sup>1</sup>; Abdalla Al Sharji<sup>1</sup>; Jasem Al Obaidli<sup>1</sup>; Amer Al Marzooqi<sup>1</sup>; <sup>1</sup>Midstream

4:25 PM

**Experimental Study on Sodium in Carbon Anodes:** Xavier Baril-Boudreault<sup>1</sup>; *Duygu Kocaefe*<sup>1</sup>; Dipankar Bhattacharyay<sup>1</sup>; Yasar Kocaefe<sup>1</sup>; Jules Côté<sup>1</sup>; <sup>1</sup>University of Quebec at Chicoutimi

4:50 PM

**Determining the Optimal Anode Baking Level Amidst Coke Quality Variation and Productivity Constraints:** *Pragasen Palavar*<sup>1</sup>; Jasem Al Obaidli<sup>1</sup>; Aiyaz Thaseen<sup>1</sup>; Mohammed Al Ghawi<sup>1</sup>; Amer Al Marzooqi<sup>1</sup>; <sup>1</sup>Midstream

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Low Temperature Soldering and Thermal Management

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

Monday PM | March 24, 2025

360 | MGM Grand

**Session Chairs:** C. Kao, National Taiwan University; Xin Tan, University of Queensland

2:00 PM

**A Study on Novel Thermal Interface Composite Indium-Based/Diamond Composite for High-Performance Computing Applications:** *Yuan-Han Ku*<sup>1</sup>; Wei-Chen Huang<sup>1</sup>; Pei-Tsen Heish<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

2:20 PM

**Impact of Temperature Gradient on the Growth of Intermetallic Compounds in Solid-State Cu and In-Solder System:** *Po-Hsun Yang*<sup>1</sup>; Pei-Ni Jiang<sup>1</sup>; Fan-Yi OuYang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

2:40 PM

**Effect of In and Zn Addition on the Interfacial Reaction of Sn-Bi/Cu Solder Joints:** *Pei-Kang Wu*<sup>1</sup>; Fu-Ling Chang<sup>1</sup>; Yu-Hsin Lin<sup>1</sup>; Meng-Chi Chuang<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

3:00 PM

**Advanced Thermal Management in Electronics: Micro-Nano Copper Forest Wicks for Thin Vapor Chambers:** *Meng-Wen Wang*<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University

3:20 PM Break

3:40 PM

**Influence of the Bi Phase Distribution on the Electrical and Thermal Properties of Sn-Bi Alloys:** *Choong-un Kim*<sup>1</sup>; Tae-Kyu Lee<sup>2</sup>; Pushkar Gothe<sup>1</sup>; Yujin Park<sup>2</sup>; Gnyaneshwar Ramakrishna<sup>2</sup>; <sup>1</sup>University of Texas at Arlington; <sup>2</sup>CISCO Systems

4:00 PM

**Void Reduction in Indium TIM in BGA and Large Size Packaging:** *Mina Yaghmazadeh*<sup>1</sup>; Youngjin Kim<sup>1</sup>; <sup>1</sup>Ningbo SJ Electronics, Ltd.

4:20 PM

**The Effect of Recent Heating on the Room Temperature Microstructure of Sn-Bi Alloys:** *Xiaozhou Ye*<sup>1</sup>; Stuart McDonald<sup>1</sup>; Xin Fu Tan<sup>1</sup>; Kazuhiro Nogita<sup>1</sup>; <sup>1</sup>Nihon Superior Centre for the Manufacture of Electronic Materials (NS CMEM)

4:40 PM

**Enhancing Low-Temperature Solder Reliability with Hybrid SAC/SnBi Systems:** *Po-Kai Chang*<sup>1</sup>; Shang-Yang Chen<sup>1</sup>; Kelvin Li<sup>2</sup>; Chang-Meng Wang<sup>2</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>National Central University; <sup>2</sup>Shenmao Technology INC.

## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Modeling and Simulation Tools to Understand Radiation Effects

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

Monday PM | March 24, 2025

162 | MGM Grand

**Session Chair:** Miaomiao Jin, Pennsylvania State University

2:00 PM Invited

**On the Microstructural Evolution Under Irradiation in Reactor Pressure Vessel Steels and Its Effects on Hardening and Embrittlement:** *Lorenzo Malerba*<sup>1</sup>; Nicolas Castin<sup>2</sup>; <sup>1</sup>CIEMAT; <sup>2</sup>SCK CEN

2:20 PM Invited

**Mesoscale Modeling of Dislocation Cell Structure Evolution and Radiation-Induced Segregation in Additively Manufactured Austenitic Stainless Steel:** *Sourabh Bhagwan Kadambi*<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Andrea Jokisaari<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Argonne National Laboratory

2:40 PM Invited

**Slip Banding and Frank-Read Model in Multi-Principal Element Alloys:** *Penghui Cao*<sup>1</sup>; <sup>1</sup>University of California, Irvine

3:00 PM

**The Role of Dilute Phosphorus, Copper, and Excess Vacancies on the Formation of Solute Clusters in Low-Alloy Steels:** *Jia-Hong Ke*<sup>1</sup>; Mukesh Bachhav<sup>1</sup>; *Anshul Kamboj*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

3:20 PM Break

3:35 PM

**Combination of Homogeneous Void Nucleation Theory and Defect Reaction Rate Theory Calculation for Understanding the Safe Analysis Zone Boundary in Self-Ion Irradiated Fe:** *Zhihan Hu*<sup>1</sup>; Yongchang Li<sup>1</sup>; Aaron French<sup>1</sup>; Frank Garner<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

3:55 PM

**Microstructural Evolution of 800H Alloy With Cluster Dynamics Simulations:** *Sophie Blondel*<sup>1</sup>; Michael Ashburn<sup>1</sup>; Dwaipayan Dasgupta<sup>1</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>University of Tennessee

4:15 PM

**DFT-Informed Design of Radiation-Resistant Dilute Ternary Cu Alloys:** *Vaibhav Vasudevan*<sup>1</sup>; Robert Averbach<sup>1</sup>; Pascal Bellon<sup>1</sup>; Thomas Schuler<sup>2</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>Université Paris-Saclay, CEA

4:35 PM

**Impact of Grain Boundary Structures on Defect Evolution in Irradiated Polycrystalline Aluminum Using Molecular Dynamics Simulations:** *Alhassan Issaka*<sup>1</sup>; Assel Aitkaliyeva<sup>1</sup>; Michael Tonks<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 Management — Decarbonizing Materials Processing

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Onuralp Yucel, Istanbul Technical University; Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Finland Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Alafara Baba, University of Ilorin; Tuan Nguyen, University of Queensland; Adam Powell, Worcester Polytechnic Institute; Thomas Battle, Duhan Zhang, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**364 | MGM Grand**

**Session Chairs:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan

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2:00 PM Introductory Comments

2:05 PM

**Study on Co-Extraction Behavior of Biomass and Low-Rank Coal:** *Jun Zhao*<sup>1</sup>; <sup>1</sup>China University of Mining and Technology (CUMT)

2:25 PM

**Study on Mathematical Modeling of Carbon Dioxide Emission and Emission Reduction Countermeasures of Baosteel Co., Ltd China:** *Danxuan Zhao*<sup>1</sup>; Yanwen Yu<sup>1</sup>; <sup>1</sup>Northeastern University

2:45 PM

**Greenhouse Gas Life Cycle Assessment of Traditional and Biomass-Integrated Steelmaking Routes:** *Avash Kumar Saha*<sup>1</sup>; Chunlin Chen<sup>2</sup>; Nawshad Haque<sup>2</sup>; Arup Mandal<sup>1</sup>; <sup>1</sup>NIT Durgapur; <sup>2</sup>CSIRO Clayton

3:05 PM

**Using 14C as an Analytical Approach for Documenting the Relative Share of Biocarbon Used in the Production of FeMn Alloy:** *Per Anders Eidem*<sup>1</sup>; Martin Seiler<sup>2</sup>; Bente Philippsen<sup>2</sup>; Michal Ksiazek<sup>3</sup>; Ingeborg Solheim<sup>3</sup>; Michal Srejdak<sup>4</sup>; Sten Yngve Larsen<sup>5</sup>; Piotr Szczówka<sup>6</sup>; <sup>1</sup>SINTEF Helgeland; <sup>2</sup>Norwegian University of Technology and Science; <sup>3</sup>SINTEF; <sup>4</sup>Institute of Energy and Fuel Processing Technology; <sup>5</sup>Eramet Norway AS; <sup>6</sup>Koksownia Czstochowa Nowa

3:25 PM Break

3:45 PM

**Feasibility of Biochar From Seaweed for Ferroalloy Production:** *Samuel Senanu*<sup>1</sup>; Judit Sandquist<sup>1</sup>; Jorunn Skjermo<sup>1</sup>; Stein Rørvik<sup>1</sup>; Magnus Windfeldt<sup>1</sup>; <sup>1</sup>SINTEF

4:05 PM

**Calcium Aluminate Production from Non-metallic Residue of Aluminum White Dross in an EAF:** *Bora Yıldız*<sup>1</sup>; Eren Yücedağ<sup>1</sup>; Veysel Kırımlı<sup>1</sup>; Barbaros Bostan<sup>1</sup>; Pelin Özbek<sup>1</sup>; *Selcuk Kan*<sup>1</sup>; Kağan Benzeşik<sup>1</sup>; Onuralp Yücel<sup>1</sup>; <sup>1</sup>Istanbul Technical University

4:25 PM

**Potential Uses of CO-Rich Off-Gas From Mn Ferroalloy Production:** *Ida Kero*<sup>1</sup>; *Halvor Dalaker*<sup>2</sup>; <sup>1</sup>Luleå University of Technology; <sup>2</sup>Sintef

4:45 PM

**Recent Studies on Use of Waste Plastics in Integrated Ironmaking:** *Ender Keskinilic*<sup>1</sup>; <sup>1</sup>Atilim University

5:05 PM Concluding Comments

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Additively Manufactured Materials — Corrosion Behavior of Additive Manufactured Materials in Chloride Environments

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Kinga Unocic, North Carolina State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Purdue University; Emma White, DECHEMA Forschungsinstitut; Benjamin Adam, Oregon State University; Mark Stoudt, National Institute of Standards and Technology; Xiaolei Guo, Colorado School of Mines

**Monday PM | March 24, 2025**  
**169 | MGM Grand**

**Session Chairs:** Xiaolei Guo, Colorado School of Mines; Mark Stoudt, National Institute of Standards and Technology; Benjamin Adam, Oregon State University

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2:00 PM Invited

**Corrosion Mechanisms of Additively Manufactured 316L Stainless Steels in Simulated Seawater:** *Thomas Voisin*<sup>1</sup>; Shohini Sen-Britain<sup>1</sup>; Shinyoung Kang<sup>1</sup>; Yuliang Zhang<sup>1</sup>; Zhen Qi<sup>1</sup>; Seongkoo Cho<sup>1</sup>; Yinmin "Morris" Wang<sup>2</sup>; Brandon Wood<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>University of California Los Angeles

2:30 PM

**Wear-Enhanced Corrosion of Compositionally Varying AM Stainless Steels:** *M. Parker*<sup>1</sup>; *Scott Wells*<sup>2</sup>; Andrew Birnbaum<sup>3</sup>; Anna Rawlings<sup>4</sup>; Derek Horton<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory; <sup>2</sup>Excet, A Precise Systems Company; <sup>3</sup>US Naval Research Laboratory; <sup>4</sup>U.S. Naval Research Laboratory



2:50 PM

**Effect of Microstructure Evolution on Hot Corrosion Resistance of P91&304 Graded Composition Transition Joint:** *Ting Sun*<sup>1</sup>; Yuying Wen<sup>1</sup>; Shanshan Hu<sup>1</sup>; Zhili Feng<sup>2</sup>; Haiyang Qian<sup>3</sup>; Xingru Tan<sup>1</sup>; Xingbo Liu<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>GE Steam Power

3:10 PM Invited

**Corrosion Behavior of a Ni-Free Austenitic Stainless Steel Produced by Additive Manufacturing:** Sophia Isacco<sup>1</sup>; Rahul Agrawal<sup>1</sup>; Alex Helmer<sup>1</sup>; Sean O'Brien<sup>1</sup>; Sofia Antinozzi<sup>1</sup>; Andrzej Wojcieszynski<sup>2</sup>; *Rajeev Gupta*<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Wingens Consulting, LLC

3:40 PM Break

3:55 PM

**Exceptional Localized Corrosion Resistance of Ni-Based Alloy 625 Processed by Directed Energy Deposition Additive Manufacturing in Concentrated Chloride Environments:** *Karthikeyan Hariharan*<sup>1</sup>; Andrew Iams<sup>2</sup>; James Zuback<sup>2</sup>; Todd Palmer<sup>3</sup>; Narasi Sridhar<sup>1</sup>; Rashed Alazemi<sup>1</sup>; Gerald Frankel<sup>1</sup>; Eric Schindelholz<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>National Institute of Standards and Technology; <sup>3</sup>The Pennsylvania State University

4:15 PM

**Studying Microstructure and Stress Corrosion Cracking of an Additive Friction Stir Deposition Processed aa7075 Aluminum Alloy:** *Ebenezer Acquah*<sup>1</sup>; Nilesh Kumar<sup>1</sup>; <sup>1</sup>The University of Alabama

4:35 PM

**Additive Manufacturing Technique to Achieve a Chemically Homogeneous Zinc/AA5456 Mixture to Arrest Corrosion Propagation:** *Minh Tran*<sup>1</sup>; Fanyue Kong<sup>1</sup>; Elena Romanovskaia<sup>1</sup>; Valentin Romanovski<sup>1</sup>; James Burns<sup>1</sup>; Ji Ma<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmentally Assisted Cracking: Theory and Practice — Stress Corrosion Cracking

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Jenifer Locke, Ohio State University

Monday PM | March 24, 2025  
167 | MGM Grand

**Session Chairs:** Ryan Katona, Sandia National Laboratories; Arya Chatterjee, University of Illinois Urbana-Champaign

2:00 PM Invited

**Localized Corrosion and Repassivation Behavior of Ni600 and SS304 Under Conditions Relevant to SCC:** Mariana Georges<sup>1</sup>; Thodla Ramgopal<sup>2</sup>; Christopher Taylor<sup>1</sup>; N. Sridhar<sup>1</sup>; *Gerald Frankel*<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>DNV Columbus, Inc.

2:30 PM Invited

**Internal Pitting Mechanisms of Chloride-Induced Stress Corrosion Cracking:** *Janelle Wharry*<sup>1</sup>; Nathan Gehmlich<sup>1</sup>; Haozheng Qu<sup>2</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>GE Vernova

3:00 PM

**On the Stress Corrosion Cracking Behavior of Aluminum Alloy Sheet for Can Applications:** *Borna Rafiei*<sup>1</sup>; Adam Thompson<sup>1</sup>; Debjit Misra<sup>1</sup>; Mary Lyn Lim<sup>2</sup>; Daehoon Kang<sup>2</sup>; Zachary Harris<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Novelis Global Research and Technology Center

3:20 PM Break

3:40 PM Invited

**CISCC of 304/316 Stainless Steels in Atmospheric Conditions:** *Mychailo Toloczko*<sup>1</sup>; Dexter Kling<sup>1</sup>; Gabrielle Schuler<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

4:10 PM Invited

**Decoupling the Role of Dissolution and H-Embrittlement on the Stress Corrosion Cracking Behavior of 304L Austenitic Stainless Steel:** *James Burns*<sup>1</sup>; Sarah Blust<sup>1</sup>; <sup>1</sup>University of Virginia

4:40 PM

**Exploring the Effect of Various Atmospheric Environmental Parameters on Pit-to-Crack Transition and SCC Failure in SS304:** *Daria Bentley*<sup>1</sup>; Jenifer Locke<sup>1</sup>; <sup>1</sup>The Ohio State University

## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue of Non-Metallic Materials and Unconventional Alloys

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

Monday PM | March 24, 2025  
318 | MGM Grand

**Session Chair:** Kelly Nygren, Cornell University

2:00 PM

**Assessment Techniques for Fatigue Damage Evolution in Composite Structures:** *Selim Mrzljak*<sup>1</sup>; Lars Gerdes<sup>1</sup>; Ramon Helwing<sup>1</sup>; Alexander Delp<sup>1</sup>; Ronja Scholz<sup>1</sup>; Frank Walther<sup>1</sup>; <sup>1</sup>TU Dortmund University - Chair of Materials Test Engineering (WPT)

2:20 PM

**Short-Time Fatigue Damage Evaluation in Thermoplastic-Based Fiber Metal Laminates:** *Selim Mrzljak*<sup>1</sup>; Frank Walther<sup>1</sup>; <sup>1</sup>TU Dortmund University - Chair of Materials Test Engineering (WPT)

2:40 PM

**Fatigue Properties Versus Tunable Partially Recrystallized Heterostructures – The Case of Ultra-High Strength and Exceptional Fracture Toughness CrCoNi MPEA:** *Milan Heczko*<sup>1</sup>; Connor Slone<sup>2</sup>; Veronika Mazánová<sup>1</sup>; Punit Kumar<sup>3</sup>; Qin Yu<sup>3</sup>; Bryan Crossman<sup>4</sup>; Jaroslav Polák<sup>1</sup>; Easo George<sup>5</sup>; Robert Ritchie<sup>3</sup>; Michael Mills<sup>4</sup>; <sup>1</sup>Institute of Physics of Materials, Czech Academy of Sciences; <sup>2</sup>Exponent; <sup>3</sup>Lawrence Berkeley National Laboratory; <sup>4</sup>The Ohio State University; <sup>5</sup>Oak Ridge National Laboratory

3:00 PM

**Fatigue of Solid State Electrolytes for Lithium Ion Batteries:** *David Armstrong*<sup>1</sup>; Johann Perera<sup>1</sup>; <sup>1</sup>University of Oxford

3:20 PM Break

3:40 PM

**In Situ SEM Micromechanical Testing to Assess Local Fatigue Properties in Nanostructured Metals:** *Daniel Kiener*<sup>1</sup>; Hannah Lichtenegger<sup>1</sup>; Alexander Jelinek<sup>1</sup>; Markus Alfreider<sup>1</sup>; <sup>1</sup>University of Leoben

4:00 PM

**Effect of Carbon Concentration on LCF Properties of N105 Alloy:** *Kyle Rozman*<sup>1</sup>; Stoichko Antonov<sup>1</sup>; Martin Detrois<sup>1</sup>; Paul Jablonski<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

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## ADVANCED CHARACTERIZATION METHODS

### Heterostructured and Gradient Materials (HGM VII): Principle, Processing and Properties — Design

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoung Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

Monday PM | March 24, 2025  
155 | MGM Grand

**Session Chairs:** David Field, Washington State University; Andrea Hodge, University of Southern California; Yunzhi Wang, Ohio State University; Ting Zhu, Georgia Institute of Technology

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2:00 PM Invited

**Design and Quantification of Gradient Microstructures by Solid Phase Processing:** *David Field*<sup>1</sup>; <sup>1</sup>Washington State University

2:25 PM Invited

**Accelerated Discovery of Heterogeneous Superalloys:** *Andrea Hodge*<sup>1</sup>; <sup>1</sup>University of Southern California

2:50 PM

**Tailoring Mechanical Behavior in Ti/Nb Nanolayered Composites via Thick 3-Dimensional Interfaces:** *Mauricio De Leo*<sup>1</sup>; Nicholas Fuchs-Lynch<sup>2</sup>; Benjamin Derby<sup>3</sup>; Jon Baldwin<sup>3</sup>; Jonathan Poplawsky<sup>4</sup>; Irene Beyerlein<sup>2</sup>; Nathan Mara<sup>1</sup>; <sup>1</sup>University of Minnesota; <sup>2</sup>University of California, Santa Barbara; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Oak Ridge National Laboratory

3:10 PM

**Superior Tensile Properties and Formability Synergy of High-Entropy Alloys Through Inverse-Gradient Structures:** *Kim Rae Eon*<sup>1</sup>; Yeon Taek Choi<sup>1</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>Postech

3:30 PM Break

3:50 PM Invited

**Mechanics of Gradient Nanostructured Metals:** *Ting Zhu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

4:15 PM

**Designing Scalable Metallic Composites by Leveraging Liquid Phase Separation in Additive Manufacturing:** *Nabila Ali*<sup>1</sup>; Yuheng Nie<sup>1</sup>; Mia Mikolajczak<sup>1</sup>; Marie Charpagne<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

4:35 PM Invited

**Computational Design of Compositionally and Structurally Modulated Materials for Desired Stress-Strain Responses:** *Zexu Chen*<sup>1</sup>; Hariharan Sriram<sup>1</sup>; Taiwu Yu<sup>1</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>Ohio State University

5:00 PM

**Using Hydrogen as a Temporary Alloying Element for Microstructure Control During Thermo-Mechanical Processing:** *Can Okuyucu*<sup>1</sup>; Haoxue Yan<sup>2</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Stanford University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Properties and Characterization

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

Monday PM | March 24, 2025  
302 | MGM Grand

**Session Chairs:** C. Tasan, Massachusetts Institute of Technology; Krista Limmer, DEVCOM Army Research Laboratory

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2:00 PM Invited

**Application of Emerging EBSD Tools for Phase Detection in Martensitic Steels:** *Patrick Callahan*<sup>1</sup>; David Rowenhorst<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory

2:30 PM

**Microstructure-Related Strain Maps of '1D', '2D', & '3D' Tests Reveal Strong Lath Martensite Plastic Anisotropy in DP Steel:** *Tijmen Vermeij*<sup>1</sup>; Job Wijnen<sup>2</sup>; Jorn Verstijnen<sup>2</sup>; Roy Kerkhof<sup>2</sup>; Casper Mornout<sup>2</sup>; Vahid Rezazadeh<sup>2</sup>; Ron Peerlings<sup>2</sup>; Marc Geers<sup>2</sup>; Johan Hoefnagels<sup>2</sup>; <sup>1</sup>EMPA; <sup>2</sup>Eindhoven University of Technology

2:50 PM Invited

**Structure-Property Relationships in Hybrid Additively Manufactured Stainless Steel 316L:** *Andrew Neils*<sup>1</sup>; *Quinn Campbell*<sup>2</sup>; Thomas Keller<sup>1</sup>; Jack Lesko<sup>1</sup>; Nathan Post<sup>1</sup>; David Hayrikyan<sup>3</sup>; Sam Boese<sup>1</sup>; <sup>1</sup>The Roux Institute at Northeastern University; <sup>2</sup>Kostas Research Institute at Northeastern University; <sup>3</sup>bluShift Aerospace

3:20 PM

**Nanomechanical Response of Rolled Homogenous Armor (RHA) Steel:** *Niraj Atale*<sup>1</sup>; Kevin Jacob<sup>1</sup>; Ethan Shimak<sup>1</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University

## Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution — Microstructural Modeling in Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Yunzhi Wang, Ohio State University; Wei Xiong, University of Pittsburgh; Jiamian Hu, University of Wisconsin Madison; Chuan Zhang, CompuTherm LLC

**Monday PM | March 24, 2025**  
**357 | MGM Grand**

**Session Chairs:** Katsuyo Thornton, University of Michigan; Jacob Zorn, Corvid Technologies, LLC

**2:00 PM Invited**

**Direct Observation of the Atomic Scale Mechanism of Grain Rotation:** *Xiaoqing Pan*<sup>1</sup>; <sup>1</sup>University of California Irvine

**2:25 PM Invited**

**Phase-Field Simulations of Microstructure Evolution: Application of PRISMS-PF for Complex Processing Conditions:** *Katsuyo Thornton*<sup>1</sup>; <sup>1</sup>University of Michigan

**2:50 PM Invited**

**Harnessing Nano/Microstructures: Unlocking the Shape Memory and Ferroelastic Potential of Zirconia-Based Ceramics:** *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**3:15 PM Invited**

**Coherent Phase Stability and Short-Range Order in Multicomponent Systems:** *Christopher Wolverton*<sup>1</sup>; <sup>1</sup>Northwestern University

**3:40 PM Break**

**4:00 PM Invited**

**Microstructure Evolutions in Ni-Based Superalloys Under Complex Creep Loadings:** *Yann Le Bouar*<sup>1</sup>; *Maeva Cottura*<sup>2</sup>; *Alphonse Finel*<sup>1</sup>; *Benoit Appolaire*<sup>2</sup>; <sup>1</sup>Lem, Cnrs/Onera; <sup>2</sup>IJL, Univ. de Lorraine

**4:25 PM Invited**

**Multiphysics Microstructural Modeling With Mixed Inhomogeneous Boundary Conditions With Fourier Spectral Methods:** *Jacob Zorn*<sup>1</sup>; <sup>1</sup>Corvid Technologies, LLC.

**4:50 PM Invited**

**Macroscopic Energy Barrier and Thermodynamic Hysteresis in Magnetic Shape Memory Alloys:** *Yongmei Jin*<sup>1</sup>; *Yu Wang*<sup>1</sup>; <sup>1</sup>Michigan Technological University

**5:15 PM Invited**

**The Development of Phenomenological Thermodynamic Energies:** *Yijia Gu*<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

## Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments — Thermoelectrics

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Energy Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Composite Materials Committee

**Program Organizers:** Paolo Mele, Shibaura Institute of Technology; Julio Gutierrez Moreno, Barcelona Supercomputing Center; Hussein Assadi, RIKEN (The Institute of Physical and Chemical Research); Esmail Doustkhah, Istinye University; Marco Fronzi, The University of Sydney; Donna Guillen, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Tuan Nguyen, University of Queensland

**Monday PM | March 24, 2025**  
**358 | MGM Grand**

**Session Chairs:** Eleonora Isotta, Max Planck Institute Susmat; Takayoshi Katase, Tokyo Institute of Technology

**2:00 PM Invited**

**Ab Initio Calculations of the Thermoelectric Figure of Merit:** *Laurent Chaput*<sup>1</sup>; <sup>1</sup>Lorraine University

**2:25 PM Invited**

**Body Heat Harvester Based on Thermoelectrics for Continuous Operation of Sensors and Actuators:** *Woochul Kim*<sup>1</sup>; <sup>1</sup>Yonsei University

**2:50 PM Invited**

**Design of Eco-Friendly and High-Efficiency Thermo-Photoelectric Conversion Materials:** *Takayoshi Katase*<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology

**3:15 PM Invited**

**Nanomaterial and Nanostructure Physics for Thermoelectric Performance Enhancement:** *Yoshiaki Nakamura*<sup>1</sup>; <sup>1</sup>Osaka University

**3:40 PM Break**

**3:55 PM Invited**

**Starrydata2: an Open Platform for Materials Data Curated From Literature:** *Yukari Katsura*<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

**4:20 PM Invited**

**Structure Low Dimensionality and Lone-Pair Stereochemical Activity: The Key to Low Thermal Conductivity in Sulfides:** *Emmanuel Guilmeau*<sup>1</sup>; <sup>1</sup>CRISMAT/CNRS

**4:45 PM Invited**

**Local Thermal Conductivity Imaging and Modelling to Guide Microstructure Engineering in Energy Materials:** *Eleonora Isotta*<sup>1</sup>; *Christina Scheu*<sup>2</sup>; *G. Jeffrey Snyder*<sup>1</sup>; *Oluwaseyi Balogun*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Max Planck Institute for Iron Research

**5:10 PM**

**Bragg Coherent X-Ray Diffraction Imaging of Strain in Energy Materials:** *Ross Harder*<sup>1</sup>; *Wonsuk Cha*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

## MATERIALS SYNTHESIS AND PROCESSING

### Innovative Hydrometallurgical Technologies for Environmentally Benign Processing and Remediation: An EPD Symposium Honoring Fiona Doyle — Honorary Session II

**Sponsored by:** TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee, TMS: Pyrometallurgy Committee

**Program Organizers:** Christina Meskers, SINTEF; Michael Free, University of Utah; Kerstin Forsberg, KTH Royal Institute of Technology; Gisele Azimi, University of Toronto; Hani Henein, University of Alberta

**Monday PM | March 24, 2025**  
**101 | MGM Grand**

**Session Chair:** Michael Free, University of Utah

**2:00 PM**

**Rare Earth Elements Recovery Using Thermo-Responsive Virus:** Inseok Chae<sup>1</sup>; Fiona Doyle<sup>1</sup>; Seung-Wuk Lee<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**2:30 PM**

**Dissolution Behavior of Vanadium and Iron From Their Oxide Compounds in D2EHPA and Investigation of the Stripping Behavior:** Kurniawan Kurniawan<sup>1</sup>; Jae-chun Lee<sup>2</sup>; Mooki Bae<sup>2</sup>; Sookyung Kim<sup>2</sup>; Alexandre Chagnès<sup>3</sup>; <sup>1</sup>Korea University of Science and Technology; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources (KIGAM); <sup>3</sup>Universite de Lorraine CNRS

**2:50 PM**

**Structure and Electrical Conductivity of Urea-Choline Chloride Deep Eutectic Solvent:** Rajyashree Lenka<sup>1</sup>; Ramana Reddy<sup>1</sup>; <sup>1</sup>The University of Alabama

**3:10 PM**

**Evaluation of the Glycine-Citrate System for the Leaching of Lead and Zinc From Mining Tailings:** Erick Muñoz Hernandez<sup>1</sup>; Edith Sarai Llanos Blancas<sup>1</sup>; Angel Ruiz Sánchez<sup>2</sup>; Martin Reyes Pérez<sup>1</sup>; Felipe Legorreta García<sup>1</sup>; Julio Cesar Juarez Tapia<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo; <sup>2</sup>Universidad Nacional Autónoma de México

**3:30 PM Break**

**3:50 PM**

**Effect of Applied Potential on the Electrodeposition of Ti-Al Alloys in AlCl<sub>3</sub>:BMIC Ionic Liquid Electrolyte:** Md Khalid Nahian<sup>1</sup>; Ramana Reddy<sup>1</sup>; <sup>1</sup>University of Alabama Tuscaloosa

**4:10 PM**

**Investigation on the Interaction Between Acidic Organophosphorous Extractants and Tri-n-octylamine (TOA) for the Extraction of Rare Earths in HCl System:** Arsyad Dzulqornain<sup>1</sup>; Jae-chun Lee<sup>1</sup>; Hosung Yoon<sup>1</sup>; Rina Kim<sup>1</sup>; Kyeong-woo Chung<sup>1</sup>; <sup>1</sup>Korea Institute of Geoscience and Mineral Resource (KIGAM)

**4:30 PM**

**Removal Studies of Mo(VI) Ions From Simulated Metallurgical Waste Liquid by MIL-100(Fe):** Zhan Chu<sup>1</sup>; Hongfei Ma<sup>1</sup>; Wenjuan Wang<sup>1</sup>; Yanfang Huang<sup>1</sup>; Guihong Han<sup>1</sup>; <sup>1</sup>Zhengzhou University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Modeling

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Monday PM | March 24, 2025**  
**316 | MGM Grand**

**Session Chairs:** Megan McCarthy, Sandia National Laboratories; Mitra Taheri, Johns Hopkins University

**2:00 PM Invited**

**Short and Medium-Range Order in Novel Battery Materials:** Gerbrand Ceder<sup>1</sup>; <sup>1</sup>University of California at Berkeley

**2:30 PM Invited**

**Developing New Modeling Capability to Enable Explicit Characterization of Short-Range Order in Alloys:** Tianshu Li<sup>1</sup>; Shunda Chen<sup>1</sup>; Xiaochen Jin<sup>1</sup>; Lilian Vogl<sup>2</sup>; Andrew Minor<sup>2</sup>; Shang Liu<sup>3</sup>; Jifeng Liu<sup>3</sup>; <sup>1</sup>George Washington University; <sup>2</sup>University of California, Berkeley; <sup>3</sup>Dartmouth College

**3:00 PM**

**Tuning Chemical Short-Range Order in Metallic Alloys via Thermomechanical Processing:** Mahmudul Islam<sup>1</sup>; Killian Sherif<sup>1</sup>; Yifan Cao<sup>1</sup>; Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**3:20 PM Break**

**3:40 PM Invited**

**Bottom-Up Models for Capturing Local Chemical Order in Complex Alloys Exhibiting Magnetism -- Application to Austenitic Stainless Steels and Magnetic Shape Memory Alloys:** Brian Blankenau<sup>1</sup>; Tianyu Su<sup>1</sup>; Elif Ertekin<sup>1</sup>; <sup>1</sup>University of Illinois

**4:10 PM**

**FYL-CVM: A Thermodynamic Model With Intrinsic Chemical Short-Range Order:** Rajendra Prasad Gorrey<sup>1</sup>; Chu-Liang Fu<sup>1</sup>; Bi-Cheng Zhou<sup>1</sup>; <sup>1</sup>University of Virginia



## LIGHT METALS

### Magnesium Technology 2025 — Experimental Characterization

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Monday PM | March 24, 2025**  
**115 | MGM Grand**

**Session Chairs:** Gerardo Garces, Cenim-Csic; Victoria Miller, University of Florida

#### 2:00 PM Keynote

**Uncovering the Microstructural Aspects of Mechanical Performance of Mg-LPSO Alloys Using In-Situ Experimental Techniques:** *Kristian Mathis*<sup>1</sup>; <sup>1</sup>Nuclear Physics Institute of the CAS; Charles University

#### 2:40 PM

**Effects of Zn and Ca Microalloying on -Series Precipitation in Mg-Nd Alloys a Comparison of Electron Microscopy and Small-Angle Scattering Techniques:** *Janet Meier*<sup>1</sup>; Jiashi Miao<sup>2</sup>; Lisa DeBeer-Schmitt<sup>1</sup>; Jan Ilavsky<sup>3</sup>; Alan Luo<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>The Ohio State University; <sup>3</sup>Argonne National Laboratory

#### 3:00 PM

**Experimental Investigation on Twinning Behavior in Mg-Y Alloys:** *Qianying Shi*<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan

#### 3:20 PM

**Understanding the Role of Interfaces and Elemental Segregation on Texture Weakening in Mg-Zn-Ca Alloys During Recrystallization:** *Rogine Gomez*<sup>1</sup>; Aerial Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University

#### 3:40 PM Break

#### 4:00 PM

**Shear Banding Mechanism and Fracture Behavior in Pure Magnesium:** *Connor Lopez*<sup>1</sup>; Reza Motallebi<sup>1</sup>; Brady Butler<sup>2</sup>; Kelvin Xie<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>DEVCOM Army Research Laboratory South at Texas A&M University

#### 4:20 PM

**SiC Nanowhisker Reinforced Lightweight Metal Composites: A Detailed Study of the Interface:** *Zhuocheng Xu*<sup>1</sup>; Anne Bonnin<sup>2</sup>; Benjamin Watts<sup>2</sup>; Xinyi Hao<sup>1</sup>; Yuting Dai<sup>3</sup>; Christopher Gourlay<sup>1</sup>; Christian Kübel<sup>3</sup>; Milo Shaffer<sup>1</sup>; *Qianqian Li*<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>Paul Scherrer Institute, Switzerland; <sup>3</sup>Institute of Nanotechnology, Karlsruhe Institute of Technology

#### 4:40 PM

**Effect of Subsequent Heat Treatment on Microstructure, Hardness and Corrosion Behavior of Extruded and Swaged Mg0.15Ca:** *Petra Maier*<sup>1</sup>; Benjamin Clausius<sup>1</sup>; Thea-Simone Tegtmeier<sup>1</sup>; Jeremy Schaffer<sup>2</sup>; Adam Griebel<sup>2</sup>; <sup>1</sup>University of Applied Sciences Stralsund; <sup>2</sup>Fort Wayne Metals

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions — Aging and Compatibility of Metals II

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bishnu Khanal, Sandia National Laboratories; Michael Melia, Sandia National Laboratories; Coby Davis, Sandia National Laboratories; Kerri Blobaum, Lawrence Livermore National Laboratory; Anthony Van Buuren, Lawrence Livermore National Laboratory; Nan Butler, Sandia National Laboratories

**Monday PM | March 24, 2025**  
**309 | MGM Grand**

**Session Chair:** Michael Melia, Sandia National Laboratories

#### 2:00 PM Invited

**Predicting Compatibility and Aging at the System-Level With a Reaction, Sorption, Transport, and Chemo-Mechanics (ReSorT-M) Model:** *Sylvie Aubry*<sup>1</sup>; Maxwell Murialdo<sup>1</sup>; Brandon Foley<sup>1</sup>; Pratanu Roy<sup>1</sup>; Stephen Castonguay<sup>1</sup>; Andrew Tompson<sup>1</sup>; Kayyum Mansoor<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 2:40 PM

**Materials Compatibility Testing and Assessment for Materials Reliability:** *Kirsty Leong-Hau*<sup>1</sup>; Dustin Murtagh<sup>1</sup>; Brent Wickemeyer<sup>1</sup>; Nan Butler<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 3:00 PM

**Research on Shape Optimization of Work Roll in Hot Rolling:** *Jianhua Wei*<sup>1</sup>; Aimin Zhao<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing, Beijing

#### 3:20 PM

**Characterization of Long Term Service Effect on Turbine Blade Alloy:** *Alwaleed Alduaiji*<sup>1</sup>; Mohammed Akbar<sup>1</sup>; Hariharan Sundaram<sup>1</sup>; <sup>1</sup>GE Vernova

#### 3:40 PM Break

#### 4:00 PM Invited

**A Mean-Field Approach for High-Temperature Shape Memory Alloys:** *Adrien Cassagne*<sup>1</sup>; *Jean-Briac le Graverend*<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 4:20 PM

**Predicting Electrochemical Responses Using Machine Learning:** *Matthew Roop*<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Aditya Venkatraman<sup>1</sup>; Sam Moran<sup>1</sup>; Rebecca Schaller<sup>1</sup>; Ryan Katona<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 4:40 PM

**Strain-Controlled High-Cycle Fatigue of Aged Solder Joints for High-Reliability Environments:** *David Kemmenoe*<sup>1</sup>; John Laing<sup>1</sup>; Benjamin White<sup>1</sup>; *Hannah Fowler*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Computational Methods applied to Molten Salts and Molten Salt Corrosion

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**165 | MGM Grand**

**Session Chair:** Yu-Chen Karen Chen-Wiegart, Stony Brook University/ Brookhaven National Lab.

#### 2:00 PM Invited

**A Computational Approach to Investigate the Impact of Impurities on Corrosion Behavior in Molten Salt Reactors:** *Soumya Bandyopadhyay*<sup>1</sup>; Thompson Igunma<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

#### 2:20 PM

**Morphological Aspects of Ni-Based Alloys Undergoing Molten Salt Dealloying Corrosion: A Phase Field Study:** *Nathan Bieberdorf*<sup>1</sup>; Justin Kerr<sup>2</sup>; Xueyang Bogdanova<sup>3</sup>; Laurent Capolungo<sup>3</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Los Alamos National Laboratory

#### 2:40 PM

**Atomistic Insights Into Orientation-Assisted Corrosion of NiCr Alloys in Molten FLiNaK Salt Using ReaxFF Molecular Dynamics:** *Hamdy Arkoub*<sup>1</sup>; Daniel Flynn<sup>1</sup>; Miaomiao Jin<sup>1</sup>; <sup>1</sup>Pennsylvania State University

#### 3:00 PM

**Molecular Dynamics Exploration of the Impurity and Radiolysis Effects on the Thermal Properties of Molten FLiBe Salt:** *Nicholas Dailey*<sup>1</sup>; Jianqi Xi<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

#### 3:20 PM

**Design of Corrosion-Resistant Ceramic Coatings Against Molten Chlorides via Computational Thermodynamics:** *Sangtae Kim*<sup>1</sup>; <sup>1</sup>Hanyang University

#### 3:40 PM Break

#### 4:00 PM Invited

**Understanding Coarsening of Dealloyed Ni-20Cr in a Molten Salt Environment Through the Comparison of Phase-Field Simulations to 4-D Experiments:** *W. Beck Andrews*<sup>1</sup>; Ellery Hendrix<sup>1</sup>; Xiaoyang Liu<sup>2</sup>; Karen Chen-Wiegart<sup>3</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Stony Brook University

#### 4:25 PM

**Investigation of Structural Alloy Corrosion in Molten Salt – Mesoscale Modeling of Electrochemical Experiments:** *Xueyang Bogdanova*<sup>1</sup>; Nathan Bieberdorf<sup>2</sup>; Mark Asta<sup>2</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of California, Berkeley

#### 4:45 PM

**Application of an Extensive Thermodynamic Database Models to Characterize Molten Salt Reactor Behavior:** *Theodore Besmann*<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Jorge Paz Soldan Pinto<sup>1</sup>; Amir Mofrad<sup>1</sup>; Clara Dixon<sup>1</sup>; Ronald Booth<sup>1</sup>; Jack Wilson<sup>1</sup>; Aiswarya Padinhare Manisseri<sup>1</sup>; Zachary Gardiner<sup>1</sup>; <sup>1</sup>University of South Carolina

#### 5:10 PM

**Phase-Field Simulations of Corrosion and Dealloying in Molten Salt:** *Ellery Hendrix*<sup>1</sup>; W. Beck Andrews<sup>1</sup>; Xiaoyang Liu<sup>2</sup>; Yuxiang Peng<sup>2</sup>; David Montiel<sup>1</sup>; Yu-chen Karen Chen-Wiegart<sup>2</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Stony Brook University

## NUCLEAR MATERIALS

### Materials Corrosion Behavior in Advanced Nuclear Reactor Environments II — Corrosion in Fusion Environments

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison

**Monday PM | March 24, 2025**  
**164 | MGM Grand**

**Session Chair:** Trishelle Copeland-Johnson, Idaho National Laboratory

#### 2:00 PM

**Liquid Lithium Corrosion of Structural Fusion Materials:** *David Armstrong*<sup>1</sup>; <sup>1</sup>University of Oxford

#### 2:20 PM

**Impact of Oxidation and Helium Irradiation-Induced Defects in Fe-18Cr Samples:** *Mira Khair*<sup>1</sup>; Santiago Cavazos<sup>1</sup>; Valeria Vessi<sup>1</sup>; Shakira Medellin<sup>1</sup>; Blas Uberuaga<sup>2</sup>; Peter Hosemann<sup>3</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>University of Texas San Antonio; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of California Berkeley

#### 2:40 PM

**Corrosion of Advanced Materials Exposed to High Temperature Helium:** *Lawrence Coghlan*<sup>1</sup>; Robert Burrows<sup>2</sup>; Ronald Clark<sup>2</sup>; David Kumar<sup>2</sup>; Mariia Zimina<sup>1</sup>; Aya Shin<sup>3</sup>; Tomas Martin<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>National Nuclear Laboratory Limited; <sup>3</sup>EDF Energy

#### 3:00 PM

**Development and Construction of a Liquid Lead-Lithium Loop at UNM:** *Xavier Angus*<sup>1</sup>; Sergey Smolentsev<sup>2</sup>; Bruce Pint<sup>2</sup>; Claude De lamater-Brotherton<sup>2</sup>; Marie Romedenne<sup>2</sup>; G. Ivan Maldonado<sup>3</sup>; Nicholas Brown<sup>3</sup>; Quang Son<sup>3</sup>; Michael Trombetta<sup>1</sup>; Daniel Levario<sup>1</sup>; Osman Anderoglu<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>Oak Ridge National Lab; <sup>3</sup>University of Tennessee Knoxville

#### 3:20 PM Break

#### 3:40 PM

**Alumina Scale Stability Under Combined High Temperature Liquid Metal Corrosion and Neutron Irradiation:** *Marie Romedenne*<sup>1</sup>; Yi-Feng Su<sup>1</sup>; Cansu On<sup>2</sup>; Josina W Geringer<sup>1</sup>; Nick Russell<sup>1</sup>; Masatoshi Kondo<sup>3</sup>; Yuji Hatano<sup>4</sup>; Jiheon Jun<sup>1</sup>; Yutai Kato<sup>1</sup>; Bruce A. Pint<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Y12; <sup>3</sup>Tokyo Institute of Technology; <sup>4</sup>University of Toyama

4:00 PM

**Evaluating Compatibility of Structural Materials for a FLiBe Fusion Breeder Blanket:** *Rishi Pillai*<sup>1</sup>; Marie Romedenne<sup>1</sup>; Monica Gehrig<sup>1</sup>; Adam Willoughby<sup>1</sup>; Paul Humrickhouse<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

4:20 PM

**Evaluation of Compatibility of Steel, Vanadium Materials and Steel-Insulator-Steel Structures With High Temperature Liquid Lithium:** *Claude De Lamater-Brotherton*<sup>1</sup>; Marie Romedenne<sup>2</sup>; Jim Pickles<sup>3</sup>; Bruce Pint<sup>2</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Tokamak Energy

4:40 PM Break

## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Research from Early Career Scientists

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

Monday PM | March 24, 2025  
160 | MGM Grand

**Session Chairs:** Eric Lang, University of New Mexico; Kayla Yano, Pacific Northwest National Laboratory

2:00 PM Invited

**Evaluating Mechanical Properties of Irradiated Ferritic/Martensitic Steels With Nanoindentation and Strengthening Model Predictions:** Pengcheng Zhu<sup>1</sup>; Yajie Zhao<sup>2</sup>; Yan-Ru Lin<sup>3</sup>; Valentin Pauly<sup>4</sup>; Stephen Taller<sup>3</sup>; Jean Henry<sup>5</sup>; Shradha Agarwal<sup>2</sup>; *Steven Zinkle*<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Tennessee, Knoxville; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>University of Michigan, Ann Arbor; <sup>5</sup>CEA, DEN, Service de Recherches Métallurgiques Appliquées

2:30 PM Invited

**Quantitative Analysis of Interfacial Defect Densities in Ion Irradiated Dual-Phase Alloy Systems:** *James Haag*<sup>1</sup>; Ana Garcia Caraveo<sup>2</sup>; Tanvi Ajantiwalay<sup>1</sup>; Matthew Olszta<sup>1</sup>; Weilin Jiang<sup>1</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Oregon State University

3:00 PM Invited

**Irradiation-Creep and Irradiation-Creep-Fatigue of Austenitic and Ferritic-Martensitic Alloys for Advanced Nuclear Reactors:** *Charles Hirst*<sup>1</sup>; Mackenzie Warwick<sup>2</sup>; Wyatt Peterson<sup>2</sup>; Kevin Field<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of Michigan

3:30 PM Break

3:50 PM Invited

**Unraveling the Roles of Grain Boundary Chemistry and Stress State on the Oxidation Response of Ni-Cr Alloys:** *Elizabeth Kautz*<sup>1</sup>; Karen Kruska<sup>2</sup>; Ziqing Zhai<sup>2</sup>; Robert McRobie<sup>1</sup>; Josephine Hartmann<sup>1</sup>; Daniel Schreiber<sup>2</sup>; Matthew Olszta<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory

4:20 PM Invited

**Understanding the Thermomechanical Response of Incumbent and ATF Fuel Claddings to Accident Transients:** *Samuel Bell*<sup>1</sup>; Nathan Capps<sup>1</sup>; Caleb Massey<sup>1</sup>; Takaaki Koyanagi<sup>1</sup>; Kory Linton<sup>1</sup>; Peter Doyle<sup>1</sup>; Yong Yan<sup>1</sup>; Jason Harp<sup>1</sup>; Nicholas Brown<sup>2</sup>; Jennifer Espersen<sup>2</sup>; Daniel Sweeney<sup>1</sup>; Daniel Schappel<sup>1</sup>; Mackenzie Ridley<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee, Knoxville

4:50 PM Invited

**Towards NRC Approval of the Fracture Toughness Test for RPV Integrity Evaluation for Long-Term Operation: Challenges and Opportunities:** *Caleb Clement*<sup>1</sup>; Brian Hall<sup>1</sup>; <sup>1</sup>Westinghouse Electric Company

## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Strength and Fracture Resistance of Interfaces

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

Monday PM | March 24, 2025  
369 | MGM Grand

**Session Chairs:** Thomas Nizolek, Los Alamos National Laboratory; Stanislav Zak, Austrian Academy of Sciences

2:00 PM

**Characterization of Interfacial Bonding Strength Between 316 Stainless Steel and Electrodeposited Nickel Layers via Mesoscale Mechanical Testing:** *Yuxin Hu*<sup>1</sup>; Sebastian Lam<sup>1</sup>; Fei Teng<sup>2</sup>; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Idaho National Lab

2:20 PM

**Variation in Oxide Dispersion Strengthening Due to Interfacial Structure:** *Jacob Tavenner*<sup>1</sup>; Mikhail Mendelev<sup>2</sup>; Gabriel Plummer<sup>2</sup>; Timothy Smith<sup>3</sup>; John Lawson<sup>2</sup>; <sup>1</sup>Kbr - NASA Ames Research Center; <sup>2</sup>NASA Ames Research Center; <sup>3</sup>NASA Glenn Research Center

2:40 PM

**Tensile Failure of Epitaxial TiN/Cu/TiN Sandwich Pillar Structures:** X. Zhang<sup>1</sup>; R. Namakian<sup>1</sup>; D. Moldovan<sup>1</sup>; *Wen Meng*<sup>1</sup>; <sup>1</sup>Louisiana State University

3:00 PM Invited

**In-Situ Characterization of Interface Properties as Well as Modelling of Crack-Steering Processes in Nano-Scale Multi-Layer and Multi-Material Composite Stacks in Microelectronics:** *André Clausner*<sup>1</sup>; Stefan Weitz<sup>2</sup>; Jendrik Silomon<sup>1</sup>; Kristina Kutukova<sup>2</sup>; <sup>1</sup>Fraunhofer IKTS; <sup>2</sup>Fraunhofer IZM-ASSID

3:30 PM Break

3:50 PM

**The Enigma of Solute Effect on Strength of Metal Alloys at the Nanoscale:** Zhao Liang<sup>1</sup>; Feitao Li<sup>1</sup>; *Eugen Rabkin*<sup>1</sup>; <sup>1</sup>Technion

4:10 PM

**Ultra-High Strength, Deformable Nanocrystalline Al-Pd Alloys:** *Xuanyu Sheng*<sup>1</sup>; Zhongxia Shang<sup>1</sup>; Nicholas Richter<sup>1</sup>; Anyu Shang<sup>1</sup>; Haiyan Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University

4:30 PM

**Ultrahigh Strength in Al-AlxGeEutectics:** *Arkajit Ghosh*<sup>1</sup>; Wenqian Wu<sup>2</sup>; Jian Wang<sup>2</sup>; Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Nebraska – Lincoln

4:50 PM Invited

**Can Zinc be Strengthened by Voids? Micromechanical Testing and Microstructural Insights Into Electrodeposited Zinc Coating:** *Maria Watroba*<sup>1</sup>; Killang Pratama<sup>1</sup>; Chunhua Tian<sup>2</sup>; Krzysztof Mackos<sup>3</sup>; Amit Sharma<sup>1</sup>; Wiktor Bednarczyk<sup>4</sup>; Johann Michler<sup>1</sup>; Jakob Schwiedrzyk<sup>1</sup>; <sup>1</sup>Empa Swiss Federal Laboratories for Materials Science and Technology; <sup>2</sup>RWTH Aachen University; <sup>3</sup>Empa Swiss Federal Laboratory for Materials Science and Technology; <sup>4</sup>AGH University of Science and Technology

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## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling – High Strain Rates

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday PM | March 24, 2025  
366 | MGM Grand

**Session Chair:** Dongchan Jang, Korea Advanced Institute of Science and Technology

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2:00 PM

**Finite Element Modeling of Impacts for the Measurement of Material Properties:** *Hyein Na*<sup>1</sup>; Yang Liu<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Massachusetts Institute of Technology / Northwestern University

2:20 PM

**In-Situ Imaging of Spall Fracture:** *Jacob Diamond*<sup>1</sup>; Justin Moreno<sup>1</sup>; Lily Zhao<sup>1</sup>; K.T. Ramesh<sup>1</sup>; <sup>1</sup>Johns Hopkins University

2:40 PM

**Influence of Lattice Metamaterial Topology on Mechanical Response From Quasistatic to Shock Compaction Regimes:** *Brandon Zimmerman*<sup>1</sup>; Eric Herbold<sup>1</sup>; Mukul Kumar<sup>1</sup>; Jonathan Lind<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

3:00 PM

**Modeling Laser-Induced Microparticle Acceleration Using a Mesoscale-Continuum Approach:** *Ching Chen*<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

3:20 PM

**Nitrogen Hardening and Its Resistance to Aging in a Martensitic Nitrided Steel Investigated by High Speed Nanoindentation:** *Romain Bordas*<sup>1</sup>; Damien Texier<sup>2</sup>; Jacques Bellus<sup>1</sup>; <sup>1</sup>Aubert&Duval; <sup>2</sup>Institut Clément Ader

3:40 PM Break

4:00 PM

**Quantifying the Response of Metals at Elevated Temperatures and Strain Rates Above 10<sup>6</sup> s<sup>-1</sup>:** *Ian Dowding*<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Northwestern University

4:20 PM

**Small-Scale Mechanical Testing of Material Properties Enabled by Site-Specific Femtosecond Laser Machining:** *Zachary Barker*<sup>1</sup>; Brian Schuster<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso

4:40 PM

**Strain Rate Dependence of Activation Volume in Au Ultrafine Grained Thin Films Investigated by In Situ TEM:** *Yichen Yang*<sup>1</sup>; Kunqing Ding<sup>1</sup>; Xing Liu<sup>1</sup>; Ting Zhu<sup>1</sup>; Josh Kacher<sup>1</sup>; Olivier Pierron<sup>1</sup>; <sup>1</sup>Gatech

5:00 PM

**Strain Rate Sensitivity: A Comparative Analysis of Nanoindentation and Split Hopkinson Bar Measurement Techniques:** *Daniel Lewis*<sup>1</sup>; James Paramore<sup>1</sup>; Brady Butler<sup>2</sup>; Nicole Person<sup>1</sup>; Christopher Walker<sup>1</sup>; George Pharr<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>DEVCOM Army Research Laboratory South at Texas A&M University

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## BIOMATERIALS

### Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues – Metals & Hierarchical Relationships in Biological Materials

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Bernd Gludovatz, UNSW Sydney; Elizabeth Zimmermann, McGill University; Steven Naleway, University of Utah; Sunita Ho, University of California, San Francisco

Monday PM | March 24, 2025  
308 | MGM Grand

**Session Chair:** Elizabeth Zimmermann, McGill University

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2:00 PM Invited

**Effects of Zinc Deficiency and Arsenic Co-Exposure on Bone in Growing Female Mice:** *Russell Turner*<sup>1</sup>; Laura Beaver<sup>1</sup>; Carmen Wong<sup>1</sup>; Laurie Hudson<sup>2</sup>; Emily Ho<sup>1</sup>; Adam Branscum<sup>1</sup>; Urszula Iwaniec<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>University of New Mexico

2:30 PM

**Zone-Specific Flocking of Zinc and Sulfur in the Temporomandibular Joint:** Brandon Lee<sup>1</sup>; Mark Yang<sup>2</sup>; Yongmei Wang<sup>3</sup>; Stephen Connelly<sup>4</sup>; Nobumichi Tamura<sup>5</sup>; Dilworth Parkinson<sup>5</sup>; Samuel Webb<sup>6</sup>; Sunita Ho<sup>7</sup>; <sup>1</sup>University of California, San Francisco; University of California, Davis; <sup>2</sup>University of California, San Francisco; University of Washington; <sup>3</sup>University of California, San Francisco; <sup>4</sup>Veterans Affairs San Francisco Hlth. Care; <sup>5</sup>Lawrence Berkeley National Laboratory; <sup>6</sup>Stanford Synchrotron Radiation Lightsource, SLAC Natl. Accelerator Laboratory; <sup>7</sup>University of California, San Francisco

2:50 PM Invited

**Assessing Molar Incisor Hypomineralisation Through Multiscale Imaging and Analytics:** *Bjorn Busse*<sup>1</sup>; <sup>1</sup>University Medical Center Hamburg

3:20 PM Break

3:40 PM

**Understanding Self-Sharpening Mechanism of Sea Urchin Tooth via Nanostructural and Nanomechanical Mapping:** *Gang Feng*<sup>1</sup>; Zhuonan Wang<sup>1</sup>; Riley McCarry<sup>1</sup>; <sup>1</sup>Villanova University



4:00 PM Invited

**The Osteoinductive Capacity of Demineralized Allogenic Bone Matrix is Impaired by Chronic Heavy Alcohol Consumption:** *Urszula Iwaniec*<sup>1</sup>; Adam Branscum<sup>1</sup>; Russell Turner<sup>1</sup>; <sup>1</sup>Oregon State University

4:30 PM

**Impact of Heavy Alcohol Consumption on Cortical Bone Mechanical Properties in Male Rhesus Macaques:** *Bernd Gludovatz*<sup>1</sup>; Mihee Shin<sup>1</sup>; Russel Turner<sup>2</sup>; Urszula Iwaniec<sup>2</sup>; Jamie Kruzic<sup>1</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>Oregon State University

4:50 PM

**Understanding the Impact Physiologically Relevant Stressors on the Structure and Properties of Fungi:** *Steven Naleway*<sup>1</sup>; Atul Agrawal<sup>1</sup>; Ihsan Elnunu<sup>1</sup>; James Gallagher<sup>1</sup>; Jessica Redmond<sup>1</sup>; <sup>1</sup>University of Utah

## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Ceramic & Functional Materials II

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusioneering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

Monday PM | March 24, 2025

158 | MGM Grand

**Session Chairs:** Ian Mccue, Northwestern University; Takaaki Koyanagi, Oak Ridge National Laboratory

2:00 PM Keynote

**ARPA-E CHADWICK Fusion Materials Program Overview:** Ahmed Diallo<sup>1</sup>; Cheng Xu<sup>2</sup>; *Assel Aitkaliyeva*<sup>3</sup>; <sup>1</sup>ARPA-E; <sup>2</sup>Booz Allen Hamilton; <sup>3</sup>ARPA-E and University of Florida

2:30 PM Keynote

**Development of SiC Composite Blanket for Fusion:** *Tatsuya Hinoki*<sup>1</sup>; Junyeab Lee<sup>1</sup>; Fujio Shinoda<sup>1</sup>; Taishi Sugiyama<sup>2</sup>; Takaaki Koyanagi<sup>3</sup>; Sosuke Kondo<sup>4</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Kyoto Fusioneering Ltd.; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Tohoku University

3:00 PM

**Ultra High Temperature Ceramics for Fusion Energy Applications:** *Lance Snead*<sup>1</sup>; David Sprouster<sup>1</sup>; Ju Li<sup>2</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Massachusetts Institute of Technology

3:20 PM

**First Principles Calculations of Fusion-Relevant Transmutation Defects in SiC:** *Alex Leide*<sup>1</sup>; Isabel Fernandez-Victorio<sup>1</sup>; Yixuan Huang<sup>2</sup>; Tesni Haddon-McMillan<sup>3</sup>; Duc Nguyen-Manh<sup>1</sup>; <sup>1</sup>UKAEA; <sup>2</sup>University of Oxford; <sup>3</sup>Ministry of Defence

3:40 PM Break

4:00 PM Invited

**Toward Understanding of the Response of SiC to Fusion Neutron Irradiation:** *Takaaki Koyanagi*<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Benjamin Lamm<sup>1</sup>; Yutai Kato<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

4:30 PM Invited

**A Carbon Foam to SiC Conversion Technology for Flow Channel Inserts:** *Jiping Zhang*<sup>1</sup>; Osman Trieu<sup>1</sup>; George Jacobsen<sup>1</sup>; Tyler Abrams<sup>1</sup>; Shawn Zamperini<sup>1</sup>; <sup>1</sup>General Atomics

## LIGHT METALS

### Melt Processing, Casting and Recycling — DC-Casting and Microstructure & Sensors and Control Systems

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Arild Hakonsen, Hycast As; Les Edwards, Rain Carbon Inc.

Monday PM | March 24, 2025

109 | MGM Grand

**Session Chairs:** Dmitry Eskin, Brunel University; Akash Pakanati, Hydro Research And Development Center

2:00 PM Introductory Comments

2:05 PM

**The Effect of Nucleating Particle Agglomerates on Grain Refiner Efficiency of 7xxx Aluminium Alloys:** Christopher Wheatley<sup>1</sup>; *Georges Salloum-Abou-Jaoude*<sup>1</sup>; <sup>1</sup>Constellium C-Tec

2:30 PM

**In Situ Observations of the Nucleation and Growth of Al-Si-Fe-Mn Intermetallics in Model Aluminium Alloys:** *Eliane Farhi*<sup>1</sup>; Georges Salloum-Abou-Jaoude<sup>2</sup>; Silvere Akamatsu<sup>3</sup>; Philippe Jarry<sup>2</sup>; Christine Nardin<sup>2</sup>; Sabine Bottin-Rousseau<sup>1</sup>; <sup>1</sup>Sorbonne Université; <sup>2</sup>Constellium Technology Center C-TEC; <sup>3</sup>CNRS

2:55 PM

**Smart Sensors for Additive Manufacturing and Aluminum Foundry 4.0 Initiatives:** Koustav Dey<sup>1</sup>; Grant Whitham<sup>1</sup>; Ben Hilgers<sup>1</sup>; *Laura Bartlett*<sup>1</sup>; Rony Saha<sup>1</sup>; Jie Huang<sup>1</sup>; Ronald O'Malley<sup>1</sup>; Jeffrey Smith<sup>1</sup>; <sup>1</sup>Missouri University of Science & Technology

3:20 PM

**Application of Digital Twins for Complete DC-Casting Lines:** *Vegard Innerdal*<sup>1</sup>; Birger Ellevseth<sup>1</sup>; Arild Hakonsen<sup>1</sup>; <sup>1</sup>Hycast As

3:45 PM Break

4:00 PM

**Liquid Composition Analysis of Wrought Aluminum Alloys Using Laser-Induced Breakdown Spectroscopy (LIBS) for Industrial Furnace Applications:** *Georges Salloum-Abou-Jaoude*<sup>1</sup>; Alexandre Nadeau<sup>2</sup>; Kristján Leósson<sup>3</sup>; Elise Garel<sup>1</sup>; <sup>1</sup>Constellium C-Tec; <sup>2</sup>Tecnar; <sup>3</sup>DTE

4:25 PM

**Tracking Primary Al<sub>3</sub>Ti and Al<sub>3</sub>Zr Phase Formation in Liquid Aluminum Alloys Using LIBS:** *Mehdi Maghsoudi*<sup>1</sup>; Georges Salloum-Abou-Jaoude<sup>2</sup>; Juan-Ricardo Castillo-Sanchez<sup>2</sup>; Snorri Ingvarsson<sup>3</sup>; Kristjan Leosson<sup>1</sup>; <sup>1</sup>DTE; <sup>2</sup>Constellium Technology Center C-TEC; <sup>3</sup>Science Institute, University of Iceland

4:50 PM

**BATSCAN – A Breakthrough for Industrial Inclusion Measurement in Aluminium Casthouses:** Jean-Louis Achard<sup>1</sup>; Jules Quinonero-Galindo<sup>1</sup>; *Pierre Le Brun*<sup>1</sup>; Marc Bertherat<sup>1</sup>; Pierre-Yves Menet<sup>1</sup>; Vincent Milani<sup>1</sup>; Nicoals Bauret<sup>1</sup>; <sup>1</sup>Constellium C-Tec

5:15 PM

**Investigating the Castability of Recycling AZ91 Machining Chips Through Shape Casting:** Xinyi Hao<sup>1</sup>; Zhuocheng Xu<sup>1</sup>; Christopher Gourlay<sup>1</sup>; *Qianqian Li*<sup>1</sup>; <sup>1</sup>Imperial College London

## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Oxide Fuels II: Mechanical Behaviors

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Monday PM | March 24, 2025**  
**159 | MGM Grand**

**Session Chairs:** Xing Wang, Pennsylvania State University; Tianyi Chen, Oregon State University

#### 2:00 PM Invited

**Understanding Burnup Effects on  $\text{UO}_2$  Mechanical Behavior Using Surrogate Materials:** *Tianyi Chen*<sup>1</sup>; Mack Cullison<sup>1</sup>; Fabiola Cappia<sup>2</sup>; David Frazer<sup>2</sup>; Fei Teng<sup>2</sup>; Jie Lian<sup>3</sup>; Kun Mo<sup>4</sup>; Michael Tonks<sup>5</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Rensselaer Polytechnic Institute; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>University of Florida

#### 2:30 PM

**Atomistic-Scale Simulations to Predict Creep Rates in Doped  $\text{UO}_2$ :** *Conor Galvin*<sup>1</sup>; David Andersson<sup>1</sup>; Andrea Rovinelli<sup>1</sup>; Laurent Capolungo<sup>1</sup>; Pieterjan Robbe<sup>2</sup>; Michael Cooper<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Sandia National Laboratory

#### 2:50 PM

**Investigation of Fuel Cladding Chemical Interactions with  $\text{UO}_2$  and Doped  $\text{UO}_2$  Using Diffusion Couples:** *Rebecca Manns*<sup>1</sup>; Josephine Libero-Cruzado<sup>1</sup>; Daniel Koury<sup>1</sup>; <sup>1</sup>University of Nevada, Las Vegas

#### 3:10 PM

**Investigation of the Creep and Fracture Behavior of Irradiated  $\text{UO}_2$  Fuel Through Density Functional Theory (DFT):** *Maria Giamouridou*<sup>1</sup>; Huan Liu<sup>2</sup>; Pär Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>University of Helsinki

#### 3:30 PM Break

#### 3:50 PM

**Comprehensive Fracture Property Analysis of High Burnup  $\text{UO}_2$  Fuels Using Multiscale Phase-Field Fracture Modeling:** *Merve Gencturk*<sup>1</sup>; Nicholas Faulkner<sup>1</sup>; Abdurrahman Ozturk<sup>1</sup>; Mohammed Abdoelatef<sup>2</sup>; David Andersson<sup>3</sup>; Michael WD Cooper<sup>3</sup>; Larry Aagesen<sup>4</sup>; Wen Jiang<sup>5</sup>; Jason Harp<sup>6</sup>; Karim Ahmed<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>EPRI; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Idaho National Laboratory; <sup>5</sup>NC State University; <sup>6</sup>Oak Ridge National Laboratory

#### 4:10 PM

**Development of a Macroscopic Model of Irradiation-Enhanced Densification:** *Brandon Battas*<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

#### 4:30 PM

**Investigating the Effect of Grain Growth Additive Incorporation on the Microstructure and Radiation Stability of  $\text{UO}_2$  Fuels:** *Ritesh Mohun*<sup>1</sup>; Sarah Vallyely<sup>1</sup>; John Thomas Prabhakar<sup>1</sup>; Simon Middleburgh<sup>1</sup>; <sup>1</sup>Bangor University

#### 4:50 PM

**Microstructurally Informed Modeling of Fragment Size in the BISON Fuel Performance Code:** *Oliver Baldwin*<sup>1</sup>; Nathan Capps<sup>2</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

#### 5:10 PM Poster Pitches

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments III — Radiation Environment II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

**Monday PM | March 24, 2025**  
**166 | MGM Grand**

**Session Chair:** Yue Fan, University of Michigan

#### 2:00 PM Invited

**Self-Patterned Metal Carbide - Amorphous Ceramics Nanostructure Enabled High Temperature Strength and Plasticity and Irradiation Resistance:** *Jian Wang*<sup>1</sup>; Bingqiang Wei<sup>1</sup>; Lin Shao<sup>2</sup>; Nan Li<sup>3</sup>; Lin Li<sup>4</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>TAMU; <sup>3</sup>LANL; <sup>4</sup>Arizona State University

#### 2:25 PM Invited

**Stability of Nanostructured Nitride and Oxide Surrogate Nuclear Fuels Under Ion Irradiation:** *Yanwen Zhang*<sup>1</sup>; <sup>1</sup>Queen's University

#### 2:50 PM

**Microstructural Effects and Mechanical Characteristics of Novel Ti-BN Coatings Post-Space Irradiation Exposure on the International Space Station:** *Abhijith Sukumaran*<sup>1</sup>; Sara Rengifo<sup>2</sup>; William Scott<sup>2</sup>; Sang Hyon Chu<sup>3</sup>; Cheol Park<sup>3</sup>; Michael Renfro<sup>4</sup>; Sudipta Seal<sup>5</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>National Aeronautics and Space Administration, Marshall Space Flight Centre; <sup>3</sup>Advanced Materials and Processing Branch, NASA Langley Research Center; <sup>4</sup>Plasma Processes; <sup>5</sup>Advanced Materials Processing and Analysis Centre, Nanoscience Technology Center, University of Central Florida

#### 3:10 PM

**Spatially Selective Catalyst Irradiation Induced Graphitization of Monocrystalline Diamond for Semiconductor Applications:** *Alexandros Spyromilios*<sup>1</sup>; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley

#### 3:30 PM Break

#### 3:50 PM Invited

**Trapping Vacancy and Suppressing Void Formation in Irradiated Refractory Alloys:** *Penghui Cao*<sup>1</sup>; <sup>1</sup>University of California, Irvine

#### 4:15 PM

**In-Situ Analysis of Electron Beam Irradiation on Amorphous Nanostructured Ceramic Materials:** *Nicole Keninger*<sup>1</sup>; Sooyeon Hwang<sup>2</sup>; Md Ali Muntaha<sup>2</sup>; Tristan Olsen<sup>3</sup>; Cyrus Koroni<sup>3</sup>; Sarah Pooley<sup>3</sup>; Claire Xiong<sup>3</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Boise State University

4:35 PM

**Atomistic-Level Understanding of Structure and Stability of Three-Dimensional Interfaces Under Irradiation:** *Youxing Chen*<sup>1</sup>; Qiang Zhu<sup>1</sup>; <sup>1</sup>University of North Carolina Charlotte

## BIOMATERIALS

### Natural Fibers and Biocomposites: A Sustainable Solution — Natural Fibers: Fundamentals and Applications

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee, TMS: Composite Materials Committee

**Program Organizers:** Henry Colorado, Universidad de Antioquia; Sergio Monteiro, Instituto Militar de Engenharia; Marc Meyers, University of California, San Diego; Carlos Castano Londono, Virginia Commonwealth University; George Youssef, San Diego State University; Felipe Perisse Duarte Lopes, Universidade Estadual do Norte Fluminense; Daniel Salazar, BCMaterials

Monday PM | March 24, 2025  
307 | MGM Grand

**Session Chairs:** Henry Colorado, Universidad de Antioquia; Felipe Perisse Duarte Lopes, Universidade Estadual do Norte Fluminense; Sergio Neves, Instituto Militar de Engenharia

#### 2:00 PM Introductory Comments

#### 2:05 PM

**Hydroxyapatite Surface Modification of Jute Fiber for Thermoset Composites: Interfacial Enhancement, Thermal Functionalization, and Additive Manufacturing:** Yuxuan Wu<sup>1</sup>; Zhuoyuan Yang<sup>1</sup>; Yizhou Jiang<sup>1</sup>; *Sirish Namila*<sup>1</sup>; <sup>1</sup>Embry-Riddle Aeronautical University

#### 2:25 PM

**Recovery of Textile Waste and Its Viability and Resistance for Application in Orthopedic Prostheses:** Angélica Campanhão<sup>1</sup>; Bruna Nogueira Simões Cobuci<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>2</sup>; <sup>1</sup>UENF; <sup>2</sup>Universidade Estadual do Norte Fluminense

#### 2:45 PM Invited

**Diatoms: A Sustainable Resource for Carbon-Negative, Multi-Functional Ceramic and Organic Materials:** Aidan Lucas<sup>1</sup>; *Hannes Schniepp*<sup>1</sup>; <sup>1</sup>William & Mary

#### 3:10 PM

**Comparison of Advanced Sample Preparation Techniques for High-Resolution Imaging of Sponge Spicule Cross-Sections:** Fariborz Tavangarian<sup>1</sup>; Niloofar Fani<sup>1</sup>; *Armaghan Hashemi Monfared*<sup>1</sup>; Sorour Sadeghzade<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Westlake University, Hangzhou

#### 3:30 PM Break

#### 3:50 PM Invited

**Tagua, the Vegetable Ivory: and Inexpensive and Sustainable Material:** *Henry Colorado*<sup>1</sup>; George Youssef<sup>2</sup>; Marc Meyers<sup>3</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>San Diego State University; <sup>3</sup>University of California San Diego

#### 4:15 PM

**Bottle Holder Composite for High Performance Cycling: Exploring the Potential of Rami Fiber:** Luis Fernando Fortunato de Freitas<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; Luis Arrubla Agudelo<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; Felipe Perisse Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV — Bonding Technology and Mechanism

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Yu-Chen Liu, National Cheng Kung University; Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Yee-wen Yen, National Taiwan University of Science and Technology; Chih-Ming Chen, National Chung Hsing University; Chao-hong Wang, National Chung Chung University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, Korea Institute of Industrial Technology; Ping-Chuan Wang, Suny New Paltz; Yu-An Shen, Feng Chia University

Monday PM | March 24, 2025  
359 | MGM Grand

**Session Chairs:** Yu-An Shen, Feng Chia University; Hiroshi Nishikawa, Osaka University

#### 2:00 PM Keynote

**Bonding Mechanism for Cu/SiO<sub>2</sub> Hybrid Joints:** *Chih Chen*<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

#### 2:35 PM Invited

**Microstructural Analysis and Mechanical Properties Evaluation of Zinc-Coated Aluminum Particles:** *Tatsuya Kobayashi*<sup>1</sup>; Rika Goto<sup>1</sup>; Ikuo Shohji<sup>1</sup>; <sup>1</sup>Gunma University

#### 3:05 PM Invited

**Computational Simulation of Interfacial Bonding Behavior with Various Grain Structures in Cu-Cu Bonding:** *Hiroaki Tatsumi*<sup>1</sup>; <sup>1</sup>Osaka University

#### 3:35 PM Break

#### 3:55 PM

**Joint Properties of Ni-Less Surface Finish / Sn-Alloy Solder Using Laser-Assisted Bonding (LAB) Technique:** Seonghui Han<sup>1</sup>; Sang-Eun Han<sup>1</sup>; Tae-Young Lee<sup>2</sup>; Young-Bae Park<sup>3</sup>; *Sehoon Yoo*<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Tech University of Korea; <sup>3</sup>Andong National University

#### 4:15 PM

**Electrodeposited Gallium for Cu-to-Cu Interconnection:** *Tzu-Hsuan Huang*<sup>1</sup>; Jian-wei Huang<sup>1</sup>; Zhi-feng Lin<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

#### 4:35 PM

**Fabrication and Properties of Nanotwinned Copper Doped with Carbon Nanotubes by Electrodeposition:** *Ciao-Yun Luo*<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

#### 4:55 PM

**High-Strength and High-Conductivity Nanotwinned Copper Foils Via Cu-Ni Co-Electrodeposition:** *Kang Ping Lee*<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

#### 5:15 PM

**Effect of Copper Grain Size on Interfacial Reactions of Copper/Solder/Copper Sandwiched Joints:** *Man-Hsuan Chung*<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; <sup>1</sup>National Chung Hsing University

## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Steels I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

**Monday PM | March 24, 2025**  
**123 | MGM Grand**

**Session Chairs:** Adriana Eres-Castellanos, Colorado School of Mines; Bharat Gwalani, North Carolina State University

**2:00 PM**

**Deformation and Strain Partitioning in a Double Soaked Medium Manganese Steel With Differing Martensite Fractions:** *Alexandra Glover*<sup>1</sup>; Paul Gibbs<sup>2</sup>; Donald Brown<sup>2</sup>; Bjørn Clausen<sup>2</sup>; John Speer<sup>3</sup>; Emmanuel De Moor<sup>3</sup>; <sup>1</sup>Michigan Technological University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Colorado School of Mines

**2:25 PM**

**Effect of Electrical Resistance Heating on Recrystallization of Cold-Rolled Low-Carbon Steel:** *Dawn Van Iderstine*<sup>1</sup>; Shiraz Mujahid<sup>1</sup>; YubRaj Paudel<sup>1</sup>; Hongjoo Rhee<sup>1</sup>; <sup>1</sup>Mississippi State University, Center for Advanced Vehicular Systems

**2:45 PM**

**Microstructure Refinement During Hot Rolling of 0.3 CrMoV Steel: Role of Crystallographic Texture:** *Pravendra Singh*<sup>1</sup>; KS Suresh<sup>1</sup>; M.K. Karthikeyan<sup>2</sup>; <sup>1</sup>Indian Institute of Technology Roorkee; <sup>2</sup>Vikram Sarabhai Space Centre, Indian Space Research Organization

**3:05 PM**

**Investigation of Microstructural Evolution and Mechanical Behaviour of Low Carbon 'Nb'-Added Micro Alloyed Steel Developed Through Quenching and Partitioning Method:** *SK Arif*<sup>1</sup>; Durbadal Mandal<sup>1</sup>; Himadri Bar<sup>2</sup>; <sup>1</sup>NIT Durgapur; <sup>2</sup>CSIR- National Metallurgical Laboratory, Jamshedpur-India

**3:25 PM Break**

**3:40 PM**

**The Effects of Ta Additions on the Microstructure of HP-Micro Alloys for Steam-Methane Reformer Applications:** *Martin Tse*<sup>1</sup>; Yunus Azakli<sup>1</sup>; Dominique Flahaut<sup>2</sup>; Naveen Manikanteswaran<sup>2</sup>; Katerina Christofidou<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>Paralloy Group

**4:00 PM**

**Influence of Al<sub>2</sub>O<sub>3</sub> on Crystallization Behavior of Mold Slag Film Based on Soret Effect:** *Qiuping Li*<sup>1</sup>; Peng Cheng<sup>1</sup>; Guanghua Wen<sup>1</sup>; Ping Tang<sup>1</sup>; Zibing Hou<sup>1</sup>; Xinyun Mo<sup>1</sup>; <sup>1</sup>Chongqing University

**4:20 PM**

**Electro-Recrystallization Behavior in Cold-Rolled Nickel-Chromium Alloys Under Direct Current Stressing:** *Meng-Chun Chiu*<sup>1</sup>; Min Ku<sup>1</sup>; Chih-An Wu<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**4:40 PM**

**Annealing Behavior of Additive Manufactured 304L Using In-Situ EBSD:** *Yuheng Nie*<sup>1</sup>; Marie Charpagne<sup>1</sup>; Jack Donoghue<sup>2</sup>; Albert Smith<sup>3</sup>; Katerina Christofidou<sup>4</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>The University of Manchester; <sup>3</sup>TESCAN-UK Ltd.; <sup>4</sup>The University of Sheffield

## SPECIAL TOPICS

### Preparing Undergraduate and Graduate Students - And the Faculty Who Prepare Them - For Materials Careers (A Symposium Held in the Memory and Honor of Elizabeth Judson) — Building a Global Workforce and Satisfying ABET Along the Way

**Sponsored by:** TMS: Education Committee

**Program Organizers:** Marian Kennedy, Clemson University; Alison Polasik, Campbell University; Jeffrey Fergus, Old Dominion University; Jennifer Carter, Case Western Reserve University

**Monday PM | March 24, 2025**  
**170 | MGM Grand**

**Session Chairs:** Enze Chen, Stanford University; Timothy Chambers, University of Michigan

**2:00 PM**

**Student Learning Through Performing Materials Science and Engineering Research in a Foreign Country:** *Carl Boehlert*<sup>1</sup>; <sup>1</sup>Michigan State University

**2:25 PM**

**Strategies for Attracting Indian Undergraduate Students to a Career in Materials Research and Technology:** *Rajiv Shekhar*<sup>1</sup>; <sup>1</sup>IIT Kanpur

**2:50 PM**

**Updates to ABET Criteria: Information and Q&A:** *Alison Polasik*<sup>1</sup>; <sup>1</sup>Campbell University

**3:15 PM**

**Building a Sustainable and Easy Process for ABET Student Outcomes Assessment:** *Steven Yalisove*<sup>1</sup>; <sup>1</sup>University of Michigan

**3:40 PM Break**

**4:00 PM ABET PEV Panel Discussion: Preparing for a Successful Visit**

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Additively Manufactured Printed Structures

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, Rice University; Konstantinos Sierros, West Virginia University; Masoud Mahjour-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ethan Secor, Iowa State University

**Monday PM | March 24, 2025**  
**361 | MGM Grand**

**Session Chairs:** Pooran Joshi, Elbit Systems of America; Kai Li, Oak Ridge National Laboratory

**2:00 PM Invited**

**Additive Manufacturing of Soft Magnetic Materials: Prospects and Challenges:** *Parans Paranthaman*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory



**2:25 PM Invited**

**Binder Jet Printing of Soft Magnetic Ferrite Materials: Motivations and Progress to Date:** Paul Ohodnicki<sup>1</sup>; Bishal Bhandari<sup>2</sup>; Chuyuan Zheng<sup>1</sup>; Dipika Mandal<sup>1</sup>; Suraj Mullurkara<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**2:50 PM Invited**

**Radically-Accessible Approach to 3D Printing of Full-Density Aluminum Alloys:** Keng Hsu<sup>1</sup>; <sup>1</sup>Arizona State University

**3:15 PM**

**Additive Manufacturing of Magnetostrictive Transducers:** Joy Morin<sup>1</sup>; Zhangxian Deng<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Boise State University

**3:35 PM Break****3:45 PM Invited**

**Towards Fast, Efficient, and Sustainable Metal AM: Novel Ultra-High Speed Regime in LPBF Printing of Pure Copper:** Natalya Kublik C<sup>1</sup>; Laura Duenas Gonzalez<sup>1</sup>; David Deisenroth<sup>2</sup>; Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>NIST

**4:10 PM Invited**

**Additive Manufacturing of Elastomer, Ceramic and Metal Multi-Functional Structures:** Eric MacDonald<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso; Oak Ridge National Laboratory

**4:35 PM**

**Enhance Electrical Conductivity and Machinal Properties of Cu-Cr Alloys Through Rapid Directional Solidification:** Arthur Zhang<sup>1</sup>; Tao Sun<sup>2</sup>; Ji Ma<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Northwestern University

**4:55 PM**

**3D Printing of Composites With Controlled Micro/Macrostructure Design for Electronic Packaging:** Hortense Le Ferrand<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**5:15 PM**

**Unveiling the Potential of Hybrid Additive Manufacturing for Next-Generation Functionality in Printed Electronics:** Devin Roach<sup>1</sup>; <sup>1</sup>Oregon State University

**5:35 PM**

**Thermal Conductivity Measurement of a Thin Layer of the Single Crystals of PMN-PT Using Time Domain Thermoreflectance (TDTR) Technique:** Sagar Kumar Verma<sup>1</sup>; Sieun Chae<sup>1</sup>; Nirmala Kandadai<sup>1</sup>; <sup>1</sup>Oregon State University, Corvallis

**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

## Revitalization of Materials through Upcycling: The 2025 Student-Led Symposium — Upcycling of Metals, Mine Waste, Concrete and Polymers

**Sponsored by:** TMS: Education Committee

**Program Organizers:** Dylan Miley, University of California Davis; Ayeman Nahin, University of California Davis; Tamanna Zakia, University of California Davis

**Monday PM | March 24, 2025**  
**315 | MGM Grand**

**Session Chairs:** Tamanna Zakia, University of California, Davis; Ayeman Nahin, University of California Davis; Dylan Miley, University of California Davis

**2:00 PM**

**Key Challenges for Upcycling to Obtain High Quality Materials:** Christina Meskers<sup>1</sup>; Anne Kvithyld<sup>1</sup>; <sup>1</sup>SINTEF

**2:30 PM**

**Utilization of Novel Reactor Constructed using Batches of Waste Natural Substrates for the Recovery and Reuse of Valuable Resources from Acid Mine Drainage:** Deogratius Titus Maiga<sup>1</sup>; Khuthadzo Mudzanani<sup>1</sup>; Terence Phadi<sup>1</sup>; Titus Msagati<sup>2</sup>; Linda Sibali<sup>2</sup>; Matome Mothetha<sup>3</sup>; <sup>1</sup>MINTEK; <sup>2</sup>UNISA; <sup>3</sup>City of Ekurhuleni

**3:00 PM**

**Enhancement of Recycled Concrete Aggregate Through Slag-Coated Carbonation:** Hammad Ahmed Shah<sup>1</sup>; Weina Meng<sup>1</sup>; <sup>1</sup>Stevens Institute of Technology

**3:30 PM Break****3:50 PM**

**Life Cycle Assessment Approach for Upcycling Expanded Polystyrene Across Industrial Sectors:** Haoyang He<sup>1</sup>; Jon Timbers<sup>2</sup>; Claude-Anne Duval<sup>2</sup>; Johnny Lincoln<sup>2</sup>; Michael Cech<sup>3</sup>; Joel DeMeritt<sup>3</sup>; Oladele A. Ogunseitan<sup>4</sup>; Julie M. Schoenung<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Epsilyte LLC; <sup>3</sup>Trek Bicycle Corporation; <sup>4</sup>University of California - Irvine

**MATERIALS SYNTHESIS AND PROCESSING**

## REWAS 2025: Sustainable End-of-Life Management and Recycling Solutions for Batteries, Wind Turbines, and Photovoltaics — Circularity in Li-Ion Batteries Technologies II

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Christina Meskers, SINTEF; Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Elsa Olivetti, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**117 | MGM Grand**

**Session Chair:** Mertol Gokelma, Izmir Institute of Technology

**2:00 PM Introductory Comments****2:05 PM Plenary**

**Advancing Circular Economy: Copper Recovery from E-Waste at Aurubis' New US Facility:** Owais Waseem<sup>1</sup>; Tom Adam<sup>1</sup>; <sup>1</sup>Aurubis Richmond

**2:35 PM**

**End-of-Life Recycling of Lithium-Ion Batteries in India:** Shalini Verma<sup>1</sup>; Akshoy Ranjan Paul<sup>1</sup>; Nawshad Haque<sup>2</sup>; Warren Bruckard<sup>2</sup>; Avash Kumar Saha<sup>3</sup>; <sup>1</sup>MNNIT Allahabad; <sup>2</sup>CSIRO; <sup>3</sup>Nit Durgapur, India

**2:55 PM**

**Reviews and Perspectives: Selective Leaching—A Promising Approach for Recycling Lithium Iron Phosphate Batteries:** Tianyu Zhao<sup>1</sup>; Yeonuk Choi<sup>1</sup>; <sup>1</sup>Queen's University

**3:15 PM**

**A Separation-Free and Purification-Free Method for Direct Production of Lithium-Rich Solution from Industrial-Grade Lithium-Ion Battery Waste:** Tianyu Zhao<sup>1</sup>; Yeonuk Choi<sup>1</sup>; <sup>1</sup>Queen's University

## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Theory and Modeling

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Monday PM | March 24, 2025**  
**163 | MGM Grand**

**Session Chair:** Evgenia Tereshina-Chitrova, Institute of Physics ASCR

**2:00 PM Invited**

**Modeling Uranium Dioxide from First Principles: Magnetic Ordering and Phonon Transport:** *Shuxiang Zhou*<sup>1</sup>; Enda Xiao<sup>2</sup>; Hao Ma<sup>3</sup>; Himani Mishra<sup>4</sup>; Krzysztof Gofryk<sup>1</sup>; Chao Jiang<sup>1</sup>; Michael Manley<sup>3</sup>; David Hurley<sup>1</sup>; Chris Marianetti<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Columbia University; <sup>3</sup>Oak Ridge National Laboratory

**2:30 PM Invited**

**Thermal Conductivity in Actinides:** *Dominik Legut*<sup>1</sup>; Urszula Wdowik<sup>1</sup>; <sup>1</sup>VSb - Technical University of Ostrava

**3:00 PM**

**DFT Studies of Electronic Properties and Swelling of Selected High Density Fuels:** *Barbara Szpunar*<sup>1</sup>; Jerzy Szpunar<sup>1</sup>; <sup>1</sup>University Of Saskatchewan

**3:20 PM Break**

**3:40 PM**

**First-Principles and Experimental Determination of Thermal Transport Due to Fission Products in ThO<sub>2</sub>:** *Linu Malakkal*<sup>1</sup>; Ankita Katre<sup>2</sup>; Shuxiang Zhou<sup>1</sup>; Ella Pek<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Zilong Hua<sup>1</sup>; James Matthew Mann<sup>3</sup>; Chao Jiang<sup>1</sup>; David Hurley<sup>1</sup>; Chris Marianetti<sup>4</sup>; Marat Khafizov<sup>5</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>SP Pune University; <sup>3</sup>AFRL; <sup>4</sup>Columbia University; <sup>5</sup>Ohio State University

**4:00 PM**

**Density Functional Theory Study of Interfacial Defects in Plutonium Oxides:** *Larissa Woryk*<sup>1</sup>; Raymond Atta-Fynn<sup>1</sup>; Aaron Kohnert<sup>1</sup>; Sarah Hernandez<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:20 PM**

**Thermo-Kinetics of Impurities in Uranium Alloys:** Emily Moore<sup>1</sup>; Adrian Gonzales<sup>1</sup>; Jibril Shittu<sup>1</sup>; Joseph Boro<sup>1</sup>; Nicholas Ury<sup>1</sup>; Kyoung Kweon<sup>1</sup>; Bradley Childs<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## MECHANICS OF MATERIALS

### Solid-State Diffusion Bonding of Metals and Alloys — Modeling, Simulation, and Qualifications of Diffusion Bonded Joints

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Mohamed Elbakhshwan, University of Wisconsin Madison; Peng Wang, University of Michigan; Tate Patterson, Idaho National Laboratory; Fei Gao, University of Michigan; Todd Allen, University of Michigan; Mark Anderson, University of Wisconsin Madison

**Monday PM | March 24, 2025**  
**301 | MGM Grand**

**Session Chair:** Xinchang Zhang, Idaho National Laboratory

**2:00 PM Introductory Comments**

**2:05 PM**

**An Aluminum-Steel Bi-Metal Compound Forging and Its Joining Characteristics:** *Minkwang Baek*<sup>1</sup>; Inbeom Lee<sup>2</sup>; Hyun-min Sung<sup>2</sup>; Minki Kim<sup>3</sup>; Myoung-Gyu Lee<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Hyundai Motor Group; <sup>3</sup>Korea Institute of Industrial Technology (KITECH)

**2:30 PM**

**Preserving Bond Strength in Solid State Diffusion Bonding of Inconel 718:** *Reggie Angell*<sup>1</sup>; Leila Ladani<sup>2</sup>; William Nickerson<sup>3</sup>; <sup>1</sup>Honeywell; <sup>2</sup>Arizona State University; <sup>3</sup>Office of Naval Research

**2:55 PM**

**Modeling Process-Structure-Property Relationship in Diffusion Bonded 316H Stainless Steel Microstructure Using Phase-Field and Crystal Plasticity Methods:** *Sagar Bhatt*<sup>1</sup>; Rui Wang<sup>2</sup>; Fei Gao<sup>2</sup>; Mark Messner<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>University of Michigan

**3:20 PM**

**Phase-Field Modeling of Diffusion Bonding for Nuclear Engineering Applications:** *Rui Wang*<sup>1</sup>; Peng Wang<sup>1</sup>; Sagar Bhatt<sup>2</sup>; Mark Messner<sup>2</sup>; Todd Allen<sup>1</sup>; Fei Gao<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Argonne National Laboratory

**3:45 PM Break**

**4:05 PM**

**Similar and Dissimilar Joining of Nitinol via Transient Liquid Phase Bonding:** *Zhaoxi Cao*<sup>1</sup>; Samuel Price<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

**4:30 PM**

**Property Comparison of Different Corrosion-Resistant Nickel Alloys for use in Explosion Cladding:** *Thomas Mann*<sup>1</sup>; Paul Crook<sup>1</sup>; Ling Chen<sup>1</sup>; Austin Hernandez<sup>1</sup>; Alex Post<sup>1</sup>; Andrew Roginski<sup>2</sup>; Michael Fahrman<sup>1</sup>; <sup>1</sup>Haynes Intl.; <sup>2</sup>Purdue University

## NUCLEAR MATERIALS

### Solid-state Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations — Solid-State Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations: Session II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Priyanka Agrawal, University of North Texas; Hang Yu, Virginia Polytechnic Institute and State University; Boopathy Kombaiah, Idaho National Laboratory; Joao Oliveira, Faculdade Ciencias Tecnologias; Tianhao Wang, Pacific Northwest National Laboratory; Mukesh Bachhav, Idaho National Laboratory; John Shelton, Northern Illinois University; Shivakant Shukla, Pacific Northwest National Laboratory; Efthymios Polatidis, University of Patras; Lakshmi Narayan Ramasubramanian, Indian Institute of Technology; Sanya Gupta, Cummins Inc.

**Monday PM | March 24, 2025**  
**161 | MGM Grand**

**Session Chairs:** Shivakant Shukla, Pacific Northwest National Laboratory; John Shelton, Northern Illinois University

**2:00 PM Invited**

**Material Needs for Deployment of Advanced Reactors:** *Mitchell Meyer*<sup>1</sup>; <sup>1</sup>NuCube Energy, Inc.

**2:30 PM**

**Multiscale and Multiphysics Computational Framework for Shear-Assisted Processing and Extrusion (SHAPE) of Nuclear Cladding Materials:** *Lei Li*<sup>1</sup>; Kuna Lukasz<sup>2</sup>; Shadab Anwar Shaikh<sup>1</sup>; Mohan Sai Kiran Kumar Yadav Nartu<sup>1</sup>; Mageshwari Komarasamy<sup>1</sup>; Dalong Zhang<sup>1</sup>; Stuart Maloy<sup>3</sup>; Isabella van Rooyen<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**2:50 PM**

**Numerical Analysis of Microstructure Evolution in Additive Friction Stir Deposition Using Smoothed Particle Hydrodynamics:** Vignesh Shankar Iyer<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; <sup>1</sup>University of Michigan

**3:10 PM**

**Performance of Cold Spray Cr Coatings on Zr-Alloy Fuel Cladding:** *Tyler Dabney*<sup>1</sup>; K. Sasidhar<sup>1</sup>; Evan Willing<sup>1</sup>; Ben Eftink<sup>2</sup>; Nan Li<sup>2</sup>; Ben Maier<sup>3</sup>; Jorie Walters<sup>3</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Westinghouse Electric Company

**3:30 PM Break**

**3:45 PM Invited**

**On the Development of SolidStir®-Extrusion for Consolidation and Extrusion of Advanced Nuclear Materials:** *Kumar Kandasamy*<sup>1</sup>; Pankaj Kulkarni<sup>1</sup>; Devin Davis<sup>1</sup>; Osman El Atwani<sup>2</sup>; Stuart Maloy<sup>2</sup>; Shubhrodev Bhowmik<sup>3</sup>; Nilesh Kumar<sup>3</sup>; <sup>1</sup>Enabled Engineering; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>University of Alabama

**4:10 PM**

**Radiation Shielding and Neutron Capture Mechanisms in Friction Stir Processed Aluminum-Boron Nitride Nanocomposite:** *Sohail Mohammed*<sup>1</sup>; Kazue Orikasa<sup>1</sup>; Zehao Li<sup>2</sup>; Arun Devaraj<sup>2</sup>; David Garcia<sup>3</sup>; Anil Lama<sup>1</sup>; R. Sarvesha<sup>4</sup>; Cheol Park<sup>5</sup>; Sang-Hyon Chu<sup>5</sup>; Ken Ross<sup>3</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>Physical & Computational Sciences Directorate, Pacific Northwest National Laboratory; <sup>3</sup>Energy and Environment Directorate, Pacific Northwest National Laboratory; <sup>4</sup>University of Kentucky; <sup>5</sup>Advanced Materials and Processing Branch, NASA Langley Research Center

**4:30 PM**

**Solid Phase Processing of High Temperature Materials for Extreme Environments:** *Mageshwari Komarasamy*<sup>1</sup>; David Garcia<sup>1</sup>; Jarrod Crum<sup>1</sup>; Mark Hall<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**4:50 PM**

**The Use of Powder Injection Molding for the Fabrication of Oxygen-Sensitive Advanced Nuclear Fuels:** *Deana Tsang*<sup>1</sup>; Adrien Terricabras<sup>1</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**5:10 PM**

**Additive Friction Stir Deposition of a Tantalum-Tungsten Refractory Alloy:** *Robert Griffiths*<sup>1</sup>; Alex Wilson-Heid<sup>1</sup>; Marissa Linne<sup>1</sup>; Eleanna Garza<sup>1</sup>; Aiden Martin<sup>1</sup>; Arnold Wright<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Lab; <sup>2</sup>Bond Technologies

## MECHANICS OF MATERIALS

### Spatially Tailored Materials: Processing-Structure-Properties — Additive Manufacturing Gradients

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois; Ian McCue, Northwestern University; J.C. Stinville, University of Illinois Urbana-Champaign

**Monday PM | March 24, 2025**  
**351 | MGM Grand**

**Session Chairs:** Marie Charpagne, University of Illinois; Gianna Valentino, University of Maryland

**2:00 PM Invited**

**A Framework for the Co-Design of Composition and Process Conditions for Functionally Graded Materials via Directed-Energy Deposition:** *Jian Cao*<sup>1</sup>; Rujing Zha<sup>1</sup>; Nhung Nguyen<sup>1</sup>; Faith Rolark<sup>1</sup>; <sup>1</sup>Northwestern University

**2:30 PM**

**Composition Gradient DED Printed Materials in Complex Build Geometries:** *Jeffrey Riemann*<sup>1</sup>; Kenneth Vecchio<sup>2</sup>; <sup>1</sup>FormAlloy; <sup>2</sup>University of California, San Diego

**2:50 PM**

**Evaluation of Bimetallic Interfaces Created by Directed Energy Deposition Metal Additive Manufacturing:** *Michael Santangelo*<sup>1</sup>; <sup>1</sup>University of Alabama Huntsville

**3:10 PM**

**Improving Interfacial Performance Through Directed Energy Deposition of Additively-Graded Combustion Chambers:** *Madeline Selby*<sup>1</sup>; Alex Lark<sup>2</sup>; Mo-Rigen He<sup>1</sup>; Li Ma<sup>2</sup>; Gianna Valentino<sup>3</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory; <sup>3</sup>University of Maryland, College Park

**3:30 PM Break**

**3:50 PM Invited**

**3D Analysis of "Meta Grain Boundaries" in "Meta Polycrystals" Produced by Laser Powder Bed Fusion:** *Samuel Taylor*<sup>1</sup>; *Matteo Seita*<sup>1</sup>; <sup>1</sup>University of Cambridge

**4:20 PM**

**Thermal Stability and Microstructural Evolution in Compositionally Graded Refractory Alloys:** *Benjamin Ellyson*<sup>1</sup>; Jennie Glerum<sup>1</sup>; Michael Juhasz<sup>2</sup>; Raiyan Seede<sup>1</sup>; Kaila Bertsch<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

4:40 PM

**Fundamental Investigation of the Interface Formation of Multi-Material Additive Manufactured 316L-CuSn10 Structures:** *Alasdair Bulloch*<sup>1</sup>; Andy Harris<sup>2</sup>; Allin Groom<sup>2</sup>; Amanda Cruchley<sup>3</sup>; Chris Tuck<sup>1</sup>; Marco Simonelli<sup>1</sup>; <sup>1</sup>University of Nottingham; <sup>2</sup>Autodesk Research; <sup>3</sup>The Manufacturing Technology Centre

5:00 PM

**Precipitation Behavior in a Soft Magnetic, Multi-Component Alloy Using Single Laser Tracks:** *Jeffrey Brookins*<sup>1</sup>; Bryan Lim<sup>1</sup>; Chase Joslin<sup>1</sup>; Chris Fancher<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Steels in Extreme Environments — Steels Under Hydrogen Environments II / Steels Under Elevated Temperatures

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Hyunseok Oh, University of Wisconsin - Madison; Lawrence Cho, Colorado School of Mines; Jeongho Han, Hanyang University; Motomichi Koyama, Tohoku University; Peeyush Nandwana, Oak Ridge National Laboratory; Fnu Kasturi Narasimha Sasidhar, University of Wisconsin - Madison

Monday PM | March 24, 2025  
168 | MGM Grand

**Session Chairs:** Motomichi Koyama, Tohoku University; Lawrence Cho, Colorado School of Mines

2:00 PM Invited

**Segmentation of Microscopy Images of Lower Bainite and Tempered Martensite High Strength Steels:** *Jun Song*<sup>1</sup>; Xiaohan Bie<sup>1</sup>; Manoj Arthanari<sup>1</sup>; <sup>1</sup>McGill University

2:20 PM Invited

**Accelerated Creep Deformation of Steels Under Hydrogen Pressure at Elevated Temperature:** Du-Hyun Kim<sup>1</sup>; Han-Jin Kim<sup>1</sup>; Ehsan Norouzi<sup>1</sup>; *Jin-Yoo Suh*<sup>1</sup>; Seok Su Sohn<sup>2</sup>; <sup>1</sup>Korea Institute of Science and Technology; <sup>2</sup>Korea University

2:40 PM Invited

**Imaging the Nanoscale Hydrogen Distribution in a Creep Ruptured Austenitic Stainless Steel (347H) Using Atom Probe Tomography:** *Jonathan Poplawsky*<sup>1</sup>; Tanzilur Rahman<sup>2</sup>; Qing-Qiang Ren<sup>1</sup>; Dongwon Shin<sup>1</sup>; Yajie Zhao<sup>3</sup>; Geeta Kumari<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Michigan State University; <sup>3</sup>University of Tennessee

3:00 PM

**Nanoindentation Study on Hydrogen Embrittlement in Martensite Microstructure of 2.0 GPa Hot Stamping Steel:** *Byung-Gil Yoo*<sup>1</sup>; Seong Kyung Han<sup>1</sup>; Jewoosoo Kim<sup>1</sup>; Tae Woo Kwon<sup>2</sup>; Jae-il Jang<sup>2</sup>; <sup>1</sup>Hyundai Steel; <sup>2</sup>Hanyang University

3:20 PM

**Understanding the Critical Role of Microstructure in Enhanced Resistance to H-Assisted Fatigue Crack Growth in Ausformed and Tempered Martensitic Steels:** *Rama Srinivas Varanasi*<sup>1</sup>; Motomichi Koyama<sup>1</sup>; Timothee Redarce<sup>2</sup>; Kosei Kobayashi<sup>3</sup>; Hiroshi Kakinuma<sup>1</sup>; Akinobu Shibata<sup>4</sup>; Hisao Matsunaga<sup>2</sup>; Eiji Akiyama<sup>1</sup>; <sup>1</sup>Institute for Materials Research, Tohoku University; <sup>2</sup>Kyushu University; <sup>3</sup>Tohoku University; <sup>4</sup>National Institute for Materials Science

3:40 PM Break

4:00 PM

**3D Characterization and Cohesive Zone Model Analysis on Hydrogen-Related Intergranular Fracture in Martensitic Steel:** *Akinobu Shibata*<sup>1</sup>; Ivan Gutierrez-Urrutia<sup>1</sup>; Akiko Nakamura<sup>1</sup>; Taku Moronaga<sup>1</sup>; Kazuho Okada<sup>1</sup>; Toru Hara<sup>1</sup>; Yazid Madi<sup>2</sup>; Jacques Besson<sup>2</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>MINES Paris-PSL

4:20 PM

**Characterization of Precipitation-Strengthening Heat-Resistant Austenitic Stainless Steels with Minor Alloying Additions:** *Qing-Qiang Ren*<sup>1</sup>; Yajie Zhao<sup>1</sup>; Rishi Pillai<sup>1</sup>; Jonathan Poplawsky<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; Martin Detrouis<sup>2</sup>; Paul Jablonski<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>National Energy Technology Laboratory

4:40 PM

**Nanoscale Analysis of Hydrogen Pick Up in Fe-Based Alloys Using Cryogenic Transfer Atom Probe Tomography:** *Venkata Bhuvaneshwari Vukkurum*<sup>1</sup>; Zehao Li<sup>1</sup>; Vaithiyalingam Shutthanandan<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab

5:00 PM

**Implications of Additively Manufactured Microstructures for Hydrogen Embrittlement Resistance of Steels:** *Saket Thapliyal*<sup>1</sup>; Jiahao Cheng<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## MECHANICS OF MATERIALS

### Structure-Property Relationships in Molecular Crystal Deformation — Deformation Across Time and Length Scales II

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Daniel Bufford, Sandia National Laboratories; Sushmita Majumder, University of Minnesota-Twin Cities; Paul Ryan, Atomic Weapons Establishment; Judith Brown, Sandia National Laboratories; Nathan Mara, University of Minnesota; Raimundo Ho, AbbVie Inc.

Monday PM | March 24, 2025  
365 | MGM Grand

**Session Chairs:** Sushmita Majumder, University of Minnesota-Twin Cities; Raimundo Ho, AbbVie Inc.

2:00 PM Invited

**Molecular Crystals - A New Class in the Global Materials Space:** *Panche Naumov*<sup>1</sup>; <sup>1</sup>New York University Abu Dhabi

2:30 PM

**Using Terahertz Spectroscopy to Probe the Reactive Coordinates and the Mechanical Response of Crystalline Solids:** *Michael Ruggiero*<sup>1</sup>; <sup>1</sup>University of Rochester

2:50 PM Invited

**The Onset of Plasticity in Molecular Crystals During Contact Loading:** *David Bahr*<sup>1</sup>; Hugh Grennan<sup>1</sup>; Morgan Chamberlain<sup>1</sup>; <sup>1</sup>Purdue University

3:20 PM Break

3:35 PM Invited

**Organic Molecular Crystals as Explosive Simulants in Polymer Composites:** *Alexandra Burch*<sup>1</sup>; John Yeager<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Dayton Research Institute



4:05 PM

**The Ultimate Strength of Plastic Bonded Explosives Under Uniaxial Stress Compression at Strain-Rates Beyond 1000 /s:** Bryan Zuanetti<sup>1</sup>; Cindy Bolme<sup>1</sup>; Claudine Armenta<sup>1</sup>; Erik Vettergren<sup>1</sup>; Kyle Ramos<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

4:25 PM

**In-situ Mechanical Characterization of Molecular Crystal Materials:** Daniel Bufford<sup>1</sup>; Danielle Hartstein<sup>1</sup>; Adam Pimentel<sup>1</sup>; Dustin Ellis<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

4:45 PM **Invited**

**Mechanical Response of Single Crystal Acetaminophen Over an Extended Strain Rate:** Kyle Ramos<sup>1</sup>; Cindy Bolme<sup>1</sup>; John Lazar<sup>2</sup>; Bryan Zuanetti<sup>1</sup>; Milovan Zecevic<sup>1</sup>; Tom Pilvelait<sup>3</sup>; Marc Cawkwell<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>U.S. Department of Energy, National Nuclear Security Administration; <sup>3</sup>Brown University

## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Processing and Manufacturing

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Sopu, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Monday PM | March 24, 2025**  
**367 | MGM Grand**

**Session Chair:** Katharine Flores, Washington University in St. Louis

2:00 PM

**Understanding How Rejuvenation and Residual Stress Engineering Affect the Mechanical Properties of Metallic Glasses:** Daniel Sopu<sup>1</sup>; Florian Spieckermann<sup>2</sup>; Xudong Yuan<sup>3</sup>; Christoph Gammer<sup>1</sup>; Juergen Eckert<sup>1</sup>; <sup>1</sup>Erich Schmid Institute; <sup>2</sup>Montan University Leoben; <sup>3</sup>Chinese Academy of Sciences

2:20 PM

**Fictive Temperature-Based Annealing Effects on the Deformation Behavior of Metallic Glasses with Different Initial Structure:** Myeongjun Lee<sup>1</sup>; Geun Hee Yoo<sup>1</sup>; Wook Ha Ryu<sup>1</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University

2:40 PM

**Atomistic Insights into the Formation and Properties of CuZr Metallic Glass Nanoparticles:** Xuezhen Ren<sup>1</sup>; Suyue Yuan<sup>1</sup>; Emily Gurniak<sup>1</sup>; Paulo Branicio<sup>1</sup>; <sup>1</sup>University of Southern California

3:00 PM

**Fractal Evolution of Metallic Glass Structure Under High Pressure:** Qiaoshi Zeng<sup>1</sup>; <sup>1</sup>Hpstar

3:20 PM **Break**

3:40 PM

**Bulk Metallic Glass Powders Production via Ultrasonic Atomization for 3D Printing:** Parthiban Ramasamy<sup>1</sup>; Haoyang Liu<sup>1</sup>; Eray Yuce<sup>1</sup>; Zhishuai Jin<sup>2</sup>; Devinder Singh<sup>1</sup>; Jürgen Eckert<sup>2</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science; <sup>2</sup>Montanuniversität Leoben

4:00 PM

**Semi-Analytical and Experimental Heat Input Study of Additively Manufactured Zr-Based Bulk Metallic Glass:** Sepide Hadibeik Neishaboori<sup>1</sup>; Emanuel Gingl<sup>1</sup>; Lukas Schretter<sup>2</sup>; Benedikt Bochtler<sup>3</sup>; Jiehua Li<sup>1</sup>; Christoph Gammer<sup>2</sup>; Anton Hohenwarter<sup>2</sup>; Florian Spieckermann<sup>1</sup>; Jürgen Eckert<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben; <sup>2</sup>Erich Schmid Institute of Materials Science (ESI); <sup>3</sup>Amorphous Metal Solutions GmbH

4:20 PM

**Assessing Printability of Bulk Glass-Forming Alloys and Composites Using Single and Multi-Track Laser Experiments:** Soumya Mohan<sup>1</sup>; Harrison Holberton<sup>2</sup>; Aaron Stebner<sup>1</sup>; Douglas Hofmann<sup>3</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Applied Technical Services; <sup>3</sup>NASA Jet Propulsion Laboratory/ California Institute of Technology

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Kinetics of Alloys III — Alloy Design and Thermodynamic Modeling

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Dilpuneet Aidhy, Clemson University; Bin Ouyang, Florida State University; Jicheng Zhao, University of Maryland

**Monday PM | March 24, 2025**  
**352 | MGM Grand**

**Session Chairs:** Yijia Gu, Missouri University of Science and Technology; Theresa Davey, Bangor University

2:00 PM **Invited**

**Alloy Design for Cr-Alloy Coated Zr-Alloy Cladding of Nuclear Fuel:** Ying Chen<sup>1</sup>; Theresa Davey<sup>2</sup>; Bo Li<sup>3</sup>; Hiroaki Abe<sup>3</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>Bangor University; <sup>3</sup>The University of Tokyo

2:30 PM **Invited**

**Uncertainty-Guided Determination of a Thermodynamic Database for Compositionally Complex UHTC Transition Metal Carbides:** Theresa Davey<sup>1</sup>; William Rosenberg<sup>2</sup>; Ying Chen<sup>3</sup>; Scott McCormack<sup>2</sup>; <sup>1</sup>Bangor University; <sup>2</sup>University of California, Davis; <sup>3</sup>Tohoku University

3:00 PM

**A Third Generation CALPHAD Description of Pure Nb:** Felicia Larsson<sup>1</sup>; Lorenzo Fenocchio<sup>2</sup>; Qing Chen<sup>1</sup>; Gabriele Cacciamani<sup>2</sup>; Malin Selleby<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Università di Genova

3:20 PM

**Thermodynamic Assessment of the fcc/hcp Transformation in Fe-Mn Alloys:** Julian Rackwitz<sup>1</sup>; Gregory Olson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

3:40 PM **Break**

4:00 PM **Invited**

**A Phase-Field Model of Stoichiometric Compound in Solidification:** Yijia Gu<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

4:30 PM **Invited**

**A Software Platform Integrating Microstructure Modeling with Finite Element Method:** Weisheng Cao<sup>1</sup>; Fan Zhang<sup>1</sup>; Kamalnath Kadirvel<sup>1</sup>; Eric Payton<sup>2</sup>; Matthew Krug<sup>3</sup>; <sup>1</sup>CompuTherm LLC; <sup>2</sup>University of Cincinnati; <sup>3</sup>Air Force Research Laboratory

5:00 PM

**Prediction of the Composition for the Al-Co-Cr-Fe-Ni High-Entropy Alloys by the CALPHAD Method and Study on Microstructure and Mechanical Properties:** *Ssu-Chi Huang*<sup>1</sup>; Yung-Chin Lin<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

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#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Phase Diagrams Applied to Materials Design and Processing: An FMD/SMD Symposium Honoring Rainer Schmid-Fetzer — Progress of Thermodynamic Modeling Including Ab-Initio Methods

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Shuanglin Chen, CompuTherm LLC; Ji-Cheng Zhao, University of Connecticut; Ursula Kattner, National Institute of Standards and Technology; Greta Lindwall, KTH Royal Institute of Technology; Alan Luo, Ohio State University; Arthur Pelton, Ecole Polytechnique; John Agren, Royal Institute of Technology; Sinn-wen Chen, National Tsing Hua University

**Monday PM | March 24, 2025**  
**350 | MGM Grand**

**Session Chairs:** Patrice Chartrand, Ecole Polytechnique; Jörg Neugebauer, Max-Planck-Institut für Eisenforschung GmbH

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#### 2:00 PM Invited

**Thermodynamic Models from Ab Initio Insights:** *Joerg Neugebauer*<sup>1</sup>; Jing Yang<sup>1</sup>; Lifang Zhu<sup>1</sup>; Mira Todorova<sup>1</sup>; Tilmann Hickel<sup>1</sup>; <sup>1</sup>MPI for Sustainable Materials

#### 2:25 PM Invited

**CALPHAD Modeling of Electrons and Holes in Compound Semiconductors:** *Qing Chen*<sup>1</sup>; <sup>1</sup>Thermo-Calc Software AB

#### 2:50 PM Invited

**On the Development of the Next Generation of Thermodynamic Models of Metallic Solid Solutions:** *Jean-Philippe Harvey*<sup>1</sup>; <sup>1</sup>Polytechnique Montréal

#### 3:15 PM Invited

**On Gibbs Equilibrium and Hillert Nonequilibrium Thermodynamics and CALPHAD Modeling:** *Zi-Kui Liu*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

#### 3:40 PM Break

#### 4:00 PM Invited

**Thermodynamic Modeling of Hydrogen in the LiF-BeF<sub>2</sub>-BeO System for MSR Applications:** *Patrice Chartrand*<sup>1</sup>; <sup>1</sup>Polytechnique Montréal

#### 4:25 PM Invited

**A Generalized Approach for Rapid Entropy Calculation of Liquids and Solids:** *Qijun Hong*<sup>1</sup>; <sup>1</sup>Arizona State University

#### 4:50 PM Invited

**Predicting Electrical Resistivity and Thermal Conductivity of Multicomponent Multiphase Alloys:** *Hai-Lin Chen*<sup>1</sup>; Qing Chen<sup>1</sup>; <sup>1</sup>Thermo-Calc Software AB

#### 5:15 PM Invited

**Thermodynamic Modeling: Extreme Challenges, Emerging Opportunities:** *Wei Xiong*<sup>1</sup>; <sup>1</sup>University of Pittsburgh

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#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Validation of Computational Tools - Industrial Perspectives — Validation of Computational Tools II

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Qiaofu Zhang, University of Alabama; Michael Titus, Purdue University; Stephane Forsik, Carpenter Technology Corporation; Govindarajan Muralidharan, Oak Ridge National Laboratory; Jonathan Priedeman, GE Aerospace

**Monday PM | March 24, 2025**  
**311 | MGM Grand**

**Session Chairs:** Jonathan Priedeman, GE Aerospace; Stephane Forsik, Carpenter Technology Corporation; Qiaofu Zhang, University of Alabama

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#### 2:00 PM Invited

**Validation of Electro-Slag Remelting Process Simulations for the Production of Commercial HAYNES® 282® Alloy Ingots:** *Ram Krishnamurthy*<sup>1</sup>; Michael Fahrman<sup>1</sup>; <sup>1</sup>Haynes International

#### 2:35 PM

**Finite Element Simulation of Edge and Crack Evolution in Thin Slab Rolling Process:** *Jiazheng Zhang*<sup>1</sup>; *JiongMing Zhang*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

#### 2:55 PM

**Modeling of Microstructure Evolution during Multi-Pass Hot-Rolling of 316L Stainless Steel:** *Goran Kugler*<sup>1</sup>; David Bombac<sup>1</sup>; Milan Tercelj<sup>1</sup>; Tomaž Šuštar<sup>2</sup>; Primož Šuštar<sup>2</sup>; Noel Gregori<sup>3</sup>; Jan Foder<sup>3</sup>; Boštjan Bradaškja<sup>3</sup>; Boštjan Pirnar<sup>3</sup>; Robert Robič<sup>3</sup>; Mojca Loncnar<sup>3</sup>; <sup>1</sup>University of Ljubljana; <sup>2</sup>C3M; <sup>3</sup>SIJ Acroni d.o.o.

#### 3:15 PM

**Multiphase Flow, Particle Transport and Capture During a Ladle Exchange in Steel Continuous Casting:** *Vipul Gupta*<sup>1</sup>; Brian Thomas<sup>1</sup>; <sup>1</sup>Colorado School of Mines

#### 3:35 PM Break

#### 3:55 PM Invited

**The Role of Process Variability within ICME Tool Development for Aerospace Turbine Applications:** *Nicholas Krutz*<sup>1</sup>; Chen Shen<sup>1</sup>; <sup>1</sup>GE Aerospace

#### 4:30 PM

**Development and Validation of Optimization Tool for Continuous Caster Operations Based on CFD Simulations:** Sai Bhuvanesh Nandipati<sup>1</sup>; Kyle Toth<sup>1</sup>; *Armin Silaen*<sup>1</sup>; Yufeng Wang<sup>2</sup>; Sunday Abraham<sup>2</sup>; Dallas Brown<sup>2</sup>; Chenn Zhou<sup>1</sup>; <sup>1</sup>Purdue University Northwest; <sup>2</sup>SSAB Americas

#### 4:50 PM

**Fluidodynamic Analysis in the Continuous Casting Mold for Conventional Slab and Inside the Submerged Entry Nozzle (Sen) Using Mathematical Simulation:** *Cesar Ayala Calderon*<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials — Advanced Experimental Validation

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates; Saikumar Reddy Yeratapally, Science and Technology Corporation; Kirubel Teferra, Naval Research Laboratory; Diwakar Naragani, Cornell University

**Monday PM | March 24, 2025**  
**354 | MGM Grand**

**Session Chairs:** Diwakar Naragani, Cornell University; Saikumar Reddy Yeratapally, Science and Technology Corporation

#### 2:00 PM Invited

**Experiments and Methods to Calibrate and Validate Defect-Sensitive Fatigue Models:** *Orion Kafka*<sup>1</sup>; Jake Benzing<sup>1</sup>; Newell Moser<sup>1</sup>; Nicholas Derimow<sup>1</sup>; Nik Hrabe<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

#### 2:20 PM Invited

**Digital Twins to Accelerate AM Qualification: Defining Challenge Problems to Validate Model Performance:** *Brendan Croom*<sup>1</sup>; David Furrer<sup>2</sup>; Michael Presley<sup>3</sup>; Morgan Trexler<sup>1</sup>; Somnath Ghosh<sup>3</sup>; Anthony Rollett<sup>4</sup>; <sup>1</sup>JHU Applied Physics Laboratory; <sup>2</sup>Pratt & Whitney; <sup>3</sup>Johns Hopkins University; <sup>4</sup>Carnegie Mellon University

#### 2:40 PM Invited

**Micromechanical Model Verification of Additively Manufactured Inconel 625 Informed by In Situ High-Energy X-Ray Diffraction:** Reilly Knox<sup>1</sup>; Robert Carson<sup>2</sup>; Matthew Rolchigo<sup>3</sup>; Katherine Shanks<sup>4</sup>; Jim Belak<sup>2</sup>; *Darren Pagan*<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Cornell High Energy Synchrotron Source

#### 3:00 PM Invited

**Synchrotron-Based Experiments and Microstructure-Sensitive Modeling:** *William Musinski*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Milwaukee

#### 3:20 PM Break

#### 3:40 PM Invited

**Microstructure Dependence of Spall Failure in Mg-Al Alloys at Extreme Strain Rates:** *Debjoy Mallick*<sup>1</sup>; <sup>1</sup>Devcom Us Army Research Laboratory

#### 4:00 PM

**Establishing Temperature-Based Relationships for Mechanical Properties and Crystal Plasticity Parameters of Additively Manufactured Haynes-214 Alloy:** *Mohammad M Keleshteri*<sup>1</sup>; Mehrdad Pourjam<sup>1</sup>; Subhadip Sahoo<sup>1</sup>; Jason Mayeur<sup>2</sup>; Kavan Hazeli<sup>1</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Oak Ridge National Laboratory

#### 4:20 PM

**Advanced Calibration of the GTN Damage Model for Aluminum Alloy AA6111 via Bayesian Inference and Digital Image Correlation Techniques:** *Sayed Mohammad Ali Seyed Mahmoud*<sup>1</sup>; Dominic Renner<sup>1</sup>; Raj Mahat<sup>1</sup>; Ali Khosravani<sup>2</sup>; Surya Kalidindi<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Multiscale Technologies

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### 2D Materials – Preparation, Properties, Modeling & Applications — Processing, Characterization, Modeling & Applications I

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nuggehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Tuesday AM | March 25, 2025**  
**362 | MGM Grand**

**Session Chairs:** Ritesh Sachan, Oklahoma State University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS

#### 8:00 AM Introductory Comments

#### 8:10 AM Invited

**ICME in Chemical Vapor Deposition Synthesis and Characterization of 2D Refractory Metal Carbides:** *Eric Payton*<sup>1</sup>; Sajjad Hasan<sup>1</sup>; Nishat Sultana<sup>1</sup>; <sup>1</sup>University of Cincinnati

#### 8:30 AM Invited

**Exploring Radiation Tolerance of MoS<sub>2</sub>:** *Assel Aitkaliyeva*<sup>1</sup>; Aaron Rabin<sup>1</sup>; Zhihan Hu<sup>2</sup>; Preston Valiant<sup>1</sup>; Kai Nordlund<sup>3</sup>; Lin Shao<sup>2</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Texas A&M University; <sup>3</sup>University of Helsinki

#### 8:50 AM Keynote

**Heterogeneous Integration of 2D/3D Heterostructures:** Nicholas Glavin<sup>1</sup>; *Michael Altwater*<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

#### 9:15 AM

**Evaluating the Diffusion Coefficient of TiSe for High-Performance Battery Applications:** *Prince Sharma*<sup>1</sup>; Gen Hasegawa<sup>1</sup>; Santosh Chhetri<sup>2</sup>; Jin Hu<sup>2</sup>; Naoaki Kuwata<sup>1</sup>; <sup>1</sup>National Institute for Materials Science Japan; <sup>2</sup>University of Arkansas

#### 9:35 AM Break

#### 9:45 AM Invited

**Enhancing Flexible Device Applications With 2D Materials:** *Harish Subbaraman*<sup>1</sup>; <sup>1</sup>Oregon State University

#### 10:05 AM Keynote

**Recent Advancements in Computational Modeling for Accelerating 2D Material Design and Applications:** *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

#### 10:30 AM Invited

**Data-Driven Discovery of 2D Materials' Systems for Solar Energy Conversion:** *Arunima Singh*<sup>1</sup>; <sup>1</sup>Arizona State University

#### 11:10 AM

**Sensing and Removal of PFAS by Titanium Carbide MXene: Impact of the MXene Surface Properties on PFAS Removal:** *Milad Esfahani*<sup>1</sup>; <sup>1</sup>University of Alabama

#### 10:50 AM

**Influence of Graphene and MoS<sub>2</sub> Buffer Layer Thickness on Performance of Copper Zin Tin Sulfide Solar Cells:** *Matias De Almeida*<sup>1</sup>; Nuggehalli Ravindra<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

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## ADDITIVE MANUFACTURING

### A Career in Powder Processing and Additive Manufacturing: A MPMD Symposium Honoring David Bourell — Laser-Based Processing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

**Program Organizers:** Paul Prichard, Oak Ridge National Laboratory; Allison Beese, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

**Tuesday AM | March 25, 2025**  
**309 | MGM Grand**

**Session Chair:** Allison Beese, Pennsylvania State University

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**8:00 AM Introductory Comments**

**8:10 AM**

**Limits of Dispersoid Size and Number Density in ODS Alloys Fabricated with Laser Powder Bed Fusion:** *Nathan Wassermann*<sup>1</sup>; Alan McGaughey<sup>1</sup>; Sneha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**8:30 AM**

**Comparison of Mechanical Properties Between Laser Powder Bed Fusion and Wrought 17-4 PH:** *Ola Harrysson*<sup>1</sup>; Harvey West<sup>1</sup>; Christopher Rock<sup>1</sup>; Satya Konala<sup>1</sup>; Erik O'Luanaigh<sup>1</sup>; <sup>1</sup>North Carolina State University

**8:50 AM**

**Liquid-Induced Healing of Cracks in Nickel-Based Superalloy Fabricated by Laser Powder Bed Fusion:** *Xiaogang Hu*<sup>1</sup>; *Qiang Zhu*<sup>1</sup>; <sup>1</sup>Southern University of Science and Technology

**9:10 AM Invited**

**The Evolution of Additive Manufacturing:** *Khershed Cooper*<sup>1</sup>; *Paul Prichard*<sup>2</sup>; <sup>1</sup>National Science Foundation; <sup>2</sup>Oak Ridge National Laboratory

**9:40 AM Break**

**10:00 AM Invited**

**Moving Metal AM into Mainstream Manufacturing:** *Ian Gibson*<sup>1</sup>; <sup>1</sup>University Tech Twente

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Alloy Design Principles and Multiscale Microscopy

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

**Tuesday AM | March 25, 2025**  
**311 | MGM Grand**

**Session Chairs:** Charles-Andre Gandin, Mines Paris | PSL University; Marie Charpagne, University of Illinois

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**8:00 AM Keynote**

**Navigating Additive Manufacturing Processing Space via Multi-Scale Microscopy:** *Simon Ringer*<sup>1</sup>; <sup>1</sup>University of Sydney

**8:40 AM Invited**

**Visualization of Solidification Under Additive Manufacturing Conditions:** *Amy Clarke*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:10 AM Invited**

**Designing Printable Alloys by Leveraging In-Situ Reactions in the Liquid State:** *Marie Charpagne*<sup>1</sup>; <sup>1</sup>University of Illinois

**9:40 AM Break**

**9:55 AM Invited**

**A Bayesian Approach to the Discovery and Optimization of Printable Refractory Alloys:** *Raymundo Arroyave*<sup>1</sup>; <sup>1</sup>Texas A&M University

**10:20 AM**

**Precipitation Reactions in Supersaturated Nickel-Based Superalloys: A Multi-Length-Scale Study:** *Yuanbo Tang*<sup>1</sup>; <sup>1</sup>University of Birmingham

**10:40 AM Invited**

**Using ICME to Design a Novel High Strength, Printable, and Burn Resistant Nickel-Based Superalloy for Re-Usable Rocket Engines:** *Gary Whelan*<sup>1</sup>; *Kerem Taskin*<sup>1</sup>; <sup>1</sup>Questek Innovations LLC

**11:05 AM Invited**

**Towards Autonomy in the Additive Manufacturing of Refractory High Entropy Alloys:** *Dan Thoma*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison



## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/ Wire Processing of Multifunctional Materials — Magnetic and Shape Memory Materials

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

Tuesday AM | March 25, 2025  
315 | MGM Grand

**Session Chair:** Markus Chmielus, University of Pittsburgh

#### 8:00 AM Invited

**Impact of Magnetic, Atomic and Microstructural Ordering on the Magnetocaloric Performance of Powdered NiCoMnSn Metamagnetic Shape Memory Ribbons:** *Jose Maria Porro*<sup>1</sup>; Bosco Rodriguez-Crespo<sup>2</sup>; Natalia Rio-Lopez<sup>2</sup>; Patricia Lazpita<sup>3</sup>; Santiago Ceballos<sup>2</sup>; Mariana Rios<sup>2</sup>; Daniel Domenech<sup>2</sup>; Jose Alberto Rodriguez-Velamazan<sup>4</sup>; Javier Lopez-Garcia<sup>5</sup>; Volodymyr Chernenko<sup>3</sup>; Daniel Salazar<sup>2</sup>; <sup>1</sup>BCMaterials & Ikerbasque; <sup>2</sup>BCMaterials; <sup>3</sup>University of the Basque Country; <sup>4</sup>Institute Laue-Langevin; <sup>5</sup>University of Oviedo

#### 8:25 AM Invited

**Isothermal Oxidation of Ni-Mn-Ga Magnetic Shape Memory Alloys and Its Application to Sintering Atmosphere:** *Pierangeli Rodriguez De Vecchis*<sup>1</sup>; Rafael Rodriguez De Vecchis<sup>1</sup>; Brian Gleeson<sup>1</sup>; Markus Chmielus<sup>1</sup>; <sup>1</sup>University of Pittsburgh

#### 8:50 AM

**Binder Jet Printing and Sintering of Ni-Mn-Ga Magnetic Shape Memory Alloy Foams with Increased Porosity Through Powder Space-Holders:** *Pierangeli Rodriguez de Vecchis*<sup>1</sup>; *Markus Chmielus*<sup>1</sup>; <sup>1</sup>University of Pittsburgh

#### 9:10 AM

**Microstructure and Properties of Functional Materials Obtained by Selective Laser Melting:** *Marcin Karpinski*<sup>1</sup>; Aleksandra Kolano-Burian<sup>2</sup>; Przemyslaw Zackiewicz<sup>2</sup>; Adrian Radon<sup>2</sup>; Bartosz Jozwik<sup>2</sup>; <sup>1</sup>Lukasiewicz Research Network Imn; <sup>2</sup>Lukasiewicz Research Network Imn

#### 9:30 AM Break

#### 9:40 AM Invited

**On the Relevance of Nanoparticle Design for the Additive Manufacturing of Magnetoactive (Multi)Functional Materials:** *Ander Garcia Díez*<sup>1</sup>; *Josu Fernández Maestu*<sup>1</sup>; *Carmen Rial Tubio*<sup>1</sup>; *N. Fernández*<sup>2</sup>; *Pedro Martins*<sup>3</sup>; *Senentxu Lanceros-Mendez*<sup>4</sup>; <sup>1</sup>BCMaterials, Basque Center for Materials, Applications and Nanostructures; <sup>2</sup>Physics Centre of Minho and Porto Universities; <sup>3</sup>Physics Centre of Minho and Porto Universities; <sup>4</sup>BCMaterials, Basque Center for Materials, Applications and Nanostructures; Physics Centre of Minho and Porto Universities; IKERBASQUE, Basque Foundation for Science

#### 10:10 AM

**Influence of Annealing on Enhancing Soft Magnetic Properties in Laser Powder Bed Fusion Processed Hiperco (Fe-49Co-2V):** *SaiSree Varahabhatla*<sup>1</sup>; <sup>1</sup>University of North Texas

#### 10:30 AM

**Additive Manufacturing of Equiatomic Fe-Co Alloy Using Wire and Arc Based Directed Energy Process:** *Soumyajit Koley*<sup>1</sup>; Supriyo Ganguly<sup>2</sup>; <sup>1</sup>Tata Steel; <sup>2</sup>Cranfield University

#### 10:50 AM

**Mechanical and Magnetostrictive Properties of Additively Manufactured Fe<sub>81</sub>Al<sub>19</sub> Rods:** *Nicholas Jones*<sup>1</sup>; Jin-Hyeong Yoo<sup>1</sup>; Bryan Kessel<sup>1</sup>; Thomas Mion<sup>2</sup>; Emily Holcombe<sup>1</sup>; Paul Lambert<sup>3</sup>; <sup>1</sup>Naval Surface Warfare Center, Carderock Division; <sup>2</sup>Naval Research Laboratory; <sup>3</sup>John Hopkins Applied Physics Laboratory

#### 11:10 AM

**Cracking of Fe-xSi Alloys During Selective Laser Melting:** *Jiwoo Park*<sup>1</sup>; Cheol Kang<sup>2</sup>; Hyung Giun Kim<sup>2</sup>; Gun-Hee Kim<sup>2</sup>; Joonho Lee<sup>1</sup>; <sup>1</sup>Korea University; <sup>2</sup>Korea Institute of Industrial Technology

## ADDITIVE MANUFACTURING

### Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction — Process-Structure- Properties Relationships II

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Nik Hrabec, National Institute of Standards and Technology; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

Tuesday AM | March 25, 2025  
317 | MGM Grand

**Session Chair:** Mohsen Seifi, ASTM International/Case Western Reserve University

#### 8:00 AM Invited

**Ductile Fracture Model for Additively Manufactured Metal Alloys:** *Allison Beese*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

#### 8:20 AM

**Influence of Pore Defects on Fatigue Crack Growth Behavior of Additively Manufactured Ti-6Al-4V:** *Luca Loiodice*<sup>1</sup>; Krzysztof Stopka<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University

#### 8:40 AM

**Assessing Part-to-Coupon Porosity Equivalence for Fatigue of Powder Bed Fusion - Laser Beam Manufactured Ti-6Al-4V:** *Justin Miner*<sup>1</sup>; Sneha Prabha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 9:00 AM

**High-Cycle and Very-High-Cycle Fatigue Behavior of Additively Manufactured Ti-6Al-4V Alloys and Methods for Future Rapid Qualification:** *Jake Scarponi*<sup>1</sup>; Anthony Spangenberg<sup>1</sup>; Cory Cunningham<sup>2</sup>; Conner Cleek<sup>3</sup>; Diana Lados<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Boeing Additive Manufacturing; <sup>3</sup>Boeing Research & Development

#### 9:20 AM

**Role of Volumetric Defect and Microstructure on the Fatigue Behavior of Additively Manufactured Inconel 718: An Experimental Study:** *Indrajit Nandi*<sup>1</sup>; Nima Shamsaei<sup>1</sup>; Shuai Shao<sup>1</sup>; <sup>1</sup>Auburn University

#### 9:40 AM Break

#### 10:00 AM Invited

**Effects of Processed Microstructure with Defects on Fatigue Strength and Damage Tolerance of Additively Manufactured Metals:** *Sebastian Stammkötter*<sup>1</sup>; Mirko Teschke<sup>1</sup>; Alexander Koch<sup>1</sup>; *Frank Walther*<sup>1</sup>; <sup>1</sup>TU Dortmund University

10:20 AM

**Post-Processing Strategies to Improve Fatigue and Fracture Properties of Net-Shape Titanium Parts:** Jake Benzing<sup>1</sup>; Orion Kafka<sup>1</sup>; Cassidy Allen<sup>1</sup>; Alec Saville<sup>1</sup>; Nik Hrabec<sup>1</sup>; Sara Randall<sup>2</sup>; Julius Bonini<sup>2</sup>; Edwin Glaubit<sup>3</sup>; *Nicholas Derimow*<sup>1</sup>; Chad Beamer<sup>4</sup>; Ryan Fishel<sup>5</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Lucideon; <sup>3</sup>Colorado School of Mines; <sup>4</sup>Quintus Technologies; <sup>5</sup>3D Systems

10:40 AM

**Tailoring the Microstructure to Improve the Fatigue Performance of Ti-6Al-4V Manufactured with Laser Powder Bed Fusion:** Mo-Rigen He<sup>1</sup>; *Anchen Tong*<sup>1</sup>; Laura Dial<sup>2</sup>; Marissa Brennan<sup>2</sup>; Victor Ostroverkhov<sup>2</sup>; Christopher Immer<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>GE Aerospace Research

11:00 AM

**Optimizing Process-Structure-Performance Relationships in Inconel718 Deposits Produced by Wire-Arc Additive Manufacturing:** *Ahmad Nourian*<sup>1</sup>; Jon Gager<sup>1</sup>; Sinan Muftu<sup>1</sup>; <sup>1</sup>Northeastern University

11:20 AM

**Competition Between Defects and Microstructure on Fatigue Crack Formation and Life in L-PBF IN718:** Alexander Caputo<sup>1</sup>; *Richard Neu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Materials in Energy Environments II — Additive Manufacturing in Energy: An Industry Perspective Panel

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Pacific Northwest National Laboratory; Subhashish Meher, Pacific Northwest National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Purdue University; Yi Xie, Peking University; Michael Kirka, Oak Ridge National Laboratory; Mohan Sai Kiran Nartu, Pacific Northwest National Laboratory

Tuesday AM | March 25, 2025  
301 | MGM Grand

**Session Chairs:** Isabella Van Rooyen, Pacific Northwest National Laboratory; Subhashish Meher, Pacific Northwest National Laboratory

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#### 8:00 AM Introductory Comments

**8:05 AM An Industry Perspective:** Current Innovation and Opportunities for Additive Manufacturing for Energy Systems Panel Discussion: Moderators: Isabella van Rooyen and Subhashish Meher (Pacific Northwest National Laboratory)

This panel will stimulate mutual responsiveness between industries, stakeholders, academia, and national laboratories about the current needs and future impacts of additive manufacturing innovations on energy applications. This panel discussion will create a dialogue with the potential to integrate differing values and understandings for technological advances through the full product/system's lifecycle, specifically in the following areas: process modeling and control; materials, processes, and machines; qualification and testing; and energy and sustainability. Challenges in supply chain and logistics are also discussed to identify possible similarity in needs between different energy applications.

10:05 AM Break

10:15 AM

**Composite Material Development by Using Additive Manufacturing Technology to Improve the Performance of Nuclear Materials:** *Hyun-Gil Kim*<sup>1</sup>; Jongdae Hong<sup>1</sup>; Hongryoul Oh<sup>1</sup>; <sup>1</sup>Kaeri

10:35 AM

**New Additive Manufacturing Route for Thermoelectric Materials Shaping and the Impact of the Geometry on the Conversion Energy: The Case of Silicides Compounds:** *Yohann Thimont*<sup>1</sup>; Alexia Mortagne Coderch<sup>1</sup>; Geoffroy Chevalier<sup>2</sup>; Benjamin Duployer<sup>1</sup>; Amélie Galodé<sup>3</sup>; David Berthebaud<sup>4</sup>; Franck Gascoin<sup>5</sup>; Lionel Presmanes<sup>1</sup>; <sup>1</sup>CIRIMAT; <sup>2</sup>CIRIMAT; <sup>3</sup>CNRS Normandie Université; <sup>4</sup>CNRS - Nantes Université; <sup>5</sup>CRISMAT

10:55 AM Invited

**A Convergent Approach to Fabricating 316L Stainless Steel (SS316L) Component for Nuclear Applications Using Additive Manufacturing (AM) and Hot Isostatic Pressing (HIP):** *Pavan Ajjarapu*<sup>1</sup>; Matthew deJong<sup>2</sup>; Fred List III<sup>1</sup>; Jason Mayeur<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; Soumya Nag<sup>1</sup>; Thomas Feldhausen<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Mithulan Paramanathan<sup>1</sup>; David Collins<sup>1</sup>; Kevin Hanson<sup>1</sup>; Ryan Dehoff<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>North Carolina State University

11:15 AM

**Additive Manufacturing of Oxide Dispersion Strengthened Steel:** *Austin Whitt*<sup>1</sup>; Christopher Kantzos<sup>1</sup>; Aaron Thompson<sup>1</sup>; Timothy Smith<sup>1</sup>; <sup>1</sup>NASA GRC

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Ta- and Mo-Based Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Faramarz Zarandi, RTX Corporation; Jeffrey Sowards, NASA Marshall Space Flight Center; Antonio Ramirez, Ohio State University; Eric Brizes, NASA Glenn Research Center; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias; Ian Mccue, Northwestern University; Zachary Sims, Small Business Consulting Corporation

Tuesday AM | March 25, 2025  
316 | MGM Grand

**Session Chairs:** Faramarz Zarandi, RTX Corporation; Matthew Osborne, Global Advanced Metals

8:00 AM Invited

**High-Throughput Refractory Alloy Design for Additive Manufacturing:** *Kaitlyn Mullin*<sup>1</sup>; Ella Allgor<sup>1</sup>; Collin Holgate<sup>1</sup>; Gareth Seward<sup>1</sup>; Noah Philips<sup>2</sup>; Matthew Begley<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>ATI Specialty Alloys and Components

8:30 AM

**Process-Structure-Property Relationships of Additively Manufactured Refractory Metals:** *Andrew Kustas*<sup>1</sup>; Erin Barrick<sup>1</sup>; Jonathan Pegues<sup>2</sup>; Hannah Sims<sup>1</sup>; Mary Louise Gucik<sup>1</sup>; Michael Melia<sup>1</sup>; Frank DelRio<sup>1</sup>; Tyler LeBrun<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Castheon, Inc.

8:50 AM

**Additive Manufacturing and High-Temperature Mechanical Behavior of High-Performance Refractory Alloys:** *Gianna Valentino*<sup>1</sup>; Elliott Wallace<sup>1</sup>; Alex Lark<sup>2</sup>; Robert Mueller<sup>2</sup>; <sup>1</sup>University of Maryland; <sup>2</sup>Johns Hopkins Applied Physics Laboratory

9:10 AM

**Additive Manufacturing Informed Tantalum Alloy Development:** *Colleen Hilla*<sup>1</sup>; *Guru Dinda*<sup>1</sup>; *Tatiana Ayers*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

9:30 AM Break

9:50 AM

**Solid State Additive Manufacturing of Refractory Alloys Using Cold Spray Technology:** *Christopher Roper*<sup>1</sup>; *Michael Kracum*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

10:10 AM

**Microstructural Evolution and Mechanical Properties of Additively Manufactured W-Ta Alloys:** *Guru Dinda*<sup>1</sup>; *Raden Gustinvil*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

10:30 AM

**A New Angle to View the Battle with Oxygen in Molybdenum (Mo) Laser Powder Bed Fusion (LPBF):** *Shiqi Ma*<sup>1</sup>; *Shuaihang Pan*<sup>2</sup>; *Xuehui Shen*<sup>1</sup>; *Bo Zhao*<sup>2</sup>; <sup>1</sup>Shandong Jianzhu University; <sup>2</sup>University of Utah

10:50 AM

**Reactive Synthesis in Additive Manufacturing of an Ultrahigh-Temperature Mo-Si-B-Ti Alloy:** *Nafisul Haque*<sup>1</sup>; *Behzad Rankouhi*<sup>1</sup>; *Phalgun Nelaturu*<sup>1</sup>; *Longfei Liu*<sup>1</sup>; *Fan Zhang*<sup>2</sup>; *John Perepezko*<sup>1</sup>; *Dan Thoma*<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>CompuTherm

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Complex and Novel Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Sezer Ozerinc, University of Illinois at Urbana-Champaign; Yu Zou, University of Toronto; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Pacific Northwest National Laboratory; Keivan Davami, University of Alabama

Tuesday AM | March 25, 2025  
310 | MGM Grand

**Session Chairs:** Tianyi Chen, Oregon State University; Eda Aydogan, Pacific Northwest National Laboratory

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8:00 AM Invited

**Additive Manufacturing of Heterogeneous Materials with High Strength and Ductility:** *Wen Chen*<sup>1</sup>; <sup>1</sup>University of Massachusetts-Amherst

8:40 AM

**Mapping Nanoscale Origin of Superior Mechanical Performance of a W-Rich Alloy Processed by Laser Powder Bed Additive Manufacturing:** *Abhijeet Dhal*<sup>1</sup>; *Eric Kusterer*<sup>1</sup>; *Amit Singh*<sup>1</sup>; *Amit Arora*<sup>1</sup>; *Prithvi Awasthi*<sup>1</sup>; *Fredrick N. Michael*<sup>2</sup>; *Rajiv Mishra*<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>National Aeronautics and Space Administration

9:00 AM

**Micromechanical Behavior of Additively Manufactured Multi-Layered Medium-Entropy Alloy:** *Zhe Gao*<sup>1</sup>; *Dong-Hyun Lee*<sup>2</sup>; *Yakai Zhao*<sup>3</sup>; *Pei Wang*<sup>3</sup>; *Hyoung Seop Kim*<sup>4</sup>; *Upadrasta Ramamurthy*<sup>5</sup>; *Jae-il Jang*<sup>1</sup>; <sup>1</sup>Hanyang University; <sup>2</sup>Chungnam National University; <sup>3</sup>Institute of Materials Research Engineering; <sup>4</sup>Pohang University of Science and Technology; <sup>5</sup>Nanyang Technological University

9:20 AM

**Cryogenic Tensile Behavior of Carbon-Doped CoCrFeMnNi High-Entropy Alloys Additively Manufactured by Laser Powder Bed Fusion:** *Haeum Park*<sup>1</sup>; *Hyeonseok Kwon*<sup>2</sup>; *Kyung Tae Kim*<sup>1</sup>; *Ji-Hun Yu*<sup>1</sup>; *Jungho Choe*<sup>1</sup>; *Hyokyung Sung*<sup>3</sup>; *Hyoung Seop Kim*<sup>2</sup>; *Seok Su Sohn*<sup>4</sup>; *Jung Gi Kim*<sup>5</sup>; *Jeong Min Park*<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science (KIMS); <sup>2</sup>Pohang University of Science and Technology; <sup>3</sup>Kookmin University; <sup>4</sup>Korea University; <sup>5</sup>Gyeongsang National University

9:40 AM Break

10:00 AM Invited

**Mechanical Properties and Microstructure Evolution of a Nanoparticle Reinforced Medium Entropy CoCrFeNi Alloy Produced by LPBF:** *Gerhard Dehm*<sup>1</sup>; *Vivek Devulapalli*<sup>1</sup>; *Schulz Fiona*<sup>2</sup>; *Erika Soares Barreto*<sup>3</sup>; *Nils Ellendt*<sup>3</sup>; *Eric Jäggle*<sup>2</sup>; <sup>1</sup>MPI for Sustainable Materials; <sup>2</sup>Universität der Bundeswehr München; <sup>3</sup>Leibniz-Institute for Materials Engineering – IWT

10:40 AM

**Tailoring Grain Boundaries and Precipitates in the Refractory Compositionally Complex Alloy NbMoCrTiAl Via Selective Laser Melting:** *Jin Wang*<sup>1</sup>; *Nicolas Peter*<sup>1</sup>; *Liuliu Han*<sup>2</sup>; *Alisson Kwiatkowski da Silva*<sup>2</sup>; *Fiona Schutz*<sup>3</sup>; *Eric Jäggle*<sup>3</sup>; *Ruth Schwaiger*<sup>1</sup>; <sup>1</sup>Forschungszentrum Juelich GmbH; <sup>2</sup>Max Planck Institute for Sustainable Materials; <sup>3</sup>Universität der Bundeswehr München

11:00 AM

**In-Situ Measurements and Modelling of Thermal Stress Evolution in Additively Manufactured Bulk Metallic Glasses:** *Samuel Gibbon*<sup>1</sup>; *Marco Simonelli*<sup>1</sup>; *Simon Sankare*<sup>2</sup>; *Adam Clare*<sup>1</sup>; *Alper Evirgen*<sup>2</sup>; *James Rouse*<sup>1</sup>; *Christopher Tuck*<sup>1</sup>; <sup>1</sup>University of Nottingham; <sup>2</sup>Oerlikon

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — Synchrotron Techniques

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

Tuesday AM | March 25, 2025  
122 | MGM Grand

**Session Chairs:** Grethe Winther, Technical University of Denmark; Klaus-Dieter Liss, University of Tennessee, Knoxville

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8:00 AM

**A Polycrystalline X-Ray Virtual Diffractometer for Direct Comparisons to Experimental Data:** *Sven Gustafson*<sup>1</sup>; *Paul Dawson*<sup>2</sup>; *Matthew Miller*<sup>2</sup>; *Kelly Nygren*<sup>1</sup>; <sup>1</sup>Cornell High Energy Synchrotron Source; <sup>2</sup>Cornell University

8:20 AM

**On-Site Characterization of Single-Crystal Elastic Moduli Via High Energy X-Ray Diffraction Microscopy and Synthetic Polycrystalline Modeling:** *Wiley Kirks*<sup>1</sup>; *Paul Dawson*<sup>1</sup>; *Matthew Miller*<sup>1</sup>; *Kelly Nygren*<sup>1</sup>; <sup>1</sup>Cornell University

8:40 AM

**Texture-Dependent Hierarchical Strain Localization in Nickel-Based Alloy and Its Effect on Deformation Behaviors:** *Yixuan Chen*<sup>1</sup>; Weihao Wang<sup>1</sup>; Yao Ou<sup>1</sup>; Hai Chang<sup>1</sup>; Zirong Zhai<sup>1</sup>; <sup>1</sup>Shanghai Institute of Technology

9:00 AM

**Recrystallization of Nano-Crystalline Material Enhancing Lattice Kinetics with Potential for Enhanced Plastic Deformation:** *Klaus-Dieter Liss*<sup>1</sup>; Megumi Kawasaki<sup>2</sup>; <sup>1</sup>University of Tennessee, Knoxville; <sup>2</sup>Oregon State University

9:20 AM Break

9:40 AM

**Characterization of the Impact of Hydrogen Concentration on the Plastic Behavior of Pure Nickel Using In-Situ X-Ray Diffraction Microscopy:** *Marco Zambolin*<sup>1</sup>; Leonidas Zisis<sup>1</sup>; Sven Gustafson<sup>2</sup>; Amlan Das<sup>2</sup>; Zachary Harris<sup>3</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>University of Pittsburgh

10:00 AM

**Formation and Evolution of Dislocation Cells During Plastic Deformation:** *Adam Cretton*<sup>1</sup>; Albert Zelenika<sup>1</sup>; Felix Frankus<sup>1</sup>; Sina Borgi<sup>1</sup>; Can Yildirim<sup>2</sup>; Carsten Detlefs<sup>2</sup>; Flemming Grumsen<sup>1</sup>; Grethe Winther<sup>1</sup>; Henning Friis Poulsen<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>European Synchrotron Radiation Facility

10:20 AM

**On the Inverse Problem of Recovering Admissible Intragranular Strain Fields from High-Energy X-Ray Diffraction Data:** *Carter Cocke*<sup>1</sup>; Andrew Akerson<sup>1</sup>; Sara Gorske<sup>1</sup>; Katherine Faber<sup>1</sup>; Kaushik Bhattacharya<sup>1</sup>; <sup>1</sup>California Institute of Technology

10:40 AM

**Combining Dark Field X-ray Microscopy and Computational Approaches to Study Dislocation Dynamics:** *Felix Frankus*<sup>1</sup>; Adam Cretton<sup>1</sup>; Albert Zelenika<sup>1</sup>; Sina Borgi<sup>1</sup>; Anter El-Azab<sup>2</sup>; Henning Poulsen<sup>1</sup>; Grethe Winther<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>Purdue University

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Materials for Energy Conversion and Storage I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

Tuesday AM | March 25, 2025  
356 | MGM Grand

**Session Chairs:** Scott Barnett, Northwestern University; Uday Pal, Boston University

8:00 AM Invited

**High-Capacity, Low-Cost Calcium-Antimony Battery in Molten Salt Electrolytes:** Sanghyeok Im<sup>1</sup>; Kelly Varnell<sup>1</sup>; Peyman Asghari-Rad<sup>1</sup>; Hojong Kim<sup>1</sup>; <sup>1</sup>Pennsylvania State University

8:25 AM Invited

**Analysis of Long-Term RSOC Electrochemical Performance:** Jhon-In Lee<sup>1</sup>; Emily Ghosh<sup>1</sup>; Soumendra Basu<sup>1</sup>; Srikanth Gopalan<sup>1</sup>; Uday Pal<sup>1</sup>; <sup>1</sup>Boston University

8:50 AM

**A Novel Catalyst Based on Pyrochlore Oxide to Reduce OER Overpotential for Low Temperature Alkaline Water Electrolysis:** Aya Okazaki<sup>1</sup>; Hiroto Ohta<sup>1</sup>; Masatsugu Morimitsu<sup>1</sup>; <sup>1</sup>Doshisha University

9:10 AM

**Comprehensive 3D Analysis Methodology for Solid Oxide Cells:** *Bartlomiej Winiarski*<sup>1</sup>; Pattiya Pibulchinda<sup>2</sup>; Patrick Barthelemy<sup>1</sup>; Chengge Jiao<sup>1</sup>; Scott Barnett<sup>2</sup>; <sup>1</sup>Thermo Fisher Scientific; <sup>2</sup>Northwestern University

9:30 AM Break

9:45 AM

**Discovery of Thermodynamically Stable Disorder in High-Entropy Li-Oxides from Ab-Initio Simulation and Crystal Graph Neural Network Prediction:** *R. Seaton Ullberg*<sup>1</sup>; John Langhouth<sup>1</sup>; Megan Butala<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida

10:05 AM

**A Net Zero Strategy for Battery Foils:** *Alexander Wimmer*<sup>1</sup>; <sup>1</sup>Constantia Teich

10:25 AM

**Application of Electrochemical Impedance Spectroscopy in Sn as a Negative Electrode and LNMO as a Positive Electrode for Lithium Ion Battery: Understanding the State of Charge and Health of the Battery:** *Arghyadeep Sau*<sup>1</sup>; Rohit Anand<sup>1</sup>; Karabi Das<sup>1</sup>; Siddhartha Das<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging — Iron, Steel, and Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Jinichiro Nakano, MatterGreen; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Noritaka Saito, Kyushu University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; Pranjal Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

Tuesday AM | March 25, 2025  
156 | MGM Grand

**Session Chair:** Bryan Webler, Carnegie Mellon University

8:00 AM Invited

**In Situ Observations of the Interfacial Phenomenon and Non-Metallic Inclusion Behaviors in High-Entropy Materials by Second Synthesis:** *Liuliu Han*<sup>1</sup>; Wangzhong Mu<sup>2</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max Planck Institute For Iron Research; <sup>2</sup>KTH Royal Institute of Technology

8:20 AM

**Visualizing Localized Electrochemical Corrosion on Metal Surfaces Using Scanning Electrochemical Cell Impedance Microscopy:** Venkateshkumar Prabhakaran<sup>1</sup>; Lyndi Strange<sup>1</sup>; Rajib Kalsar<sup>1</sup>; *Sridhar Niverty*<sup>1</sup>; Olga Marina<sup>1</sup>; Piyush Upadhyay<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

8:40 AM

**Time-Resolve X-ray Imaging of Freeze-Thaw Damage in AA7075:** *Ankit Kumar*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University



9:00 AM

**On the Solid State Dendritic Growth of Carbide at Interfaces in a High Temperature Alloy:** *Yuanbo Tang*<sup>1</sup>; Anh Hoang Pham<sup>2</sup>;

<sup>1</sup>University of Birmingham; <sup>2</sup>Shimane University

9:20 AM Break

9:40 AM

**Dissolution of Calcium Aluminate Inclusions in CaO-SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub> Steelmaking Slags: An In-Situ and Modelling Study:** *Guang Wang*<sup>1</sup>;

André Phillion<sup>1</sup>; Muhammad Nabeel<sup>1</sup>; Wangzhong Mu<sup>2</sup>; Neslihan Dogan<sup>3</sup>; <sup>1</sup>McMaster University; <sup>2</sup>KTH Royal Institute of Technology; <sup>3</sup>Delft University of Technology

10:00 AM

**In-Situ Observation of Magnetite Dissolution into Cu<sub>2</sub>S-FeS Matte with Gas Generation:** *Sakiko Kawanishi*<sup>1</sup>; Seung-Hwan Shin<sup>2</sup>; Sohei Sukenaga<sup>3</sup>; Junichi Takahashi<sup>4</sup>; Hiroyuki Shibata<sup>3</sup>; <sup>1</sup>Tohoku University; Kyoto University; <sup>2</sup>Tohoku University; Hyundai Steel Co., Ltd.; <sup>3</sup>Tohoku University; <sup>4</sup>Sumitomo Metal Mining Co., Ltd.

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Bcc-Superalloys — Alloy Design & Mechanical Properties I

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Alexander Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Howard Stone, University of Cambridge; Oleg Senkov, Air Force Research Laboratory; Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

Tuesday AM | March 25, 2025  
102 | MGM Grand

**Session Chair:** Oleg Senkov, MRL Materials Resources LLC

8:00 AM Invited

**Understanding Refractory Metal High Entropy Superalloys Through Systematic Design:** *Tamsin Whitfield*<sup>1</sup>; Ed Pickering<sup>2</sup>; James Miller<sup>3</sup>; Rosie Mellor<sup>3</sup>; Howard Stone<sup>3</sup>; Nick Jones<sup>3</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>University of Manchester; <sup>3</sup>University of Cambridge

8:30 AM

**Mechanical Properties of an A2/B2 Refractory Superalloy (RSA) and Its Constituent Phases:** *Oleg Senkov*<sup>1</sup>; Bryan Crossman<sup>2</sup>; Jean-Philippe Couzinie<sup>3</sup>; Daniel Miracle<sup>4</sup>; Todd Butler<sup>1</sup>; Vishal Soni<sup>4</sup>; Rajarshi Banerjee<sup>4</sup>; Michael Mills<sup>2</sup>; <sup>1</sup>Air Force Research Laboratory; <sup>2</sup>The Ohio State University; <sup>3</sup>Univ Paris Est Creteil; <sup>4</sup>University of North Texas

8:50 AM

**Design and Development of a Light-Weight and Low Neutron Cross-Section TiZrNbV High-Entropy Alloy with Room Temperature Tensile Plasticity:** *Muhammad Naeem*<sup>1</sup>; Pedro Ferreira<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>VTT Technical Research Centre of Finland

9:10 AM

**Development of (Relatively) Low Cost Refractory-Ruthenium Based Superalloys (RRSs):** *Alex Carruthers*<sup>1</sup>; Ed Pickering<sup>1</sup>; <sup>1</sup>University of Manchester

9:30 AM Break

9:50 AM

**Tungsten-Based BCC Superalloys for Nuclear Fusion:** *Matthew Lloyd*<sup>1</sup>; Johan Magnussen<sup>1</sup>; Neal Parkes<sup>1</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham

10:10 AM

**A Comparison Between Cr- and Fe-Based Superalloys Strengthened by Hierarchically Structured Precipitates:** *Steffen Neumeier*<sup>1</sup>; Jan Vollhüter<sup>1</sup>; Mathias Göken<sup>1</sup>; <sup>1</sup>University of Erlangen Nuernberg

10:30 AM

**Room Temperature Tensile Ductility in a Cr-based Alloy:** *Bryan Lim*<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Jeffrey Brookins<sup>1</sup>; Marissa Brennan<sup>2</sup>; Steve Buresh<sup>2</sup>; Brian Gordon<sup>3</sup>; Michael Spencer<sup>3</sup>; Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>GE Aerospace Research; <sup>3</sup>Touchstone Research Laboratory

10:50 AM

**Mechanical and Environmental Behaviour of Novel Cr(Fe)-NiAl bcc-Superalloys Tailored for High Temperature Applications:** *Thomas Blackburn*<sup>1</sup>; Kan Ma<sup>1</sup>; Michael Kerbstadt<sup>2</sup>; Rebeca Hernandez<sup>3</sup>; Marta Navas<sup>3</sup>; Marta Serrano<sup>3</sup>; Mathias Galetz<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>DECHEMA-FORSCHUNGSINSTITUT; <sup>3</sup>CIEMAT

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — Laser Fusion and Sintering of Ceramics

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

Tuesday AM | March 25, 2025  
106 | MGM Grand

**Session Chairs:** Gregory Thompson, University of Alabama; Dipankar Ghosh, Old Dominion University

8:00 AM

**Influence of Process Parameters on the Network Microstructure of In-Situ Synthesized TiBw/Ti6Al4V Composites Produced by Laser-Directed Energy Deposition:** *Bathusile Masina*<sup>1</sup>; Paul Lekoadi<sup>1</sup>; Hosi Kgomo<sup>1</sup>; <sup>1</sup>Council for Scientific and Industrial Research

8:20 AM

**LPS and PVDF Ceramic/Polymer Composite Electrolytes for Stable and High-Performance Lithium-Sulfur Battery:** *Ruigang Wang*<sup>1</sup>; Amirhossein Mirtaleb<sup>1</sup>; <sup>1</sup>Michigan State University

8:40 AM

**Achieving Heterogeneous Network Microstructure in Laser Additively Manufactured Hybrid TiB/TiC/Ti6Al4V Composite:** *Bathusile Masina*<sup>1</sup>; Paul Lekoadi<sup>1</sup>; Hosi Kgomo<sup>1</sup>; <sup>1</sup>Council for Scientific and Industrial Research

9:00 AM

**Latest Capabilities in Hot Isostatic Pressing for Advanced Ceramics:** Chad Beamer<sup>1</sup>; Andrew Cassese<sup>1</sup>; Anders Magnusson<sup>1</sup>; <sup>1</sup>Quintus Technologies LLC

9:20 AM

**Microrstructural Study of Laser Directed Energy Deposited Zirconia Powder:** *Dilipkumar Choudary Ratnala*<sup>1</sup>; Fabian Hanning<sup>1</sup>; Shrikant Joshi<sup>1</sup>; Joel Andersson<sup>1</sup>; <sup>1</sup>University West

9:40 AM Break

9:50 AM

**Shape Memory Ceramics: Phase Stability in the System  $\text{LaNbO}_4 - \text{V}_2\text{O}_5$ :** *Olivia Graeve*<sup>1</sup>; Cesar Martinez<sup>1</sup>; <sup>1</sup>University of California San Diego

10:10 AM

**Progress in Combining 3D Printing and Electric Field Assisted Sintering (EFAS) for Complex Part Fabrication: Pressure Transfer Media, X-Ray Computed Tomography, and Electrothermal Modeling:** *Jorgen Rufner*<sup>1</sup>; William Chuirazzi<sup>1</sup>; Arin Preston<sup>1</sup>; Andrew Gorman<sup>1</sup>; Stephanie Pitts<sup>1</sup>; James Ford<sup>1</sup>; Brennan Harris<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

10:30 AM

**Effect of Graded Microstructure on the Modulus, Hardness, and Strength of Hot-Pressed  $\text{ZrB}_2\text{-B}_4\text{C}$  FGM:** *Ajit Kumar Naik*<sup>1</sup>; Lava Kumar Pillari Pillari<sup>2</sup>; Manish Patel<sup>3</sup>; Lukas Bichler<sup>2</sup>; Tapas Laha<sup>4</sup>; Siddhartha Roy<sup>4</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur; <sup>2</sup>The University of British Columbia-Okanagan; <sup>3</sup>Defence Metallurgical Research Laboratory, Hyderabad, Kanchanbagh, Telangana; <sup>4</sup>Indian Institute of Technology Karagpur

10:50 AM

**Elucidating the Contribution of Anion Polarizability in Anharmonic Interactions in Oxides and Sulphides:** *Peter Greaney*<sup>1</sup>; Cameron Chevalier<sup>1</sup>; <sup>1</sup>University of California, Riverside

11:10 AM

**Cation size and Mass Modulated Multi-Stabilizer Zirconia With Low Thermal Conductivity:** *Sairam Ramachandran*<sup>1</sup>; Ashutosh Gandhi<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — Caloric Materials, Applications and Theory

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

Tuesday AM | March 25, 2025  
363 | MGM Grand

**Session Chairs:** Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Joao Horta Belo, University of Porto / Faculty of Sciences / IFIMUP

8:00 AM Invited

**Experiments in Pulsed Magnetic Fields: A Powerful Tool to Study Multicaloric Materials:** *Catalina Salazar Mejia*<sup>1</sup>; Timo Niehoff<sup>1</sup>; Marc Strassheim<sup>1</sup>; Eduard Bykov<sup>1</sup>; Jochen Wosnitza<sup>1</sup>; Tino Gottschall<sup>1</sup>; <sup>1</sup>Helmholtz Zentrum Dresden Rossendorf

8:25 AM Invited

**First-Order Ferromagnetic Transition in  $\text{MnFe}(\text{P,Si})$  Single Crystals:** *Francois Guillou*<sup>1</sup>; H. Yibole<sup>2</sup>; <sup>1</sup>Caen University; <sup>2</sup>Inner Mongolia Normal University

8:50 AM

**Influence of Applied Magnetic Field on the Nature of First-Order Phase Transformations in  $\text{R}_2\text{In}$  Cryogenic Magnetocaloric Materials:** *Ajay Kumar*<sup>1</sup>; Anis Biswas<sup>1</sup>; *Yaroslav Mudryk*<sup>1</sup>; <sup>1</sup>Ames National Laboratory of US Department of Energy

9:10 AM Invited

**Rotating Magnetocaloric Effect in Polycrystals: Fundamentals and Applications:** *Joao Horta Belo*<sup>1</sup>; Rafael Almeida<sup>1</sup>; João Esteves de Araújo<sup>1</sup>; João S. Amaral<sup>2</sup>; Rodrigo Kiefe<sup>2</sup>; João Ventura<sup>1</sup>; Claudia Fernandes<sup>1</sup>; Daniel Silva<sup>1</sup>; <sup>1</sup>IFIMUP, Faculdade de Ciencias, Universidade do Porto; <sup>2</sup>University of Aveiro

9:35 AM Break

9:55 AM Invited

**Additive Manufacturing of Thin-Walled Magnetocaloric Regenerator Structures for Heat Pump Applications:** *Radhika Barua*<sup>1</sup>; Vaibhav Sharma<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

10:20 AM

**Magnetocaloric Properties of  $\text{LaFe}_{11.5}\text{Si}_{1.5}$  Alloys with Cobalt and Nickel Substitutions:** *Elena Priesen Reis*<sup>1</sup>; Kyle Hunady<sup>1</sup>; Brent Fultz<sup>1</sup>; <sup>1</sup>California Institute of Technology

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Materials Deposition by Cold Spray and Related Technologies — Processing, Characterization, and Properties I

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Materials Characterization Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Tanaji Paul, Florida International University; Yu Zou, University of Toronto; Maniya Aghasibeig, National Research Council Canada; Aaron Nardi, Vrc Metal Systems, LLC; Pin Lu, Solvus Global

Tuesday AM | March 25, 2025  
103 | MGM Grand

**Session Chairs:** Yu Zou, University of Toronto; Pin Lu, Solvus Global

8:00 AM Invited

**Breaking Through Traditional Boundaries: Cold Spray Deposition of 'Brittle' Ceramics:** *Arvind Agarwal*<sup>1</sup>; Ambreen Nisar<sup>1</sup>; Denny John<sup>1</sup>; Anil Lama<sup>1</sup>; <sup>1</sup>Florida International University

8:30 AM

**Evaluation of Additively Manufactured Nd-Fe-B and Bi-Te via Tailored-Feedstock Low Pressure Cold Spray:** *Thomas Keller*<sup>1</sup>; Quinn Campbell<sup>2</sup>; Sam Boese<sup>2</sup>; Yunume Fitchorova<sup>2</sup>; Jack Lesko<sup>1</sup>; Andrew Neils<sup>1</sup>; <sup>1</sup>The Roux Institute at Northeastern University; <sup>2</sup>Kostas Research Institute at Northeastern University

8:50 AM

**Cold Spray Bonding Improvements of SS316 Using Copper Additions:** *Michael Pagan*<sup>1</sup>; Styler Goring<sup>1</sup>; HuChun Yi<sup>2</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Elementum3D

9:10 AM

**Bonding and Microstructure of Single Particle Impacts: A 3D Investigation:** *Veera Panova*<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Northwestern University, Massachusetts Institute of Technology

9:30 AM Break

9:50 AM Invited

**In-Situ Heat Treatment with Laser Assisted Cold Spray: Modeling and Experiments:** *Salih Duran*<sup>1</sup>; Samuel Boese<sup>1</sup>; Aidan Sevinsky<sup>1</sup>; Ozan Ozdemir<sup>1</sup>; Ahmad Nourian-Avval<sup>1</sup>; *Sinan Muftu*<sup>1</sup>; <sup>1</sup>Northeastern University

10:20 AM

**Microstructure and Multi-scale Mechanical Properties of As-Deposited and Heat-Treated Cold-Sprayed Scalmalloy-Al7075 Deposits:** *Anil Lama*<sup>1</sup>; Denny John<sup>1</sup>; Tanaji Paul<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

10:40 AM

**Understanding the Effect of Feedstock Microstructure on Mechanical Performance of AA7075 Cold Spray Material:** *Christopher Williamson*<sup>1</sup>; Ning Zhu<sup>2</sup>; Arthur Webb<sup>1</sup>; Luke Brewer<sup>1</sup>; <sup>1</sup>The University of Alabama; <sup>2</sup>The University of Baylor

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## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Structures and Mechanical Properties I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Tuesday AM | March 25, 2025  
368 | MGM Grand

**Session Chairs:** Jamieson Brechtel, Oak Ridge National Laboratory; Rui Feng, National Energy Technology Laboratory

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8:00 AM Invited

**Interstitial Engineering of BCC Refractory Multi-Principal Element Alloys and their Dislocation Pathways:** *Daniel Gianola*<sup>1</sup>; <sup>1</sup>University of California-Santa Barbara

8:20 AM Invited

**Controllable Structure and Superior Mechanical Properties of Metallic Glasses through Atomic Manufacturing:** Hang Zhao<sup>1</sup>; Jing Zhou<sup>1</sup>; Baoshuang Shang<sup>1</sup>; Rongce Sun<sup>1</sup>; Yuqiang Yan<sup>1</sup>; Xing Tong<sup>1</sup>; Haijie Xian<sup>1</sup>; Yong Ding<sup>1</sup>; Bo Zhang<sup>1</sup>; Haibo Ke<sup>1</sup>; *Wei-Hua Wang*<sup>1</sup>; <sup>1</sup>Songshan Lake Materials Laboratory

8:40 AM Invited

**Impact of Elemental Additions on Elastic and Plastic Behavior of Refractory Multi-Principal-Element Alloys:** *Rui Feng*<sup>1</sup>; George Kim<sup>2</sup>; Dunji Yu<sup>3</sup>; Yan Chen<sup>3</sup>; Yongjie Hu<sup>4</sup>; Wei Chen<sup>5</sup>; Peter Liaw<sup>6</sup>; Ke An<sup>3</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Illinois Institute of Technology; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Drexel University; <sup>5</sup>University at Buffalo; <sup>6</sup>The University of Tennessee, Knoxville

9:00 AM Invited

**Fracture Resistance of Refractory High-Entropy Alloys:** *Punit Kumar*<sup>1</sup>; David Cook<sup>2</sup>; Madelyn Payne<sup>2</sup>; Wenqing Wang<sup>2</sup>; Pedro Borges<sup>2</sup>; Mingwei Zhang<sup>3</sup>; Li Yi<sup>4</sup>; Andrew Minor<sup>2</sup>; Mark Asta<sup>2</sup>; Robert Ritchie<sup>2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>University of California, Berkeley; <sup>3</sup>University of California, Davis; <sup>4</sup>Institute of Metal Research, Chinese Academy of Sciences, Shenyang

9:20 AM Invited

**Microstructure and Mechanical Property Changes in Ion Irradiated MPEAs:** *Steven Zinkle*<sup>1</sup>; Sydney Copp<sup>1</sup>; Siwei Chen<sup>1</sup>; Yajie Zhao<sup>1</sup>; Sicilia Christadore<sup>1</sup>; <sup>1</sup>University of Tennessee

9:40 AM Break

10:00 AM Invited

**Direct Ink Writing and Sintering of Micro-Lattices with Multi-Principal Element Alloys with High Specific Mechanical Properties:** *David Dunand*<sup>1</sup>; Dingchang Zhang<sup>1</sup>; Ming Chen<sup>1</sup>; Ya-Chu Hsu<sup>1</sup>; <sup>1</sup>Northwestern University

10:20 AM Invited

**Macroscopically-Smooth Plastic Flow in an Al-Containing High-Entropy Alloy: Unveiling Multiscale Complexity in a Mesoscopic Range:** *Jamieson Brechtel*<sup>1</sup>; Rui Feng<sup>2</sup>; Peter Liaw<sup>3</sup>; Benoit Beausir<sup>4</sup>; Hafsa Jaber<sup>4</sup>; Tatiana Lebedkina<sup>4</sup>; Mikhail Lebyodkin<sup>4</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>National Energy Technology Laboratory; <sup>3</sup>University of Tennessee-Knoxville; <sup>4</sup>Université de Lorraine

10:40 AM

**Fracture Toughness and Deformation Mechanisms in Cantor-Based Medium Entropy Alloys:** *Sheron Tavares*<sup>1</sup>; David Cook<sup>2</sup>; Punit Kumar<sup>2</sup>; Robert Ritchie<sup>2</sup>; Bingfeng Wang<sup>3</sup>; Marc Meyers<sup>1</sup>; <sup>1</sup>University of California, San Diego; <sup>2</sup>University of California, Berkeley; <sup>3</sup>Central South University

11:00 AM Invited

**On the Damage Tolerance of TiZrNbHfTa Refractory High-Entropy Alloys:** *Bernd Gludovatz*<sup>1</sup>; Michael Moschetti<sup>1</sup>; William Carpenter<sup>1</sup>; Moses Paul<sup>2</sup>; Alan Xu<sup>3</sup>; Dhriti Bhattacharyya<sup>3</sup>; Jean-Philippe Couzinié<sup>4</sup>; Anton Hohenwarter<sup>5</sup>; Easo George<sup>6</sup>; Jamie Kruzic<sup>1</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>Nanyang Technological University; <sup>3</sup>ANSTO; <sup>4</sup>ICMPE/CNRS; <sup>5</sup>Montanuniversität Leoben; <sup>6</sup>University of Tennessee, Knoxville

11:20 AM Invited

**Significance of Grain Refinement on the Nanomechanical Behavior of Multi-Principal Alloys:** Dong-Hyun Lee<sup>1</sup>; In-Chul Choi<sup>2</sup>; Tianyi Chen<sup>3</sup>; Jae-il Jang<sup>4</sup>; *Megumi Kawasaki*<sup>3</sup>; <sup>1</sup>Chungnam National University; <sup>2</sup>Kumoh National Institute of Technology; <sup>3</sup>Oregon State University; <sup>4</sup>Hanyang University

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VII — Advances in Surface Engineering: Session III

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Ning Zhu, Baylor University

Tuesday AM | March 25, 2025  
107 | MGM Grand

**Session Chairs:** Mohammad Umar Farooq Khan, Ohio State University; Jijo Christudasjustus, Pacific Northwest National Laboratory

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8:00 AM Introductory Comments

8:05 AM

**Effect of Plasma Spraying Parameters on Corrosion Behavior of Fe-Based Amorphous/Crystalline Composite Coatings:** *Md Akif Faridi*<sup>1</sup>; Sapan K. Nayak<sup>1</sup>; Shubham Halder<sup>1</sup>; Tapas Laha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

8:25 AM

**Role of Current Density on the Tribological and Electrochemical Properties of Zn-Co Coatings Deposited from a Non-Aqueous-Based Electrolyte:** *Anjali Kumari*<sup>1</sup>; Bangmaya Satpathy<sup>2</sup>; Panakati Siva Prasad<sup>1</sup>; Juan David Matallana Guerrero<sup>1</sup>; Siddhartha Das<sup>1</sup>; Karabi Das<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur; <sup>2</sup>IIT Bombay

8:45 AM

**Plasma Spray of Micro-Co-Based Coating on 55NiCrMoV7 Steel:** *Ajit Pramanick<sup>1</sup>; Bittu Topo<sup>1</sup>; Ratnakar Das<sup>1</sup>; Anup Keshri<sup>2</sup>; <sup>1</sup>National Institute of Advanced Manufacturing Technnology; <sup>2</sup>Indian Institute of Technology*

9:05 AM

**A Corrosion Resistant and Mechanically Robust Superhydrophobic Coating with Self-Healing Characteristics for Biodegradable Low Alloyed Mg-Ag-Zn-Ca:** *Amarjeet Singh<sup>1</sup>; <sup>1</sup>Punjab Engineering College*

9:25 AM

**Application of Self-Supporting Vermiculite Membrane in LiCl/MgCl<sub>2</sub> Separation:** *Jiaqing Zhao<sup>1</sup>; Jinhong Li<sup>1</sup>; Jiayang Wang<sup>1</sup>; Yunxuan Wang<sup>1</sup>; Shaogang Zhang<sup>1</sup>; <sup>1</sup>China University of Geosciences*

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## LIGHT METALS

### Advances in Titanium Technology — Deformation Behavior of Titanium Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

**Tuesday AM | March 25, 2025**  
**108 | MGM Grand**

**Session Chair:** Srinivas Aditya Mantri, Argonne National Laboratory

8:00 AM Invited

**Recent Advances in Understanding Fracture at Basal Twist Grain Boundary:** *Thomas Yvinec<sup>1</sup>; Florence Hamon<sup>1</sup>; Valery Valle<sup>1</sup>; Denis Bertheau<sup>1</sup>; Zhihong Wu<sup>2</sup>; Fan Sun<sup>2</sup>; Frederic Prima<sup>2</sup>; Samuel Hemery<sup>1</sup>; <sup>1</sup>ENSMA - Institut Pprime; <sup>2</sup>IRCP*

8:30 AM

**Exploration of Superior LCF Strength in a Novel Alpha/Beta Titanium Alloy:** *Zachary Kloenne<sup>1</sup>; Oscar Langdon<sup>1</sup>; David Dye<sup>1</sup>; <sup>1</sup>Imperial College London*

8:50 AM

**Defect Structures at Basal Twist Boundaries in Ti-6Al-4V:** *Nadib Akram<sup>1</sup>; Baris Yavas<sup>1</sup>; Christopher Collins<sup>2</sup>; Asa Frye<sup>2</sup>; Vasisht Venkatesh<sup>2</sup>; Adam Pilchak<sup>2</sup>; David Furrer<sup>2</sup>; Iuliana Cernatescu<sup>2</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Pratt & Whitney*

9:10 AM

**Clarifying the Different Stages of Dwell-Fatigue in Ti-6Al-4V Using Quantitative Fractography:** *Lucas Prince<sup>1</sup>; Patrick Villechaise<sup>2</sup>; Loic Dimithe Aboumou<sup>1</sup>; Samuel Hemery<sup>2</sup>; <sup>1</sup>Safran Aircraft Engines; <sup>2</sup>Institut Pprime*

9:30 AM Break

9:50 AM Invited

**Competing Fatigue Failures, Complex S-N Fatigue Behavior and Reciprocal Relationships in Ti-6Al-4V Titanium Alloy:** *K. S. Ravi Chandran<sup>1</sup>; <sup>1</sup>The University of Utah*

10:20 AM

**Cross-Slips in a Bulk Near- Titanium Alloy:** *Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto*

10:40 AM

**Nucleation of Damage Along Twin-Twin Boundaries in (•) Ti Alloys:** *Megan Cooper<sup>1</sup>; Shaolou Wei<sup>1</sup>; C. Cem Taşan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

11:00 AM

**In-Situ TiB and TiN Reinforced Ti-35Nb-7Zr-5Ta Composite Fabricated Through Spark Plasma Sintering (SPS): Microstructure, Mechanical Characteristics, and Biocompatibility:** *Satyavan Digole<sup>1</sup>; Sanoj Karki<sup>1</sup>; Manoj Mugale<sup>1</sup>; Amit Choudhari<sup>1</sup>; Mayank Garg<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University*

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Alloy Design

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Tuesday AM | March 25, 2025**  
**320 | MGM Grand**

**Session Chair:** Dehao Liu, Binghamton University

8:00 AM Invited

**From Pure Metals to Multi-Principal Element Alloys – A Physics-Informed Data-Driven Approach for Alloy Design:** *Jaafar El-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University*

8:40 AM

**Advancing Alloy Design: A Parameter-Free Statistical Approach to Predicting Stress Strain Curves of BCC Polycrystals:** *Jing Luo<sup>1</sup>; Yejun Gu<sup>2</sup>; Jaafar El-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Institute of High-Performance Computing, A\*STAR*

9:00 AM

**Accelerating Creep-Resistant Aluminum Alloy Design Through Generative AI-Driven Computational Models and Robust Validation:** *Yizhi Wang<sup>1</sup>; Yuksel Asli Sari<sup>2</sup>; Mihriban Pekguleryuz<sup>1</sup>; <sup>1</sup>McGill University; <sup>2</sup>Queen's University*

9:20 AM

**Towards an Interpretable and Reliable Framework for Alloy Design in Thermomechanical Processing:** *Sushant Sinha<sup>1</sup>; Xiaoping Ma<sup>2</sup>; Kashif Rehman<sup>2</sup>; Narges Armanfard<sup>1</sup>; Stephen Yue<sup>1</sup>; <sup>1</sup>McGill University; <sup>2</sup>Algoma Steel Inc.*

9:40 AM Break

9:50 AM

**Machine-Learning Structural Stability of Complex Intermetallic Phases:** *Mariano Forti<sup>1</sup>; Ralf Drautz<sup>1</sup>; Thomas Hammerschmidt<sup>1</sup>; <sup>1</sup>ICAMS*

10:10 AM

**Physics-Based Priors for Phase Classification in Alloy Design:** *Brent Vela<sup>1</sup>; Danial Khatamsaz<sup>1</sup>; Raymundo Arróyave<sup>1</sup>; <sup>1</sup>Texas A&M University*

10:30 AM

**Computational Design and Optimization of 2D Spinodal Metallic Metamaterials for Improved Structural Behavior:** *Saltuk Yildiz<sup>1</sup>; Zekeriya Ender Eger<sup>1</sup>; Pinar Acar<sup>1</sup>; <sup>1</sup>Virginia Tech*



10:50 AM

**Utilization of Neural Networks and Numerical Modeling for Microstructural Analysis of Aluminum 6060 Alloy Composites:** Anna Wojcicka<sup>1</sup>; Krzysztof Mroczka<sup>2</sup>; Carter Hamilton<sup>3</sup>; <sup>1</sup>AGH University of Science and Technology in Krakow; <sup>2</sup>Cracow University of Technology; <sup>3</sup>Miami University

11:10 AM

**Inverse Design of Architected Composite Materials with Desired Mechanical Behavior Based on Conditional Diffusion Model:** Guangfa Li<sup>1</sup>; Dehao Liu<sup>1</sup>; <sup>1</sup>Binghamton University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Algorithms and Methods for Complex Materials and Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Tuesday AM | March 25, 2025**  
**319 | MGM Grand**

**Session Chairs:** Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory

8:00 AM

**A Statistical Approach to Revealing Structure-Property Relationships and "Defects" in Amorphous Metal Oxides:** Peter Greaney<sup>1</sup>; Cameron Chevalier<sup>1</sup>; Mahesh Neupane<sup>2</sup>; <sup>1</sup>University of California, Riverside; <sup>2</sup>Army Research Laboratory

8:20 AM

**Comparative Study of Chemical Short Range Order Structure Construction in Multi-Principal Element Alloys:** Subah Mubassira<sup>1</sup>; Cliff Hirt<sup>1</sup>; Shuozhi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma

8:40 AM

**Enumeration and First-Principles Based Parameterization of Interfaces and Transformation Pathways in Alloys Using CASM:** Brian Puchala<sup>1</sup>; Anton Van der Ven<sup>2</sup>; Sesha Sai Behara<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

9:00 AM

**High Strain-Rate Microstructural Failure Modes in Refractory Alloys:** Omar Eldaly<sup>1</sup>; Mohammed Zikry<sup>1</sup>; <sup>1</sup>North Carolina State University

9:20 AM

**Elastic Constants from Charge Density Distribution in FCC High Entropy Alloys Using CNN and DFT:** Nathan Linton<sup>1</sup>; Ramin Soltanmohammadi<sup>2</sup>; Hossein Mirzaee<sup>2</sup>; Jacob Fischer<sup>1</sup>; Serveh Kamrava<sup>2</sup>; Pejman Tahmasebi<sup>2</sup>; Dilpuneet Aidhy<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Colorado School of Mines

9:40 AM Break

10:00 AM

**Microstructure-Sensitive Surrogate Modeling of Viscoplastic Creep in Nuclear Fuel Cladding: A Mechanism-Based, Data-Driven Approach:** Andre Ruybalid<sup>1</sup>; Ryan Sweet<sup>2</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>LANL; <sup>2</sup>Idaho National Laboratory

10:20 AM

**A Transition Interface Sampling Study of Nano-Void Nucleation in Magnesium Alloys:** Vicente Munizaga<sup>1</sup>; Homero Reyes Pulido<sup>1</sup>; Michael Falk<sup>1</sup>; <sup>1</sup>Johns Hopkins University

10:40 AM

**Research Data Management for Reference Data in Materials Science and Engineering Exemplified for Creep Data of Ni-Base Superalloys:** Jürgen Olbricht<sup>1</sup>; Luis Ávila Calderón<sup>1</sup>; Yusra Shakeel<sup>2</sup>; Angelika Gedsun<sup>3</sup>; Mariano Forti<sup>4</sup>; Sirieam Hunke<sup>5</sup>; Ying Han<sup>1</sup>; Thomas Hammerschmidt<sup>6</sup>; Rossella Aversa<sup>2</sup>; Miroslaw Chmielowski<sup>7</sup>; Rainer Stotzka<sup>2</sup>; Erik Bitzek<sup>7</sup>; Tilmann Hinkel<sup>1</sup>; Birgit Skrotzki<sup>1</sup>; <sup>1</sup>Bundesanstalt für Materialforschung und -prüfung (BAM); <sup>2</sup>Karlsruhe Institute of Technology (KIT); <sup>3</sup>Albert-Ludwigs-Universität Freiburg; <sup>4</sup>Ruhr-Universität Bochum; <sup>5</sup>RWTH Aachen; <sup>6</sup>Ruhr -Universität Bochum (RUB); <sup>7</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

11:00 AM

**Simulation of Twinning-Detwinning in Magnesium Alloys Using an Open-Source Integrated Phase-Field/Crystal-Plasticity Framework:** David Montiel<sup>1</sup>; Chaitali Patil<sup>1</sup>; Mohammadreza Yaghooobi<sup>1</sup>; Brian Puchala<sup>1</sup>; Anton Van der Ven<sup>2</sup>; Katsuyo Thornton<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Computational and Experimental Advances in Thermoelectric and Optoelectronic Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

**Tuesday AM | March 25, 2025**  
**355 | MGM Grand**

**Session Chairs:** Chenguang Fu, Zhejiang University; Alexandra Zevalkink, Michigan State University

8:00 AM Invited

**Accelerating the Search of New Photovoltaic and Opto-Electronic Materials Using High-Throughput Computational Screening:** Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College

8:20 AM Invited

**Using AI to Predict the Thermoelectric Performance of New Materials:** Holger Kleinke<sup>1</sup>; <sup>1</sup>University of Waterloo

8:40 AM Invited

**High-Temperature Elastic Moduli: A Tool for Understanding Chemical Bonding In Thermoelectric Materials:** Alexandra Zevalkink<sup>1</sup>; <sup>1</sup>Michigan State University

9:00 AM Invited

**Weak Bonding and Lattice Vibrations: Two Ingredients for Low Thermal Conductivity in Thermoelectric Sulfides, Chalcogenides and Halides:** Emmanuel Guilmeau<sup>1</sup>; <sup>1</sup>CRISMAT/CNRS

9:20 AM Invited

**Visualizing Vacancy Annihilation in CZTSe Solar Cells by Hydrogen-Assisted Selenization with In Situ/Operando X-ray Nanoprobe Studies:** *Li-Chyong Chen*<sup>1</sup>; Chih-Yang Huang<sup>1</sup>; Shao-Chin Tseng<sup>2</sup>; Wei-Chao Chen<sup>3</sup>; Gung-Chian Yin<sup>2</sup>; Bo-Yi Chen<sup>2</sup>; Kuei-Hsien Chen<sup>3</sup>; Cheng-Ying Chen<sup>4</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>National Synchrotron Radiation Research Center; <sup>3</sup>Academia Sinica; <sup>4</sup>National Taiwan Ocean University

9:40 AM Break

10:00 AM Invited

**Geometric Design and 3D Printing of Thermoelectric Materials and Devices:** *Jae Sung Son*<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology

10:20 AM Invited

**Turning Up the Heat: Designing New Zintl Phases for Thermoelectrics:** *Prashun Gora*<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute

10:40 AM

**Conversion Efficiency in Silver Chalcogenide Materials Showing Enhanced Structural Stability:** *Yun-Han Huang Lu*<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

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## LIGHT METALS

### Alumina and Bauxite — Bauxite and Alumina II

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Efthymios Balomenos, Metlen Energy and Metals; Les Edwards, Rain Carbon Inc.

Tuesday AM | March 25, 2025  
111 | MGM Grand

**Session Chair:** Roberto Seno, Cba - Companhia Brasileira De Aluminio

8:00 AM

**Operational Excellence Through Advanced Analytics at Hindalco Muri:** *Prasanta Bose*<sup>1</sup>; Kumar Ayush<sup>1</sup>; Ravi Das<sup>1</sup>; Ashish Chopra<sup>1</sup>; Bharathesh Kumar<sup>1</sup>; Anuj Verma<sup>1</sup>; <sup>1</sup>Prasanta

8:25 AM

**Dealkalization Behavior of TiO<sub>2</sub> Sulfuric Acid Waste on Bayer Red Mud:** *Chaojun Fang*<sup>1</sup>; *Ruixue Lou*<sup>1</sup>; Yihong Jia<sup>1</sup>; Lijuan Gao<sup>1</sup>; Xueqian Qin<sup>2</sup>; Yongping Wang<sup>2</sup>; Xiaowei Deng<sup>1</sup>; Bo Lv<sup>1</sup>; <sup>1</sup>Henan Polytechnic University; <sup>2</sup>CHALCO

8:50 AM

**Metal Recovery from Waste Using Bayer Process Desilication Products:** *Hong Peng*<sup>1</sup>; James Vaughan<sup>1</sup>; Tae Kim<sup>1</sup>; <sup>1</sup>University of Queensland

9:15 AM Question and Answer Period

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing Supplier Forum — Aluminum Alloys: Development and Manufacturing Supplier Forum

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

Tuesday AM | March 25, 2025  
114 | MGM Grand

**Session Chairs:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.; Roderick Guthrie, McGill University

8:00 AM **Introductory Comments:** Welcome to Supplier Forum Session

8:05 AM **Keynote**

**A Physical Twin of a Multi-Laser Powder Bed Fusion System for Correlative Photodiode Sensing, High-Speed Optical and Synchrotron X-Ray Imaging:** *Chu Lun Alex Leung*<sup>1</sup>; Samy Hocine<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Wei Li<sup>1</sup>; Da Guo<sup>1</sup>; Rubén Lambert-García<sup>1</sup>; Elena Ruckh<sup>1</sup>; Marta Majkut<sup>2</sup>; Alexander Rack<sup>2</sup>; Andy Farndell<sup>3</sup>; Nick Jones<sup>3</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>ESRF - The European Synchrotron; <sup>3</sup>Renishaw plc.

8:30 AM

**Innovative Solutions for Aluminum Alloy Manufacturing via Directed Energy Deposition (DED) Technology:** *Jeffrey Riemann*<sup>1</sup>; Melanie Lang<sup>1</sup>; <sup>1</sup>Formalloy Technologies, Inc.

8:55 AM

**Rapid Characterization of the Mechanical Properties of Aluminum Alloys Using Profilometry-Based Indentation Plastometry:** *Philip McKeown*<sup>1</sup>; James Miller<sup>1</sup>; <sup>1</sup>Plastometrex

9:20 AM

**Enhanced Aluminum Billets Heat Treatment Process in Batch Homogenizer Furnace for Energy Efficiency and Cycle Time Reduction:** *Mohamed Hassan Ali*<sup>1</sup>; Mostafa Abdelsamie<sup>1</sup>; <sup>1</sup>Khalifa University of Science and Technology

9:45 AM Break

10:00 AM

**Twin Roll Casting Process to Make High Strength Aluminum Alloy Sheets:** *Hyoung-Wook Kim*<sup>1</sup>; Yong-Hee Jo<sup>1</sup>; Yun-Soo Lee<sup>1</sup>; Kim Won-Kyeong<sup>1</sup>; <sup>1</sup>Korea Inst of Materials Science

10:25 AM

**Low-Cost Aluminum Scandium Master Alloy Technology:** *Tim Grbavac*<sup>1</sup>; Jim Intrater<sup>1</sup>; Rick Salvucci<sup>1</sup>; Brian Hunt<sup>1</sup>; Eugene Prahin<sup>1</sup>; <sup>1</sup>Fea Materials LLC

10:50 AM

**SmartBurner: Advanced Monitoring System to Enhance Gas Burner Performance:** *Amin Rostamian*<sup>1</sup>; Marc Bertherat<sup>2</sup>; <sup>1</sup>Novamet Sarl; <sup>2</sup>Constellium

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## LIGHT METALS

### Aluminum Cast Shop Supplier Forum — Aluminum Cast Shop Supplier Forum

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Samuel Wagstaff, Oculatus Consulting; Edward Williams, Arconic; Les Edwards, Rain Carbon Inc.

**Tuesday AM | March 25, 2025**  
**109 | MGM Grand**

**Session Chair:** Edward Williams, Arconic

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**8:00 AM**

**Burners and Furnaces for Aluminum Recycling: Towards Zero Emissions:** *Jonathan Erman*<sup>1</sup>; <sup>1</sup>GHI Smart Furnaces

**8:25 AM**

**Decarbonization with Hydrogen Fuel Combustion:** *James Checkeye*<sup>1</sup>; <sup>1</sup>Bloom Engineering Co. Inc.

**8:50 AM**

**X-Series, The Next Generation of Multi-Chamber Furnaces:** Terri-Ann Bethell<sup>1</sup>; *Lee Allen*<sup>1</sup>; <sup>1</sup>Mechatherm International Limited

**9:15 AM**

**New Developments in Metal Cleaning and Filter Preheating:** *Marion Betzing*<sup>1</sup>; Jochen Schnelle<sup>1</sup>; <sup>1</sup>Drache Umwelttechnik GmbH

**9:40 AM Break**

**9:55 AM**

**Dynaprime High Efficiency Filtration:** *Pascal Cote*<sup>1</sup>; <sup>1</sup>Dynamic Concept

**10:20 AM**

**Heated Refractory:** *Nicholas Tebbe*<sup>1</sup>; <sup>1</sup>Wagstaff

**10:45 AM**

**Hycast - Continual Improvements in Safety, Quality and Sustainability in the Casthouse:** *Shaun Hamer*<sup>1</sup>; Arild Hakonsen<sup>1</sup>; Ola Furu<sup>1</sup>; <sup>1</sup>Hycast As

**11:10 AM**

**State of the Art Process Technology and Operational Examples for Single- and TwinChamber© Furnaces for Remelting and Recycling of Aluminum Scraps:** *Hartwig Thie*<sup>1</sup>; <sup>1</sup>Tenova Loi

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## LIGHT METALS

### Aluminum Reduction Technology — Cell Design, Modeling and Power Modulation

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

**Tuesday AM | March 25, 2025**  
**113 | MGM Grand**

**Session Chairs:** Nicholas Depree, Enpot Ltd; Stephan Broek, Kensington Technology Inc

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**8:00 AM Introductory Comments**

**8:05 AM**

**Study on the Interface Deformation and Anode Current Distribution Variation in the Process of Anode Change in Aluminum Reduction Cell:** Xi Cao<sup>1</sup>; Jie Li<sup>2</sup>; Hongliang Zhang<sup>2</sup>; Qinsong zhang<sup>1</sup>; Zhibin Zhao<sup>1</sup>; Hongwu Hu<sup>1</sup>; Wei Liu<sup>1</sup>; *Michael Ren*<sup>3</sup>; <sup>1</sup>Shenyang Aluminum and Magnesium Engineering and Research Institute Co.Ltd.; <sup>2</sup>Central South University; <sup>3</sup>Sunlightmetal Consulting Inc.

**8:30 AM**

**Electrical and Magnetohydrodynamic Effect of Cathode Rodding and Anode-Cathode Arrangement in Aluminium Reduction Cell:** Pankaj Bohra<sup>1</sup>; Venkannababu Thalagani<sup>1</sup>; *Amit Jha*<sup>1</sup>; <sup>1</sup>Aditya Birla Science and Technology Company Private Limited

**8:55 AM**

**Modelling Aluminium Electrolysis Cell Cathode Assembly with Iron-Copper Composite Bars and Super Pastes:** *Marc Dupuis*<sup>1</sup>; Xianan Liao<sup>2</sup>; Xiangting Ren<sup>3</sup>; <sup>1</sup>GeniSim Inc.; <sup>2</sup>XLIAO Consulting, Consultant for Elken; <sup>3</sup>Elkem Carbon China Co. Ltd

**9:20 AM**

**Numerical Simulations of Copper Rod Insertion Effects on Current Density, Flow Field Distribution, Cathode Wear, and Electrothermal Dynamics in Aluminum Reduction Cells:** Sen Zhou<sup>1</sup>; Mouhamadou Diop<sup>1</sup>; *Zhaowen Wang*<sup>1</sup>; <sup>1</sup>Northeastern University (NEU)

**9:45 AM Break**

**10:00 AM**

**Evolution of Power Modulation Technology in Response to Changing Market Conditions Worldwide:** *Nicholas Depree*<sup>1</sup>; Yashuang Gao<sup>1</sup>; Mark Taylor<sup>2</sup>; John Chen<sup>2</sup>; <sup>1</sup>Enpot Ltd; <sup>2</sup>University of Auckland

**10:25 AM Concluding Comments**

TUESDAY AM

## MECHANICS OF MATERIALS

### Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — Extreme Conditions

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

**Tuesday AM | March 25, 2025**  
**370 | MGM Grand**

**Session Chairs:** Alejandro Strachan, Purdue University; Maryam Ghazisaeidi, Ohio State University

**8:00 AM**

**Multiscale Models for Materials at Extreme Conditions Using Physics-Informed Machine Learning:** *Alejandro Strachan*<sup>1</sup>; <sup>1</sup>Purdue University

**8:20 AM Invited**

**The Impact of Initial Grain Boundary Structure on the Properties of Irradiated Materials:** *Saryu Fensin*<sup>1</sup>; Sarah Paguaga<sup>1</sup>; Ian Chesser<sup>1</sup>; Calvin Lear<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:45 AM**

**Investigating the Pressure-Temperature States During Shock Compression and Shock Release in Metals Using Molecular Dynamics Simulations:** *Christian Sabatin*<sup>1</sup>; Phillip Tsurkan<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

**9:05 AM**

**Spall Strength of Pure Solids on the Periodic Table and Its Correlation with Known Thermomechanical Properties:** *Robert Swallow*<sup>1</sup>; Justin Wilkerson<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:25 AM Break**

**9:45 AM Invited**

**The Origin of Photo Plasticity in ZnS:** *Maryam Ghazisaeidi*<sup>1</sup>; <sup>1</sup>Ohio State University

**10:10 AM**

**Energy Dissipation Mechanisms and Role of Porosity in Shock Loaded Niobium: A Molecular Dynamics Study:** *William Zummo*<sup>1</sup>; Chunyu Li<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

**10:30 AM**

**Atomistic Simulations on the Dynamic Recrystallisation During High-Velocity Impact In Copper:** Yifeng Wang<sup>1</sup>; Che Zhang<sup>1</sup>; *Christian Brandl*<sup>1</sup>; <sup>1</sup>The University of Melbourne

**10:50 AM**

**Unravel Failure Mode in Garnet-Type Solid Electrolytes from Atomistic Simulations:** *Suyue Yuan*<sup>1</sup>; Kwangnam Kim<sup>1</sup>; Bo Wang<sup>1</sup>; Longsheng Feng<sup>1</sup>; Tae Wook Heo<sup>1</sup>; Brandon Wood<sup>1</sup>; Liwen Wan<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## BIOMATERIALS

### Biological Materials Science — Biological and Bio-Inspired Materials I

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Tuesday AM | March 25, 2025**  
**306 | MGM Grand**

**Session Chairs:** Grace Gu, University of California, Berkeley; Ling Li, University of Pennsylvania

**8:00 AM Invited**

**3D Printing Bioinspired Material Systems with Autonomous and Robotic Capabilities:** *Ryan Truby*<sup>1</sup>; <sup>1</sup>Northwestern University

**8:30 AM**

**The Mitic System: A Morphological Analysis of Fungal Hyphae:** *James Gallagher*<sup>1</sup>; Jessica Redmond<sup>1</sup>; Alex Bradshaw<sup>1</sup>; Bryn Dentinger<sup>1</sup>; Steven Naleway<sup>1</sup>; <sup>1</sup>University of Utah

**8:50 AM Invited**

**Engineering Biodegradable and Bioresorbable Materials for Biomedical Applications:** *Huinan Liu*<sup>1</sup>; <sup>1</sup>University of California, Riverside

**9:20 AM Break**

**9:40 AM Invited**

**Functional and Mechanical Behaviors of Inorganic-Organic Hierarchical Structures:** *Rayne Zheng*<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**10:10 AM**

**An Investigation on the Effect of Contrast Agents in the Chitosan-Nanoclay Shear Thinning Hydrogel for Trans-Catheter Arterial Embolization:** *George Varghese P J*<sup>1</sup>; Peng Chen<sup>1</sup>; Keren Zhao<sup>1</sup>; Mitesha Saha<sup>1</sup>; Jingjie Hu<sup>1</sup>; <sup>1</sup>North Carolina State University

**10:30 AM**

**The Embira Bark Fiber: a Sustainable Amazon Tape:** *Marc Meyers*<sup>1</sup>; Sheron Tavares<sup>1</sup>; Lucas Neuba<sup>2</sup>; Sergio Monteiro<sup>2</sup>; Henry Colorado<sup>3</sup>; <sup>1</sup>University of California, San Diego; <sup>2</sup>Military Institute of Technology; <sup>3</sup>University of Antioquia

**10:50 AM Invited**

**Crystal Defects Tailor the Properties of Biomineralized Tissue and Bio-Inspired Materials:** *Boaz Pokroy*<sup>1</sup>; <sup>1</sup>Technion Israel Institute of Technology



## SPECIAL TOPICS

### Bladesmithing 2025 — Bladesmithing 2025

**Sponsored by:** TMS: Bladesmithing Committee

**Program Organizer:** Samuel Wagstaff, Oculatus Consulting

**Tuesday AM | March 25, 2025**  
**164 | MGM Grand**

**Session Chairs:** Tarik Saleh, Los Alamos National Laboratory;  
Samuel Wagstaff, Oculatus Consulting

#### 8:00 AM Introductory Comments

**8:10 AM**

**Comparison of Small-scale Wootz Steel Production Methods:** *Stephen Gebes*<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

**8:30 AM**

**Forging High Entropy Alloys:** *Robert Wilkins*<sup>1</sup>; <sup>1</sup>University of North Texas

**8:50 AM**

**Hammering Together a Bladesmithing Team from Basics:** *Brock Nowak*<sup>1</sup>; Nathan Jones<sup>1</sup>; Bradley Diak<sup>1</sup>; <sup>1</sup>Queen's University

**9:10 AM**

**Making a Modernized Khanda:** Minhchau Do<sup>1</sup>; Wyatt Hodges<sup>1</sup>; *Alexander Saggi*<sup>1</sup>; <sup>1</sup>Texas A&M

**9:30 AM Break**

**9:50 AM**

**Material Characterization and Analysis of a Seax Blade:** *Joseph Kallal*<sup>1</sup>; Kylie Broderick<sup>1</sup>; River Chen<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**10:10 AM**

**Nickel-Plated Bronze Sword for Enhanced Durability and Corrosion Resistance:** *Camilo Soto*<sup>1</sup>; Justin Lebeau<sup>1</sup>; Jacob Lowenstein<sup>1</sup>; Henry Cabrera<sup>1</sup>; Jonathan Seyoum<sup>1</sup>; Jose Ortiz<sup>1</sup>; <sup>1</sup>Rice University

**10:30 AM**

**UMN MA Eire Sword:** *Courtney Archibald*<sup>1</sup>; <sup>1</sup>University of Minnesota

**10:50 AM**

**UTEP American Foundry Society TMS Bladesmithing:** Christina Pickett<sup>1</sup>; *Chase Paff*<sup>1</sup>; *Ruben Martinez*<sup>1</sup>; <sup>1</sup>University of Texas El Paso

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Modeling of Amorphous and Crystalline Materials at the Mesoscales and Microscales

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Tuesday AM | March 25, 2025**  
**353 | MGM Grand**

**Session Chair:** Liang Qi, University of Michigan

**8:00 AM Invited**

**Simulation-Informed Models for Amorphous Metal Mechanical Property Prediction:** *Michael Falk*<sup>1</sup>; Bin Xu<sup>1</sup>; Zhao Wu<sup>2</sup>; Jiayin Lu<sup>3</sup>; Michael Shields<sup>1</sup>; Chris Rycroft<sup>3</sup>; Franz Bamer<sup>2</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>RWTH Aachen; <sup>3</sup>University of Wisconsin, Madison

**8:30 AM**

**Machine Learning-Enhanced Multiscale Modeling of Solidification:** *Sepideh Kavousi*<sup>1</sup>; Mohsen Asle Zaeem<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**8:50 AM Invited**

**Atomistically Informed Mesoscale Modeling of Deformation Behavior of Bulk Metallic Glasses:** Yuchi Wang<sup>1</sup>; Yuchu Wang<sup>2</sup>; Jinwoo Hwang<sup>1</sup>; Yue Fan<sup>2</sup>; *Yunzhi Wang*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University of Michigan

**9:20 AM**

**Multiscale Modeling for Studying Corrosion-Induced Hydrogen Embrittlement in Zirconium:** *Shubham Pandey*<sup>1</sup>; Kyle Starkey<sup>1</sup>; Volker Eyert<sup>2</sup>; Erich Wimmer<sup>2</sup>; <sup>1</sup>Materials Design Inc.; <sup>2</sup>Materials Design SARL

**9:40 AM Break**

**10:00 AM Invited**

**Multiscale Computation-Experiment Study of Advanced Materials with Characteristic Microstructure:** *Jian Wang*<sup>1</sup>; Amit Misra<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>University of Michigan

**10:30 AM Invited**

**Understanding Microstructural Evolution Using Graph Attention Networks:** *Elizabeth Holm*<sup>1</sup>; Ryan Cohn<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Carnegie Mellon University

**11:00 AM Invited**

**Discovering New Mechanisms of Grain Growth with a Machine Learning Model Trained on Experimental and Simulation Data:** *Michael Tonks*<sup>1</sup>; Amanda Krause<sup>2</sup>; Joel Harley<sup>1</sup>; Lin Yang<sup>1</sup>; Vishal Yadav<sup>1</sup>; Joseph Melville<sup>1</sup>; Bryan Conry<sup>3</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Carnegie-Mellon University; <sup>3</sup>Oak Ridge National Laboratory

TUESDAY AM

## ADVANCED CHARACTERIZATION METHODS

### Characterization of Materials through High Resolution Coherent Imaging — Advancements in Methods and AI/ML

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Xianghui Xiao, Brookhaven National Laboratory; Richard Sandberg, Brigham Young University; Ross Harder, Argonne National Laboratory; Brian Abbey, La Trobe University; Saryu Fensin, Los Alamos National Laboratory; Ana Diaz, Paul Scherrer Institute; Mathew Cherukara, Argonne National Laboratory

**Tuesday AM | March 25, 2025**  
**157 | MGM Grand**

**Session Chair:** Mathew Cherukara, Argonne National Laboratory

**8:00 AM**

**AI-Driven Workflow for Autonomous High-Resolution Scanning X-Ray Microscopy:** *Tao Zhou*<sup>1</sup>; Saugat Kandel<sup>2</sup>; Mathew Cherukara<sup>1</sup>; Charadatta Phatak<sup>1</sup>; Martin Holt<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Chan Zuckerberg Imaging Institute

**8:30 AM**

**Rapid Reconstruction of the Full Strain Tensor via Coupled Phase Retrieval With Multipeak Bragg Coherent Diffraction Imaging:** *J. Nicholas Porter*<sup>1</sup>; Yueheng Zhang<sup>2</sup>; Ross Harder<sup>3</sup>; Barbara Frosik<sup>3</sup>; Wonsuk Cha<sup>3</sup>; Yuan Gao<sup>4</sup>; Garth Williams<sup>4</sup>; Joshua Miller<sup>1</sup>; Nash Karrington<sup>1</sup>; Andres Herrera<sup>1</sup>; Stephan Hruszkewycz<sup>3</sup>; Anthony Rollett<sup>2</sup>; Richard Sandberg<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Carnegie Mellon University; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>Brookhaven National Laboratory

**8:50 AM**

**ML-Guided Non-Destructive 3D Metrology of Functioning Devices With an X-Ray Laser:** Oliver Hoidn<sup>1</sup>; Aashwin Mishra<sup>1</sup>; Matthew Seaberg<sup>1</sup>; *Apurva Mehta*<sup>1</sup>; <sup>1</sup>SLAC National Accelerator Laboratory

**9:20 AM**

**Enhanced Mineral Characterization With 3D X-Ray CT and AI-Driven Imaging:** Parisa Asadi<sup>1</sup>; Matthew Andrew<sup>1</sup>; *Andriy Andreyev*<sup>1</sup>; Zeyu Zhou<sup>1</sup>; <sup>1</sup>Zeiss

**9:40 AM Break**

**10:00 AM**

**High Bandwidth Scanning X-Ray Microscopy:** *David Shapiro*<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Lab

**10:30 AM**

**Nanolotomography With Coded Apertures for Efficient Dynamic Imaging of Nanomaterials:** *Viktor Nikitin*<sup>1</sup>; Doga Gursoy<sup>1</sup>; Marcus Carlsson<sup>2</sup>; Rajmund Mokso<sup>3</sup>; Peter Cloetens<sup>4</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Lund University; <sup>3</sup>Technical University of Denmark; <sup>4</sup>European Synchrotron Radiation Facility

**10:50 AM**

**In-Situ/Operando Bragg Coherent X-Ray Diffraction Imaging for Catalysis Studies:** *Wonsuk Cha*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**11:10 AM**

**Coherent x-Ray Diffraction Imaging Dedicated Beamlines at PLS-II and Korea-4GSR:** Daseul Ham<sup>1</sup>; *Su Yong Lee*<sup>1</sup>; <sup>1</sup>Pohang Accelerator Laboratory / PLS-II Beamline Department

## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Mineralogical Analysis and Process Improvement

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Tuesday AM | March 25, 2025**  
**121 | MGM Grand**

**Session Chairs:** Jian Li, CanmetMATERIALS; Andrew Brown, Devcom Arl Army Research Office

**8:00 AM**

**Study and Characterization of an Adsorbent Material Used in the Direct Extraction of Lithium:** *Gabriela Pantoja Salgado*<sup>1</sup>; <sup>1</sup>La Paz

**8:20 AM**

**High Purity Arsenic Trioxide Prepared From Arsenic Sulfide Residue With Reduction Method:** *Ai-liang Chen*<sup>1</sup>; Wen-tao Dai<sup>1</sup>; Ling-yun Huang<sup>1</sup>; Huan-wu Zhan<sup>2</sup>; Xue-xian Jiang<sup>3</sup>; Gui-xiang He<sup>3</sup>; Bing Liu<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>Guangxi Nanguo copper Co., Ltd.; <sup>3</sup>Guilin University of Technology

**8:40 AM**

**Estimation of Online Homogenization of a Particle Mixture With Acoustic Emission:** *Yeonjee Choi*<sup>1</sup>; Juyeong Lee<sup>1</sup>; Ikhyeon Cho<sup>1</sup>; Joonho Lee<sup>1</sup>; <sup>1</sup>Korea University

**9:00 AM**

**Enhancement Recovery of Fine Kaolin Particles by Microbubble Flotation:** *Xinqiang Li*<sup>1</sup>; Yanfang Huang<sup>1</sup>; Hu Sun<sup>1</sup>; Yifan Du<sup>1</sup>; Guihong Han<sup>1</sup>; <sup>1</sup>Zhengzhou University

**9:20 AM**

**Process Mineralogy of a Manganese-Silver Ore in Mexico:** *Han Yang*<sup>1</sup>; Liulu Cai<sup>1</sup>; Gaoyang Chen<sup>1</sup>; Shuang Liu<sup>1</sup>; Wei Qu<sup>1</sup>; Qian Li<sup>1</sup>; Hongzhi Zhang<sup>1</sup>; <sup>1</sup>Youyan Resources and Environment Technology Research Institute (Beijing) Co., Ltd

**9:40 AM Break**

**10:00 AM**

**Physicochemical Characterization and Alkali Dissolution of Alluvial Fe-Columbite Deposit for Feasible Formation of Soluble Niobium and Tantalum Complexes:** *Nnaemeka Nzeh*<sup>1</sup>; Patricia Popoola<sup>1</sup>; <sup>1</sup>Tshwane University of Technology, Pretoria

**10:20 AM**

**Research and Application of O2-CO2 Mixed Blowing in Converter Steelmaking:** *Botao Xue*<sup>1</sup>; Kai Dong<sup>1</sup>; Fengya Qin<sup>1</sup>; Rong Zhu<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Grain Boundary Segregation and Migration

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Tuesday AM | March 25, 2025**  
**304 | MGM Grand**

**Session Chairs:** Sergii Divinskyi, University of Muenster, Germany; Fadi Abdeljawad, Lehigh University

**8:00 AM Invited**

**Structure, Energetics and Kinetic Properties of Crystal-Melt Interfaces in Salts:** Zhao Fan<sup>1</sup>; Piotr Zarzycki<sup>1</sup>; Michael Whittaker<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

**8:30 AM**

**Triple Junction Interstitial Solute Segregation in Nanocrystalline Alloys:** Nutth Tuchinda<sup>1</sup>; Malik Wagih<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Northwestern University & Massachusetts Institute of Technology

**8:50 AM Invited**

**Do We Need Non-Steady-State Interfacial Kinetic Models?:** Shen Dillon<sup>1</sup>; <sup>1</sup>University of California, Irvine

**9:20 AM**

**Dependence of 9R Interfacial Phase Formation on Boundary Inclination at Medium Angle Grain Boundaries (MAGBs) in Au:** Alejandro Hinojos<sup>1</sup>; Darcey Britton<sup>2</sup>; David Adams<sup>1</sup>; Daniel Vizoso<sup>1</sup>; Remi Dingreville<sup>1</sup>; Douglas Medlin<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Brigham Young University

**9:40 AM Break**

**10:00 AM Invited**

**Metastable Defect Phase Diagrams as a Roadmap for Defect and Materials Design:** Joerg Neugebauer<sup>1</sup>; Ali Tehranchi<sup>2</sup>; Prince Matthews<sup>2</sup>; Tilmann Hickel<sup>2</sup>; <sup>1</sup>MPI for Sustainable Materials; <sup>2</sup>MPI for Sustainable Materials

**10:30 AM**

**Stabilization of Polycrystalline Alloys by Solute Segregation:** Omar Hussein<sup>1</sup>; Yuri Mishin<sup>1</sup>; <sup>1</sup>George Mason University

**10:50 AM**

**Mesoscale Mechanics of Grain Boundary Disconnections and Shear Coupling:** Brandon Runnels<sup>1</sup>; Yang Hu<sup>2</sup>; Dennis Kochmann<sup>2</sup>; Abhijith Thoopul Anantharanga<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>ETH Zurich

## MATERIALS SYNTHESIS AND PROCESSING

### Composite Materials: Sustainable and Eco-Friendly Material Development and Applications — Sustainable and Eco-Friendly Materials: Advanced Manufacturing and Recycled Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Yahya Al-Majali, Ohio University; Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)

**Tuesday AM | March 25, 2025**  
**116 | MGM Grand**

**Session Chair:** Simona Hunyadi Murph, Savannah River National Laboratory

**8:00 AM**

**Biologically Derived and Recycled Feedstocks: Key Components of the Circular Economy for Composites:** Matthew Korey<sup>1</sup>; Amber Hubbard<sup>1</sup>; Soydan Ozcan<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**8:20 AM**

**Characterization of Natural Fibers and Steel Waste for Preparation of Polymer-Based Composite Materials:** Mery Gomez Marroquin<sup>1</sup>; Kenny Salazar-Yantas<sup>1</sup>; Jhonathan Ocares-Hermosa<sup>1</sup>; Victor Malaspina-Rojas<sup>1</sup>; Percy Mantilla-Matta<sup>1</sup>; Fernando Huamán-Pérez<sup>1</sup>; <sup>1</sup>Universidad Nacional de Ingeniería

**8:40 AM**

**Microscale Damage Mechanism Characterization in Coal Polymer Composites:** Cheosung O'Brien<sup>1</sup>; Essa AlAmiri<sup>1</sup>; Scott Downard<sup>1</sup>; Brian Wisner<sup>1</sup>; <sup>1</sup>Ohio University

**9:00 AM**

**Nanoparticle Dispersion and Effective Interface in Lightweight Metal Composites: A Detailed Study:** Qianqian Li<sup>1</sup>; Zhuocheng Xu<sup>1</sup>; Milo Shaffer<sup>1</sup>; <sup>1</sup>Imperial College London

**9:20 AM Break**

**9:40 AM**

**Durability of Glass Rubber Concrete Containing Magnesium Sulphate Environment:** Olasehinde Stephen<sup>1</sup>; <sup>1</sup>Ahmadu Bello University

**10:00 AM**

**Enhancing Sustainable Composite Materials Through Thermal Analysis:** Karim Elhatab<sup>1</sup>; <sup>1</sup>TA Instruments

**10:20 AM**

**Development of Nitrogen-Induced Self-Forming Aluminum Matrix Composites for Reduced Carbon Footprint:** Konbae Lee<sup>1</sup>; Kanhu Nayak<sup>1</sup>; Juyeon Han<sup>1</sup>; Seoyeon Jeon<sup>1</sup>; Jiwon Lee<sup>1</sup>; Hyokyung Sung<sup>1</sup>; Hyunjo Choi<sup>1</sup>; <sup>1</sup>Kookmin University

TUESDAY AM

## Computational Thermodynamics and Kinetics — Short-Range Order in Random Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Tuesday AM | March 25, 2025**  
**305 | MGM Grand**

**Session Chairs:** Rodrigo Freitas, Massachusetts Institute of Technology; Jonathan McGill, Arizona State University

### 8:00 AM Invited

**First-Principles Study of the Order-Disorder Transition in the AlCrTiV High Entropy Alloy:** *Michael Widom*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 8:30 AM Invited

**Solution Thermodynamics Guided Tuning of Local Chemical Ordering in High Entropy Alloys to Achieve High Strength and Ductility:** *Sriswaroop Dasari*<sup>1</sup>; *Abhishek Sharma*<sup>1</sup>; *Chao Jiang*<sup>2</sup>; *Bharat Gwalani*<sup>1</sup>; *Stephane Gorsse*<sup>3</sup>; *An-Chou Yeh*<sup>4</sup>; *Srinivasan Srivilliputhur*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of Bordeaux; <sup>4</sup>National Tsing Hua University

### 9:00 AM

**Capturing Short-Range Order in High-Entropy Alloys With Machine-Learning Potentials:** *Yifan Cao*<sup>1</sup>; *Killian Sherif*<sup>1</sup>; *Rodrigo Freitas*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

### 9:20 AM

**Mechanism of Ferroelastic Domain Nucleation: A Phase-Field Study:** *Avisor Bhattacharya*<sup>1</sup>; *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

### 9:40 AM Break

### 10:00 AM

**Molecular Dynamics Investigation of Short-Range Chemical Ordering in the MoTaW Refractory Complex Concentrated Alloy Compositional Space Using Machine Learning Potential:** *Jonathan McGill*<sup>1</sup>; *Yi Yao*<sup>1</sup>; *Lin Li*<sup>1</sup>; <sup>1</sup>Arizona State University

### 10:20 AM Invited

**Unraveling the Combined Impact of Stress and Hydrogen on Stress Corrosion Cracking of Fe-Based Alloys: A Synergistic Experimental and Computational Study:** *Arun Devaraj*<sup>1</sup>; *Semanti Mukhopadhyay*<sup>1</sup>; *Venkata Vukku*<sup>1</sup>; *Zehao Li*<sup>1</sup>; *Tingkun Liu*<sup>1</sup>; *Dallin Barton*<sup>1</sup>; *Sten Lambeets*<sup>1</sup>; *Maria Sushko*<sup>1</sup>; *Prashant Singh*<sup>2</sup>; *Matthew Olszta*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>AMES National Laboratory

### 10:50 AM

**Stress-Driven Void Emission From Edge Dislocation Jogs in FCC Metals:** *Yifan Wang*<sup>1</sup>; *Wu-Rong Jian*<sup>1</sup>; *Wei Cai*<sup>1</sup>; <sup>1</sup>Stanford University

### 11:10 AM

**Ab Initio Study of the Structure and Stability of Al10V:** *Hassan Albuhairan*<sup>1</sup>; *Michael Widom*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

## Drying, Roasting, Calcining and Agglomeration of Feedstocks — Iron Ore Agglomeration and Related Processes / Non Ferrous and Other Topics

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee

**Program Organizers:** Stuart Nicol, Glencore Technology; Dean Gregurek, RHI Magnesita; Jesse White, Kanthal AB; Allie Anderson, RHI Magnesita; Elmira Moosavi, Ecole De Technologie Supérieure; Kristian Mackowiak, Kingston Process Metallurgy Inc.

**Tuesday AM | March 25, 2025**  
**104 | MGM Grand**

**Session Chairs:** Stuart Nicol, Glencore Technology; Kristian Mackowiak, Kingston Process Metallurgy Inc.

### 8:00 AM Introductory Comments

### 8:05 AM

**Investigation of Factors Affecting Iron Oxide Pellet Properties During Production:** *Grant Kenny*<sup>1</sup>; *Petrus Pistorius*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 8:25 AM

**Optimization of Process Technology for Preparing Bayan Obo Pellets by Grate Rotary Kiln:** *Yifan Chai*<sup>1</sup>; *Shuai Ma*<sup>1</sup>; *Long Su*<sup>2</sup>; *Xiaoguang Bai*<sup>2</sup>; *Guoping Luo*<sup>1</sup>; *Shengli An*<sup>1</sup>; *Peijun Liu*<sup>1</sup>; *Suqian Gu*<sup>1</sup>; <sup>1</sup>Inner Mongolia University of Science and Technology; <sup>2</sup>Inner Mongolia Baogang United Steel Co., Ltd.

### 8:45 AM

**Application Technology of High-Performance Composite Bentonite in Low Silicon Pellets:** *Ming Li*<sup>1</sup>; <sup>1</sup>Shougang Jingtang United Iron & Steel Co

### 9:05 AM

**Optimizing the Use of Stainless Steel Pickling Sludge in Iron Ore Sintering:** *Wenwen Liu*<sup>1</sup>; *Jing Chen*<sup>2</sup>; *Mingjun Rao*<sup>2</sup>; *Yuanhong Qi*<sup>3</sup>; *Haokun Li*<sup>4</sup>; <sup>1</sup>Central Iron and Steel Research Institute and Taiyuan Iron and Steel Group Co., Ltd.; <sup>2</sup>Central South University; <sup>3</sup>Central Iron and Steel Research Institute; <sup>4</sup>Taiyuan Iron and Steel Group Co., Ltd.

### 9:25 AM Break

### 10:05 AM

**Selective Chlorination as an Innovative Method for the Extraction of Valuable From Spent Refractories:** *Stefan Steinlechner*<sup>1</sup>; *Kerrin Witt*<sup>1</sup>; *Thomas Howard*<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben

### 9:45 AM

**New Calcining and Roasting Applications Using Oxygen and OxyFuel Combustion:** *Eric Eccleston*<sup>1</sup>; <sup>1</sup>Technip Energies

### 10:25 AM

**Lime Roasting Process for Copper Production From Chalcocite Without Polluting With SO<sub>2</sub>:** *Rafael Padilla*<sup>1</sup>; *Pablo Hernandez*<sup>1</sup>; *Oscar Jerez*<sup>1</sup>; <sup>1</sup>University of Concepcion



## LIGHT METALS

### Electrode Technology for Aluminum Production Supplier Forum — Electrode Technology for Aluminum Production Supplier Forum

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Egil Skybakmoen, SINTEF Industry; Les Edwards, Rain Carbon Inc.

**Tuesday AM | March 25, 2025**  
**112 | MGM Grand**

**Session Chair:** Samuel Senanu, SINTEF

#### 8:00 AM Introductory Comments

**8:05 AM**

**Advancing Prebaked Anode Technology: Innovations, Sustainability, and Operational Excellence:** Maxime Beraud<sup>1</sup>; Alexandre Roques<sup>1</sup>; <sup>1</sup>Fives

**8:30 AM**

**Design Considerations for Anode Bake Furnace Refractories:** Edwin Aalbers<sup>1</sup>; <sup>1</sup>Gouda Refractories BV

**8:55 AM**

**The Pleats Bag in GTC'S Application and Development:** Yan Zhou<sup>1</sup>; Qianshuang Zhuang<sup>1</sup>; <sup>1</sup>Alubase Industry Co.,Ltd

**9:20 AM**

**Practical Use of Simulation in the Design and Debottlenecking of Rodshop Plant Operations:** Paul Merlin<sup>1</sup>; <sup>1</sup>REEL Aluminium Inc.

**9:45 AM Break**

**10:00 AM**

**Wettable Titanium Diboride Cathode Tile Technology by VSCA:** David Jarvis<sup>1</sup>; Rosanna van den Blik-Jarvis<sup>1</sup>; Rosie Mellor<sup>1</sup>; Alf Bjørseth<sup>1</sup>; <sup>1</sup>VSCA

**10:25 AM**

**Integrated Cathode Assembly and Energy-Saving Technology:** Yan Zhou<sup>1</sup>; Haifei Xu<sup>1</sup>; Xiangde Shen<sup>1</sup>; <sup>1</sup>Alubase Industry Co.,Ltd

**10:50 AM**

**The Intelligent Measuring Ramp - A New Approach to Anode Firing in Demanding Process Conditions:** Frank Appel<sup>1</sup>; <sup>1</sup>Innovatherm

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Sintering and Bonding Techniques

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**Tuesday AM | March 25, 2025**  
**360 | MGM Grand**

**Session Chairs:** Hiroshi Nishikawa, Osaka University; Fan-Yi Ouyang, National Tsing Hua University

**8:00 AM**

**Ag-Nodule Mediated Bonding With Ag-Si Metastable Phase:** Koji Nakayama<sup>1</sup>; Yicheng Zhang<sup>1</sup>; Masahiko Nishijima<sup>1</sup>; Koji Inoue<sup>2</sup>; Chuantong Chen<sup>1</sup>; Minoru Ueshima<sup>3</sup>; Katsuaki Suganuma<sup>1</sup>; <sup>1</sup>Osaka University; <sup>2</sup>Tohoku University; <sup>3</sup>Daicel Corporation

**8:20 AM**

**Electroless Plated Highly (111) Nanotwinned Cu-to-Cu Direct Bonding:** I-En Chen<sup>1</sup>; P. S. Shih<sup>1</sup>; Yung-Sheng Lin<sup>2</sup>; Yun-Ching Hung<sup>2</sup>; Chun-Wei Chiang<sup>2</sup>; C. R. Kao<sup>1</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Product Characterization, Corporate R&D, Advanced Semiconductor Engineering (ASE) Group

**8:40 AM**

**Investigation of SiCN-SiCN Bonding With Different Wet Pretreatment Solutions for Cu Hybrid Bonding Applications:** Chien-Yu Liu<sup>1</sup>; Pin-Syuan He<sup>1</sup>; Rou-Jun Lee<sup>1</sup>; Yi-Chen Chung<sup>1</sup>; Yun-Hsuan Chen<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**9:00 AM**

**Investigation of Electroless Ag-Passivated Cu-to-Cu Direct Bonding and Micro Cu Pillar Bonding:** Ming-Hsuan Hsieh<sup>1</sup>; Yung-Sheng Lin<sup>2</sup>; Yun-Ching Hung<sup>2</sup>; Chun-Wei Chiang<sup>2</sup>; C. Robert Kao<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Product Characterization, Corporate R&D, Advanced Semiconductor Engineering (ASE) Group; <sup>3</sup>National Taiwan University

**9:20 AM**

**Low Vacuum Bonding Using Nano-Twinned Silver and SiO<sub>2</sub> for Heterogeneous Integration:** Tang Yu<sup>1</sup>; Chunchieh Huang<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**9:40 AM Break**

**10:00 AM**

**Thermal-Structural Coupling Analysis of Cu-Cu Hybrid Bonding in 3D Stacked Die Configurations:** Yong Jie Wong<sup>1</sup>; Mohd Sharizal Abdul Aziz<sup>1</sup>; C.Y. Khor<sup>2</sup>; Zheng Lin Goh<sup>1</sup>; <sup>1</sup>Universiti Sains Malaysia; <sup>2</sup>Universiti Malaysia Perlis

**10:20 AM**

**Microstructural Evolution and Shear Strength of Nano-Ag Paste Joints With Variable Sintering Temperatures and Particle Sizes:** Changcheng Zheng<sup>1</sup>; Roman Bolzowski<sup>2</sup>; Ming Liu<sup>3</sup>; Dekui Mu<sup>1</sup>; David Yan<sup>2</sup>; <sup>1</sup>Huaqiao University; <sup>2</sup>San Jose State University; <sup>3</sup>General Motors China Science Lab

**10:40 AM**

**Plasma-Free Surface Modification in Fine-Pitch Cu/SiO<sub>2</sub> Hybrid Bonding:** Pin-Lin Chen<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

TUESDAY AM

11:00 AM

**Low Temperature Cu-Cu Direct Bonding in Air ambient by Ultrafast Surface Grain Growth:** *Yun-Fong Lee*<sup>1</sup>; <sup>1</sup>National Central University

## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Radiation Effects on Fuels, Ceramics, and Moderator Systems

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**Tuesday AM | March 25, 2025**  
**162 | MGM Grand**

**Session Chair:** Assel Aitkaliyeva, University of Florida

8:00 AM Invited

**Evolution of Interstitial-Type Defects in Thorium Dioxide:** Yongfeng Zhang<sup>1</sup>; Lin-Chieh Yu<sup>2</sup>; Miaomiao Jin<sup>2</sup>; Kaustubh Bawane<sup>3</sup>; Boopathy Kombaiah<sup>4</sup>; Anshul Kamboj<sup>4</sup>; Chao Jiang<sup>4</sup>; *Marat Khafizov*<sup>5</sup>; David Hurley<sup>4</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>Penn State University; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Idaho National Laboratory; <sup>5</sup>Ohio State University

8:30 AM

**In-Situ TEM Study of Microstructural Evolution in Proton Irradiated Single Crystal UO<sub>2</sub> Under High-Temperature Annealing:** *Kaustubh Bawane*<sup>1</sup>; Anshul Kamboj<sup>1</sup>; Miaomiao Jin<sup>2</sup>; Md Minaruzzaman<sup>3</sup>; Mutaz Alshannaq<sup>3</sup>; Karl Rickert<sup>4</sup>; J. Matthew Mann<sup>5</sup>; Fei Teng<sup>1</sup>; Mason Childs<sup>1</sup>; Lin Shao<sup>6</sup>; David Hurley<sup>1</sup>; Yongfeng Zhang<sup>7</sup>; *Marat Khafizov*<sup>3</sup>; Boopathy Kombaiah<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Pennsylvania State University; <sup>3</sup>The Ohio State University; <sup>4</sup>KBR Inc.; <sup>5</sup>Air Force Research Laboratory; <sup>6</sup>Texas A&M University; <sup>7</sup>University of Wisconsin-Madison

8:50 AM

**Machine Learning Potential Development for Advanced Oxide Fuels:** *Audrey Miles*<sup>1</sup>; Bartomeu Monserrat<sup>2</sup>; Sarah Finkeldei<sup>3</sup>; <sup>1</sup>University of California, Irvine; University of Cambridge; <sup>2</sup>University of Cambridge; <sup>3</sup>University of California, Irvine

9:10 AM

**Examining Fission Gas Diffusion at Grain Boundaries in Advanced Nuclear Fuels:** *Sarah Finkeldei*<sup>1</sup>; John Proctor<sup>1</sup>; Oran Lori<sup>1</sup>; Shen Dillon<sup>1</sup>; Joshua White<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Michael Cooper<sup>2</sup>; David Andersson<sup>2</sup>; <sup>1</sup>University of California-Irvine; <sup>2</sup>Los Alamos National Laboratory

9:30 AM Break

9:45 AM

**Investigation of the Mechanisms Behind Irradiation-Induced Grain Subdivision:** Bao-Phong Nguyen<sup>1</sup>; Assel Aitkaliyeva<sup>1</sup>; *Sadie Wicks*<sup>1</sup>; <sup>1</sup>University of Florida

10:05 AM Invited

**Irradiation-Induced Microstructure Evolution in Graphite:** *Anne Campbell*<sup>1</sup>; José Arregui Mena<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

10:35 AM

**Impact of Alpha-Damage and Helium Production on Heat Capacity of Advanced Oxide Fuels:** *Thierry Wiss*<sup>1</sup>; <sup>1</sup>European Commission, Joint Research Centre

10:55 AM

**Embrittlement and Hardening of Beryllium Under Irradiation at Low Temperatures:** *Viacheslav Kuksenko*<sup>1</sup>; <sup>1</sup>UK Atomic Energy Authority

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 Management — Energy Efficiency, Combustion, Renewable Energy

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Onuralp Yucel, Istanbul Technical University; Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Finland Oy; Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Alafara Baba, University of Ilorin; Tuan Nguyen, University of Queensland; Adam Powell, Worcester Polytechnic Institute; Thomas Battle; Duhan Zhang, Massachusetts Institute of Technology

**Tuesday AM | March 25, 2025**  
**364 | MGM Grand**

**Session Chairs:** Hong Peng, University of Queensland; Tuan Nguyen, University of Queensland

8:00 AM Introductory Comments

8:10 AM

**Infrared Thermal Loading on Walls and Structures:** *Joshua Jordan*<sup>1</sup>; Taylor Sparks<sup>1</sup>; Howard Atkin<sup>2</sup>; Rob Atkin<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Pirta LLC

8:30 AM

**Refractories for Hydrogen Use in Metal Production: A Review:** *Erik Koren*<sup>1</sup>; Samuel Senanu<sup>1</sup>; <sup>1</sup>SINTEF Industry

8:50 AM

**SmartBurner: Enhancing Gas Burner Performance Through Advanced Monitoring:** *Amin Rostamian*<sup>1</sup>; Marc Bertherat<sup>2</sup>; <sup>1</sup>Novamet Sarl; <sup>2</sup>Constellium

9:10 AM

**Solar Convective Furnace: System Dynamics and Operations Strategy:** Vishwa Deepak Kumar<sup>1</sup>; Laltu Chandra<sup>2</sup>; *Rajiv Shekhar*<sup>2</sup>; <sup>1</sup>Indian Institute of Technology, Jodhpur; <sup>2</sup>IIT Kanpur

9:30 AM Break

9:50 AM

**Plasma-Enhanced Low-Temperature Dry Reforming of Methane:** *Ruigang Wang*<sup>1</sup>; MD Monir Hossain<sup>1</sup>; <sup>1</sup>Michigan State University

10:10 AM

**Effect of Open Metal Sites on Methane Adsorption in Metal-Organic Framework HKUST-1:** *Hyo-Sun Jang*<sup>1</sup>; Byung-Hyun Kim<sup>2</sup>; Hee Jung Lee<sup>1</sup>; Jae-Hyung Cho<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science (Kims); <sup>2</sup>Hanyang University ERICA

## Environmental Degradation of Additively Manufactured Materials — Corrosion and Environmentally Assisted Cracking in Additively Manufactured Components

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Kinga Unocic, North Carolina State University; Sebastien Dryepondt, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Purdue University; Emma White, DECHEMA Forschungsinstitut; Benjamin Adam, Oregon State University; Mark Stoudt, National Institute of Standards and Technology; Xiaolei Guo, Colorado School of Mines

**Tuesday AM | March 25, 2025**  
**169 | MGM Grand**

**Session Chairs:** Emma White, DECHEMA Forschungsinstitut; Xiaoyuan Lou, Purdue University

**8:00 AM Invited**

**Microstructural and Compositional Distribution Effects on LPBF CuNi Corrosion:** *Robert Kelly*<sup>1</sup>; Timothy Montoya<sup>2</sup>; Finley Pettitt<sup>1</sup>; <sup>1</sup>University of Virginia

**8:30 AM**

**Understanding the Influence Processing on LPBF Cu-30Ni Corrosion in Flowing Chloride Environments:** *Timothy Montoya*<sup>1</sup>; Finley Pettitt<sup>1</sup>; Robert Kelly<sup>1</sup>; <sup>1</sup>University of Virginia

**8:50 AM**

**Evaluation of Environmentally Assisted Cracking on Wire Arc Additively Manufactured (WAAM) AISI 316LSi:** *Vishnu Ramasamy*<sup>1</sup>; Brett Ley<sup>1</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University

**9:10 AM**

**Corrosion Fatigue Response of Laser Powder Bed Fused High Strength Steel:** *Abhi Sharda*<sup>1</sup>; Sheng Huang<sup>1</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:30 AM Break**

**9:50 AM**

**Microstructure and Corrosion Behavior of a Friction Stir Additively Manufactured Al-Cr-Mn-Co-Zr I-Phase Alloy:** *Sarshad Rommel*<sup>1</sup>; Mingxuan Li<sup>1</sup>; Richard Eberheim<sup>2</sup>; Callie Benson<sup>3</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Solvus Global; <sup>3</sup>Collins Aerospace

**10:10 AM**

**Oxidation of Al/Si-Coated Additive Manufactured 699XA Alloy:** *Antoine Duval*<sup>1</sup>; G. Bonnet<sup>1</sup>; Fernando Pedraza<sup>1</sup>; <sup>1</sup>La Rochelle Université. LaSIE UMR 7356- CNRS

**10:30 AM**

**Understanding the Interplay Between Dislocation Slip, Hydrogen Clustering, GB Cavitation and Cracking in Hydrogen Embrittlement Through Atomistic-to-Mesoscale Simulations:** *Liming Xiong*<sup>1</sup>; Thanh Phan<sup>1</sup>; Yipeng Peng<sup>1</sup>; <sup>1</sup>North Carolina State University/Iowa State University

## Environmentally Assisted Cracking: Theory and Practice — Innovative Techniques in Corrosion Research

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Jenifer Locke, Ohio State University

**Tuesday AM | March 25, 2025**  
**167 | MGM Grand**

**Session Chairs:** Gary Was, University of Michigan; John Scully, University of Virginia

**8:00 AM Invited**

**The Roles of Intrinsic Material Factors and Hydrogen-Metal Interactions in the Increased Hydrogen Environmentally Assisted Cracking Susceptibility of Additively Manufactured 17-4 PH Stainless Steel:** Lauren Singer<sup>1</sup>; Zachary Harris<sup>1</sup>; James Burns<sup>1</sup>; *John Scully*<sup>1</sup>; <sup>1</sup>University of Virginia

**8:30 AM Invited**

**Mechanisms and Design Strategies for Tribocorrosion Resistance in Aluminum Alloys:** *Wenjun Cai*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**9:00 AM Invited**

**Mapping and Mitigating of Oxidation Mechanism Transitions in Tungsten Driven by Scale Cracking:** *Samuel Humphry-Baker*<sup>1</sup>; James Davidson<sup>1</sup>; <sup>1</sup>Imperial College London

**9:30 AM Break**

**9:50 AM Invited**

**How Irradiation Induces Intergranular Stress Corrosion Cracking in Stainless Steels:** *Gary Was*<sup>1</sup>; <sup>1</sup>University of Michigan

**10:20 AM Invited**

**Experimental Methods for the Performance Test of EAC and Case Studies Through NSUF:** *Rongjie Song*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**10:50 AM Invited**

**High-Throughput Testing of Alloy Compositions in Radiation-Corrosion Environments:** *Franziska Schmidt*<sup>1</sup>; Ben Derby<sup>1</sup>; Nan Li<sup>1</sup>; Hyosim Kim<sup>1</sup>; Peter Hosemann<sup>2</sup>; Blas Uberuaga<sup>1</sup>; Yongqiang Wang<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of California Berkeley

## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Predictive Methods for Fatigue Properties

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

**Tuesday AM | March 25, 2025**  
**318 | MGM Grand**

**Session Chair:** Krzysztof Stopka, Purdue University

**8:00 AM Invited**

**A Direct Physical Approach to Characterize Fatigue Crack Growth Under Large Scale Plasticity in Stress- and Strain-Controlled Fatigue:** *K. S. Ravi Chandran*<sup>1</sup>; <sup>1</sup>The University of Utah

**8:20 AM**

**A Fatigue Calculation Workflow Considering Effects of Microstructure and Defects:** *Junyan He*<sup>1</sup>; Anupam Neogi<sup>1</sup>; Deepankar Pal<sup>1</sup>; Ali Najafi<sup>1</sup>; Grama Bhashyam<sup>1</sup>; <sup>1</sup>Ansys Inc.

**8:40 AM**

**Crystal Plasticity Modeling of In-Phase/Out-of-Phase Thermo-Mechanical Loading in a High Temperature Shape Memory Alloy:** *Adrien Cassagne*<sup>1</sup>; Dimitris Lagoudas<sup>1</sup>; Jean Briac Le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:00 AM**

**Investigating Fatigue Crack Nucleation in Ti Alloys Containing Micro-Texture Regions (MTR) Using Parametrically Upscaled Constitutive and Crack Nucleation Models:** *Kishore Appunhi Nair*<sup>1</sup>; Somnath Ghosh<sup>1</sup>; *Tawqeer Nasir Tak*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**9:20 AM Break**

**9:30 AM**

**Microstructure-Sensitive Fatigue Modeling for Additively Manufactured Ti, Al, and Ni Alloys:** *Gary Whelan*<sup>1</sup>; *Hariharan Sriram*<sup>1</sup>; <sup>1</sup>Questek Innovations LLC

**9:50 AM Invited**

**Predicting TMF Life of Single-Crystal Ni-Base Superalloys Using a Probabilistic Physics-Guided Neural Network:** *Richard Neu*<sup>1</sup>; Rohan Acharya<sup>1</sup>; Alexander Caputo<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**10:10 AM**

**Studying Dislocation - Prior Particle Boundary Interactions in Ni-Based Superalloy From Polycrystalline Discrete Dislocation Dynamics:** *Divyesh Kumar Mistry*<sup>1</sup>; Tawqeer Tak<sup>2</sup>; Amuthan Ramabathiran<sup>1</sup>; P. J. Guruprasad<sup>1</sup>; <sup>1</sup>Indian Institute of Technology-Bombay; <sup>2</sup>CISMMS- Johns Hopkins University

**10:30 AM**

**Synergistic Effects of Volumetric Defect and Microstructure on Fatigue Crack Initiation in Additively Manufactured Inconel 718: Insights From Crystal Plasticity Simulations:** *Indrajit Nandi*<sup>1</sup>; Sajith Soman<sup>1</sup>; Nima Shamsaei<sup>1</sup>; Shuai Shao<sup>1</sup>; <sup>1</sup>Auburn University

## ADVANCED CHARACTERIZATION METHODS

### Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties — Deformation Mechanisms

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoung Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

**Tuesday AM | March 25, 2025**  
**155 | MGM Grand**

**Session Chairs:** Jian Wang, University of Nebraska-Lincoln; Caizhi Zhou, University of South Carolina; Andrea Bachmaier, Austrian Academy of Sciences, Erich-Schmid Institute of Materials Science

**8:00 AM Invited**

**Plastic Deformation Mechanisms of Rapidly Solidified Al-Si Eutectic:** *Jian Wang*<sup>1</sup>; Wenqian Wu<sup>1</sup>; Arkajit Ghosh<sup>2</sup>; Amit Misra<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>University of Michigan

**8:25 AM**

**An Investigation on Synergistic Strengthening Produced by Skin Pass Rolling of Commercially Pure Titanium:** *Ruben Ochoa*<sup>1</sup>; Adam Freund<sup>1</sup>; Josh Edwards<sup>1</sup>; Nicholas Derimow<sup>2</sup>; Nicholas Krienke<sup>1</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>National Institute of Standards and Technology

**8:45 AM Invited**

**Strain-Dependent Microstructure and Magnetic Properties of Ferro- and Antiferromagnetic Composites by Severe Plastic Deformation:** *Michael Zawodski*<sup>1</sup>; Lukas Weissitsch<sup>1</sup>; *Andrea Bachmaier*<sup>1</sup>; <sup>1</sup>Erich-Schmid Institute of Materials Science, Austrian Academy of Sciences

**9:10 AM**

**Effects of Aging on the Deformation Behavior and Mechanical Properties of Heavily Cold-Rolled Duplex Stainless Steel:** *Chihiro Watanabe*<sup>1</sup>; Norimitsu Koga<sup>1</sup>; Tomotsugu Shimokawa<sup>1</sup>; Masakazu Kobayashi<sup>2</sup>; Hiromi Miura<sup>2</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>Toyohashi University of Technology

**9:30 AM**

**Harnessing Plastic Instability for Work Hardening in a Heterostructured Multi-Principal Element Alloy:** *Xiaolei Wu*<sup>1</sup>; <sup>1</sup>Institute of Mechanics, Chinese Academy of Sciences

**9:50 AM Break**

**10:10 AM Invited**

**Probing the Evolution of Dislocation Structures in Heterogeneous Lamellar Metals via Discrete Dislocation Dynamics Simulations:** *Caizhi Zhou*<sup>1</sup>; <sup>1</sup>University of South Carolina

**10:35 AM Invited**

**Fatigue Behavior of Core-Shell Heterogeneous Grain Structured CoCrFeMnNi High-Entropy Alloy:** *Zhe Zhang*<sup>1</sup>; Xu Chen<sup>1</sup>; Kei Ameyama<sup>2</sup>; <sup>1</sup>Tianjin University; <sup>2</sup>Ritsumeikan University

**11:00 AM**

**Deformation Behavior and Dislocation Patterning in TC4/Ti Heterogeneous Structures Prepared by Spark Plasma Sintering:** *Zongchang Guo*<sup>1</sup>; <sup>1</sup>Tsinghua University



## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Steel Design I

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

**Tuesday AM | March 25, 2025**  
**302 | MGM Grand**

**Session Chairs:** Pello Uranga, University of Navarra; Jonah Klemm-Toole, Colorado School of Mines

#### 8:00 AM Invited

**Impact of Copper Additions on Phase Transformations and Mechanical Properties of High-Strength Steels Alloyed With Nickel and Molybdenum:** Xabier Azpeitia<sup>1</sup>; Unai Mayo<sup>1</sup>; Nerea Isasti<sup>2</sup>; Pello Uranga<sup>1</sup>; <sup>1</sup>CEIT and TECNUN (University of Navarra)

#### 8:30 AM

**High Temperature Nitriding Behavior of Low Carbon Low Alloy Steel:** Ryota Takao<sup>1</sup>; Goro Miyamoto<sup>2</sup>; Tadashi Furuhashi<sup>2</sup>; <sup>1</sup>Aichi Steel Corporation; <sup>2</sup>Tohoku University

#### 8:50 AM

**Genetic Design of Cu Nanoprecipitation Hardened Maraging Steels for Additive Manufacturing:** Pedro Rivera-Diaz-Del-Castillo<sup>1</sup>; Xinjiang Hao<sup>2</sup>; Hossein Eskandari Sabzi<sup>2</sup>; <sup>1</sup>University of Southampton; <sup>2</sup>Globus Metal Powders

#### 9:10 AM Break

#### 9:30 AM Invited

**A Model Case for Liquid-Metal Embrittlement: Early Grain-Boundary Structure Evolution in a Binary Iron-Zinc System:** Yuki Ikeda<sup>1</sup>; Reza Darvishi Kamachali<sup>1</sup>; Robert Maass<sup>1</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM)

#### 10:00 AM

**Powder Metallurgy Processing of a Highly Wear Resistant Nanostructured Bainitic Steel:** Rangasayee Kannan<sup>1</sup>; Yiyu Wang<sup>1</sup>; Tomas Grejtak<sup>1</sup>; Bryan Lim<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution — Modeling Grain Dynamics and Thermodynamic Behavior in Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Yunzhi Wang, Ohio State University; Wei Xiong, University of Pittsburgh; Jiamian Hu, University of Wisconsin Madison; Chuan Zhang, CompuTherm LLC

**Tuesday AM | March 25, 2025**  
**357 | MGM Grand**

**Session Chairs:** Yu Wang, Michigan Technological University; Ye Cao, University of Texas at Arlington

#### 8:00 AM Invited

**When Grains go Wild! Tracking the Emergence and Persistence of Abnormal Grain Growth in the Commercial Aluminum Alloy 5252:** André Schulz-Harder<sup>1</sup>; Wolfgang Ludwig<sup>2</sup>; Jules Dake<sup>1</sup>; Haixing Fang<sup>2</sup>; Pierre-Olivier Autran<sup>2</sup>; Karolina Gutbrod<sup>1</sup>; Markus Ziehmer<sup>1</sup>; Carl Krill<sup>1</sup>; <sup>1</sup>Ulm University; <sup>2</sup>European Synchrotron Radiation Facility

#### 8:25 AM Invited

**Understanding the Impact of Applied Magnetic Fields on the Thermodynamic and Kinetic Behavior of Heat-Treated Steels:** Michael Tonks<sup>1</sup>; Soumya Bandyopadhyay<sup>1</sup>; Ming Li<sup>1</sup>; Luke Wirth<sup>2</sup>; Ravi Bollineni<sup>3</sup>; Richard Hennig<sup>1</sup>; Dallas Trinkle<sup>2</sup>; Shima Shahab<sup>3</sup>; Charlie Li<sup>4</sup>; <sup>1</sup>University of Florida; <sup>2</sup>UIUC; <sup>3</sup>Virginia Tech; <sup>4</sup>DANTE Solutions

#### 8:50 AM Invited

**Evolving Information Complexity of Coarsening Materials Microstructures:** Jeffrey Rickman<sup>1</sup>; <sup>1</sup>Lehigh University

#### 9:15 AM Invited

**Understanding Mechanical Tunability in Ba<sub>1-x</sub>Sr<sub>x</sub>TiO<sub>3</sub> Membrane by Phase-Field Simulation:** Laveeza Ahmad<sup>1</sup>; Yi-De Liou<sup>1</sup>; Kena Zhang<sup>1</sup>; Ye Cao<sup>1</sup>; <sup>1</sup>University of Texas at Arlington

**9:40 AM Commentary from Experimental Perspective:** High throughput and autonomous lab experiment for AI driven materials discovery Speaker: Chengyi Wu, MTI Corporation

#### 9:50 AM Break

#### 10:10 AM Invited

**Microscopic Modeling of Pre-Martensitic Phenomena: Complementary Perspectives From Bottom-Up and Top-Down Approaches:** Yu Wang<sup>1</sup>; Yongmei Jin<sup>1</sup>; <sup>1</sup>Michigan Technological University

#### 10:35 AM Invited

**Predicting Domain Structure and Switching in Ferroelectrics: Physics-Informed Machine Learning and Phase-Field Modeling:** Samrat Choudhury<sup>1</sup>; Benjamin Rhoads<sup>1</sup>; Abigail Hogue<sup>1</sup>; Joseph Hafen<sup>1</sup>; <sup>1</sup>University of Mississippi

#### 11:00 AM Invited

**Hydride Formation in Superconducting Q-Bits:** Tyler Leibengood<sup>1</sup>; Pierre-Clement A. Simon<sup>2</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Idaho National Laboratory

#### 11:25 AM Invited

**Critical Role of Internal Stresses in the Nucleation of Nanoscale Undercooled Melts at Solid-Solid Phase Interfaces:** Kasra Momeni<sup>1</sup>; <sup>1</sup>University of Alabama

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments — Batteries and Catalysis

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Energy Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Composite Materials Committee

**Program Organizers:** Paolo Mele, Shibaura Institute of Technology; Julio Gutierrez Moreno, Barcelona Supercomputing Center; Hussein Assadi, RIKEN (The Institute of Physical and Chemical Research); Esmail Doustkhah, Istinye University; Marco Fronzi, The University of Sydney; Donna Guillen, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Tuan Nguyen, University of Queensland

**Tuesday AM | March 25, 2025**  
**358 | MGM Grand**

**Session Chairs:** Yoshiaki Nakamura, Osaka University; Anming Hu, University of Tennessee

#### 8:00 AM Invited

**Nanoscale Design of 3D Anode and High Effective Catalysis for High Performance Aluminum-Air Batteries:** *Anming Hu*<sup>1</sup>; <sup>1</sup>University of Tennessee

#### 8:25 AM

**Quantum-Assisted Machine Learning Analysis of Silicon-Based Anodes for Lithium Batteries: Thermodynamics, Structural Insights, and Lithium Diffusion. Identifying Challenges and Exploring Novel Candidates:** *Marco Fronzi*<sup>1</sup>; Catherine Stampfl<sup>1</sup>; Amanda Ellis<sup>2</sup>; Eirini Goudeli<sup>2</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>The University of Melbourne

#### 8:45 AM

**Exploring Ultra-Stable Green Rust Compositions for Green Energy Catalysis:** *Mohammad Al Assadi*<sup>1</sup>; <sup>1</sup>RIKEN

#### 9:05 AM

**Optimization of CO<sub>2</sub> Reduction Reaction Using Nanoporous Copper Catalysts Through Machine Learning-Driven Process Parameter Modeling:** *Yu-Hung Lai*<sup>1</sup>; Jun-Yi Lok<sup>1</sup>; Wen-Han Tsai<sup>1</sup>; I-Chung Cheng<sup>1</sup>; <sup>1</sup>National Taiwan University

#### 9:25 AM Break

#### 9:45 AM

**Ab Initio Models for the Prediction of Corrosion-Passivation Behavior in Aqueous Media:** *Rachel Gorelik*<sup>1</sup>; Arunima Singh<sup>1</sup>; <sup>1</sup>Arizona State University

#### 10:05 AM Invited

**Resonant Ultrasound Spectroscopy for Rapid Down Selection, Elastic Property Determination, and Model Validation in High-Entropy Materials:** *Christopher Mizzi*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

## SPECIAL TOPICS

### Looking Outside Materials Science: Lessons Learned for and from Materials Discovery - A Student-Led Symposium — Looking Outside Materials Science: Lessons Learned for and from Materials Discovery

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Katelyn Jones, NIST; Robert Moore, Lehigh University; Yasir Mahmood, NIST, UMD; Ashley Spear, University of Utah; Natasha Vermaak, Lehigh University

**Tuesday AM | March 25, 2025**  
**170 | MGM Grand**

**Session Chairs:** Katelyn Jones, NIST; Yasir Mahmood, NIST, UMD; Daniel Moore, Lehigh University; Natasha Vermaak, Lehigh University; Ashley Spear, University of Utah

#### 8:00 AM Invited

**Can Synchrotron X-Ray Imaging Tools Developed for Materials Science Help Predict Volcanic Eruptions or Minimise Back Pain?:** *Peter Lee*<sup>1</sup>; <sup>1</sup>University College London

#### 8:30 AM Invited

**Bringing Ultrafast Optics to Metallurgy:** *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University

#### 9:00 AM Invited

**Carbonate Minerals Reveal Fundamental Insights Into Nucleation and Growth:** *Wenhao Sun*<sup>1</sup>; <sup>1</sup>University of Michigan

#### 9:30 AM Break

#### 9:50 AM Invited

**Microstructure Characterization and Design With Help From Video Games, Geostatistics, and Other Interdisciplinary Tools:** *Oliver Johnson*<sup>1</sup>; Christopher Adair<sup>1</sup>; Jose Nino<sup>1</sup>; Sterling Baird<sup>1</sup>; Eric Homer<sup>1</sup>; Gregory Thompson<sup>2</sup>; Troy Munro<sup>3</sup>; Heng Ban<sup>3</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of Alabama; <sup>3</sup>University of Pittsburgh

#### 10:20 AM Invited

**Under Pressure: The Lasting Interdisciplinary Impact of Percy Bridgman on Processing in Extreme Environments:** *Suveen Mathaudhu*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**10:50 AM Speaker Panel:** Yasir Mahmood (Clemson University), Robert Daniel Moore (Lehigh University) and Katelyn Jones (Carnegie Mellon University) will moderate a Question and Answer session with the panel of invited speakers from the symposium "Looking outside materials science: lessons learned for and from materials discovery - A Student-Led Symposium".

This is a first of its kind technical symposium organized by the graduate students. The panel discussion will highlight origin stories, challenges, and advice the speakers have for others pursuing unconventional collaborations and working across disciplines.

## Magnesium Technology 2025 — Biomedical Applications

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Tuesday AM | March 25, 2025**  
**115 | MGM Grand**

**Session Chairs:** Berit Zeller-Plumhoff, Helmholtz-Zentrum Hereon; Petra Maier, University of Applied Sciences Stralsund

### 8:00 AM Keynote

**Magnesium in the Medical Device Industry: A Material Supplier's View:** *Adam Griebel*<sup>1</sup>; <sup>1</sup>Fort Wayne Metals

### 8:40 AM

**Microstructure, Mechanical Properties, Bio-Corrosion Behaviors and Cytotoxicity of Mg-Zn Alloy as Bone Fixation Implant:** *Kun Yu*<sup>1</sup>; <sup>1</sup>Central South University

### 9:00 AM

**Material Extrusion-Based 3D Printing of Mg Scaffolds:** *Joung Sik Suh*<sup>1</sup>; Byeong-Chan Suh<sup>1</sup>; Ha Sik Kim<sup>1</sup>; Sang Eun Lee<sup>1</sup>; Jae Seong Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

### 9:20 AM

**Capabilities of Mg-Zn-Ca-Ce Alloys and Polymer Coated Mg for Biomedical Implants:** *Daria Humeniuc*<sup>1</sup>; Natalie Debiak<sup>1</sup>; Dheeksha Jayasankar<sup>1</sup>; Stephanie Kotiadis<sup>1</sup>; Ashutosh Singh<sup>1</sup>; Abdallah Elsayed<sup>1</sup>; <sup>1</sup>University of Guelph

### 9:40 AM Break

### 10:00 AM

**Investigation the Effect of Silver Addition on the Age Hardening Response of Mg-2.5Zn-0.5Ca-xAg (x=0.5, 1.5 and 2.5%) Alloy for Orthopedic Applications:** *Amarjeet Singh*<sup>1</sup>; <sup>1</sup>Punjab Engineering College

### 10:20 AM

**Investigating the Effect of Silver on the Microstructural, Mechanical and Corrosion Behavior of Mg-Zn-Ca-xAg (x=0.5,1.5 and 2.5%) Alloy for Orthopedic Applications:** *Amarjeet Singh*<sup>1</sup>; <sup>1</sup>Punjab Engineering College

### 10:40 AM

**Influence of Temperature on the Tensile Test Behaviour of Mg-Li-Y Alloy Wires:** *Kenneth MacLeod*<sup>1</sup>; <sup>1</sup>The University of Strathclyde

## Materials and Chemistry for Molten Salt Systems — Influence of Environmental Factors on Molten Salt Corrosion

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Tuesday AM | March 25, 2025**  
**165 | MGM Grand**

**Session Chair:** Kumar Sridharan, University of Wisconsin-Madison

### 8:00 AM

**Dealloying of Post-Irradiated Model Ni20Cr (wt.%) Alloy in Molten FLiNaK Salts:** Ho Lun Chan<sup>1</sup>; Sean Mills<sup>2</sup>; Matthew Chancey<sup>3</sup>; Benjamin Derby<sup>3</sup>; *Harjot Singh*<sup>1</sup>; Elena Romanovskaia<sup>1</sup>; Valentin Romanovski<sup>1</sup>; Nathan Bieberdorf<sup>2</sup>; Yongqiang Wang<sup>3</sup>; Mark Asta<sup>2</sup>; Andrew Minor<sup>2</sup>; Peter Hosemann<sup>2</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>University of California, Berkeley; <sup>3</sup>Los Alamos National Laboratory

### 8:20 AM Invited

**The Evolving Morphology of Porosities in Ni-Cr-Based Alloys Under Molten Salt Corrosion:** *Yang Yang*<sup>1</sup>; Andrew Minor<sup>2</sup>; Michael Short<sup>3</sup>; Weiyue Zhou<sup>3</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of California, Berkeley; <sup>3</sup>Massachusetts Institute of Technology

### 8:45 AM

**Influence of Irradiation on Microstructure and Oxidation Behavior in Fe-8Cr Film:** *Jijo Christudasjustus*<sup>1</sup>; Kayla Yano<sup>1</sup>; Tanvi Ajantiwalay<sup>1</sup>; Minju Choi<sup>1</sup>; Mark Bowden<sup>1</sup>; Hyosim Kim<sup>2</sup>; Ryan Hayes<sup>3</sup>; Daniel Schreiber<sup>1</sup>; Tiffany Kaspar<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of California, Berkeley

### 9:05 AM

**Corrosion of Ultrahigh Temperature Ceramics and PM-HIP Refractory Alloys In Molten Chloride Salt:** *Brian Carpmann*<sup>1</sup>; James Kelly<sup>2</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Lawrence Livermore National Laboratory

### 9:25 AM

**Simultaneous Proton Irradiation and Molten FLiNaK Corrosion of 316-SS and Ni-Based Alloys:** *Cole Evered*<sup>1</sup>; Michael Tonks<sup>2</sup>; Kumar Sridharan<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>University of Florida

### 9:45 AM Break

### 10:05 AM

**The Effect of Temperature on the Dealloying Behavior of Binary Ni-20Cr Alloy in Molten FLiNaK:** *Harjot Singh*<sup>1</sup>; Ho Lun Chan<sup>1</sup>; Elena Romanovskaia<sup>1</sup>; Valentin Romanovski<sup>1</sup>; Minh Tran<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

### 10:25 AM

**Introducing Damage Gradient in Stainless Steel 316H by 2 MeV Proton Irradiation and Mapping of Corrosion Susceptibility in FLiNaK:** *Michenna Allen*<sup>1</sup>; Zhihan Hu<sup>1</sup>; Kenneth Cooper<sup>1</sup>; Kyle Williams<sup>1</sup>; Rijul Chauhan<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

### 10:45 AM

**Assessing the Impact of Molten Halide Salts on Creep of Structural Alloys at 650°-750°C:** *Rishi Pillai*<sup>1</sup>; Bruce A. Pint<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

11:05 AM

**Corrosion Behavior of Metallic Materials in Heat Transfer Fluids and Mitigation Strategies for CSP Applications:** Ceyhun Oskay<sup>1</sup>; Christoph Grimme<sup>2</sup>; Benjamin Grégoire<sup>2</sup>; *Mathias Galetz*<sup>1</sup>; <sup>1</sup>DECHEMA-Forschungsinstitut; <sup>2</sup>La Rochelle Université

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## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Irradiated Materials Performance Prepared by Novel Processing Techniques

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**Tuesday AM | March 25, 2025**  
**160 | MGM Grand**

**Session Chairs:** Caleb Massey, Oak Ridge National Laboratory; Eric Lang, University of New Mexico

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8:00 AM Invited

**Investigating Radiation Effects on Anisotropic Properties of WAAM-Fabricated Grade 91 Steel for Nuclear Applications:** T.M. Kelsy Green<sup>1</sup>; Caleb Massey<sup>2</sup>; Niyanth Sridharan<sup>3</sup>; *Kevin Field*<sup>4</sup>; <sup>1</sup>Antares Industries; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Lincoln Electric; <sup>4</sup>University of Michigan

8:30 AM

**Evolution of Heterogeneous 316L Stainless Steel Microstructures Under Neutron Irradiation:** *Geeta Kumari*<sup>1</sup>; Tim Lach<sup>1</sup>; Stephen Taller<sup>1</sup>; Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

8:50 AM

**Effect of Neutron Irradiation on Parent and Friction Stir Processed Ni-Based ODS MA754 Alloy:** *Ramprashad Prabhakaran*<sup>1</sup>; Kayla Yano<sup>2</sup>; Stuart Maloy<sup>1</sup>; Rajiv Mishra<sup>2</sup>; Indrajit Charit<sup>3</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>University of North Texas; <sup>3</sup>University of Idaho

9:10 AM

**Establishing IASCC-Microstructure Relationship for 316L Stainless Steel Made by Laser Direct Energy Deposition Additive Manufacturing:** *Evan Mcdermott*<sup>1</sup>; Jingfan Yang<sup>2</sup>; John Snitzer<sup>1</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory

9:30 AM

**Hot Deformation and Processing Maps of Austenitic Stainless Steel, FXM19 for Nuclear Reactor Pressure Vessel:** *Jae Suk Jeong*<sup>1</sup>; Tae-Ho Lee<sup>2</sup>; Jae Hoon Jang<sup>2</sup>; Kwangsik Han<sup>1</sup>; Jeon Young Song<sup>1</sup>; Young Hwa Ma<sup>1</sup>; <sup>1</sup>Doosan Enerbility; <sup>2</sup>Korea Institute of Materials Science

9:50 AM Break

10:10 AM

**Simulation of Spark Plasma Sintering of Uranium Mononitride: Finite Element and Machine Learning Approaches:** *Faris Sweidan*<sup>1</sup>; Amit Arpon<sup>1</sup>; Justin Kermarrec<sup>1</sup>; Yi Meng Chan<sup>1</sup>; Pär Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

10:30 AM

**Effects of Radiation-Induced Segregation on the Structure-Property Relationship of RPV Steel Electron Beam Welds:** *Elliot Marrero*<sup>1</sup>; Grayson Nemets<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Yu Lu<sup>2</sup>; Maria Okuniewski<sup>1</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University, Center for Advanced Energy Studies

10:50 AM

**Tailoring Properties of HT9 Ferritic/Martensite Steel via Magnetic Field Heat Treatment:** *Kirk Lemmen*<sup>1</sup>; Haluk Karaca<sup>1</sup>; Osman Anderoglu<sup>2</sup>; XiaTong Yang<sup>2</sup>; Nan Li<sup>3</sup>; Stuart Maloy<sup>4</sup>; <sup>1</sup>University of Kentucky; <sup>2</sup>University of New Mexico; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pacific Northwest National Laboratory

11:10 AM

**Effects of External Magnetic Field Heat Treatment on Irradiation Resistance of Ferritic/Martensitic Steels:** *Xiatong Yang*<sup>1</sup>; Kirk Lemmen<sup>2</sup>; Cle' Sanchez<sup>2</sup>; Nan Li<sup>3</sup>; Haluk Karaca<sup>2</sup>; Stuart Maloy<sup>4</sup>; Osman Anderoglu<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>University of Kentucky; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pacific Northwest National Laboratory

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## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Interfaces Related to Novel Materials and Manufacturing Methods

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

**Tuesday AM | March 25, 2025**  
**369 | MGM Grand**

**Session Chairs:** Thomas Edwards, Nims; Kevin Schmalbach, Bruker Nano

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8:00 AM

**Elucidating the Ballistic Impact Response of CFRP Impregnated Reinforced Concrete:** *Samuel Bartlett*<sup>1</sup>; Juan Escobedo-Diaz<sup>2</sup>; Amar Khennane<sup>1</sup>; Hongxu Wang<sup>1</sup>; Jianshen Wang<sup>1</sup>; <sup>1</sup>UNSW Canberra

8:20 AM

**Evading Strength – Ductility Tradeoff in the Complex Concentrated Alloy Laminate by Combining Metastability Engineered Alloy Design and Friction Stir Welding Technique:** *Roopam Jain*<sup>1</sup>; Ravi Haridas<sup>1</sup>; Prithvi Awasthi<sup>1</sup>; Abhijeet Dhal<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

8:40 AM Invited

**The Impact of Nanoscale Additive Manufacturing on Interfaces and Their Mechanical Contributions in Nanocrystalline and Nanophase-Segregated Materials:** *Rebecca Gallivan*<sup>1</sup>; Nikolaus Porenta<sup>2</sup>; Stephan Gerstl<sup>1</sup>; Mirco Nydegger<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

9:10 AM

**Thermo-Mechanical Molding of High-Entropy Alloy Nanowires via Interface Diffusion:** *Ethen Lund*<sup>1</sup>; Joana De La Torre<sup>1</sup>; Arindam Raj<sup>2</sup>; Yi-Xiang Yang<sup>1</sup>; Michael Aderibigbe<sup>1</sup>; Sungwoo Sohn<sup>1</sup>; Jan Schroers<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>Northwestern University

9:30 AM Break

9:50 AM

**Local Deformation Mapping of Microstructures Using Thermo-Mechanical Nanomolding:** *Michael Aderibigbe*<sup>1</sup>; Arindam Raj<sup>1</sup>; Yi-Xiang Yang<sup>1</sup>; Jan Schroers<sup>1</sup>; <sup>1</sup>Yale University



10:10 AM

**Novel Interface-Engineered Nanolaminated Al-X / ALOH Thin Films for Superior Mechanical Properties and Thermal Stability:** Hendrik Jansen<sup>1</sup>; Amit Sharma<sup>1</sup>; Barbara Putz<sup>1</sup>; Marcus Hans<sup>2</sup>; Jochen Schneider<sup>2</sup>; Jakob Schwiedrzik<sup>1</sup>; Thomas Edwards<sup>3</sup>; Johann Michler<sup>1</sup>; <sup>1</sup>EMPA: Laboratory for Mechanics of Materials and Nanostructures; <sup>2</sup>Materials Chemistry RWTH Aachen; <sup>3</sup>National Institute for Materials Science (NIMS)

10:30 AM Invited

**The Role of Interface Strength and Plastic Anisotropy on the Deformation Behavior of Fe-Al and Ti-Al Nanolaminates:** Thomas Nizolek<sup>1</sup>; Yifan Zhang<sup>2</sup>; Emma Gordon<sup>1</sup>; Hi Vo<sup>1</sup>; Miroslav Zecevic<sup>1</sup>; Rodney McCabe<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Purdue University

11:00 AM

**Effect of Back-Switching on Kinetics of Ferroelastic Domain Switching: A Phase Field Study:** Avisor Bhattacharya<sup>1</sup>; Mohsen Asle Zaeem<sup>1</sup>; <sup>1</sup>Colorado School of Mines

## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Advanced In-Situ Characterisation

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Tuesday AM | March 25, 2025  
366 | MGM Grand

**Session Chair:** Minh-Son Pham, Imperial College London

8:00 AM Invited

**Strength and Deformability in Nanolaminates Containing Thick 3D Interfaces:** Nathan Mara<sup>1</sup>; Mauricio De Leo<sup>1</sup>; Nicolas Fuchs-Lynch<sup>2</sup>; Justin Cheng<sup>1</sup>; Shuozhi Xu<sup>3</sup>; Benjamin Derby<sup>4</sup>; Irene Beyerlein<sup>2</sup>; <sup>1</sup>University of Minnesota; <sup>2</sup>University of California-Santa Barbara; <sup>3</sup>University of Oklahoma; <sup>4</sup>Los Alamos National Laboratory

8:30 AM

**Acoustic Emission Testing During In-Situ Ion Irradiation:** Hayden Sutton<sup>1</sup>; Miguel Crespillo<sup>1</sup>; Khalid Hattar<sup>1</sup>; <sup>1</sup>The University of Tennessee - Knoxville

8:50 AM

**In-Situ Characterization Investigating Damage Propagation of SiC Composite Cladding:** William McMahon<sup>1</sup>; Sarah Oswald<sup>1</sup>; David Frazer<sup>1</sup>; Sean Gonderman<sup>1</sup>; Joel Kosmatka<sup>1</sup>; George Jacobson<sup>1</sup>; <sup>1</sup>General Atomics

9:10 AM

**Microstructural Impact on Brittle Fracture Path Investigated via High-Energy Synchrotron Techniques:** Sara Gorske<sup>1</sup>; Mythreyi Ramesh<sup>2</sup>; Jun-Sang Park<sup>3</sup>; Peter Kenesei<sup>3</sup>; Hemant Sharma<sup>3</sup>; Jonathan Almer<sup>3</sup>; Peter Voorhees<sup>2</sup>; Katherine Faber<sup>1</sup>; <sup>1</sup>California Institute of Technology; <sup>2</sup>Northwestern University; <sup>3</sup>Argonne National Laboratory

9:30 AM Break

9:50 AM

**The Effect of  $\beta$  Phase Stability on the Cyclic Transformation Behaviour Metastable Ti Alloys:** Nicole Church<sup>1</sup>; Christian Talbot<sup>1</sup>; Nicholas Jones<sup>1</sup>; <sup>1</sup>University of Cambridge

10:10 AM

**Operando, Correlated Mechanical Microscopy of the Ni—Mo System:** Jeffrey Wheeler<sup>1</sup>; <sup>1</sup>Oxford Instruments

10:30 AM Invited

**Interfacial Plasticity of Nano-Twinned Cu After Proton Irradiation:** Dongchan Jang<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

11:00 AM

**Influence of Mechanical, Thermal, and Corrosive Impacts on the Performance of Light Metal Structures and Biomaterials:** Alexander Koch<sup>1</sup>; Nils Wegner<sup>1</sup>; Frank Walther<sup>1</sup>; <sup>1</sup>TU Dortmund University

## BIOMATERIALS

### Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues — Biomimetics

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Bernd Gludovatz, UNSW Sydney; Elizabeth Zimmermann, McGill University; Steven Naleway, University of Utah; Sunita Ho, University of California, San Francisco

Tuesday AM | March 25, 2025  
308 | MGM Grand

**Session Chair:** Bernd Gludovatz, UNSW Sydney

8:00 AM Keynote

**Convergent Evolution to Engineering: Blueprints for Multifunctional Advanced Materials:** David Kisailus<sup>1</sup>; <sup>1</sup>University of California-Irvine

8:45 AM Invited

**Sustainable Innovation – Learning From Nature's Grippers and Stingers:** Eduard Arzt<sup>1</sup>; Marc Meyers<sup>1</sup>; <sup>1</sup>University of California San Diego

9:15 AM

**The Hierarchical Design of the Echinoid Skeletal Structure: Structural, Compositional and Crystallographic Variability in Relation to the Regional Micromechanical Function:** Valentina Perricone<sup>1</sup>; Pasquale Cesarano<sup>2</sup>; Ezra Sarmiento<sup>1</sup>; Chao Sung<sup>1</sup>; Derek Lublin<sup>1</sup>; Samantha Apodaca<sup>1</sup>; Andrew Nguyen<sup>1</sup>; Adrian Ornelas<sup>1</sup>; Taige Hao<sup>1</sup>; Francesco Marmo<sup>2</sup>; David Kisailus<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>University of Naples Federico II

9:35 AM Break

9:55 AM Invited

**Development of Novel Mechanochemically Active Hydrogels:** Jamie Kruzic<sup>1</sup>; Yuwan Huang<sup>1</sup>; Alaa Ajam<sup>1</sup>; Zihao Li<sup>1</sup>; P. Bhakthi Jayathilaka<sup>1</sup>; Md Shariful Islam<sup>1</sup>; Chavinya Ranaweera<sup>1</sup>; Meredith Silberstein<sup>2</sup>; Kristopher Kilian<sup>1</sup>; <sup>1</sup>University of New South Wales (UNSW Sydney); <sup>2</sup>Cornell University

## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Environmental Effects I

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusioning; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

**Tuesday AM | March 25, 2025**  
**158 | MGM Grand**

**Session Chairs:** Weicheng Zhong, Oak Ridge National Laboratory; Tianyi Chen, Oregon State University

#### 8:00 AM Keynote

**Radiation Effects Challenges in High-Performance Materials:** *Steven Zinkle*<sup>1</sup>; Siwei Chen<sup>1</sup>; Yajie Zhao<sup>1</sup>; Zehui Qi<sup>1</sup>; Sydney Copp<sup>1</sup>; Ethan Payne<sup>1</sup>; <sup>1</sup>University of Tennessee

#### 8:30 AM

**The Role of Hydrogen Co-Injection on the Cavity Microstructure of Triple Ion Irradiated F82H-IEA:** *Logan Clowers*<sup>1</sup>; Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan

#### 8:50 AM

**Material Characterization of Lateral Transmutation Gas Gradients in Triple-Ion Irradiated F82H-IEA:** *Aaron Penders*<sup>1</sup>; *Zhexian Zhang*<sup>1</sup>; Charles Hirst<sup>1</sup>; Alexander Flick<sup>1</sup>; Fabian Naab<sup>1</sup>; Logan Clowers<sup>1</sup>; Valentin Pauly<sup>1</sup>; Lauren Garrison<sup>2</sup>; Cody Dennett<sup>2</sup>; Michael Short<sup>3</sup>; Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Commonwealth Fusion Systems; <sup>3</sup>Massachusetts Institute of Technology

#### 9:10 AM

**Demystify Radiation-Enhanced Hydrogen Isotope Diffusion:** *Xiaowang Zhou*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 9:30 AM Break

#### 9:50 AM Invited

**Physics-Based Evaluation of General Fusion Facility Concepts for a Prototypical Neutron Fusion Source:** *Jaime Marian*<sup>1</sup>; Brian Wirth<sup>2</sup>; Steve Zinkle<sup>2</sup>; Lance Snead<sup>3</sup>; Jason Trelewicz<sup>3</sup>; Ying Yang<sup>3</sup>; Yutai Katoh<sup>4</sup>; Wahyu Setyawan<sup>5</sup>; Laurent Capolungo<sup>6</sup>; <sup>1</sup>University of California, Los Angeles; <sup>2</sup>University of Tennessee-Knoxville; <sup>3</sup>Stony Brook University; <sup>4</sup>Oak Ridge National Laboratory; <sup>5</sup>Pacific Northwest National Laboratory; <sup>6</sup>Los Alamos National Laboratory

#### 10:20 AM

**Microstructural Changes in Ion and Neutron Irradiated REBCO-Based Magnet Materials for Fusion:** *Christopher Reis*<sup>1</sup>; Kooknoh Yoon<sup>1</sup>; Mehdi Balooch<sup>1</sup>; Tengming Shen<sup>2</sup>; Soren Prestemon<sup>2</sup>; Masami Iio<sup>3</sup>; Toru Ogitsu<sup>3</sup>; Lee Bernstein<sup>2</sup>; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Berkeley National Laboratory; <sup>3</sup>KEK

#### 10:40 AM

**Synergistic Study of Neutron Irradiation and Hydrogen Exposure on Tungsten:** *Weicheng Zhong*<sup>1</sup>; Yuji Hatano<sup>2</sup>; Takaaki Koyanagi<sup>1</sup>; Hanns Gietl<sup>3</sup>; Chase Taylor<sup>3</sup>; Josina Geringer<sup>1</sup>; Takeshi Toyama<sup>2</sup>; Yutai Katoh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Tohoku University; <sup>3</sup>Idaho National Laboratory

#### 11:00 AM

**The Effect of Ion Irradiation Conditions on the Damage Morphology of a Tungsten Heavy Alloy:** *James Haag*<sup>1</sup>; Bethany Matthews<sup>1</sup>; Matthew Olszta<sup>1</sup>; Weilin Jiang<sup>1</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 11:20 AM

**Scale-Up of Advanced Castable Nanostructured Alloys for Fusion First-Wall/Blanket Applications:** *Ying Yang*<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Yanli Wang<sup>1</sup>; Xiang Chen<sup>1</sup>; Wei Tang<sup>1</sup>; Marie Romedenne<sup>1</sup>; Kevin Field<sup>1</sup>; Tim Graening<sup>1</sup>; QQ Ren<sup>1</sup>; Bruce Pint<sup>1</sup>; Yutai Katoh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Microstructural Evolution and Material Properties: Session I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

**Tuesday AM | March 25, 2025**  
**303 | MGM Grand**

**Session Chairs:** Jonathan Zimmerman, Sandia National Laboratories; Elizabeth Holm, University of Michigan

**8:00 AM Introductory Comments:** A Short History of Anthony Rollett's Career

#### 8:20 AM Invited

**Advances in FFT-Based Modelling of Microstructure/Property Relationships of Polycrystalline Materials:** *Ricardo Lebensohn*<sup>1</sup>; Miroslav Zecevic<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 8:50 AM Invited

**Predicting Spatial Variability of Mechanical Properties in Additively Manufactured Metals Using a Process-Structure-Property Modeling Framework:** *Ashley Spear*<sup>1</sup>; Wenda Tan<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Michigan

#### 9:20 AM

**Grain-Resolved Reorientation and Orientation Gradient Development in Cyclic Loading of Ti-7Al Using High Energy X-Ray Diffraction Microscopy:** *Rachel Lim*<sup>1</sup>; Sven Gustafson<sup>2</sup>; Darren Pagan<sup>3</sup>; Anthony Rollett<sup>4</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>Pennsylvania State University; <sup>4</sup>Carnegie Mellon University

#### 9:40 AM Break

#### 10:00 AM Invited

**Quantifying Abnormal Grain Growth with Correlation Analyses and Information Theory:** *Jeffrey Rickman*<sup>1</sup>; <sup>1</sup>Lehigh University

#### 10:30 AM Invited

**The Annealing Twin Paradox : Well-Known Defects but Still not Fully Understood:** *Nathalie Bozzolo*<sup>1</sup>; <sup>1</sup>Safran

#### 11:00 AM

**Understanding Twin Nucleation in Mg Alloys Through In Situ Synchrotron Experiments and Machine Learning Models:** Duncan Greeley<sup>1</sup>; Valentin Vassilev-Galindo<sup>2</sup>; John Allison<sup>3</sup>; *Javier Llorca*<sup>4</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>IMDEA Materials Institute; <sup>3</sup>University of Michigan; <sup>4</sup>IMDEA Materials Institute & Technical University of Madrid

11:20 AM

**First-Principle Investigation and Modeling of Airborne Acoustic Emission Mechanisms In Selective Laser-Metal Fusion Printing Processes:** *Haolin Liu<sup>1</sup>; Zhongshu Ren<sup>2</sup>; Jiayun Shao<sup>3</sup>; Anthony Rollett<sup>1</sup>; Tao Sun<sup>3</sup>; Levent Burak Kara<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Northwestern University*

## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Oxide Fuels III: High Burnup

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Tuesday AM | March 25, 2025**  
**159 | MGM Grand**

**Session Chairs:** Jason Harp, Oak Ridge National Laboratory; Karim Ahmed, Texas A&M University

**8:00 AM Invited**

**Multiphysics and Multiscale Modeling of High Burnup UO<sub>2</sub>:** *Karim Ahmed<sup>1</sup>; <sup>1</sup>Texas A&M University*

**8:30 AM**

**Microstructurally Informed Modeling of High Burnup Structure in UO<sub>2</sub> Fuel:** *Walter Brinkley<sup>1</sup>; Nathan Capps<sup>2</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>Utk; <sup>2</sup>Oak Ridge National Laboratory*

**8:50 AM**

**The Thermal Mechanical Properties and Transient Behavior of High Burn-Up Structure Pure and Cr<sub>2</sub>O<sub>3</sub>-Doped UO<sub>2</sub> Pellets with Xe Gas Bearing Under the LOCA and RIA Thermal Shock Tests:** *Dong Zhao<sup>1</sup>; Kevin Yan<sup>1</sup>; Saurabh Sharma<sup>1</sup>; Andre Broussard<sup>1</sup>; Heng Ban<sup>2</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>University of Pittsburgh*

**9:10 AM**

**Effects of Charge State on Chromium Substitution and Oxygen Vacancy Segregation Energies at Grain Boundaries in Uranium Dioxide:** *Mack Cleveland<sup>1</sup>; Ericmoore Jossou<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

**9:30 AM Break**

**9:50 AM**

**Microstructural Impacts of Dopants in Advanced Nuclear Fuels:** *Maria Kosmidou<sup>1</sup>; Adrien Terricabras<sup>1</sup>; Meagan Wheeler<sup>1</sup>; John Proctor<sup>2</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Sarah Finkeldei<sup>2</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of California Irvine*

**10:10 AM**

**Polyepitaxial Approach to Studying Topotactic Phase Transitions in Actinides:** *Jacek Wasik<sup>1</sup>; <sup>1</sup>University of Bristol*

**10:30 AM**

**Chemical Compatibility of UC/UO<sub>2</sub> Composites for Accident Tolerant Fuel:** *Steven Cavazos<sup>1</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Ian Porter<sup>2</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>General Electric - Vernova*

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments III — Thermal Extreme

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

**Tuesday AM | March 25, 2025**  
**166 | MGM Grand**

**Session Chair:** Khalid Hattar, University of Tennessee Knoxville

**8:00 AM Invited**

**Beyond Fingerprinting: Multi-Objective AI-Guided High-Throughput Exploration of Nanostructured Metals:** *Brad Boyce<sup>1</sup>; Remi Dingreville<sup>1</sup>; <sup>1</sup>Sandia National Laboratories*

**8:25 AM**

**Heat And Force-Resistance of Nanograined Ni Depends on Grain Boundary Energy:** *Yuxin Chu<sup>1</sup>; Yi Li<sup>1</sup>; <sup>1</sup>Chinese Academy of Sciences, Institute of Metal Research*

**8:45 AM**

**Enhancement of Chromium-Based Bcc-Superalloys for High-Temperature Applications:** *Kan Ma<sup>1</sup>; Thomas Blackburn<sup>1</sup>; Anke Silvia Ulrich<sup>2</sup>; Michael Kerbstadt<sup>3</sup>; Tatu Pinomaa<sup>4</sup>; Mathias Galetz<sup>3</sup>; Uwe Glatzel<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>University of Bayreuth; <sup>3</sup>DECHEMA-Forschungsinstitut; <sup>4</sup>VT*

**9:05 AM Invited**

**Property Mapping and Creep Behavior of Advanced Nuclear Reactor Alloys Via Nanoindentation:** *Nathan Mara<sup>1</sup>; Minh-Tam Hoang<sup>1</sup>; Kevin Schmalbach<sup>2</sup>; Eric Hintsala<sup>2</sup>; Douglas Stauffer<sup>2</sup>; Jobin Joy<sup>3</sup>; Laurent Capolungo<sup>3</sup>; <sup>1</sup>University of Minnesota; <sup>2</sup>Bruker Nano Surfaces; <sup>3</sup>Los Alamos National Laboratory*

**9:30 AM Break**

**9:50 AM**

**Creep Behavior of an Al-Zr-Sn Alloy Dual-Strengthened by L1<sub>2</sub>-Al<sub>3</sub>Zr Nanoscale Precipitates and Cold Working:** *Sumit Bahl<sup>1</sup>; Ismael Ramirez<sup>2</sup>; Jie Qi<sup>2</sup>; Jovid Rakhmonov<sup>1</sup>; David Dunand<sup>2</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Northwestern University*

**10:10 AM Invited**

**Grain Boundary Creep in Simple and High Entropy Oxides:** *Shen Dillon<sup>1</sup>; <sup>1</sup>University of California, Irvine*

**10:35 AM Invited**

**Deformation Behaviors and Microstructure Evolution of Al/Ti Nano Laminates at Elevated Temperatures:** *Yifan Zhang<sup>1</sup>; Ruizhe Su<sup>2</sup>; Nicholas Richter<sup>2</sup>; Tongjun Niu<sup>3</sup>; Xuanyu Sheng<sup>2</sup>; Haiyan Wang<sup>2</sup>; Xinghang Zhang<sup>2</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Purdue University; <sup>3</sup>Los Alamos National Lab*

TUESDAY AM

## BIOMATERIALS

### Natural Fibers and Biocomposites: A Sustainable Solution — Sustainable Composites and Biocomposites

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee, TMS: Composite Materials Committee

**Program Organizers:** Henry Colorado, Universidad de Antioquia; Sergio Monteiro, Instituto Militar de Engenharia; Marc Meyers, University of California, San Diego; Carlos Castano Londono, Virginia Commonwealth University; George Youssef, San Diego State University; Felipe Perisse Duarte Lopes, Universidade Estadual do Norte Fluminense; Daniel Salazar, BCMaterials

**Tuesday AM | March 25, 2025**  
**307 | MGM Grand**

**Session Chairs:** Carlos Castano Londono, Virginia Commonwealth University; Felipe Perisse Duarte Lopes, Universidade Estadual do Norte Fluminense; George Youssef, San Diego State University

#### 8:00 AM Introductory Comments

##### 8:10 AM Invited

**Towards Sustainable Construction: Characterization of Vegetable Polyurethane Composite Reinforced with Figue Fiber for Warm and Humid Environments:** *Luis Ricardo Arrubla Agudelo*<sup>1</sup>; Luis Fortunato de Freitas<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; Henry Alonso Colorado Lopera<sup>2</sup>; Felipe Perissé Duarte Lopes<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense; <sup>2</sup>UDEA

##### 8:35 AM Invited

**Exceptional Strength of Mycelium-Bound Composite: A Sustainable Brick Alternative for Construction:** *Deepak Sharma*<sup>1</sup>; Hortense Le Ferrand<sup>1</sup>; <sup>1</sup>Nanyang Technological University

##### 9:00 AM Invited

**The Adhesion Enhancement Effects of Nanocellulose at the Glass Fiber/Epoxy Interphase Through Molecular Dynamics Simulations:** *Xiawa Wu*<sup>1</sup>; <sup>1</sup>Penn State Behrend

##### 9:20 AM

**Processing of Composites Incorporated with in 3D Printing as a Potential Way of Producing High-Performance Glasses:** Rogério Rabello<sup>1</sup>; Victor Gonçalves<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; Sergio Monteiro<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>2</sup>; <sup>1</sup>UENF - State University of the Northern Rio de Janeiro; <sup>2</sup>Universidade Estadual do Norte Fluminense

##### 9:40 AM Break

##### 10:00 AM

**Enhancing the Properties of Polyester Composites Using Unidirectional Acetylated Fibers from *Luffa Cylindrica*:** Eduarda de Melo<sup>1</sup>; Heliane Amaral<sup>1</sup>; Roseméri da Silva<sup>1</sup>; Verônica Cândido<sup>2</sup>; *Felipe Lopes*<sup>3</sup>; Sergio Monteiro<sup>4</sup>; Michel Oliveira<sup>1</sup>; <sup>1</sup>UFES; <sup>2</sup>UFPA; <sup>3</sup>UENF; <sup>4</sup>IME

##### 10:20 AM

**Hybrid Epoxy Matrix Composites Reinforced with Montmorillonite Clay and Eucalyptus Particulates:** Juam Pierott Cabral<sup>1</sup>; Rebeca Seixas Quintanilha Gomes<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Sergio Neves Monteiro<sup>2</sup>; *Felipe Perisse Duarte Lopes*<sup>3</sup>; <sup>1</sup>UENF; <sup>2</sup>Instituto Militar de Engenharia; <sup>3</sup>Universidade Estadual do Norte Fluminense

##### 10:40 AM

**Development of Anticorrosive Coatings Reinforced with Eucalyptus Residue:** *Darcy Oliveira*<sup>1</sup>; Luis de Freitas<sup>1</sup>; Rogério Júnior<sup>1</sup>; David Velasco<sup>1</sup>; Carlos Vieira<sup>1</sup>; Felipe Lopes<sup>1</sup>; <sup>1</sup>UENF

##### 11:00 AM

**Compressive Strength of Epoxydic Composite Reinforced with Coffee Ground Waste:** Bruna Cobuci<sup>1</sup>; Mayara Campos<sup>1</sup>; Noan Simonassi<sup>1</sup>; Sérgio Monteiro<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>2</sup>; <sup>1</sup>UENF; <sup>2</sup>Universidade Estadual do Norte Fluminense

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV — Phase Stability of Electronic Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Yu-Chen Liu, National Cheng Kung University; Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Yee-wen Yen, National Taiwan University of Science and Technology; Chih-Ming Chen, National Chung Hsing University; Chao-hong Wang, National Chung Chung University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, Korea Institute of Industrial Technology; Ping-Chuan Wang, Suny New Paltz; Yu-An Shen, Feng Chia University

**Tuesday AM | March 25, 2025**  
**359 | MGM Grand**

**Session Chairs:** Chao-hong Wang, National Chung Chung University; Yee-wen Yen, National Taiwan University of Science and Technology

##### 8:00 AM Invited

**Microstructure Evolution and Phase Transformation of Ni-Sn Compounds aAfter Long-Term Storage:** *Yi-Wun Wang*<sup>1</sup>; Cheng-Ting Tsai<sup>1</sup>; Tzu-Yi Lin<sup>1</sup>; <sup>1</sup>Tamkang University

##### 8:30 AM

**Liquidus and Invariant Reaction Temperatures of Sn-In-Ni-Zn Alloys:** *Sinn-wen Chen*<sup>1</sup>; Te-wei Lin<sup>1</sup>; Yung-Chun Tsai<sup>1</sup>; Cheng-hsi Ho<sup>1</sup>; <sup>1</sup>National Tsing Hua University

##### 8:50 AM

**Interfacial Reactions Between Sn-Based Solders and FeCoNiCrMn High-Entropy Alloy:** *Chao-hong Wang*<sup>1</sup>; Yue-han Li<sup>1</sup>; <sup>1</sup>National Chung Chung University

##### 9:10 AM

**Microstructure Evolution and Growth Behavior of Intermetallic Compound Between Cu and Sn-Ag Alloys:** *Minho Oh*<sup>1</sup>; Naru Tokunaga<sup>1</sup>; Equo Kobayashi<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology

##### 9:30 AM Break

##### 9:50 AM

**Liquidus Projections and Invariant Reactions in the Bi-Cu-Sn-Te Quaternary System:** *Hsin-Chieh Huang*<sup>1</sup>; Cheng-Hsi Ho<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

##### 10:10 AM

**Liquid-Solid Interfacial Reactions Between Lead-Free Solders and Cu-6.01wt.% Sn-0.12wt.%P Alloy (C5191):** *Mavindra Ramadhani*<sup>1</sup>; Hsiang Chiu<sup>1</sup>; Yee Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

##### 10:30 AM

**Solid/Solid Interfacial Reactions Between Lead-Free Solders and Cu-Ni-Si-Mg (C7025) Substrate:** *Ting Chen*<sup>1</sup>; Jing-Ting Chou<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology



10:50 AM

**Liquid/Solid Interfacial Reactions Between the Sn Solder and Cu-Fe Alloy (C194) with the Ni Plating Layer:** *Ssu-Chen Pan*<sup>1</sup>; Yu-Cheng Jhen<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

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## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Non Ferrous Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

**Tuesday AM | March 25, 2025**  
**123 | MGM Grand**

**Session Chairs:** Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines

8:00 AM

**Quantifying the Kinetics of Defect Phase Transitions Through Ultrafast Calorimetry:** *William Cunningham*<sup>1</sup>; Tianjiao Lei<sup>2</sup>; Hannah Howard<sup>1</sup>; Timothy Rupert<sup>3</sup>; Daniel Gianola<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>University of Alabama; <sup>3</sup>Johns Hopkins University

8:20 AM

**Microstructural Coarsening of Cells, Dendrites, and Fibrous Eutectic in Al-2Fe-1Ni Alloy:** Jaderson Rodrigo da Silva Leal<sup>1</sup>; Guilherme Lisboa de Gouveia<sup>1</sup>; *Jose Spinelli*<sup>1</sup>; <sup>1</sup>Federal University of Sao Carlos Brazil

8:40 AM

**Effect of Si Impurities on the Microstructural Development of a Cast Al-Mg-Fe Alloy:** *Nicholas Richter*<sup>1</sup>; Sumit Bahl<sup>1</sup>; Ying Yang<sup>1</sup>; Alice Perrin<sup>1</sup>; Alex Plotkowski<sup>1</sup>; James Haynes<sup>1</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:00 AM

**Evaluation of Phase Stability of Quasicrystals in Spark Plasma Sintered Al Alloy:** *Baris Yavas*<sup>1</sup>; Sarshad Rommel<sup>1</sup>; Cain Hung<sup>2</sup>; Callie Benson<sup>2</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Collins Aerospace Systems

9:20 AM

**Integrated Modeling of Static Recrystallization in Mg-Zn-Ca Alloy Using the PRISMS Framework:** Supriyo Chakraborty<sup>1</sup>; *David Montiel*<sup>1</sup>; Tracy Berman<sup>1</sup>; Chaitali Patil<sup>1</sup>; Michael Pilipchuk<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; John Allison<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

9:40 AM Break

9:55 AM

**Influence of Alloy Composition on the Precipitate Evolution and Properties of 7xxx Aluminum Alloy During Magnetic Field Annealing:** *Damilola Alew*<sup>1</sup>; Kirk Lemmen<sup>1</sup>; Cle' Sanchez<sup>1</sup>; Haluk Karaca<sup>1</sup>; Paul Rottmann<sup>1</sup>; <sup>1</sup>University of Kentucky

10:15 AM

**Phase-Field Modeling of Nanotwins Evolution and Grain Boundary Interactions in Cu During Annealing:** *Yixi Shen*<sup>1</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

10:35 AM

**Controlling Intermetallic Precipitation in Cu-Ti Alloys to Tune Mechanical and Electrical Properties:** *Rohit Berlia*<sup>1</sup>; Michael Wall<sup>1</sup>; Todd Hufnagel<sup>1</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University

10:55 AM

**Microstructural Evolution and Phase Transformations in Al-Cu Friction Stir Welding:** *Michael Lastovich*<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University

11:15 AM

**Solidification Modelling and Wetting of Al-Ce Alloys and Composites:** *Swaroop Behera*<sup>1</sup>; Kaustubh Rane<sup>1</sup>; David Weiss<sup>2</sup>; Pradeep Rohatgi<sup>1</sup>; <sup>1</sup>University of Wisconsin Milwaukee; <sup>2</sup>Vision Materials

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## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Field Assisted Sintering Technology

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

**Tuesday AM | March 25, 2025**  
**105 | MGM Grand**

**Session Chair:** Natalia Daudt, Universidade Federal de Santa Maria

8:00 AM

**High Intensity Electric Nano Pulsing Technology for Rapid Materials Processing and Sintering:** *Runjian Jiang*<sup>1</sup>; Eugene Olevsky<sup>1</sup>; Elisa Torresani<sup>1</sup>; Andrii Maksymenko<sup>1</sup>; Wenwu Xu<sup>1</sup>; <sup>1</sup>San Diego State University

8:20 AM

**Enhancing Aluminum with Graphene: Advances in Resistance-Based Sintering for High Conductivity Composites:** *Olga Eliseeva*<sup>1</sup>; Srinath Kistampally<sup>2</sup>; Jerry Gould<sup>1</sup>; <sup>1</sup>EWI; <sup>2</sup>Martinrea

8:40 AM Invited

**Blacklight Sintering of Ceramics:** Julian Ebert<sup>1</sup>; Dylan Jennings<sup>1</sup>; Pascal Zahler<sup>1</sup>; *Wolfgang Rheinheimer*<sup>1</sup>; <sup>1</sup>University of Stuttgart

9:10 AM

**PLUFS: The Controlled Pressure-Less Ultra-Fast and Ultra-High Temperature Sintering:** Thomas Grippi<sup>1</sup>; *Eugene Olevsky*<sup>1</sup>; Elisa Torresani<sup>1</sup>; Andrii Maximenko<sup>1</sup>; <sup>1</sup>San Diego State University

9:30 AM

**Integrating Molecular Dynamics and Experimental Techniques to Study Flash Sintering of Zirconia and 8% YSZ:** *Colin Delaney*<sup>1</sup>; Sky Soltero<sup>1</sup>; Thomas Grippi<sup>1</sup>; Runjian Jiang<sup>1</sup>; Eugene Olevsky<sup>1</sup>; Wenwu Xu<sup>1</sup>; <sup>1</sup>San Diego State University

9:50 AM Break

10:00 AM Invited

**Ultrafast Sintering With Versus Without Electric Fields and Controlling Microstructures With Electric Fields:** *Jian Luo*<sup>1</sup>; <sup>1</sup>University of California, San Diego

10:30 AM

**Ultra-Fast High Temperature Sintering of Metal Alloys:** *Natalia Daudt*<sup>1</sup>; Dalton Lima<sup>1</sup>; Sergio Noal Alves<sup>1</sup>; Andreia Moreira da Silva<sup>1</sup>; Luana Crozatti Rocha<sup>1</sup>; <sup>1</sup>Universidade Federal de Santa Maria

TUESDAY AM

10:50 AM

**The Fabrication of TiAl Compositized with Near -Ti Alloys using SPS and HIP:** *YunJo Ro*<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; Sean R. Agnew<sup>1</sup>; Haydn N. G. Wadley<sup>1</sup>; <sup>1</sup>University of Virginia

11:10 AM

**Interface Structure and Characteristics of High Temperature Carbide Ceramics Co-Sintered with Lightweight Carbon-Carbon Composites:** Jorgen Rufner<sup>1</sup>; *Arin Preston*<sup>1</sup>; Andrew Gorman<sup>1</sup>; Cody Gibson<sup>1</sup>; William Chuirazzi<sup>1</sup>; Nathan Stranberg<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Continuous Composites

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics II - 3D Printing

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, Rice University; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ethan Secor, Iowa State University

Tuesday AM | March 25, 2025  
361 | MGM Grand

**Session Chairs:** Dave Estrada, Boise State University; Joseph Andrews, University Of Wisconsin Madison

8:00 AM Invited

**3D Necropainter:** Justin Puma<sup>1</sup>; Zhen Yang<sup>1</sup>; Jianyu Li<sup>1</sup>; *Changhong Cao*<sup>1</sup>; <sup>1</sup>McGill University

8:25 AM Invited

**Additive Manufacturing of Interconnect Structures for Microelectronics Packaging Applications:** *Michael Cullinan*<sup>1</sup>; <sup>1</sup>University of Texas at Austin

8:50 AM Invited

**Direct-Write and 3D Printing of Electronic Materials Enabled by Liquid Metals:** *Michael Dickey*<sup>1</sup>; <sup>1</sup>NC State University

9:15 AM Invited

**Multimaterial Aerosol Jet Printing for Patterning Material Gradients:** *Ethan Secor*<sup>1</sup>; <sup>1</sup>Iowa State University

9:40 AM Break

10:00 AM Invited

**Optimization of Aerosol Jet-Printed Nanomaterial Thin Films for Enhanced Sensor Performance:** *Joseph Andrews*<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison

10:25 AM Invited

**Aerosol Jet Printing and Optimization of PEDOT:PSS for Flexible Electronics and Soft Robots:** Md Shariful Islam<sup>1</sup>; *Changyong Cao*<sup>1</sup>; <sup>1</sup>Case Western Reserve University

10:50 AM Invited

**Hyper Devices: Using Aerosol Jet 3D Nanoprinting for Ultrahigh Performance Biomedical and Energy Storage Devices:** *Rahul Panat*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## MATERIALS SYNTHESIS AND PROCESSING

### REWAS 2025: Sustainable End-of-Life Management and Recycling Solutions for Batteries, Wind Turbines, and Photovoltaics — Recovery and Reuse Values from EOL Products

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Christina Meskers, SINTEF; Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Elsa Olivetti, Massachusetts Institute of Technology

Tuesday AM | March 25, 2025  
117 | MGM Grand

**Session Chair:** Emanuele Pagone, Cranfield University

8:00 AM Introductory Comments

8:05 AM

**Decommissioning, Characterization and Proposed Recycling Route of a Used Na-ZnCl<sub>2</sub> Battery Cell:** *Cathrine Solem*<sup>1</sup>; Thomas P. Simonsen<sup>1</sup>; Fabrizio Vagliani<sup>2</sup>; Zhaohui Wang<sup>1</sup>; Stein Rørvik<sup>1</sup>; Alberto Turconi<sup>2</sup>; Andrea Pozzi<sup>2</sup>; Camilla Sommersest<sup>1</sup>; Karen S. Osen<sup>1</sup>; Kent-Robert Molvik<sup>1</sup>; Ole S. Kjos<sup>1</sup>; <sup>1</sup>SINTEF; <sup>2</sup>FZSoNick S.A.

8:25 AM

**Photovoltaic Waste Management: Technologies and Strategies to Recycle c-Si and Cl(G)S PV Waste:** *Goril Jahrsengene*<sup>2</sup>; Ana Maria Martinez<sup>1</sup>; Charly Lemoine<sup>2</sup>; Wolfram Palitzsch<sup>3</sup>; Ingo Röver<sup>3</sup>; Olivier Caille<sup>4</sup>; Rui de Almeida<sup>4</sup>; Thomas Peccavet<sup>4</sup>; Emmanuel Billy<sup>2</sup>; Fabrice Coustier<sup>2</sup>; Claire Agrafeil<sup>2</sup>; <sup>1</sup>SINTEF; <sup>2</sup>CEA; <sup>3</sup>LuxChemtech GmbH; <sup>4</sup>Mondragon Assembly

8:45 AM

**Recycling of Solar Wafers Through Acid Leaching and Vacuum Refining:** *Elif Emil Kaya*<sup>1</sup>; Mona Tellebond Hassel<sup>1</sup>; Gabriella Tranell<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology

9:05 AM Invited

**Barriers and Opportunities for Recycling Wind Turbine Blades in the United States:** *Matthew Korey*<sup>1</sup>; Peter Wang<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:35 AM Break

9:50 AM

**Formation and Stability of Hydrides During Hydrogenation of NdFeB Magnets:** Adamantia Lazou<sup>1</sup>; Alireza Habibzadeh<sup>2</sup>; *Mertol Gokelma*<sup>2</sup>; <sup>1</sup>National Technical University of Athens; <sup>2</sup>Izmir Institute of Technology

10:10 AM

**Evaluating the Use of Wind Blade Residue and Recycled Aggregate in Low-Strength Concrete:** *Marta Skaf*<sup>1</sup>; Nerea Hurtado-Alonso<sup>1</sup>; Ana Espinosa<sup>1</sup>; Roberto Serrano<sup>1</sup>; Amaia Santamaria<sup>2</sup>; Juan Manso<sup>1</sup>; <sup>1</sup>University of Burgos; <sup>2</sup>University of the Basque Country UPV/EHU

10:30 AM

**Recycling of Raw-Crushed Wind-Turbine Blade for Concrete Production: Mechanical and Durability Performance:** *Vanesa Ortega-Lopez*<sup>1</sup>; Javier Manso-Morato<sup>1</sup>; Chaimae Mourou<sup>1</sup>; Manuel Hernando-Revenga<sup>1</sup>; Victor Revilla-Cuesta<sup>1</sup>; Flora Faleschini<sup>1</sup>; <sup>1</sup>University of Burgos

## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Actinide Physics II

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Tuesday AM | March 25, 2025**  
**163 | MGM Grand**

**Session Chair:** Jason Jeffries, Lawrence Livermore National Laboratory

**8:00 AM Invited**

**Physics and Chemistry of UTe<sub>2</sub>:** *Eteri Svanidze*<sup>1</sup>; <sup>1</sup>Max Planck Institute for Chemical Physics of Solids

**8:30 AM Invited**

**Actinide Thin Films: Recreating the Usual and Creating the Unusual:** *Ross Springell*<sup>1</sup>; Eleanor Lawrence Bright<sup>2</sup>; Daniel Chaney<sup>2</sup>; Lottie Harding<sup>1</sup>; Chris Bell<sup>1</sup>; Roger Ward<sup>3</sup>; Gerard Lander<sup>4</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>European Synchrotron Radiation Facility; <sup>3</sup>University of Oxford; <sup>4</sup>Joint Research Centre, European Commission

**9:00 AM Invited**

**Changes in Stiffness and Internal Friction of Delta-PuGa Due to Aging and Annealing:** *Boris Maiorov*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:30 AM Break**

**9:50 AM Invited**

**Mastering the Magnetic State of Uranium-Based Thin Films:** *Evgenia Tereshina-Chitrova*<sup>1</sup>; <sup>1</sup>Institute of Physics ASCR

**10:20 AM Invited**

**Synthesis, Structure and Physical Properties of NpIr<sub>3</sub>:** *Tomasz Klimczuk*<sup>1</sup>; Jean-Christophe Griveau<sup>2</sup>; Zofia Stożek<sup>1</sup>; Olaf Walter<sup>2</sup>; Eric Colineau<sup>2</sup>; <sup>1</sup>Gdansk University of Technology; <sup>2</sup>European Commission, Joint Research Centre

**10:50 AM**

**Lanthanide-Based Antiperovskite Nitrides:** *Kevin Vallejo*<sup>1</sup>; Shuxiang Zhou<sup>1</sup>; Volodymyr Buturlim<sup>1</sup>; Zachery Cresswell<sup>1</sup>; Brelon May<sup>1</sup>; Sabin Regmi<sup>1</sup>; Krzysztof Gofryk<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

## MECHANICS OF MATERIALS

### Spatially Tailored Materials: Processing-Structure-Properties — Gradient Microstructures and Mechanical Behavior

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois; Ian Mccue, Northwestern University; J.C. Stinville, University of Illinois Urbana-Champaign

**Tuesday AM | March 25, 2025**  
**351 | MGM Grand**

**Session Chairs:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois

**8:00 AM Invited**

**Combinatorial and High-Throughput Synthesis, Characterization, and Design of Metallic Alloys and Nanotwin Microstructures:** *Andrea Hodge*<sup>1</sup>; <sup>1</sup>University of Southern California

**8:30 AM**

**Combinatorial High Throughput Study of the Interplay Between Microstructure and Mechanical Properties in Ni-Al Thin Films:** *Nicolas Peter*<sup>1</sup>; Peter Nellesen<sup>1</sup>; Adie Alwen<sup>2</sup>; Andrea Hodge<sup>2</sup>; Ruth Schwaiger<sup>1</sup>; <sup>1</sup>Forschungszentrum Juelich; <sup>2</sup>University of Southern California

**8:50 AM**

**Combinatorial High Throughput Methodology: A Twinning and Phase Formation Study in CuNiAl Alloys:** *Ashley Maldonado Otero*<sup>1</sup>; Adie Alwen<sup>1</sup>; Andrea Hodge<sup>1</sup>; Nicolas Peter<sup>2</sup>; Ruth Schwaiger<sup>2</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Forschungszentrum Jülich GmbH

**9:10 AM**

**Phase Evolution and Mechanical Behavior of Sputtered Cu-Fe Alloys:** *Debargha Paul*<sup>1</sup>; Xuanyu Sheng<sup>1</sup>; Ke Xu<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University

**9:30 AM Break**

**9:50 AM**

**Mechanical Characterisation of Micro-Architected AM Lattices Using X-Ray Computed Tomography:** *David McArthur*<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; PJ Tan<sup>1</sup>; <sup>1</sup>University College London

**10:10 AM**

**Dynamic Tensile Damage and Spall Behavior of Electroplated Nickel:** *Gary Simpson*<sup>1</sup>; Esther Hessong<sup>2</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of California, Irvine

**10:30 AM**

**Microstructure and Mechanical Properties of In-Situ Alloyed Steels via Wire Arc Directed Energy Deposition:** *Kazi Moshir Rahman*<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Saket Thapliyal<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:50 AM**

**Multiscale Characterization of an Additively Manufactured Property Graded Ni-Base Alloy for Molten-Salts Supercritical-CO<sub>2</sub> Heat Exchangers:** *Qing-Qiang Ren*<sup>1</sup>; Yi-Feng Su<sup>1</sup>; Thomas Feldhausen<sup>1</sup>; Rebecca Kurfess<sup>1</sup>; Kenton Fillingim<sup>1</sup>; Soumya Nag<sup>1</sup>; Rishi Pillai<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

TUESDAY AM

## NUCLEAR MATERIALS

### Spectroscopic Methods and Analysis for Nuclear Energy Related Materials — Synchrotron Based Investigations

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Scarlett Widgeon Paisner, Los Alamos National Laboratory; Arjen van Veelen, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Farida Selim, Arizona State University; Maik Lang, University of Tennessee; Dong (Lilly) Liu, University of Oxford

**Tuesday AM | March 25, 2025**  
**161 | MGM Grand**

**Session Chairs:** Scarlett Widgeon Paisner, Los Alamos National Laboratory; Arjen van Veelen, Los Alamos National Laboratory

#### 8:00 AM Introductory Comments

**8:05 AM**

**X-Ray Diffraction-Computed Tomography (XRD-CT) Facility at NSLS-II for Studying Materials for Nuclear Applications:** *Mehmet Topsakal<sup>1</sup>; Simerjeet Gill<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory*

**8:25 AM**

**Advanced Synchrotron Characterization Techniques for Fusion Materials Science:** *David Sprouster<sup>1</sup>; Takaaki Koyanagi<sup>2</sup>; D Olds<sup>3</sup>; M Ouyang<sup>1</sup>; S Fayfar<sup>4</sup>; E O'Quinn<sup>5</sup>; M Lang<sup>6</sup>; Y Yang<sup>2</sup>; Y Lin<sup>2</sup>; B Khaykovich<sup>4</sup>; Y Katoh<sup>2</sup>; Julie Tucker<sup>7</sup>; J Trelewicz<sup>1</sup>; Lance Snead<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>Massachusetts Institute of Technology; <sup>5</sup>University of Tennessee Knoxville; <sup>6</sup>University of Tennessee Knoxville; <sup>7</sup>Oregon State University*

**8:45 AM**

**Nanostructural Characterization of Electron Beam Welded Reactor Pressure Vessel Steel via XANES and Nano-CT:** *Jasmyne Emerson<sup>1</sup>; Xianghui Xiao<sup>2</sup>; Elliot Marrero<sup>1</sup>; Grayson Nemets<sup>1</sup>; Janelle Wharry<sup>1</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Brookhaven National Laboratory*

**9:05 AM**

**Atomic-Scale Structural Analysis of Metastable Zirconia:** *Maik Lang<sup>1</sup>; Alexandre Solomon<sup>1</sup>; Eric O'Quinn<sup>1</sup>; Gianguido Baldinozzi<sup>2</sup>; Juejing Liu<sup>3</sup>; Xiaofeng Guo<sup>4</sup>; Joerg Neuefeind<sup>5</sup>; Christina Trautmann<sup>6</sup>; Rodney Ewing<sup>7</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>CNRS CentraleSupélec, Université Paris-Saclay; <sup>3</sup>Washington State University; <sup>4</sup>Washington State University; <sup>5</sup>Oak Ridge National Laboratory; <sup>6</sup>GSI Helmholtz Center; <sup>7</sup>Stanford University*

**9:25 AM Break**

**9:45 AM Invited**

**Correlative Multi-Modal Analysis of Nuclear Graphite Deformation Mechanisms:** *Thomas Zillhardt<sup>1</sup>; <sup>1</sup>Diamond Light Source*

**10:10 AM**

**Investigation of Local Defects in Ln-Doped UO<sub>2</sub>: Impact of Fabrication Condition and Lanthanide Type:** *Juejing Liu<sup>1</sup>; Shinhyo Bang<sup>1</sup>; Arjen van Veelen<sup>2</sup>; Joshua White<sup>2</sup>; Nicolas Dacheux<sup>3</sup>; Xiaofeng Guo<sup>1</sup>; <sup>1</sup>Washington State University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Institute Chemistry Séparative De Marcoule*

**10:30 AM**

**In-situ Synchrotron Diffraction Investigations of a Scalable, Non-Equilibrium Processing Route of ODS Steels for Nuclear Power:** *Zongyang Lyu<sup>1</sup>; Kevin Jacob<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Siddhartha Pathak<sup>1</sup>; Andrey Yakovenko<sup>2</sup>; Nicolas Argibay<sup>3</sup>; Jordan Tiarks<sup>3</sup>; Iver Anderson<sup>3</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Ames National Laboratory*

**10:50 AM**

**Revealing the Crystal Chemistry and Dissolution Kinetics of Doped Uranium Dioxide Nuclear Fuel:** *Lottie Harding<sup>1</sup>; Eleanor Lawrence Bright<sup>2</sup>; Christopher Bell<sup>1</sup>; Jude Laverock<sup>1</sup>; Tom Scott<sup>1</sup>; Anna Adamska<sup>3</sup>; Claire Corkhill<sup>1</sup>; Ross Springell<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>ESRF; <sup>3</sup>Sellafield Ltd*

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Steels in Extreme Environments — Steels Under Irradiation Environments / Steels Under Cryogenic Temperatures

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Hyunseok Oh, University of Wisconsin - Madison; Lawrence Cho, Colorado School of Mines; Jeongho Han, Hanyang University; Motomichi Koyama, Tohoku University; Peeyush Nandwana, Oak Ridge National Laboratory; Fnu Kasturi Narasimha Sasidhar, University of Wisconsin - Madison

**Tuesday AM | March 25, 2025**  
**168 | MGM Grand**

**Session Chairs:** Peeyush Nandwana, Oak Ridge National Laboratory; Hyunseok Oh, University of Wisconsin - Madison

#### 8:00 AM Keynote

**Steel's Gassing Problems and Ways to Solve Them:** *Ju Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

**8:30 AM Invited**

**Resilience of PM-HIP Steels in Extreme Irradiation Environments:** *Janelle Wharry<sup>1</sup>; Arya Chatterjee<sup>1</sup>; Soumita Mondal<sup>1</sup>; Saquib Bin Habib<sup>1</sup>; Grayson Nemets<sup>1</sup>; Elliot Marrero Jackson<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Maria Okuniewski<sup>1</sup>; Yu Lu<sup>2</sup>; Yaqiao Wu<sup>2</sup>; Donna Guillen<sup>3</sup>; Benjamin Sutton<sup>4</sup>; David Gandy<sup>4</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Electric Power Research Institute*

**8:50 AM Invited**

**Mechanical Performance of Laser Powder Bed Fusion 316H Stainless Steel Following Low-Dose Neutron Irradiation:** *Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory*

**9:10 AM Invited**

**Neutron Irradiation-Induced Performance Degradation of RAFM and ODS Steels:** *Arunodaya Bhattacharya<sup>1</sup>; <sup>1</sup>University of Birmingham*

**9:30 AM Invited**

**In situ Ion Irradiation Creep Testing of Austenitic and Ferritic-Martensitic Steels:** *Charles Hirst<sup>1</sup>; Mackenzie Warwick<sup>2</sup>; Wyatt Peterson<sup>2</sup>; Kevin Field<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of Michigan*

**9:50 AM Break**

**10:10 AM Invited**

**Tensile Deformation Behavior and Thermal Conductivity of Metallic Alloys Including Stainless Steels at Deep Cryogenic Temperature as Low as 4K:** *Young-Sang Na<sup>1</sup>; Young-Kyun Kim<sup>1</sup>; Sang-Hun Shim<sup>1</sup>; Seung-Min Jeon<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science*

**10:30 AM Invited**

**Design of Fe-xNi-yMn Martensitic Steels for Cryogenic Liquefied Gas Applications:** *Jeongho Han<sup>1</sup>; Hyun Wook Lee<sup>1</sup>; Hyo Joo Han<sup>1</sup>; Min-Ho Park<sup>2</sup>; Hyeong-Sub So<sup>2</sup>; <sup>1</sup>Hanyang University; <sup>2</sup>Hyundai Steel*



10:50 AM

**A Study on the Tensile Behavior of Fcc Ferrous Alloy Accompanied by Cryogenic Serrations at 4.2 K:** *Seon-Keun Oh*<sup>1</sup>; Jun-Ho Lee<sup>1</sup>; Ka-Ram Lim<sup>1</sup>; Young-Kyun Kim<sup>1</sup>; Young-Sang Na<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

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## MECHANICS OF MATERIALS

### Structure-Property Relationships in Molecular Crystal Deformation — Structure-Function Relationships and Hot Spots in High-Rate Deformation

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Daniel Bufford, Sandia National Laboratories; Sushmita Majumder, University of Minnesota-Twin Cities; Paul Ryan, Atomic Weapons Establishment; Judith Brown, Sandia National Laboratories; Nathan Mara, University of Minnesota; Raimundo Ho, AbbVie Inc.

**Tuesday AM | March 25, 2025**  
**365 | MGM Grand**

**Session Chairs:** Paul Ryan, Atomic Weapons Establishment; Mitchell Wood, Sandia National Laboratories

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**8:00 AM Invited**

**From Atoms to Constituent Models for Energetic Molecular Crystals:** *Mitchell Wood*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**8:30 AM**

**Multi-Scale Model for Describing the Thermo-Mechanical Behavior of Polycrystalline Energetic System Subjected to Dynamic Loadings:** *Benoit Revil-Baudard*<sup>1</sup>; <sup>1</sup>University of Arizona

**8:50 AM Invited**

**High-Fidelity Simulations of Shock to Detonation Transition:** *Marisol Koslowski*<sup>1</sup>; <sup>1</sup>Purdue University

**9:20 AM Invited**

**Quantitative Analysis of Granular Explosives Through Examination of the Compaction Manufacturing Process:** *Dimitrios Samaras*<sup>1</sup>; *Oliver Blackman*<sup>1</sup>; *Matthew Maisey*<sup>2</sup>; *Paul Ryan*<sup>2</sup>; *Soraia Pimenta*<sup>1</sup>; *Maria Charalambides*<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>AWE

**9:50 AM Break**

**10:05 AM Invited**

**Physical Aspects of Plasticity and Constitutive Modeling of Molecular Crystal HMX:** *Catalin Picu*<sup>1</sup>; *Zhaocheng Zhang*<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute

**10:35 AM**

**Multiscale Modeling of Material Strength for the Shock-to-Detonation Behavior in Heterogeneous PETN:** *James Stewart*<sup>1</sup>; *Mitchell Wood*<sup>1</sup>; *David Damm*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:55 AM**

**Plasticity and Heat Conversion of Energetic Materials Under Different Dynamic Loading Conditions:** *Chunyu Li*<sup>1</sup>; *Alejandro Strachan*<sup>1</sup>; <sup>1</sup>Purdue University

**11:15 AM Invited**

**Advances in Mesoscale Modelling of Highly Filled Composite Explosives:** *Daniel Lewis*<sup>1</sup>; *Paul Ryan*<sup>1</sup>; *David Williamson*<sup>2</sup>; *Maria Charalambides*<sup>3</sup>; *Muhammad Iqbal*<sup>3</sup>; *Joanna Li-Mayer*<sup>3</sup>; *Hari Arora*<sup>3</sup>; <sup>1</sup>AWE; <sup>2</sup>Cambridge University; <sup>3</sup>Imperial College London

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## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Relaxation and Deformation

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Soppa, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Tuesday AM | March 25, 2025**  
**367 | MGM Grand**

**Session Chairs:** A. Lindsay Greer, University of Cambridge; Miguel Costa, NASA JPL

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**8:00 AM Invited**

**Atomic Cluster Dynamics and Transport in Metallic Glasses:** *Birte Riechers*<sup>1</sup>; *Zengquan Wang*<sup>1</sup>; *Amlan Das*<sup>2</sup>; *Eric Dufresne*<sup>3</sup>; *Peter Derlet*<sup>4</sup>; *Robert Maass*<sup>1</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM); <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory; <sup>4</sup>Paul Scherrer Institute

**8:25 AM Invited**

**Atomic Cooperativity in Metallic Glass:** *Takeshi Egami*<sup>1</sup>; <sup>1</sup>University of Tennessee

**8:50 AM Invited**

**Complexity and Dynamics in Metallic Glasses: Linking Structure and Entropy:** *Florian Spieckermann*<sup>1</sup>; *Sepide Hadibeik*<sup>1</sup>; *Daniel Soppa*<sup>2</sup>; *Juergen Eckert*<sup>1</sup>; <sup>1</sup>University of Leoben; <sup>2</sup>Austrian Academy of Sciences

**9:15 AM Invited**

**Structural Dynamics of Glass-Forming Alloys: Mechanical and Microscopic Insights:** *Yajuan Duan*<sup>1</sup>; *Mehran Nabahat*<sup>1</sup>; *Guillem Eliasson*<sup>1</sup>; *Maximilian Frey*<sup>2</sup>; *Eloi Pineda*<sup>1</sup>; <sup>1</sup>Universitat Politècnica de Catalunya - BarcelonaTech; <sup>2</sup>Saarland University

**9:40 AM Break**

**10:00 AM Invited**

**Stress-Strain Curves for Hard-Sphere Colloidal Glasses: Experiments and Microscopic Analysis:** *Frans Spaepen*<sup>1</sup>; *Aidan Duncan*<sup>2</sup>; *J. Terdik*<sup>1</sup>; *Katharine Jensen*<sup>2</sup>; <sup>1</sup>Harvard University; <sup>2</sup>Williams College

**10:25 AM Invited**

**The Impact of Deformation or Relaxation on the Atomic Structure, Self-Diffusion and Atomic Mobility in Bulk Metallic Glasses:** *Gerhard Wilde*<sup>1</sup>; <sup>1</sup>University of Muenster

**10:50 AM**

**Ultrastable Metallic Glass by Room Temperature Aging:** *Yong Zhao*<sup>1</sup>; *Bo Zhang*<sup>2</sup>; *Baoshuang Shang*<sup>3</sup>; *Xing Tong*<sup>3</sup>; *Haibo Ke*<sup>3</sup>; *Haiyang Bai*<sup>1</sup>; *Wei-Hua Wang*<sup>1</sup>; <sup>1</sup>Songshan Lake Materials Laboratory; <sup>2</sup>Institute of Physics, Chinese Academy of Sciences; <sup>3</sup>Songshan Lake Materials Laboratory; <sup>4</sup>Hefei University of Technology; <sup>5</sup>Songshan Lake Materials Laboratory

## Thermodynamics and Kinetics of Alloys III — Practical Application and Theoretical Investigation

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Dilpuneet Aidhy, Clemson University; Bin Ouyang, Florida State University; Jicheng Zhao, University of Maryland

**Tuesday AM | March 25, 2025**  
**352 | MGM Grand**

**Session Chairs:** Maria Ioanna Tzini, Massachusetts Institute of Technology; Hyunseok Oh, University of Wisconsin - Madison

### 8:00 AM Invited

**Understanding the Thermodynamics and Kinetics of Microstructural Evolution and Resultant Mechanical Properties of Friction Stir Processed Al7xxx Alloy:** *Arun Devaraj*<sup>1</sup>; Zehao Li<sup>1</sup>; Tingkun Liu<sup>1</sup>; Rakesh Kamath<sup>2</sup>; Hrishikesh Das<sup>1</sup>; Shivakant Shukla<sup>1</sup>; Dileep Singh<sup>2</sup>; Mert Efe<sup>1</sup>; Piyush Upadhyay<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Argonne National Laboratory

### 8:30 AM Invited

**Design of a High Strength, High Electrical Conductivity and High Thermostability Twitch Aluminum Alloy:** *Maria Ioanna Tzini*<sup>1</sup>; Gregory Olson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

### 9:00 AM

**Effect of Sn Microalloying on the Precipitation Kinetics of L1<sub>2</sub>-Al<sub>3</sub>Zr in a Dilute Aluminum-Zirconium Alloy:** *Janet Meier*<sup>1</sup>; Dongwon Shin<sup>1</sup>; Jonathan Poplawsky<sup>1</sup>; Lawrence Allard<sup>1</sup>; Sumit Bahl<sup>1</sup>; James Haynes<sup>1</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 9:20 AM

**Understanding Aging Behavior in 6xxx Alloys Using Advanced Characterization Techniques:** *XiaoXiang Yu*<sup>1</sup>; Dieter Isheim<sup>2</sup>; Jeffrey Tschirhart<sup>1</sup>; Matthew Heyen<sup>1</sup>; John Carsley<sup>1</sup>; <sup>1</sup>Novelis Inc.; <sup>2</sup>Northwestern University

### 9:40 AM Break

### 9:50 AM Invited

**Integration of Large-Language Model and CALPHAD for Alloy Design Hypothesis Generation:** *Quanliang Liu*<sup>1</sup>; *Hyunseok Oh*<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison

### 10:20 AM Invited

**Site Preferences and Ordering in Nb-Al-M (M = Ni or Cu) Ternary Laves Phases:** *Wei Chen*<sup>1</sup>; <sup>1</sup>University at Buffalo

### 10:50 AM

**Effects of Chromium Addition on Microstructural Evolution of Wrought Al-Mn-Mg Alloys:** *Blaine Wheaeton*<sup>1</sup>; *Minju Kang*<sup>1</sup>; Kyle Dasch<sup>1</sup>; Jaeseuck Park<sup>1</sup>; DaeHoon Kang<sup>1</sup>; <sup>1</sup>Novelis

### 11:10 AM

**Coupled Experimental-Computational Study of Phase Transformations in Fe-Cr-Mo-Co-Ni Dual-Anneal Diffusion Multiples:** *Jessica Garnett*<sup>1</sup>; Ji-Cheng Zhao<sup>1</sup>; <sup>1</sup>University of Maryland

## Thermodynamics and Phase Diagrams Applied to Materials Design and Processing: An FMD/SMD Symposium Honoring Rainer Schmid-Fetzer — Computational Design of Materials and Microstructure Development with CALPHAD and Phase-Field Simulations

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Shuanglin Chen, CompuTherm LLC; Ji-Cheng Zhao, University of Connecticut; Ursula Kattner, National Institute of Standards and Technology; Greta Lindwall, KTH Royal Institute of Technology; Alan Luo, Ohio State University; Arthur Pelton, Ecole Polytechnique; John Agren, Royal Institute of Technology; Sinn-wen Chen, National Tsing Hua University

**Tuesday AM | March 25, 2025**  
**350 | MGM Grand**

**Session Chairs:** Ma Qian, Royal Melbourne Institute of Technology; Shih-kang Lin, National Cheng Kung University

### 8:00 AM Invited

**Computational Microstructural Engineering for Multi-Phase HEAs:** *Shiddhartha Ramprakash*<sup>1</sup>; *Shalini Roy Koneru*<sup>2</sup>; *Paraic O'Kelly*<sup>1</sup>; *Brian Welk*<sup>1</sup>; *Gopal Viswanathan*<sup>1</sup>; *Hamish Fraser*<sup>1</sup>; *Yunzhi Wang*<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>TCS Research

### 8:25 AM Invited

**Compositional Screening of Secondary Aluminum Alloys by Combining CALPHAD and Phase Field Simulations:** *Markus Apel*<sup>1</sup>; *Bernd Böttger*<sup>1</sup>; *Janin Eiken*<sup>1</sup>; <sup>1</sup>Access e.V.

### 8:50 AM Invited

**Utilizing Computational Thermodynamics to Design Phase Transformation, Strength, and Ductility of HEAs:** *Ying Yang*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 9:15 AM Invited

**CALPHAD-Assisted Process Optimization for Free-Cutting Steels:** *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University

### 9:40 AM Break

### 10:00 AM Invited

**Inputs From Computational Thermodynamics for Grain Size Prediction and Alloy Design:** *Mark Easton*<sup>1</sup>; *David StJohn*<sup>2</sup>; *Mark Gibson*<sup>3</sup>; *Ma Qian*<sup>1</sup>; <sup>1</sup>Royal Melbourne Institute of Technology; <sup>2</sup>University of Queensland; <sup>3</sup>CSIRO

### 10:25 AM Invited

**Prediction of as Cast Microstructure by Solidification Model Coupled with CALPHAD Database: Conventional Casting and Additive Manufacturing Process:** *In-Ho Jung*<sup>1</sup>; *Nishant Kumar*<sup>1</sup>; *Minho Yun*<sup>1</sup>; <sup>1</sup>Seoul National University

### 10:50 AM Invited

**Microstructure Design for Precipitation-Hardened Aluminium and Magnesium Alloys:** *Jian-Feng Nie*<sup>1</sup>; <sup>1</sup>Monash University

### 11:15 AM Invited

**Kinetics of Solid State Transformations Involving Intermetallic Phases:** *Frank Stein*<sup>1</sup>; <sup>1</sup>Max-Planck-Institut fuer Eisenforschung

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials — UQ & Plasticity II

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates; Saikumar Reddy Yeratapally, Science and Technology Corporation; Kirubel Teferra, Naval Research Laboratory; Diwakar Naragani, Cornell University

**Tuesday AM | March 25, 2025**  
**354 | MGM Grand**

**Session Chairs:** Saikumar Reddy Yeratapally, Science and Technology Corporation; George Weber, NASA Langley Research Center

**8:00 AM Invited**

**Substructure-Sensitive Crystal Plasticity: A Consistent Approach Across Materials, Loading Conditions and Temperatures:** *Gustavo Castelluccio*<sup>1</sup>; <sup>1</sup>Cranfield University

**8:40 AM Invited**

**Uncertainty-Aware Validation in Modeling of Metal Plasticity: Beyond Mean Squared Error:** *Aaron Tallman*<sup>1</sup>; <sup>1</sup>Florida International University

**9:00 AM**

**Probabilistic Global-Local Calibration of Crystal Plasticity Parameters for Additively Manufactured Metals Using Synthetic Data:** *Joshua Pribe*<sup>1</sup>; George Weber<sup>2</sup>; Saikumar Yeratapally<sup>3</sup>; Patrick Leser<sup>2</sup>; Brodan Richter<sup>2</sup>; Edward Glaessgen<sup>2</sup>; <sup>1</sup>Analytical Mechanics Associates; <sup>2</sup>NASA Langley Research Center; <sup>3</sup>Science and Technology Corporation

**9:20 AM Break**

**9:40 AM**

**A Constitutive Framework for Modeling Dynamic Recrystallization in Pure Copper:** *Andrew Ruggiero*<sup>1</sup>; <sup>1</sup>University of Cassino and Southern Lazio

**10:00 AM**

**Uncertainty Quantification of Crystal Plasticity Parameters Using ExaConstit:** *Venkata Sai Harshit Gaddam*<sup>1</sup>; Robert Carson<sup>2</sup>; Leonidas Zisis<sup>1</sup>; James Belak<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Lawrence Livermore National Laboratory

## SPECIAL TOPICS

### TMS2025 All-Conference Plenary — All-Conference Plenary

**Tuesday PM | March 25, 2025**  
**120 | MGM Grand**

**Session Chair:** Srinivas Chada, General Dynamics Mission Systems

**12:00 PM Introductory Comments**

**12:05 PM Plenary**

**From Finite to Infinite: Closing the Loop on Critical Minerals:** *Emily Molstad*<sup>1</sup>; <sup>1</sup>VALIS Insights

**12:45 PM Question and Answer Period**

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### 2D Materials – Preparation, Properties, Modeling & Applications — Preparation, Properties, Modeling & Applications II

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nuggehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Tuesday PM | March 25, 2025**  
**362 | MGM Grand**

**Session Chairs:** Ramana Chintalapalle, University of Texas at El Paso; Sufian Abedrabbo, Khalifa University

**2:30 PM Introductory Comments**

**2:40 PM Invited**

**Modeling Intercalation of 2D Metals in Epitaxial Graphene:** *Qian Mao*<sup>1</sup>; Malgorzata Kowalik<sup>1</sup>; Nadire Nayir<sup>2</sup>; Adri van Duin<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Istanbul Technical University

**3:00 PM Invited**

**Phase-Field Modeling of 2D Materials Growth During Chemical Vapor Deposition:** *Yanzhou Ji*<sup>1</sup>; <sup>1</sup>Ohio State University

**3:20 PM Keynote**

**Solid-State van der Waals Solids: From Pristine Crystalline-Quality Films to Quasi-Amorphous Ensembles for Optoelectronics and Sensors:** *Anupama Kaul*<sup>1</sup>; <sup>1</sup>University of North Texas

**3:45 PM Invited**

**Scalable 2D Semiconductor-Based Field Effect Transistor Nanosensor for Emerging Contaminants Detection:** Md Mohidul Alam Sabuj<sup>1</sup>; Sufian Abedrabbo<sup>2</sup>; Mengqiang Zhao<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology; <sup>2</sup>Khalifa University

**4:05 PM Break**

**4:15 PM Invited**

**Strain-Induced Moiré Patterns in Non-Twisted 2D Materials: Evolution Mechanism and Interface Dynamics:** *Hesam Askari*<sup>1</sup>; Aditya Dey<sup>1</sup>; <sup>1</sup>University of Rochester

**4:35 PM**

**Atomic and Electronic Structure of Si-Ge Quantum Wells:** *Siba Sundar Sahoo*<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University

**4:55 PM Keynote**

**Investigating the “Stiffness of Water” in Ti3C2Tx MXenes via Modulated Nano Indentation:** *Remi Dingreville*<sup>1</sup>; Ryan Khan<sup>1</sup>; Frank Delrio<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**5:20 PM Invited**

**Investigation of Layer Stacking in 2D Material Polymorphs and Heterostructures:** *Danielle Reifsnnyder Hickey*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**5:40 PM Invited**

**Matrix-Assisted Pulsed Laser Evaporation of Drug-Containing Coatings:** Andrew Sachan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>University of North Carolina

## ADDITIVE MANUFACTURING

### A Career in Powder Processing and Additive Manufacturing: A MPMD Symposium Honoring David Bourell — Sinter-Based Additive Processing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

**Program Organizers:** Paul Prichard, Oak Ridge National Laboratory; Allison Beese, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

**Tuesday PM | March 25, 2025**  
**309 | MGM Grand**

**Session Chair:** Paul Prichard, Oak Ridge National Laboratory

**2:30 PM Question and Answer Period:** Dave Bourell has witnessed firsthand the opportunities and challenges in the growth of the powder metallurgy and additive manufacturing processes. Brent Stucker will moderate a Q&A session to discuss past innovations and future potential developments.

**3:00 PM**

**Evaluation of Green State Anisotropy in Parts Produced by Binder Jetting, Via Machine Learning Enhanced Discrete Element Modelling:** *Thomas Grippi*<sup>1</sup>; Runjian Jiang<sup>1</sup>; Andrii Maximenko<sup>1</sup>; John Kang<sup>1</sup>; Elisa Torresani<sup>1</sup>; Eugene Olevsky<sup>1</sup>; <sup>1</sup>San Diego State University

**3:20 PM**

**From Binder Jet Printing to Sintering of Fully-Dense, Controlled-Irregular Copper Powder:** *Mahsa Beyk Khorasani*<sup>1</sup>; Markus Chmielus<sup>1</sup>; John Barnes<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Powder Metal Works

**3:40 PM**

**Fabrication of Open Porous Magnesium Scaffold Using Rapid Tooling Method for Orthopedic Applications:** Abhishek Kansal<sup>1</sup>; Akshay Dvivedi<sup>1</sup>; Pradeep Kumar<sup>1</sup>; <sup>1</sup>IIT Rookree

**4:00 PM Break**

**4:20 PM**

**Dual Concentric Ring Atomization Gas Die to Improve Gas Atomization Efficiency for SFF/AM Metal Powder Feedstocks:** *Iver Anderson*<sup>1</sup>; Franz Hernandez<sup>1</sup>; Tim Prost<sup>2</sup>; David Byrd<sup>1</sup>; Trevor Riedemann<sup>1</sup>; Jordan Tiarks<sup>1</sup>; <sup>1</sup>Iowa State University Ames Laboratory; <sup>2</sup>Kansas City National Security Campus-Honeywell

**4:40 PM**

**Cr and Al Diffusion Coatings for Improved Corrosion Resistance of AM Surfaces:** *Emma White*<sup>1</sup>; Ceyhan Oskay<sup>1</sup>; Michael Kerbstadt<sup>1</sup>; Clara Schlereth<sup>1</sup>; Mathias Galetz<sup>1</sup>; <sup>1</sup>DECHEMA Research Institute

**5:00 PM**

**Temperature Dependent Experimental and Analytical Evaluation of Thermal Conductivity for Metallic Powder for Additive Manufacturing:** *Leila Ladan*<sup>1</sup>; Jafar Razmi<sup>1</sup>; <sup>1</sup>Arizona State University

**5:20 PM**

**Failure Phenomena of Additively Manufactured Ni-Base Superalloys at Various Temperatures under Static and Cyclic Loadings:** *Shuai Shao*<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

## SPECIAL TOPICS

### Acta Materialia Symposium — Acta Materialia Award Session

**Program Organizer:** Carolyn Hansson, University of Waterloo

**Tuesday PM | March 25, 2025**  
**170 | MGM Grand**

**Session Chair:** Carolyn Hansson, University of Waterloo

**2:30 PM Introductory Comments**

**2:40 PM Presentation of Acta Student Awards**

**3:00 PM Invited**

**Acta Materialia Gold Medal Lecture: Journey to the Center of the Earth: Using High Power Lasers to Explore Extreme Regimes:** *Marc Meyers*<sup>1</sup>; Gaia Righi<sup>2</sup>; Yong-Jae Kim<sup>3</sup>; Camelia Stan<sup>3</sup>; Robert Rudd<sup>3</sup>; Bruce Remington<sup>3</sup>; Christopher Wehrenberg<sup>3</sup>; Hye-Sook Park<sup>3</sup>; Arianna Gleason<sup>4</sup>; Eduardo Bringas<sup>5</sup>; Carlos Ruestes<sup>6</sup>; <sup>1</sup>University of California, San Diego; <sup>2</sup>University of California San Diego; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>Stanford Linear Accelerator; <sup>5</sup>Conicet and University of Mendoza; <sup>6</sup>Technical University of Madrid

**3:20 PM Question and Answer Period**

**3:30 PM Invited**

**Acta Materialia Silver Medal Lecture: Stress State's Controlling Role in Deformation and Transformation of Rare-Earth Orthophosphate Ceramics:** *Corinne Packard*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**3:50 PM Question and Answer Period**

**4:00 PM Invited**

**Acta Materialia Hollomon Award for Materials and Society: Water-Activated Polymers to Mitigate Growing Global Challenges:** *Richard Spontak*<sup>1</sup>; <sup>1</sup>North Carolina State University

**4:20 PM Question and Answer Period**

**4:30 PM Brief break to prepare for reception**

**4:40 PM Wine and Cheese Reception with Posters Student Award Winners in Acta Materialia Symposium:** Pedro Borges,

"Ab Initio Study of Local Lattice Distortions and the Structural Instabilities in bcc Nb-Ta-Ti-Hf High-Entropy Alloys"; Ni Cheng, "A Tumor Microenvironment-Responsive Core-Shell Tecto Dendrimer Nanoplatfrom for Magnetic Resonance Imaging-Guided and Cuproptosis-Promoted Chemo-Chemodynamic Therapy"; Antje Dollmann, "Temporal Sequence of Deformation Twinning in CoCrNi Under Tribological Load"; Johanna-Maria Frenck, "Interrelationship of Stress-Induced Martensitic Transformation and Pitting Corrosion in Iron-Based Shape Memory Alloys"; Wenjiang Huang, "High-Throughput Machine Learning - Kinetic Monte Carlo Framework for Diffusion Studies in Equiatomic and Non-Equiatomic FeNiCrCoCu High-Entropy Alloys."; Rae Eon Kim, "Superior Tensile Properties and Formability Synergy of High-Entropy Alloys Through Inverse-Gradient Structures"; Janith Wannin, "Columnar Grain Morphology and Mechanical Anisotropy of Face-Centered Cubic Metals and Alloys"; Di Xie, "Identifying the Effect of Coherent Precipitates on the Deformation Mechanisms by In Situ Neutron Diffraction in an Extruded Magnesium Alloy Under Low-Cycle Fatigue Conditions"; Jingxiao (Jane) Zhong, "Functional Non-Uniformity of Periodontal Ligaments Tunes Mechanobiological Stimuli Across Soft- and Hard-Tissue Interfaces"; and Hyeonseok Kwon, "High-Density Nanoprecipitates and Phase Reversion via Maraging Enable Ultrastrong Yet Strain-Hardenable Medium-Entropy Alloy"



## ADDITIVE MANUFACTURING

### Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — From Process Modeling to Next-Generation Structural Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Laverna, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

**Tuesday PM | March 25, 2025**  
**311 | MGM Grand**

**Session Chairs:** Charles-Andre Gandin, Mines Paris | PSL University; Marie Charpagne, University of Illinois

#### 2:30 PM Invited

**Grain Structure Formation During Additive Manufacturing:** Alexander F. Chadwick<sup>1</sup>; Juan Santos Macias<sup>2</sup>; Arash Samaei<sup>1</sup>; Manas Upadhyay<sup>2</sup>; Gregory Wagner<sup>1</sup>; *Peter Voorhees*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Ecole Polytechnique

#### 3:00 PM Invited

**Modeling of L-PBF from Microstructures to Properties:** *Charles-Andre Gandin*<sup>1</sup>; Gildas Guillemot<sup>1</sup>; Yancheng Zhang<sup>1</sup>; Michel Bellet<sup>1</sup>; <sup>1</sup>PSL University

#### 3:30 PM

**Atomistic Simulations of Surface Energies in Immiscible Alloys to Promote Inward Marangoni Convection:** *Kenji Choy-Hernandez*<sup>2</sup>; Pascal Bellon<sup>1</sup>; <sup>1</sup>University of Illinois, Urbana-Champaign

#### 3:50 PM Break

#### 4:05 PM

**An Additively Manufactured Al-Zr-Ce-Cu Conductor Alloy with High Strength and Creep Resistance:** *Jovid Rakhmonov*<sup>1</sup>; Jonathan Poplawsky<sup>1</sup>; Lawrence Allard<sup>1</sup>; Alice Perrin<sup>1</sup>; Sumit Bahl<sup>1</sup>; Allen Haynes<sup>1</sup>; Alex Plotkowski<sup>1</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 4:25 PM

**Design of Additively Manufactured Al-Ni-Zr-Er Alloys with Enhanced Thermally Stable Strength and Ductility:** *Zhaoxuan Ge*<sup>2</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 4:45 PM

**Next Generation of Structural Materials Through Additive Manufacturing:** *Punit Kumar*<sup>1</sup>; David Cook<sup>2</sup>; Robert Ritchie<sup>2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>University of California, Berkeley

#### 5:05 PM Invited

**Laser Powder Directed Energy Deposition (LP-DED) of Single- and Multi-Layer HfB<sub>2</sub> Coating:** *Shir Andreev Batat*<sup>1</sup>; Vladimir Popov<sup>1</sup>; Zlatomir Apostolov Apostolov<sup>2</sup>; Noam Eliaz<sup>1</sup>; <sup>1</sup>Tel Aviv University; <sup>2</sup>Air Force Research Laboratory

#### 5:25 PM

**In-Situ Manufacturing of SiC-Si Composites Using Laser Powder Directed Energy Deposition:** *Vladimir Popov*<sup>1</sup>; Shir Andreev Batat<sup>1</sup>; Noam Eliaz<sup>1</sup>; <sup>1</sup>Tel Aviv University

## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Lightweight Metals and Materials

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

**Tuesday PM | March 25, 2025**  
**315 | MGM Grand**

**Session Chair:** Riccardo Casati, Politecnico Di Milano

#### 2:30 PM Invited

**Sustainable Production of 5xxx Aluminum Alloy Powders Via Inert Gas Atomization:** Federico Gobber<sup>1</sup>; Antonio Pennacchio<sup>1</sup>; *Marco Actis Grande*<sup>1</sup>; <sup>1</sup>Politecnico Di Torino

#### 3:00 PM

**Elucidating Laser Processing-Property Relationship in Aluminum Nitride Towards Laser Powder Bed Fusion:** *Rachel McNamara*<sup>1</sup>; Ji Ma<sup>1</sup>; <sup>1</sup>University of Virginia

#### 3:20 PM

**Fabrication and Characterization of Aluminum-Copper Functionally Graded Materials Using Wire Arc Additive Manufacturing:** Marwan El-Husseiny<sup>1</sup>; Ehab El-Danaf<sup>1</sup>; *Hanadi Salem*<sup>2</sup>; <sup>1</sup>Cairo University; <sup>2</sup>American University in Cairo

#### 3:40 PM

**Sinter-Based Additive Manufacturing of Titanium:** *Pei Sun*<sup>1</sup>; Nathan Jump<sup>1</sup>; Cole Walker<sup>1</sup>; Z.Zak Fang<sup>1</sup>; Jiaqi Jin<sup>1</sup>; <sup>1</sup>University of Utah

#### 4:00 PM Break

#### 4:15 PM

**Al Alloys with Low Coefficient of Thermal Expansion Produced by Laser Powder Bed Fusion:** Giorgia Lupi<sup>1</sup>; Luca Mariotti<sup>1</sup>; Luca Patriarca<sup>1</sup>; Stefano Beretta<sup>1</sup>; Antonio Pennacchio<sup>1</sup>; Federico Gobber<sup>1</sup>; Marco Actis Grande<sup>1</sup>; Romano Iazurlo<sup>1</sup>; *Riccardo Casati*<sup>1</sup>; <sup>1</sup>Politecnico Di Milano

#### 4:35 PM

**A Novel Method to Enhance The Characteristics of 3d Printed Polymer Patterns for Rapid Investment Casting Process:** Thomas Mathew<sup>1</sup>; Bethala Sujith<sup>1</sup>; *Dagarapu Karunakar*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

#### 4:55 PM

**Real-Time Pore Dynamics During Additive Manufacturing of Oxidized Powders Using Correlative X-Ray and Optical Imaging:** *Kwan Kim*<sup>1</sup>; Samy Hocine<sup>1</sup>; Wei Li<sup>1</sup>; Shishira Bhagavath<sup>1</sup>; Anna Getley<sup>1</sup>; Rubén Lambert-García<sup>1</sup>; Elena Ruckh<sup>1</sup>; Maureen Fitzpatrick<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Marta Majkut<sup>2</sup>; Alexander Rack<sup>2</sup>; Joseph Oluleke<sup>3</sup>; Peter Lee<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>European Synchrotron Radiation Facility; <sup>3</sup>Carpenter Additive

#### 5:15 PM

**Innovative Additive Manufacturing of MOF-Based, Bulk Metallic Hydrides for Advanced Fission Power Systems:** *Timothy Defranco*<sup>1</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan

## ADDITIVE MANUFACTURING

### Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction — Joint Session with Fatigue in Materials Symposium: Microstructure-Based Fatigue Studies on Additive-Manufactured Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Nik Hrabe, National Institute of Standards and Technology; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Tuesday PM | March 25, 2025**  
**317 | MGM Grand**

**Session Chairs:** Nima Shamsaei, Auburn University; Orion Kafka, National Institute of Standards and Technology

#### 2:30 PM Invited

**Predicting Fracture Location in Additively Manufactured Metals Containing Porosity and Surface Defects:** Elliott Marsden<sup>1</sup>; Brian Phung<sup>1</sup>; Mira Terry<sup>1</sup>; *Ashley Spear*<sup>1</sup>; <sup>1</sup>University of Utah

#### 2:50 PM

**Fatigue Life Prediction in Powder Bed Fusion Method Using Modified Goodman Diagram with Residual Stress and Anomalies Weighting: Incorporating Strain Hardening, Cyclic Hardening, and Bauschinger Effect:** *Hamed Hosseinzadeh*<sup>1</sup>; <sup>1</sup>Manufacturing Technology Project

#### 3:10 PM

**A Strong and Fracture-Resistant High-Entropy Alloy Intrinsically Toughened by 3D-Printing:** *Punit Kumar*<sup>1</sup>; Sheng Huang<sup>2</sup>; David Cook<sup>3</sup>; Kai Chen<sup>4</sup>; Upadrasta Ramamurty<sup>5</sup>; Xipeng Tan<sup>6</sup>; Robert Ritchie<sup>3</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>Massachusetts Institute of Technology; <sup>3</sup>University of California, Berkeley; <sup>4</sup>Xi'an Jiaotong University; <sup>5</sup>Nanyang Technological University; <sup>6</sup>National University of Singapore

#### 3:30 PM

**Modeling the Effects of Transient Liquid Phase Surface Smoothing on the Fatigue Performance of AM Ti-6Al-4V Microlattices:** *Kyle Jung*<sup>1</sup>; Kendall Yetter<sup>2</sup>; William LePage<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Tulsa

#### 3:50 PM Break

#### 4:10 PM

**As-Printed Surface Roughness Analysis for Predicting Minimum Fatigue Life of Additively Manufactured Parts:** *Sushant Jha*<sup>1</sup>; Matthew Krug<sup>2</sup>; Patrick Golden<sup>2</sup>; Reji John<sup>2</sup>; <sup>1</sup>University of Dayton Research Institute; <sup>2</sup>US Air Force Research Laboratory

#### 4:30 PM Invited

**Synergistic Effects of Defects and Microstructure on Fatigue Crack Initiation in Additively Manufactured Materials:** *Shuai Shao*<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

#### 4:50 PM

**Refining the Fatigue and Toughness-Based Process Window and Understanding Long Crack Growth Behavior in LPBF Ti64 Specimens Fabricated Across PV Space:** *Brett Ley*<sup>1</sup>; Austin Ngo<sup>1</sup>; Oluwatimilolu Adeeko<sup>1</sup>; Anthony Rollett<sup>2</sup>; Christian Gobert<sup>2</sup>; Jack Beuth<sup>2</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>Carnegie Mellon University

#### 5:10 PM

**Fracture-Based Fatigue Life Prediction of Additively Manufactured Parts with As-Built Surface Roughness:** *Leland Shimizu*<sup>1</sup>; Xueyong Qu<sup>1</sup>; Jacob Rome<sup>1</sup>; <sup>1</sup>The Aerospace Corporation

#### 5:30 PM

**PRISMS-Fatigue Framework: Applications for Additive Manufacturing:** *Mohammadreza Yaghoobi*<sup>1</sup>; Krzysztof S. Stopka<sup>2</sup>; John E. Allison<sup>1</sup>; David L. McDowell<sup>3</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Purdue University; <sup>3</sup>Georgia Institute of Technology

## ADDITIVE MANUFACTURING

### Additive Manufacturing Materials in Energy Environments II — Accelerated Testing and Qualification

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Pacific Northwest National Laboratory; Subhashish Meher, Pacific Northwest National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Purdue University; Yi Xie, Peking University; Michael Kirka, Oak Ridge National Laboratory; Mohan Sai Kiran Nartu, Pacific Northwest National Laboratory

**Tuesday PM | March 25, 2025**  
**301 | MGM Grand**

**Session Chairs:** Xiaoyuan Lou, Purdue University; Michael Kirka, Oak Ridge National Laboratory

#### 2:30 PM

**Accelerating the Evaluation of Creep Properties in Laser Powder Bed Fusion Processed Haynes 230 and Inconel 738:** *Daniel McConville*<sup>1</sup>; Ben Rafferty<sup>2</sup>; Stan Baldwin<sup>2</sup>; Kevin Eckes<sup>2</sup>; Jeremy Iten<sup>2</sup>; Amy Clarke<sup>1</sup>; Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Elementum 3D

#### 2:50 PM Invited

**Combining X-Ray Computed Tomography and Microstructure Characterization to Elucidate the Creep Behavior of LPBF 282 Alloy:** *Sebastien Dryepondt*<sup>1</sup>; Holden Hyer<sup>1</sup>; Amir Ziabari<sup>1</sup>; Amanda Heimbrook<sup>1</sup>; Franklin Rahul<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:15 PM

**Characterization of Novel Friction Stir Layer Processed Al10Cr12Fe35Mn23Ni20 High Entropy Alloy for Nuclear Applications:** *Mohan Sai Kiran Nartu*<sup>1</sup>; David Garcia<sup>1</sup>; Subhashish Meher<sup>1</sup>; Tianhao Wang<sup>1</sup>; Jorge F Dos Santos<sup>1</sup>; Isabella Van Rooyen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory (Pnnl)

#### 3:35 PM

**Investigation on the Processing Parameter Effect on Microstructural Evolution of YTiO- Reinforced SS 316L Nanocomposites Via Wire-Powder Fed Directed Energy Deposition:** *Seongun Yang*<sup>1</sup>; Kwangtae Son<sup>1</sup>; Zhengming Wang<sup>1</sup>; Tyler Finch<sup>1</sup>; Donghua Xu<sup>1</sup>; Chih-hung Chang<sup>1</sup>; Marc Albert<sup>2</sup>; Somayeh Pasebani<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Electric Power Research Institute

#### 3:55 PM

**Microstructure Evolution and Mechanical Behavior of an Additively Manufactured High Strength Austenitic Stainless Steel:** *Srinivas Aditya Mantri*<sup>1</sup>; Xuan Zhang<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; Lin Gao<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

4:15 PM Break

4:25 PM

**An Additively Manufactured IN718 Strengthened by CSL Boundaries with High-Temperature Tensile and Short-Term Creep Resistance up to 800°C:** *Marcus Lam*<sup>1</sup>; Anthony Koumpias<sup>2</sup>; Amberlee Haselhuhn<sup>2</sup>; Andrew Wessman<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>LIFT

4:45 PM

**Fabrication of Nanostructured Alumina Forming Austenitic Alloys via Conventional and Advanced Manufacturing Approaches:** *Caleb Massey*<sup>1</sup>; Tim Graening<sup>1</sup>; Holden Hyer<sup>1</sup>; David Hoelzer<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

5:05 PM Invited

**High Performance Computing-Enabled Laser Powder Bed Fusion (L-PBF) Manufacturing of High Gamma Prime Alloy:** *Jiahao Cheng*<sup>1</sup>; Ning Zhou<sup>2</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Tao Wang<sup>2</sup>; Gian Colombo<sup>2</sup>; Austin Dicus<sup>2</sup>; Stephane Forsik<sup>2</sup>; Mario Epler<sup>2</sup>; Michael Kirka<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Carpenter Technology Corporation

5:25 PM

**An Experimental Qualification Pipeline for the LPBF Fabrication of Complex Thermo-Fluidic Components for High-Temperature and High-Pressure Heat Exchange Applications:** *Junwon Seo*<sup>1</sup>; Nicholas Lamprinakos<sup>1</sup>; Yu-Tsen Yi<sup>1</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Tungsten and Tungsten-Based Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Faramarz Zarandi, RTX Corporation; Jeffrey Sowards, NASA Marshall Space Flight Center; Antonio Ramirez, Ohio State University; Eric Brizes, NASA Glenn Research Center; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias; Ian McCue, Northwestern University; Zachary Sims, Small Business Consulting Corporation

Tuesday PM | March 25, 2025

316 | MGM Grand

**Session Chairs:** Ian McCue, Northwestern University; Zachary Sims, University of Tennessee, Knoxville

2:30 PM Invited

**Impact of Ceramic Nanoparticle Additions on the Properties of Additive Manufactured Refractory Metals:** *Carly Romnes*<sup>1</sup>; Toren Hobbs<sup>1</sup>; Fernando Reyes Tirado<sup>1</sup>; Jeffrey Sowards<sup>1</sup>; Omar Mireles<sup>2</sup>; James Stubbins<sup>3</sup>; <sup>1</sup>NASA Marshall Space Flight Center; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of Illinois Urbana-Champaign

3:00 PM

**Enhanced Development of Tungsten Alloy Plasma Facing Materials:** *Hyeji Im*<sup>1</sup>; Jason Trelewicz<sup>2</sup>; Ian McCue<sup>3</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>Stony Brook University; <sup>3</sup>Northwestern University

3:20 PM

**Dense and Crack-Free Pure Tungsten Manufactured by Electron Beam Powder Bed Fusion Using Chemically Reduced Powder:** *Arun Ramanathan Balachandramurthi*<sup>1</sup>; *Ian Crawford*<sup>1</sup>; Gloria Graf<sup>2</sup>; Ulf Ackelid<sup>1</sup>; Ulric Ljungblad<sup>1</sup>; Greta Lindwall<sup>2</sup>; <sup>1</sup>Freemelt AB; <sup>2</sup>KTH Royal Institute of Technology

3:40 PM

**Impact of Stochastic Scanning Strategies in Electron Beam Powder Bed Fusion of Tungsten Alloys:** *Shashank Sharma*<sup>1</sup>; Sheldon Dowden<sup>1</sup>; Zane Hughes<sup>1</sup>; Rohit Randhavan<sup>1</sup>; Krishna Verma<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

4:00 PM Break

4:20 PM

**Direct Energy Deposition of Tungsten by High Repetition High Power Femtosecond Laser:** *Anming Hu*<sup>1</sup>; <sup>1</sup>University of Tennessee

4:40 PM

**Microstructural Evolution in Laser Powder Bed Fusion Processed W and W-Re:** *Krishna Kamlesh Verma*<sup>1</sup>; KV Mani Krishna<sup>2</sup>; Shashank Sharma<sup>1</sup>; M Radhakrishnan<sup>1</sup>; Jitesh Kumar<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Bhabha Atomic Research Center

5:00 PM

**Prototype Elements Manufactured from Molybdenum and Tungsten Modified with Rhenium Using LPBF Technology:** *Adriana Wrona*<sup>1</sup>; Adrian Kukofka<sup>2</sup>; Anna Czech<sup>1</sup>; Marcin Lis<sup>1</sup>; Tomasz Palacz<sup>3</sup>; <sup>1</sup>Lukasiewicz Research Network - Imn; <sup>2</sup>Progresja S.A.; <sup>3</sup>Lifero Sp. z o. o.

5:20 PM

**WC-Based Functionally Graded Materials Fabricated by Laser Powder Directed Energy Deposition:** *Eleonora Santecchia*<sup>1</sup>; Gabriele Grima<sup>1</sup>; Alberto Santoni<sup>1</sup>; Maria Laura Gatto<sup>1</sup>; Marcello Cabibbo<sup>1</sup>; Riccardo Luigi Di Mattia<sup>1</sup>; Vincenzo Foti<sup>1</sup>; Stefano Spigarelli<sup>1</sup>; <sup>1</sup>Università Politecnica delle Marche

5:40 PM

**Thermo-Mechanical Testing Approach of Additive Manufactured Ultra-High Temperature Refractory Alloys:** *Kelly Orsborn*<sup>1</sup>; *Kaue Riffel*<sup>1</sup>; Eric Brizes<sup>2</sup>; Fernando Tirado<sup>3</sup>; Omar Mireles<sup>4</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>Nasa Marshall Space Flight Center; <sup>4</sup>Los Alamos National Laboratory

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Iron, Nickel, and Aluminum-Based Alloys I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Sezer Ozerinc, University of Illinois at Urbana-Champaign; Yu Zou, University of Toronto; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Pacific Northwest National Laboratory; Keivan Davami, University of Alabama

Tuesday PM | March 25, 2025

310 | MGM Grand

**Session Chairs:** Wendy Gu, Stanford University; Meysam Haghsheenas, University of Toledo

2:30 PM Invited

**Static and Fatigue Failure Mechanisms Governed by Multi-scale Dynamic Structural Evolution in Additive Friction Stir Deposition:** *Hang Yu*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute And State University

3:10 PM

**Influence of Additive Friction Stir Deposition Process Parameters on Enhanced Mechanical Performance of IN625:** *Shreyash Patil*<sup>1</sup>; Madhavan Radhakrishnan<sup>1</sup>; Shashank Sharma<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Rajarsh Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University Of North Texas, Denton

3:30 PM

**Analyzing Hydrogen Diffusivity and Its Impact on Mechanical Behavior in Additively Manufactured FCC Alloys Using Nanoindentation:** *Dong-Hyun Lee*<sup>1</sup>; Yun Hee An<sup>1</sup>; Yakai Zhao<sup>1</sup>; Ju Hyeok Lee<sup>1</sup>; Hyun You Kim<sup>1</sup>; You Sub Kim<sup>1</sup>; Soo Yeol Lee<sup>1</sup>; <sup>1</sup>Chungnam National University

3:50 PM

**Investigating the Impact of Part Dimensions on Microstructural Integrity and Mechanical Performances in Optimized L-PBF Process:** *Soung Yeoul Ahn*<sup>1</sup>; Sang Guk Jeong<sup>1</sup>; Man Jae SaGong<sup>1</sup>; Gitaek Lee<sup>1</sup>; Eun Seong Kim<sup>1</sup>; Hyojin Park<sup>1</sup>; Jung-Wook Cho<sup>1</sup>; Jung Gi Kim<sup>2</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>POSTECH; <sup>2</sup>Gyeongsang National University

4:10 PM Break

4:30 PM Invited

**Length-Scale Phenomena in Creep Behavior of Laser Powder Bed Fusion (LPBF) 316H Stainless Steel:** *Xuan Zhang*<sup>1</sup>; Lin Gao<sup>1</sup>; Ashale Fernando<sup>2</sup>; Gareth Douglas<sup>2</sup>; Bo Chen<sup>3</sup>; Caleb Massey<sup>4</sup>; Mark Messner<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>University of Leicester; <sup>3</sup>University of Southampton; <sup>4</sup>Oak Ridge National Laboratory

5:10 PM

**Uniaxial-Load Stitch Modalities in Multi-Laser Powder Bed Fusion:** *Jonathan Priedeman*<sup>1</sup>; Laura Dial<sup>1</sup>; Tyler Borchers<sup>2</sup>; <sup>1</sup>GE Aerospace Research; <sup>2</sup>GE Aerospace

5:30 PM

**Hard-Facing of Worn-Out Railway Sections with High Mn-Steel Using Wire Arc Additive Repair:** *Hanadi Salem*<sup>1</sup>; Joanne Ishak<sup>2</sup>; Omar El Saadany<sup>1</sup>; Hanaa Mohamed<sup>1</sup>; Yasmin Tawfik<sup>1</sup>; Bassel El-Garaihy<sup>1</sup>; <sup>1</sup>American University in Cairo; <sup>2</sup>Universities of Canada in Egypt

## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — Crystal Plasticity and XRD

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

Tuesday PM | March 25, 2025  
122 | MGM Grand

**Session Chairs:** Carlos Tome, Los Alamos National Laboratory; Thomas Kohne, Technical University of Denmark

2:30 PM

**A Crystal Plasticity Model with Intragranular Heterogeneity — Application to Steel Forming:** *Carlos Tome*<sup>1</sup>; Anirban Patra<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Indian Institute of Technology Bombay

2:50 PM

**Slip System Activities in BCC Ta Revealed Via Nanoindentation and Micropillar Compression: Experiments and Crystal Plasticity Simulations:** *Sajjad Izadpanah*<sup>1</sup>; Muthanna Kareem<sup>1</sup>; Olajesu Olanrewaju<sup>2</sup>; Kevin Jacob<sup>2</sup>; Siddhartha Pathak<sup>2</sup>; Curt Bronkhorst<sup>3</sup>; Marko Knezevic<sup>1</sup>; <sup>1</sup>University of New Hampshire; <sup>2</sup>Iowa State University; <sup>3</sup>University of Wisconsin-Madison

3:10 PM

**Fully Coupled Thermomechanical Crystal Plasticity Framework for Analyzing Micromechanical Fields in Additive Manufacturing:** *Anderson Nascimento*<sup>1</sup>; James Lamb<sup>1</sup>; Kaitlyn Mullin<sup>1</sup>; Evan Raeker<sup>1</sup>; Tresa Pollock<sup>1</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

3:30 PM

**Modeling of the Thermo-Mechanical Response and Texture Evolution of AA6016 and Uranium Using a Strain Gradient Elasto-Plastic Self-Consistent Formulation:** *Zhangxi Feng*<sup>1</sup>; Rodney McCabe<sup>1</sup>; Ricardo Lebensohn<sup>1</sup>; Marko Knezevic<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of New Hampshire

3:50 PM Break

4:10 PM

**Evolution of Internal Strain During Cyclic Deformation of Aluminum Studied by High-Resolution Reciprocal Space Mapping and Large-Strain Elasto-Viscoplastic Fast Fourier Transformation Simulation:** *Thomas Kohne*<sup>1</sup>; Miroslav Zecevic<sup>2</sup>; Zoltan Hegedues<sup>3</sup>; Ulrich Lienert<sup>3</sup>; Ricardo Lebensohn<sup>2</sup>; Wolfgang Pantleon<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Deutsches Elektronensynchrotron

4:30 PM

**Assessing Intragranular Orientations and Slip Processes during Cyclic Loading Using Crystal Plasticity and High-Energy X-Ray Microscopy:** *Justine Schulte*<sup>1</sup>; Dalton Shadle<sup>2</sup>; Jonathan Hestoffer<sup>1</sup>; Kelly Nygren<sup>2</sup>; Matthew Miller<sup>2</sup>; Tresa Pollock<sup>1</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>Cornell University

4:50 PM

**Illuminating Ductile Failure Via X-Ray Diffraction-Based Imaging:** *Jose Solano*<sup>1</sup>; Sven Gustafson<sup>1</sup>; Philip Noell<sup>2</sup>; Krzysztof Stopka<sup>1</sup>; Jun-Sang Park<sup>3</sup>; Peter Kenesei<sup>3</sup>; Kyle Johnson<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory

5:10 PM

**Machine Learning of Dislocation Microstructure from High-Resolution Differential-Aperture X-Ray Structural Microscopy Data:** *Khaled SharafEldin*<sup>1</sup>; Bryan Miller<sup>2</sup>; Wenjun Liu<sup>3</sup>; Jon Tischler<sup>3</sup>; Benjamin Anglin<sup>2</sup>; Anter EL-Azab<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Naval Nuclear Laboratory; <sup>3</sup>Argonne National Laboratory

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Materials for Energy Storage

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

Tuesday PM | March 25, 2025  
356 | MGM Grand

**Session Chairs:** Surojit Gupta, University of North Dakota; Sankha Banerjee, California State University, Fresno

2:30 PM Invited

**Functional Liquid Alloys for Ammonia Synthesis from Nitrogen and Hydrogen:** *Xiaofei Guan*<sup>1</sup>; <sup>1</sup>ShanghaiTech University



#### 2:55 PM Invited

**Unraveling the Conundrum of Electronic Leakage in Protonic Ceramic Cells: Operation-Specific Insights and Rational Design Strategies:** Bo Guan<sup>1</sup>; Hanchen Tian<sup>1</sup>; Yoosuf Picard<sup>2</sup>; Jian Liu<sup>2</sup>; Harry Abernathy<sup>2</sup>; Thomas Kalapos<sup>2</sup>; Lingfeng Zhou<sup>1</sup>; Xuemei Li<sup>1</sup>; Wenyan Li<sup>1</sup>; *Xingbo Liu*<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>National Energy Technology Laboratory

#### 3:20 PM

**Development of 3D-Printed PLA-BaTiO<sub>3</sub>-MXene Hybrid Composites: Advancing Multidimensional Material Systems for Biomedical Sensing:** *Jelizaveta Chern*<sup>1</sup>; Aidee Gonzales<sup>1</sup>; Derek Xiong<sup>1</sup>; Sankha Banerjee<sup>1</sup>; <sup>1</sup>California State University, Fresno

#### 3:40 PM

**Fabrication and Characterization of a Novel Multimodal Water Purification Platform: Integrating Graphene, MXene, and Activated Carbon Nanocomposites for Enhanced Contaminant Removal:** Parshwa Khane<sup>1</sup>; Prakhya Gautam<sup>1</sup>; Armando Correa<sup>1</sup>; *Sankha Banerjee*<sup>1</sup>; <sup>1</sup>California State University, Fresno

#### 4:00 PM Break

#### 4:15 PM

**3D Printed Carbon and Graphene Aerogels for Energy Storage and Conversion Applications:** *Swetha Chandrasekaran*<sup>1</sup>; Xinzhe Xue<sup>2</sup>; Megan Freyman<sup>1</sup>; Jean-Baptiste Forien<sup>1</sup>; Thomas Roy<sup>1</sup>; Jeremy Feaster<sup>1</sup>; Yat Li<sup>2</sup>; Bruce Dunn<sup>3</sup>; Marcus Worsley<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>University of California, Santa Cruz; <sup>3</sup>University of California, Los Angeles

#### 4:35 PM

**PVDF-TrFE Nanocomposites Enhanced with BaTiO<sub>3</sub> and Ti<sub>3</sub>C<sub>2</sub> MXene: Innovating Non-Toxic Electroactive Materials for Medical Wearables:** *Derek Xiong*<sup>1</sup>; Jelizaveta Chern<sup>1</sup>; Parshwa Khane<sup>1</sup>; Sankha Banerjee<sup>1</sup>; <sup>1</sup>California State University, Fresno

#### 4:55 PM

**Study on Microswing Adsorption of Low Concentration Gas by Activated Carbon:** *Jun Zhao*<sup>1</sup>; <sup>1</sup>China University of Mining and Technology (CUMT)

#### 5:15 PM

**Advances In Design and Development of Broadband Energy Harvesting Devices Using Piezoelectric Effect:** *Vishwas Bedekar*<sup>1</sup>; <sup>1</sup>Middle Tennessee State University

#### 5:35 PM

**Design of Novel Materials from Biomass for Energy Intensive Applications:** *Surojit Gupta*<sup>1</sup>; <sup>1</sup>University of North Dakota

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Bcc-Superalloys — Alloy Design & Mechanical Properties II

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Alexander Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Howard Stone, University of Cambridge; Oleg Senkov, Air Force Research Laboratory; Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

**Tuesday PM | March 25, 2025  
102 | MGM Grand**

**Session Chairs:** Sandy Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

#### 2:30 PM

**Microstructure Evolution and Mechanical Properties of A2/L2<sub>2</sub>-Strengthened Ferritic Superalloys:** *Christopher Zenk*<sup>1</sup>; Luis Morales<sup>1</sup>; Kai Eberl<sup>1</sup>; Carolin Körner<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg

#### 2:50 PM

**Development of Novel Intermetallic Dispersion Strengthened Steels:** *Iris Carneiro*<sup>1</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham

#### 3:10 PM

**High Temperature Environmental Degradation of Novel Fe-Based BCC Superalloys:** *Karthikeyan Hariharan*<sup>1</sup>; Oswaldo Luengas<sup>1</sup>; Sannakaisa Virtanen<sup>1</sup>; Christopher Zenk<sup>1</sup>; <sup>1</sup>Friedrich Alexander University, Erlangen-Nuremberg

#### 3:30 PM

**Enhanced Creep Resistance Influenced by Lattice Strain Fields and Grain Boundary Sliding of Mo-Doped Ferritic Medium Entropy Superalloys:** *Sang-Hun Shim*<sup>1</sup>; Kanghyun Park<sup>2</sup>; Heoun-Jun Kwon<sup>1</sup>; Young-Kyun Kim<sup>1</sup>; Young-Sang Na<sup>1</sup>; Gian Song<sup>2</sup>; Hye Jung Chang<sup>3</sup>; Ka Ram Lim<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science; <sup>2</sup>Kongju National University; <sup>3</sup>Korea Institute of Science and Technology

#### 3:50 PM Break

#### 4:10 PM

**High Temperature Mechanical and Irradiation Response of a Eutectic Refractory Alloy:** *Sriswaroop Dasari*<sup>1</sup>; Boopathy Kombaiiah<sup>2</sup>; Philip Petersen<sup>2</sup>; Mukesh Bachhav<sup>2</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>Idaho National Laboratory

#### 4:30 PM

**Mechanical Properties and Deformation Mechanism of Cast and Additively Manufactured NiAl-CrMo In-Situ Composites:** *Jan Vollhuth*<sup>1</sup>; Katharina Titz<sup>1</sup>; Benjamin Wahlmann<sup>1</sup>; Carolin Körner<sup>1</sup>; Steffen Neumeier<sup>1</sup>; Mathias Göken<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg

#### 4:50 PM

**Characterisation of Ion-Irradiated BCC Ferritic Superalloys for High-Temperature and Nuclear Applications:** *Sophia Von Tiedemann*<sup>1</sup>; Kan Ma<sup>1</sup>; Colin Ophus<sup>2</sup>; Jóhan Pauli Magnussen<sup>1</sup>; Muhammad Naeem<sup>1</sup>; Pedro Ferreiros<sup>3</sup>; David Bowden<sup>4</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Lawrence Berkeley National Laboratory; <sup>3</sup>VTT Technical Research Centre of Finland Ltd.; <sup>4</sup>United Kingdom Atomic Energy Authority

5:10 PM

**AlCoCrFeNi-Based High Entropy Superalloy Coating Applied onto the Surface of Al-Alloys:** *Murat Alkan*<sup>1</sup>; *Esra Dokumaci Alkan*<sup>1</sup>; *Gizem Ari*<sup>1</sup>; <sup>1</sup>DEU

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — 2D Ceramics

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

**Tuesday PM | March 25, 2025**  
**106 | MGM Grand**

**Session Chairs:** Kathy Lu, University of Alabama Birmingham; Babak Anasori, Purdue University

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2:30 PM

**Flash Joining of Metal-Ceramic Multi-Layered Sandwich Structure:** *Raghav Mundra*<sup>1</sup>; *Pulkin Gupta*<sup>1</sup>; *Shikhar Krishn Jha*<sup>1</sup>; <sup>1</sup>IIT Kanpur

2:50 PM

**Multi-Layer Composite Armor: Experimental and Computational Study:** *Alberto Pagano*<sup>1</sup>; *Nicola Bonora*<sup>1</sup>; *Gianluca Iannitti*<sup>1</sup>; *Sara Ricci*<sup>1</sup>; *Andrew Ruggiero*<sup>1</sup>; *Gabriel Testa*<sup>1</sup>; *Andrea Ceccacci*<sup>1</sup>; <sup>1</sup>University of Cassino and Southern Lazio

3:10 PM

**Stability and Properties of MAX Phases With Compositionally Complex M-layers:** *Milos Dujovic*<sup>1</sup>; *Miladin Radovic*<sup>1</sup>; *Ankit Srivastava*<sup>1</sup>; *Zeyi Tan*<sup>1</sup>; <sup>1</sup>Texas A&M University

3:30 PM

**Challenges and Opportunities in Integrating MXene Into Ceramic Nanocomposites:** *Maxim Sokol*<sup>1</sup>; *Barak Ratzker*<sup>1</sup>; *Or Messer*<sup>1</sup>; <sup>1</sup>Tel Aviv University

3:50 PM Break

4:00 PM

**Optimizing Freeze-Cast Alumina for High-Temperature Applications:** *Mert Arslanoglu*<sup>1</sup>; *Somnath Mandal*<sup>2</sup>; *Eric Bell*<sup>3</sup>; *Burak Ozdoganlar*<sup>1</sup>; *Rahul Panat*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Vesuvius; <sup>3</sup>Vesuvius

4:20 PM

**Feasibility of Graphene-Enhanced Strength in Sanitary Ceramics:** *Ziyad Sherif*<sup>1</sup>; *John Patsavellas*<sup>1</sup>; *Konstantinos Salonitis*<sup>1</sup>; <sup>1</sup>Cranfield University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — Characterization of Magnetic Materials and Properties

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

**Tuesday PM | March 25, 2025**  
**363 | MGM Grand**

**Session Chairs:** Rudolf Schaefer, Ifw Dresden; Anton Bolyachkin, National Institute for Materials Science

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2:30 PM Invited

**Magneto-Optics, Revisited:** *Rudolf Schaefer*<sup>1</sup>; <sup>1</sup>Ifw Dresden

3:00 PM Invited

**Characterization of Crystallographic and Magnetic Domain Structures in Magnetic Alloys Using Complementary TEM Techniques:** *Takehiro Tamaoka*<sup>1</sup>; *Yuto Tomita*<sup>2</sup>; *Yasukazu Murakami*<sup>2</sup>; <sup>1</sup>Toray Research Center Inc.; <sup>2</sup>Kyushu University

3:30 PM

**Effects of Interstitial Elements on the Ordered Structure of Fe-Ni Alloys:** *Jeongsoo Han*<sup>1</sup>; *Hyunseok Oh*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

3:50 PM Break

4:10 PM

**Magnetic and Nano-Indentation Behavior in FeNi Invar Alloys:** *Rahul Kumar Sunil Singh*<sup>1</sup>; *Subbu Venkata Satyasri Harsha Pathapati*<sup>1</sup>; *Sivaraman Guruswamy*<sup>1</sup>; <sup>1</sup>University of Utah

4:30 PM

**Magnetic Properties of Sm<sub>2</sub>Fe<sub>17</sub>N<sub>3</sub> at Low Temperature:** *Xubo Liu*<sup>1</sup>; *M. Parans Paranthaman*<sup>2</sup>; *Ikenna Nlebedim*<sup>3</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Ames Laboratory

4:50 PM

**Internal Defect Detection and Characterization of Sm-Co Sintered Magnets by Ultrasonic Testing and Related Magnetic Properties:** *Baozhi Cui*<sup>1</sup>; *Jun Cui*<sup>2</sup>; *Daniel Barnard*<sup>2</sup>; *Leonard Bond*<sup>2</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University

5:10 PM

**Influence of Spinodal Decomposition on the Magnetic Properties of Additively Manufactured Alnico:** *Saikumar Dussa*<sup>1</sup>; *Sameehan Joshi*<sup>1</sup>; *Krishna Verma*<sup>1</sup>; *Chaitanya Kumar KN*<sup>1</sup>; *Madhavan Radhakrishnan*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; *Narendra Dahotre*<sup>1</sup>; <sup>1</sup>University of North Texas

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Materials Deposition by Cold Spray and Related Technologies — Processing, Characterization, and Properties II

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Materials Characterization Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Tanaji Paul, Florida International University; Yu Zou, University of Toronto; Maniya Aghasibeig, National Research Council Canada; Aaron Nardi, Vrc Metal Systems, LLC; Pin Lu, Solvus Global

**Tuesday PM | March 25, 2025**  
**103 | MGM Grand**

**Session Chairs:** Tanaji Paul, Florida International University; Ahmed Alade Tiamiyu, University of Calgary, Canada

#### 2:30 PM Invited

**Powder Surface Conditions in Cold Spray: What Single Particle Impact Studies Teach Us:** *Christopher Schuh*<sup>1</sup>; <sup>1</sup>Northwestern University

#### 3:00 PM

**Fatigue Resistance of Aluminum Alloy Components Repaired Using Cold Spray:** Patrick Morrison<sup>1</sup>; Krzysztof Stopka<sup>2</sup>; John Ferguson<sup>1</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University

#### 3:20 PM

**Comparison of Recycled Battlefield Titanium Scrap vs. Virgin Titanium Feedstock Powder for Cold Spray Consolidation:** *Kiran Judd*<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### 3:40 PM

**The Accumulation of Single-Particle Impacts: Statistical Connections Between Impact Parameters, Coating Flaws and Microstructure Evolution in Cold Spray:** *Alain Reiser*<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Northwestern University

#### 4:00 PM Break

#### 4:20 PM

**Correlative Microstructure and Mechanical Property Investigation of Aluminum Cold Sprayed Coating on Magnesium Substrate:** *Tanvi Ajantiwalay*<sup>1</sup>; Sridhar Niverty<sup>1</sup>; James Haag<sup>1</sup>; Rajib Kalsar<sup>1</sup>; Arun Devaraj<sup>1</sup>; Vineet V. Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 4:40 PM Invited

**Cold Spray, HVOF, and Plasma Spray of Eutectic High Entropy Alloys:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Structures and Mechanical Properties II

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Tuesday PM | March 25, 2025**  
**368 | MGM Grand**

**Session Chairs:** Koichi Tsuchiya, National Institute For Materials Science; Wenjun Cai, Virginia Polytechnic Institute and State University

#### 2:30 PM Invited

**Effect of SFE on Mechanical Properties in Co-Cr-Mo-Ni Medium Entropy Alloys:** *Koichi Tsuchiya*<sup>1</sup>; Elango Chandiran<sup>1</sup>; Bikash Tripathy<sup>1</sup>; Wataru Tasaki<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

#### 2:50 PM Invited

**High Entropy Alloys- The Intrigue:** *Huseyin Sehitoglu*<sup>1</sup>; O Celebi<sup>1</sup>; Daegun You<sup>1</sup>; ASK Mohammed<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

#### 3:10 PM Invited

**High Temperature Wear and Deformation Behavior of Compositionally Complex Oxide Formed on Metal Surfaces:** Zhengyu Zhang<sup>1</sup>; *Wenjun Cai*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

#### 3:30 PM Invited

**Martensitic Phase Transformation and Anomalous Hardening in CrMnFeCoNi High-Entropy Alloy:** Robert Chulist<sup>1</sup>; Aurimas Pukenas<sup>2</sup>; Anton Hohenwarter<sup>3</sup>; Reinhard Pippan<sup>3</sup>; *Werner Skrotzki*<sup>2</sup>; <sup>1</sup>Polish Academy of Sciences, Krakow; <sup>2</sup>Technische Universität Dresden; <sup>3</sup>Montanuniversität Leoben

#### 3:50 PM Invited

**Microstructure and Mechanical Properties of New Compositionally-Complex Fe-Cr-Mn-Al Ferritic Stainless Steels Free of  $\sigma$ -Phase,  $\chi$ -Phase and 475 °C Embrittlement:** *Kevin Laws*<sup>1</sup>; Stephanie Blankley<sup>2</sup>; Douglas Raigosa<sup>2</sup>; Natalie Krieger<sup>2</sup>; Jackson Baker<sup>2</sup>; Joel Abraham<sup>1</sup>; Kaitlyn Paulsen<sup>2</sup>; Alexandra Loumidis<sup>2</sup>; Fadlin Natsition<sup>1</sup>; Karen Privat<sup>1</sup>; Patrick Conway<sup>1</sup>; Lori Bassman<sup>2</sup>; <sup>1</sup>UNSW; <sup>2</sup>Harvey Mudd College

#### 4:10 PM Break

#### 4:30 PM Invited

**Ultrahigh Strength Triggered by BCC and B2 Eutectic-Phase Interfaces in a Novel Fe30Cr15V15Ni20Al20 High Entropy Alloy:** M.Z. Wang<sup>1</sup>; *Yongfeng Shen*<sup>1</sup>; N. Jia<sup>1</sup>; <sup>1</sup>Northeastern University

#### 4:50 PM

**Ramifications of Introducing Local Chemical Ordering in FCC-Based High Entropy Alloys and Its Manifestations on the Bulk Mechanical Properties via Slip Planarity:** *Abhishek Sharma*<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Tirthesh Ingale<sup>1</sup>; Chao Jiang<sup>2</sup>; Bharat Gwalani<sup>1</sup>; Stephane Gorsse<sup>3</sup>; An-Chou Yeh<sup>4</sup>; Srinivasan Srivilliputhur<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of Bordeaux; <sup>4</sup>National Tsing Hua University

5:10 PM

**Kink Bands Promote Exceptional Fracture Resistance in a NbTaTiHf Refractory High-Entropy Alloy:** *David Cook*<sup>1</sup>; Punit Kumar<sup>1</sup>; Madelyn Payne<sup>1</sup>; Calvin Belcher<sup>2</sup>; Pedro Borges<sup>1</sup>; Wenqing Wang<sup>1</sup>; Flynn Walsh<sup>1</sup>; Zehao Li<sup>3</sup>; Arun Devaraj<sup>3</sup>; Mingwei Zhang<sup>4</sup>; Mark Asta<sup>1</sup>; Andrew Minor<sup>1</sup>; Enrique Lavernia<sup>5</sup>; Diran Apelian<sup>2</sup>; Robert Ritchie<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>University of California, Irvine; <sup>3</sup>Pacific Northwest National Labs; <sup>4</sup>University of California, Davis; <sup>5</sup>Texas A&M University

## LIGHT METALS

### Advances in Titanium Technology — Conventional and Advanced Processing of Titanium Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

**Tuesday PM | March 25, 2025**  
**108 | MGM Grand**

**Session Chair:** Fan Sun, Cnrs Irpc 8247 - Chimie Paristech Psl

#### 2:30 PM Invited

**Impact of Ultrafine Microstructures on Mechanical Properties in Various Kinds of Titanium Alloys:** *Nobuhiro Tsuji*<sup>1</sup>; Yan Chong<sup>1</sup>; <sup>1</sup>Kyoto University

#### 3:00 PM Invited

**Interface Sliding in an  $\alpha/\beta$  Titanium Alloy:** *G. Babu Viswanathan*<sup>1</sup>; Zachary Kloenne<sup>2</sup>; Pariac O'Kelly<sup>1</sup>; Yukthesh Surisetti<sup>1</sup>; Brian Welk<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Imperial College

#### 3:30 PM

**Multiscale Model for Site-Specific Texture Evolution During Thermomechanical Processing of  $\alpha$  + Ti Alloys:** *Benjamin Begley*<sup>1</sup>; Megan Hurley<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

#### 3:50 PM Break

#### 4:00 PM Invited

**The Effect of Aluminium in Titanium on Deformation Mechanisms:** *Michael Preuss*<sup>1</sup>; Yunkun Xu<sup>2</sup>; Joao Quinta da Fonseca<sup>2</sup>; <sup>1</sup>Monash University; <sup>2</sup>University of Manchester

#### 4:30 PM

**The Anisotropy of Deformation Twinning in bcc Materials Mechanical Loading, Temperature Effect, and Twin-Twin Interaction:** *Mehrab Lotfipour*<sup>1</sup>; Lei Cao<sup>1</sup>; Amir Hassan Zahiri<sup>1</sup>; Jamie Ombogo<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

#### 4:50 PM

**High-Temperature Oxidation Resistance of Ti-6Al-4V Alloy Fabricated by Wire Arc Additive Manufacturing:** *Soobin Kim*<sup>1</sup>; Dong-Hyuck Kam<sup>2</sup>; Kee-Ahn Lee<sup>1</sup>; Inha University; <sup>2</sup>Korea Institute of Industrial Technology

#### 5:10 PM

**Anisotropic Plasticity of Pure Titanium Grade 1 Sheet Predicted by Crystal Plasticity Model:** *Jehyun You*<sup>1</sup>; Hyukjong Bong<sup>2</sup>; Myounggyu Lee<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Korea Institute of Materials Science

#### 5:30 PM

**Upscaling of Recycling of Ti64 Powder by HDH Process - Challenges and Results:** *Jacek Mazur*<sup>1</sup>; Adriana Wrona<sup>1</sup>; Marcin Lis<sup>1</sup>; Adrian Kukofka<sup>2</sup>; Klaudia Pełtowska<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals; <sup>2</sup>PROGRESJA New Materials Sp. z o.o.

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Atomistics

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Tuesday PM | March 25, 2025**  
**320 | MGM Grand**

**Session Chair:** Saaketh Desai, Sandia National Laboratories

#### 2:30 PM Invited

**Structural Causal Learning with Atomistic Simulations for Advanced Materials:** *Ayana Ghosh*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:10 PM

**Multi-Fidelity Deep Learning Approach for Designing Single-Phase BCC Refractory Multi-Principal Element Alloys (RMPEA) Across Various Temperatures:** *Ali Shargh*<sup>1</sup>; Christopher Stiles<sup>2</sup>; Jaafar EL-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory

#### 3:30 PM

**AI-Powered Interface: Fully Automated Tool for LAMMPS Simulation and Analysis:** *Ethan Holbrook*<sup>1</sup>; Juan Verduzco Gastelum<sup>1</sup>; Kat Nykiel<sup>1</sup>; William Zummo<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

#### 3:50 PM

**Charting the Large Chemical Space of Zintl Phases Using Graph Neural Networks:** *Rinkumoni Chaliha*<sup>1</sup>; Manish Kothakonda<sup>2</sup>; Cheng-Wei Lee<sup>2</sup>; Qian Yang<sup>3</sup>; Jeff N. Law<sup>4</sup>; Svilen Bobev<sup>5</sup>; Prashun Gorai<sup>6</sup>; <sup>1</sup>Colorado School of Mines; Rensselaer Polytechnic Institute; <sup>2</sup>Colorado School of Mines; <sup>3</sup>University of Connecticut; <sup>4</sup>National Renewable Energy Laboratory; <sup>5</sup>University of Delaware; <sup>6</sup>Rensselaer Polytechnic Institute

#### 4:10 PM Break

#### 4:20 PM

**AtomGPT: Atomistic Generative Pre-Trained Transformer for Forward and Inverse Materials Design:** *Kamal Choudhary*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

#### 4:40 PM

**A Generative Deep Learning Initialization Strategy to Accelerate Genetic Algorithms for Crystal Structure Prediction:** *Sam Dong*<sup>1</sup>; Ajinkya Hire<sup>1</sup>; Jason Gibson<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

#### 5:00 PM

**Self-Supervised Learning (SSL) for Crystal Property Prediction via Structure Denoising:** *Alexander New*<sup>1</sup>; Nam Le<sup>1</sup>; Michael Pekala<sup>1</sup>; Christopher Stiles<sup>1</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory

#### 5:20 PM

**Structural Constraint Integration in Generative Model for Discovery of Quantum Material Candidates:** *Ryotaro Okabe*<sup>1</sup>; Mouyang Cheng<sup>1</sup>; Abhijatmedhi Chotrattanapituk<sup>1</sup>; Mingda Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology



5:40 PM

**Rapid Crystal Structure Prediction with the Aid of AI Generative Model and Descriptor Based Optimization:** *Qiang Zhu*<sup>1</sup>; Osman Goni Ridwan<sup>1</sup>; <sup>1</sup>UNC Charlotte

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Algorithm Developments for Materials Science Applications

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Tuesday PM | March 25, 2025**  
**319 | MGM Grand**

**Session Chairs:** Hojun Lim, Sandia National Laboratories; Douglas Spearot, University of Florida

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2:30 PM

**10-Fold Faster Molecular Dynamics: 100  $\mu$ s of Grain Boundary Evolution:** *Tomas Oppelstrup*<sup>1</sup>; Timofey Frolov<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

2:50 PM

**Computational Multiphysics Problems in Materials Science with Alamo:** Brandon Runnels<sup>1</sup>; Abhijith Thoopul Anantharanga<sup>1</sup>; <sup>1</sup>Iowa State University

3:10 PM

**Developing an Algorithm to Obtain Spatially Registered Orientation and Elastic Stiffness Tensor Data from Spatially Resolved Acoustic Spectroscopy Maps:** *Peter Collins*<sup>1</sup>; Jonathan Zaugg<sup>1</sup>; Thomas Ales<sup>1</sup>; <sup>1</sup>Iowa State University

3:30 PM

**Enhancing the Performance of Constrained Minimization Algorithm:** *Sunyong Kwon*<sup>1</sup>; Benjamin Stump<sup>1</sup>; Ying Yang<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

3:50 PM

**FFT-Based Micromechanical Modeling of Stress Fields at Tip of an Elliptical Crack by Using Composite Voxels:** *Vahid Tari*<sup>1</sup>; Christopher Kantzos<sup>2</sup>; Anthony D. Rollett<sup>3</sup>; *Daniel Diaz*<sup>3</sup>; <sup>1</sup>ATI - Allegheny Technologies Incorporated; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>Carnegie Mellon University

4:10 PM Break

4:30 PM

**Lattice to Continuum:** *Gorkem Gengor*<sup>1</sup>; Orcun Celebi<sup>1</sup>; Huseyin Sehitoglu<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign

4:50 PM

**Performant Parallel Contact Mechanics:** *Sam Reeve*<sup>1</sup>; Pablo Seleson<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Data-Driven and Material Engineering Approaches for Thermoelectric Performance Enhancement

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

**Tuesday PM | March 25, 2025**  
**355 | MGM Grand**

**Session Chairs:** Albert T. Wu, National Central University; Bo-Chia Chen, National Taiwan University

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2:30 PM

**Developing Data-Driven Design Rules for Thermoelectric Performance of Zintl Phases:** *Rinkumoni Chaliha*<sup>1</sup>; Michael Toriyama<sup>2</sup>; Prashun Gorai<sup>3</sup>; <sup>1</sup>Colorado School of Mines; Rensselaer Polytechnic Institute; <sup>2</sup>Northwestern University; <sup>3</sup>Rensselaer Polytechnic Institute

2:50 PM Invited

**Exploring Structures and Dynamics of Materials with Mobile Atoms Using Machine-Learning Interatomic Potentials:** *Ching-Ming Wei*<sup>1</sup>; <sup>1</sup>Institute of Atomic and Molecular Sciences, Academia Sinica

3:10 PM Invited

**Disordered Thermoelectric Materials, the Examples of Misfit Layered Sulfides and Zinc-Blende Phosphides:** *David Berthebaud*<sup>1</sup>; <sup>1</sup>CNRS - Nantes Université

3:30 PM Invited

**Enhancing Stability and Performance of GeTe Thermoelectric Materials:** *Albert T. Wu*<sup>1</sup>; Cheng-Hao Kung<sup>1</sup>; Jyun-Yong Huang<sup>1</sup>; Chun-Han Ku<sup>1</sup>; <sup>1</sup>National Central University

3:50 PM

**Enhancing Room-Temperature Thermoelectric Performance of SnSe through Multi-Cation Doping:** *Bo-Chia Chen*<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang-Ming Chiao Tung University

4:10 PM Break

4:25 PM Invited

**Exploring the Pseudo-Hollandite Family of Compounds for High Temperature Thermoelectric Applications:** *Hugo Bouteiller*<sup>1</sup>; Bruno Fontaine<sup>2</sup>; Yoshitaka Matsushita<sup>3</sup>; Sylvie Hébert<sup>4</sup>; Takao Mori<sup>3</sup>; Franck Gascoin<sup>4</sup>; Jean-François Halet<sup>2</sup>; David Berthebaud<sup>5</sup>; <sup>1</sup>Oak Ridge National Laboratory, University of Tennessee-Oak Ridge Innovation Institute; <sup>2</sup>Institut des Sciences Chimiques de Rennes (ISCR) UMR 6226, Université de Rennes, ENSCR; <sup>3</sup>National Institute for Materials Science (NIMS); <sup>4</sup>Laboratory of Crystallography and Materials Science (CRISMAT), CNRS Normandie Univ., ENSICAEN, UNICAEN; <sup>5</sup>Nantes Université, CNRS, Institut des Matériaux de Nantes Jean Rouxel, IMN

4:45 PM Invited

**Leveraging Machine Learning to Enhance the Performance of Filled Skutterudites Through Composition Optimization:** *Yifan Sun*<sup>1</sup>; Sora-at Tanusilp<sup>2</sup>; Masaya Kumagai<sup>1</sup>; Hirofumi Tsuruta<sup>3</sup>; Yuji Ohishi<sup>4</sup>; Hiroaki Muta<sup>4</sup>; Ken Kurosaki<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Khon Kaen University; <sup>3</sup>SAKURA Internet Inc.; <sup>4</sup>Osaka University

5:05 PM

**Stoichiometric Effect of SnTe on Thermoelectric Property:** *Chun-Han Ku*<sup>1</sup>; Alber T. Wu<sup>1</sup>; <sup>1</sup>National Central University

5:25 PM

**Development of Ag-to-Ag Bonding Technique for Middle-High Thermoelectric Module:** *Yu-En Tsaï*<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University

5:45 PM

**Binder Jetting as an Alternative Method of Advanced Manufacturing for Bulk Thermoelectric Materials For Radioisotope Power Systems:** *Luke Hansen*<sup>1</sup>; Steven Zinkle<sup>2</sup>; Hugo Bouteiller<sup>2</sup>; Hsin Wang<sup>2</sup>; Brad Johnson<sup>2</sup>; Trevor Aguirre<sup>2</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Defect Detection and Process Control

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**114 | MGM Grand**

**Session Chairs:** Roderick Guthrie, McGill University; Dmitry Eskin, Brunel University

2:30 PM Keynote

**Revealing New Insights into Aluminum Alloys Using Synchrotron X-Ray Imaging and Tomography:** *Peter Lee*<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; Alexander Rack<sup>2</sup>; Robert C. Atwood<sup>3</sup>; Samuel J. Clark<sup>4</sup>; <sup>1</sup>University College London; <sup>2</sup>ESRF - The European Synchrotron; <sup>3</sup>Diamond Light Source; <sup>4</sup>Advanced Photon Source

2:55 PM

**Evaluation of Hydrogen-Induced Pores in Ni-P-Plated Al-Zn-Mg Alloys Using Synchrotron X-Ray Computed Tomography and Hydrogen Analysis:** *Keitaro Horikawa*<sup>1</sup>; Makoto Hino<sup>2</sup>; Masato Hoshino<sup>3</sup>; Kentaro Uesugi<sup>3</sup>; <sup>1</sup>Osaka University; <sup>2</sup>Hiroshima Institute of Technology; <sup>3</sup>Japan Synchrotron Radiation Research Institute

3:20 PM

**Two-Chamber Hollow Profiles with Single-Sided Variations in Wall Thickness:** *Janne Max Heydrich-Bodenseick*<sup>1</sup>; Maik Negendank<sup>1</sup>; Soeren Mueller<sup>1</sup>; <sup>1</sup>Extrusion Research and Development Center

3:45 PM

**Evolution of Microstructure Near Crack Tips in High-Strength Aluminum Alloy AA7075-T6 Sheet at 200 °C:** *Daniel Nikolai*<sup>1</sup>; Eric Taleff<sup>1</sup>; <sup>1</sup>University of Texas Austin

4:10 PM Break

4:25 PM

**Development of LiMCA (Liquid Metal Cleanliness Analyzer) Sensor: A Comprehensive Review:** *Rohit Tiwari*<sup>1</sup>; Mihaiela Isac<sup>1</sup>; Roderick Guthrie<sup>1</sup>; <sup>1</sup>McGill University

4:50 PM

**Effect of Post-Annealing on Mechanical Properties and Microstructural Evolution of Ultrafine Grained Hypoeutectic Al-Si Conductor Wires:** Mohammad Khoshghadam Pireyousefan<sup>1</sup>; Mousa Javidani<sup>1</sup>; Alexandre Maltais<sup>2</sup>; Julie Lévesque<sup>3</sup>; X.-Grant Chen<sup>1</sup>; <sup>1</sup>University of Québec at Chicoutimi; <sup>2</sup>Arvida Research and Development Center; <sup>3</sup>Québec Metallurgy Centre

5:15 PM

**Towards Digital Twin Creation Workflow for Secondary Aluminum Alloy for Automotive Components:** *Eugen Gazenbiller*<sup>1</sup>; Qiqi Li<sup>1</sup>; Lukas Jarren<sup>1</sup>; Markus Apel<sup>2</sup>; Alexandre Viardin<sup>2</sup>; Daniel Höche<sup>1</sup>; Mikhail Zheludkevich<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon; <sup>2</sup>Access e.V.

5:40 PM

**Investigation on Generation Mechanism of White Stripe Defects in Battery Aluminum Foils:** *Wei Tang*<sup>1</sup>; Yang Sun<sup>2</sup>; Ju Wenbin<sup>2</sup>; Zhu Zizong<sup>1</sup>; Wang Hongpo<sup>1</sup>; Wang Yu<sup>1</sup>; <sup>1</sup>ChongQing University; <sup>2</sup>Shangqiu Sunshine Aluminum Co., Ltd

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## LIGHT METALS

### Aluminum Reduction Technology — Major Faults in Aluminum Smelting Process: Causes, Consequences, and Solutions: Joint Session with Electrode Technology

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**113 | MGM Grand**

**Session Chair:** Pascal Lavoie, Alcoa

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2:30 PM Introductory Comments

2:50 PM

**Potential Significance of Baking Furnace Indicators to Potroom Business Performance:** *Robert Higginson*<sup>1</sup>; <sup>1</sup>SCCR Group

3:10 PM

**The (In)Evitable Link Between Carbon Dust and Anode Quality:** *Matthias Dechent*<sup>1</sup>; <sup>1</sup>Trimet Aluminium SE

3:30 PM

**Experiences and Learnings from Two Major Power Outages at the Hydro Årdal Smelter:** *Trond Eirik Jentoftsen*<sup>1</sup>; <sup>1</sup>Hydro Aluminium

3:50 PM Panel Discussion

4:10 PM Break

4:30 PM

**Impact of Operational Practices, Housekeeping and Maintenance in the Reliability of Pot-to-pot Busbar Circuits:** *Daniel Champagne*<sup>1</sup>; <sup>1</sup>Hatch Ltd.

4:50 PM

**Basement Thermite Events in Smelting Operations:** *Brian Zukas*<sup>1</sup>; <sup>1</sup>Alcoa Corp.

5:10 PM Panel Discussion

5:50 PM Concluding Comments

## MECHANICS OF MATERIALS

### Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — Dislocations Studies

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

**Tuesday PM | March 25, 2025**  
**370 | MGM Grand**

**Session Chairs:** Irene Beyerlein, University of California, Santa Barbara; Tamás Ungár, Eotvos University

#### 2:30 PM Invited

**Diffusivity and Mechanical Response of Phase Boundaries:** Raj Koju<sup>1</sup>; Omar Hussein<sup>1</sup>; Yuri Mishin<sup>1</sup>; <sup>1</sup>George Mason University

#### 3:00 PM

**Controlling Dislocation Motion and Nanoscale Plasticity in Semiconductors Using Electric Fields and Illumination:** Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

#### 3:20 PM

**Dislocation Slip in bcc Nb from Large-Scale Molecular Dynamics Simulations:** Pedro Borges<sup>1</sup>; Nicolas Bertin<sup>1</sup>; Vasily Bulatov<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 3:40 PM Invited

**A Revised Elastic Field of an Edge Dislocation:** Peter Anderson<sup>1</sup>; John Hirth<sup>1</sup>; <sup>1</sup>Ohio State University

#### 4:10 PM Break

#### 4:30 PM

**Computational Alloy Design Based on Dislocation Plasticity:** Gyu Jang Sim<sup>1</sup>; Kyeongmi Yeon<sup>1</sup>; Ill Ryu<sup>1</sup>; <sup>1</sup>Seoul National University

#### 4:50 PM

**Mobile Dislocation Mediated Hall-Petch and Inverse Hall-Petch Behaviors in Nanocrystalline Al-Doped Boron Carbide:** Jun Li<sup>1</sup>; Kun Luo<sup>1</sup>; Qi An<sup>1</sup>; <sup>1</sup>Iowa State University

## LIGHT METALS

### Bauxite Residue Valorization and Best Practices — Technologies for Valorization as Binder, Cement and Geopolymers

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Tobias Hertel, KU Leuven; Christina Meskers, SINTEF; Efthymios Balomenos, Metlen Energy and Metals; Casper Van Der Eijk, SINTEF; Brajendra Mishra, Worcester Polytechnic Institute; Yiannis Pontikes, KU Leuven R&D

**Tuesday PM | March 25, 2025**  
**111 | MGM Grand**

**Session Chair:** Christina Meskers, SINTEF

#### 2:30 PM

**Processing Routes of Bauxite Residue And Its Valorisation Potential: Various Case Studies Demonstrated at Pilot Scale:** Glenn Beersaerts<sup>1</sup>; Ganesh Pilla<sup>1</sup>; Michiel Giels<sup>1</sup>; Tobias Hertel<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven

#### 2:50 PM Question and Answer Period

#### 2:55 PM

**Towards Scalable Autoclaved Masonry Units: How Bauxite Residue Feedstock Characteristics Impact Performance:** Tobias Hertel<sup>1</sup>; Yakinthi Avtzi<sup>1</sup>; Nikolaos Athanasakis<sup>1</sup>; Fábio Oliveira<sup>1</sup>; Glenn Beersaerts<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven

#### 3:15 PM Question and Answer Period

#### 3:20 PM

**Assessment of High Temperature Valorisation Routes for Bauxite Residue towards Cementitious Binders: A Case Study on Vitrification:** Michiel Giels<sup>1</sup>; Tobias Hertel<sup>1</sup>; Glenn Beersaerts<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven Materials Engineering

#### 3:40 PM Question and Answer Period

#### 3:45 PM

**Impact of Chemical Admixtures on the Setting Time and Freeze-Thaw Resistance of Bauxite Residue-Based Geopolymer:** Andrie Harmaji<sup>1</sup>; Reza Jafari<sup>1</sup>; Guy Simard<sup>1</sup>; <sup>1</sup>Université du Québec à Chicoutimi

#### 4:05 PM Question and Answer Period

#### 4:10 PM Break

#### 4:25 PM

**Assessing the Carbonation Potential of De-alkalized Bauxite Residue Using Different Carbonation Methods:** Fabio Cabral De Oliveira<sup>1</sup>; Tobias Hertel<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven

#### 4:45 PM Question and Answer Period

#### 4:50 PM

**Mineralogy Prediction for Iron-Rich Sulfo-Aluminate Cements Made from Elevated Contents of Bauxite Residue:** Rahul Roy<sup>1</sup>; Debadri Som<sup>1</sup>; Tobias Hertel<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven

#### 5:10 PM Question and Answer Period

#### 5:15 PM

**A Linear Programming-Based Approach for Creating Cements from Bauxite Residue:** Debadri Som<sup>1</sup>; Rahul Roy<sup>1</sup>; Tobias Hertel<sup>1</sup>; Panagiotis Patrinos<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>KU Leuven

#### 5:35 PM Question and Answer Period

#### 5:40 PM Concluding Comments

## BIOMATERIALS

### Biological Materials Science — Biological and Bio-Inspired Materials II

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Tuesday PM | March 25, 2025**  
**306 | MGM Grand**

**Session Chairs:** Ning Zhang, Baylor University; Debora Lyn Porter, University of California Merced

#### 2:30 PM Invited

**Eco-Voxels: Building Blocks for Sustainable Terrestrial and Extraterrestrial Lattice Structures:** *Christos Athanasiou<sup>1</sup>*; <sup>1</sup>Georgia Tech

#### 3:00 PM

**Durable Enzymatic Structural Materials with High Strength (ESM) Materials (ECM):** *Shuai Wang<sup>1</sup>*; Nima Rahbar<sup>1</sup>; Suzanne Scarlate<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### 3:20 PM

**Understanding the Micro-Mechanical Properties and Biomechanical Behavior of Wasatch Range Bracket Polypore Fungi:** *Ihsan Elnunu<sup>1</sup>*; Jessica Redmond<sup>1</sup>; Steven Naleway<sup>1</sup>; <sup>1</sup>University of Utah

#### 3:40 PM Invited

**Sequence and Process Design for Silk-Inspired Protein-Based Materials:** *Sinan Keten<sup>1</sup>*; <sup>1</sup>Northwestern University

#### 4:10 PM Break

#### 4:25 PM

**Filamentous Fungi as a Source for Bioinspired Filamentous Network Models:** *Debora Lyn Porter<sup>1</sup>*; Mohamed El Hachimi<sup>2</sup>; Akbar Solhtalab<sup>2</sup>; Mir Jalil Razavi<sup>2</sup>; <sup>1</sup>University of California Merced; <sup>2</sup>Binghamton University

#### 4:45 PM

**The Role of Calcium Phosphate Nanoparticles in Dental Materials: Properties, Applications, and Future Prospects:** Omowunmi Aworinde<sup>1</sup>; Chimezie Onukwuli<sup>2</sup>; Kolawole Adesina<sup>3</sup>; Stella Obuba<sup>4</sup>; Peter Agyemang<sup>1</sup>; Osasere Osayawe<sup>4</sup>; Lovelyn Odo<sup>5</sup>; *Ikechukunonso Okeke<sup>6</sup>*; <sup>1</sup>Michigan Technological University; <sup>2</sup>Eastern New Mexico, University Portales NM; <sup>3</sup>Purdue University; <sup>4</sup>Montclair State University; <sup>5</sup>University of Nigeria; <sup>6</sup>University of Benin

#### 5:05 PM Invited

**Sensitivity Analyses of Biomechanical Systems to Estimated Properties of Biological Materials:** *Douglas Cook<sup>1</sup>*; <sup>1</sup>Brigham Young University

#### 5:35 PM

**Quantitative Percussion Diagnostics for Detecting Microgap Defects in Teeth: Correlation Between In Vivo, FEA, and 3D-Printed Replica Studies:** *Jie Shen<sup>1</sup>*; Cheryl Sheets<sup>2</sup>; *James Earthman<sup>1</sup>*; <sup>1</sup>University of California Irvine; <sup>2</sup>Newport Coast Oral Facial Institute

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Theories, Models, and Algorithms of Multiscale Modeling

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Tuesday PM | March 25, 2025**  
**353 | MGM Grand**

**Session Chair:** Subhendu Chakraborty, University of Michigan

#### 2:30 PM Invited

**Rethinking Materials Simulations; Blending Direct Numerical Simulations with Machine-Learning Strategies:** *Remi Dingreville<sup>1</sup>*; <sup>1</sup>Sandia National Laboratories

#### 3:00 PM

**AtomAgents: Alloy Design and Discovery Through Physics-Aware Multi-Modal Multi-Agent Artificial Intelligence:** *Alireza Ghafarollahi<sup>1</sup>*; Markus Buehler<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

#### 3:20 PM Invited

**Integrating AI for High-Dimensional Saddle Point Sampling:** *Haixuan Xu<sup>1</sup>*; <sup>1</sup>University of Tennessee

#### 3:50 PM

**Multiscale Computational Tools and AI Integration Using Chocolate as a Frugal Model System in Self-Driving Lab:** *Kinston Acköf<sup>1</sup>*; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

#### 4:10 PM Break

#### 4:30 PM Invited

**Bridging Scales in Metal Plasticity: The Roles of Theory, Data Science, and Computing:** *Anter El-Azab<sup>1</sup>*; Khaled SharafEldin<sup>1</sup>; <sup>1</sup>Purdue University

#### 5:00 PM

**Coarse-Graining Atomistic Simulation Data with Physics-Guided Gaussian Process Regression:** *Ryan Sills<sup>1</sup>*; Yating Fang<sup>1</sup>; Qian Qian Zhao<sup>1</sup>; Ahmed Aziz Ezzat<sup>1</sup>; <sup>1</sup>Rutgers University



## Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Metallurgical Processing Analysis and Characterization

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyeel Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Tuesday PM | March 25, 2025**  
**121 | MGM Grand**

**Session Chair:** Bowen Li, Michigan Technological University

### 2:30 PM

**Thermodynamic Study of Waste Circuit Board Chlorination Treatment:** *Yan Ma*<sup>1</sup>; Yuen Wu<sup>1</sup>; Linfeng Hu<sup>1</sup>; Ailiang Chen<sup>1</sup>; Fenglong Sun<sup>1</sup>; Xijun Zhang<sup>2</sup>; <sup>1</sup>Central South University; <sup>2</sup>Jinchuan Group Co. LTD

### 2:50 PM

**Thermophysical Property Measurement of Rare Earth Titanates With Aerodynamic Levitation and Laser Heating:** *Sean Drewry*<sup>1</sup>; Katharine Page<sup>1</sup>; Dante Quirinale<sup>2</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>Oak Ridge National Laboratory

### 3:10 PM

**Study on the Influence of Utilization Ratio of Carbonaceous Particles Injection in BOF Steelmaking:** *Xin Ren*<sup>1</sup>; Kai Dong<sup>1</sup>; Rong Zhu<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

### 3:30 PM

**Slag Characterization Techniques— Necessary Tool for Simulation of Refractory Corrosion:** *Dean Gregurek*<sup>1</sup>; <sup>1</sup>RHI Magnesita

### 3:50 PM

**Simulation of Temperature Field of Water Cooling System in Nickel Flash Furnace Melting Process:** *Wentao Dai*<sup>1</sup>; <sup>1</sup>Central South University

## Chemistry and Physics of Interfaces — Grain Boundary Dynamics

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Tuesday PM | March 25, 2025**  
**304 | MGM Grand**

**Session Chairs:** Gregory Rohrer, Carnegie Mellon University; Timothy Rupert, Johns Hopkins University

### 2:30 PM Invited

**The Driving Force for Grain Boundary Migration in Polycrystals:** *Gregory Rohrer*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 3:00 PM

**Mechanisms of Non-Arrhenius Grain Boundary Motion: A Study of Activation Energy Distributions and Atomic Processes:** *Eric Bridenstine*<sup>1</sup>; Darcey Britton<sup>1</sup>; Gregory Thompson<sup>2</sup>; Eric Homer<sup>1</sup>; Oliver Johnson<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of Alabama

### 3:20 PM

**Atomistic Modeling of Diffusivity and Shearing of Al-Si Phase Boundaries:** *Yang Li*<sup>1</sup>; Yuri Mishin<sup>1</sup>; <sup>1</sup>George Mason University

### 3:40 PM Invited

**Associating GB Characteristics With its Mobility and Sink Efficiency in Absorbing Frank Loops via Molecular Dynamics Simulations:** *Saryu Fensin*<sup>1</sup>; Jie Chen<sup>1</sup>; Ian Chesser<sup>1</sup>; Khanh Dang<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

### 4:10 PM Break

### 4:30 PM Invited

**Complex Concentrated Grain Boundaries and the Stabilization of Unexpected Interfacial Structures:** *Timothy Rupert*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

### 5:00 PM

**Grain Boundary Segregation and Solute Drag in Multicomponent Alloys:** *Milad Taghizadeh*<sup>1</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University

### 5:20 PM

**Tailoring the Microstate Thresholds of Grain Boundaries Using Compositional Complexity:** *Annie Barnett*<sup>1</sup>; Emily Mang<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Jaime Marian<sup>3</sup>; Michael Falk<sup>1</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>University of California Los Angeles

### 5:40 PM

**Grain Boundary Property Distributions Resulting From Coarsening of an Al-Cu Alloy:** *Zipeng Xu*<sup>1</sup>; Jun Sun<sup>2</sup>; Jette Oddershede<sup>2</sup>; Harpreet Kaur<sup>1</sup>; Kiana Naghibzadeh<sup>3</sup>; Kaushik Dayal<sup>1</sup>; Jules Dake<sup>4</sup>; Carl Krill<sup>4</sup>; Gregory Rohrer<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Xnovo Technology; <sup>3</sup>Massachusetts Institute of Technology; <sup>4</sup>Ulm University

## MATERIALS SYNTHESIS AND PROCESSING

### Composite Materials: Sustainable and Eco-Friendly Material Development and Applications — Sustainable and Eco-Friendly Materials: Biodegradable and Carbon-Based Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Yahya Al-Majali, Ohio University; Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)

**Tuesday PM | March 25, 2025**  
**116 | MGM Grand**

**Session Chair:** Yahya Al-Majali, Ohio University

**2:30 PM**

**Shape Memory Alloy Reinforced Self-Healing Aluminum Composites for Energy Conservation:** *Masum Bellah<sup>1</sup>*; Vaibhav Srivastava<sup>1</sup>; Michael Nosonovsky<sup>1</sup>; Benjamin Church<sup>1</sup>; Pradeep Rohatgi<sup>1</sup>; <sup>1</sup>University of Wisconsin Milwaukee

**2:50 PM**

**Study on Photocatalytic Degradation of Azo Dye Wastewater by Thermal Stripping of g-C<sub>3</sub>N<sub>4</sub>:** *Renwen Li<sup>1</sup>*; Yifan Du<sup>1</sup>; Chunke Tang<sup>1</sup>; Guihong Han<sup>1</sup>; Yanfang Huang<sup>1</sup>; <sup>1</sup>Zhengzhou University

**3:10 PM Invited**

**Waste Coal-Thermoset Composites for Additive Manufacturing of Amorphous Carbon Structures:** *Natasha Smith<sup>1</sup>*; Rudolph Olson<sup>1</sup>; Grace Baranack<sup>2</sup>; Landon Gudac<sup>1</sup>; Daniel Parker<sup>1</sup>; Yahya Al-Majali<sup>2</sup>; <sup>1</sup>CONSOL Innovations; <sup>2</sup>Ohio University

**3:40 PM**

**Polymer Matrix Composites Incorporating Plant-Based Fibers for Reduced Embodied Energy:** *Swaroop Behera<sup>1</sup>*; Satyanarayana Kestur Gundapa<sup>2</sup>; Pradeep Rohatgi<sup>1</sup>; <sup>1</sup>University of Wisconsin Milwaukee; <sup>2</sup>Poornaprajna Institute of Scientific Research

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Materials for Extreme and Phase Transformation

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Tuesday PM | March 25, 2025**  
**305 | MGM Grand**

**Session Chairs:** Arun Devaraj, Pacific Northwest National Laboratory; Brandon Bocklund, Lawrence Livermore National Laboratory

**2:30 PM Invited**

**On the Competition Between Solute and Precipitate Strengthening: Effects on Creep Strength:** *Laurent Capolungo<sup>1</sup>*; Jobin Joy<sup>1</sup>; Anjana Talapatra<sup>1</sup>; andrea Rovinelli<sup>1</sup>; Ricardo Lebensohn<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:00 PM**

**Dislocation-Assisted Carbon Migration Theory: Application to Fatigue, Drawing, and Wear:** *Pedro Rivera-Díaz-Del-Castillo<sup>1</sup>*; Wei Xu<sup>2</sup>; Yong Li<sup>1</sup>; <sup>1</sup>University of Southampton; <sup>2</sup>Northeastern University

**3:20 PM**

**Implementation of an Extensible Property Modeling Framework in ESPEI:** *Brandon Bocklund<sup>1</sup>*; Aurélien Perron<sup>1</sup>; Kaila Bertsch<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**3:40 PM**

**A Dual-Solute Model for Grain Boundary Segregation Prediction in Nanocrystalline Metals:** *Zuoyong Zhang<sup>1</sup>*; Chuang Deng<sup>1</sup>; <sup>1</sup>University of Manitoba

**4:00 PM Break**

**4:20 PM Invited**

**Topology of a Phase Transition:** *Jeremy Mason<sup>1</sup>*; Ozan Ericok<sup>1</sup>; <sup>1</sup>University of California, Davis

**4:50 PM**

**First-Principles Investigations of Martensitic Phase Transitions in NiTi-Based and Ru-Based Shape Memory Alloys:** *Zhigang Wu<sup>1</sup>*; Hessam Malmir<sup>1</sup>; John Lawson<sup>1</sup>; Othmane Benefan<sup>2</sup>; <sup>1</sup>NASA Ames Research Center; <sup>2</sup>NASA Glenn Research Center

## SPECIAL TOPICS

### DMMM5: A Decade of Creating Inclusion and Belonging for Diversity in the Minerals, Metals, and Materials Professions — A Decade of DMMM Impact

**Sponsored by:** TMS: Membership Diversity & Development Committee, TMS: Diversity, Equity, and Inclusion Committee

**Program Organizers:** Ben Britton, University of British Columbia; Lauren Garrison, Commonwealth Fusion Systems; Keith Bowman, University of Maryland Baltimore County; Katelyn Jones; Suveen Mathaudhu, Colorado School of Mines; Ashley Paz y Puente, University of Cincinnati; Soumya Varma, KLA Corporation; Eva Zarkadoulia; Danielle White, University of Southern California

**Tuesday PM | March 25, 2025**  
**150 | MGM Grand**

**Session Chair:** Ashley Paz y Puente, University of Cincinnati

**2:30 PM**

**A Decade of DMMM Impact:** *Ashley Paz y Puente<sup>1</sup>*; <sup>1</sup>University of Cincinnati

**2:50 PM Keynote**

**Which Faculty Diversity Programs Work? Evidence From 600 Colleges and Universities:** *Frank Dobbin<sup>1</sup>*; <sup>1</sup>Harvard University

**3:50 PM Interactive Activity - Cultivating Belonging:** We will lead an activity in small groups aimed at helping everyone relate to the feeling of being an outsider, and how that impacts our experiences in the world and at work. We will also explore how the experience shifts if you feel a sense of belonging, and how to create spaces that cultivate belonging and inclusion.

**4:10 PM Break**

**4:30 PM Interactive Activity - Strength Through Diversity:** This activity will be led through small groups, and aimed at relating our collective approach to diversity and its impact. We will explore what symbols resonate with our individual experiences and outlooks, and leverage that to have dialogue about coming together to find

strength through diversity in STEM.

**4:50 PM Panel Discussion - Shaping the Future of STEM: Insights from Previous DMMM Leaders:** Panelists include Liz Holm, University of Michigan (DMMM1); Keith Bowman, University of Maryland, Baltimore County (DMMM2); Michael Rawlings, TMS (DMMM3); Aerial Leonard, The Ohio State University (DMMM4)

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Advanced Electronic Packaging Materials/Process I

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**Tuesday PM | March 25, 2025**  
**360 | MGM Grand**

**Session Chairs:** Christopher Gourlay, Imperial College London; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis

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**2:30 PM**

**Crystallographic Aspects of Phase Transformations in Sn-58Bi Low Temperature Solder:** *Christopher Gourlay*<sup>1</sup>; Xiaomei Shen<sup>1</sup>; Chen-Lin Hsieh<sup>1</sup>; <sup>1</sup>Imperial College London

**2:50 PM**

**Unveiling the Influence of Interfacial Microstructures on the Evolutions of Interfacial Strength and Electric Resistance of Lamellar Cu/Al/Cu Composites Fabricated by Ultrasonic Welding:** *Jheyu Lin*<sup>1</sup>; Zi-Yuan Liu<sup>1</sup>; <sup>1</sup>National Taipei University of Technology

**3:10 PM**

**Inspection, Estimation, and Design of Hybrid Bonding Processes Using In-Situ Heating Atomic Force Microscopy:** *Huai En Lin*<sup>1</sup>; Pin Lin Chen<sup>1</sup>; Chih Chen<sup>1</sup>; Wei Lan Chiu<sup>2</sup>; Hsiang Hung Chang<sup>2</sup>; <sup>1</sup>National Yang Ming Chiao Tung University; <sup>2</sup>Industrial Technology Research Institute

**3:30 PM**

**The Effect of Grain Size on the Chemical-Mechanical-Planarization Removal Rate of Cu Films:** *Yi-Chen Chung*<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**3:50 PM Break**

**4:10 PM**

**The Effect of Ag Addition on the Performance of In-Rich Binary Solder:** *Mohd Arif Anuar Salleh*<sup>1</sup>; Tan Yi Pei<sup>1</sup>; Flora Somidin<sup>1</sup>; Kazuhiro Nogita<sup>2</sup>; <sup>1</sup>Universiti Malaysia Perlis (Unimap); <sup>2</sup>The University of Queensland

**4:30 PM**

**Surface Precipitation and Growth Mechanisms of Bismuth Particles in Sn-Bi and Sn-Ag-Cu (SAC)-Bi Solder Alloys:** John Wu<sup>1</sup>; Amey Luktuke<sup>2</sup>; Eshan Ganju<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Argonne National Lab

**4:50 PM**

**Characterization of FCQFN Solder Interconnects Incorporating Ni Metallization for Advanced High-Power Automobile Applications: An Electromigration Study:** *Yu-Chun Liu*<sup>1</sup>; Min-Yan Tsai<sup>2</sup>; Meng-Chun Chiu<sup>1</sup>; Shan-Bo Wang<sup>2</sup>; Yung-Sheng Lin<sup>2</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology; <sup>2</sup>Corporate Research and Development (CRD), Advanced Semiconductor Engineering (ASE) Group

**5:10 PM**

**Electrical Current-Induced Phase Transformation and Enhanced Mechanical Properties in  $\eta'$ -Cu<sub>6</sub>Sn<sub>5</sub> for Electronic Solder Joints:** *Shubhayan Mukherjee*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

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## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Advanced Techniques for Elucidating Radiation Effects in Structural Materials I

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**Tuesday PM | March 25, 2025**  
**162 | MGM Grand**

**Session Chair:** Boopathy Kombaiiah, Idaho National Laboratory

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**2:30 PM Invited**

**Investigating Radiation Induced Segregation Near Nanosized Cavities by Combining Rate Theory Calculation and Atom Probe Tomography:** *Xing Wang*<sup>1</sup>; Xingyu Liu<sup>1</sup>; Xinyuan Xu<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**3:00 PM**

**Correlative STEM-APT Analysis of Solute-Defect Interaction:** *Siwei Chen*<sup>1</sup>; Jonathan Poplawsky<sup>2</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

**3:20 PM**

**Effect of Irradiation on the Microstructure of Oxide Dispersion Strengthened HT-9 Alloy:** Sohail Shah<sup>1</sup>; Xinchang Zhang<sup>1</sup>; Lin Shao<sup>2</sup>; Andrew Gorman<sup>1</sup>; Cheng Sun<sup>3</sup>; *Mukesh Bachhav*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Texas A&M University; <sup>3</sup>Clemson University

**3:40 PM**

**Determining the Safety Analysis Zones Unaffected by the Injected Interstitial Effect for Both Heavy Ion and Proton Ion Irradiation:** *Yinyin Hong*<sup>1</sup>; Zhihan Hu<sup>1</sup>; Yongchang Li<sup>1</sup>; Frank Garner<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

**4:00 PM Break**

**4:15 PM**

**Application of Autonomous STEM Acquisition for High-Throughput 3D Characterization of Irradiated Materials:** *Hangyu Li*<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Matthew Olszta<sup>3</sup>; Benjamin Eftink<sup>4</sup>; Logan Ward<sup>2</sup>; Zhi-Gang Mei<sup>2</sup>; Kevin Fiedler<sup>3</sup>; James Haag<sup>3</sup>; Derek Hopkins<sup>3</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan Ann Arbor; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Los Alamos National Laboratory

4:35 PM

**Advanced Statistical Techniques for 4D-STEM: Characterizing Defect Populations in Post-Irradiation Au and Cr:** *Dongye Liu*<sup>1</sup>; Sean Mills<sup>1</sup>; Dana Byrne<sup>2</sup>; Benjamin Derby<sup>2</sup>; Matthew Chancey<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Andrew Minor<sup>3</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Lawrence Berkeley National Laboratory

4:55 PM

**In Situ TEM Observation of Complex Irradiation-Driven Interface Amorphization and Amorphization-Driven Grain Reorientation at Immiscible Cu – Ta Interfaces:** *Soumita Mondal*<sup>1</sup>; Priyam Patki<sup>2</sup>; Arya Chatterjee<sup>1</sup>; Wei-Ying Chen<sup>3</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Intel Corporation; <sup>3</sup>Argonne National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 Management — Energy Saving Approach and Material Advances

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Onuralp Yucel, Istanbul Technical University; Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Finland Oy; Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Alafara Baba, University of Ilorin; Tuan Nguyen, University of Queensland; Adam Powell, Worcester Polytechnic Institute; Thomas Battle, Duhan Zhang, Massachusetts Institute of Technology

Tuesday PM | March 25, 2025

364 | MGM Grand

**Session Chairs:** Duhan Zhang, Massachusetts Institute of Technology; Alexander Wimmer, Constantia Teich GmbH

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#### 2:30 PM Introductory Comments

2:35 PM

**Antibiotic Removal From Wastewater Using SrAl<sub>2</sub>O<sub>4</sub> Composites Synthesized by Energy-Saving Volumetric Combustion Method:** *Pelin Demircivi*<sup>1</sup>; Kağan Benzeşik<sup>2</sup>; Mehmet Bugdayci<sup>1</sup>; <sup>1</sup>Yalova University; <sup>2</sup>Istanbul Technical University

2:55 PM

**Processing and Characterization of CoCrFeNiAl High Entropy Alloy by Mechanical Alloying and Spark Plasma Sintering:** *Yusuf Cicek*<sup>1</sup>; Ipek Karadayi<sup>1</sup>; *Gultekin Goller*<sup>1</sup>; <sup>1</sup>Istanbul Technical University

3:15 PM

**FeMn Production via SHS Method From Mill Scale and Magnetite Ironoxide Sources:** *Mehmet Bugdayci*<sup>1</sup>; *Pelin Demircivi*<sup>1</sup>; Kagan Benzesik<sup>2</sup>; <sup>1</sup>Yalova University; <sup>2</sup>Istanbul Technical University

3:35 PM

**Production of Light-Weight Metals Containing High-Entropy Alloys via SHS Process:** *Murat Alkan*<sup>1</sup>; Esra Dokumaci Alkan<sup>1</sup>; Aslihan Karakanat<sup>1</sup>; <sup>1</sup>Dokuz Eylül University

3:55 PM Break

4:15 PM

**Fast Fabrication of MgO Added ALON Ceramics by Reactive Spark Plasma Sintering:** *Demet Aydogmus*<sup>1</sup>; Filiz Cinar Sahin<sup>1</sup>; <sup>1</sup>Istanbul Technical University

4:35 PM

**Eco-feasible Energy Approach for Industrial Uranium Compound Preparation Using Uranyl Pregnant Leach Solution (UPLS):** *Alafara Baba*<sup>1</sup>; Mustapha Raji<sup>2</sup>; Christianah Adeyemi<sup>3</sup>; Kuranga Ayinla<sup>1</sup>; Jude Majasan<sup>4</sup>; Rasheed Agava<sup>5</sup>; <sup>1</sup>University of Ilorin; <sup>2</sup>Ahman Pategi University; <sup>3</sup>Federal Polytechnic Offa; <sup>4</sup>Electrochemical Innovation Laboratory; <sup>5</sup>National Agency for Science and Engineering Infrastructure (NASENI)

4:55 PM

**Effect of Water Flow Rate on the Heat Exchange Between Water Curtain and Iron Powder:** *Wenchao He*<sup>1</sup>; Yin Deng<sup>1</sup>; Jian Chen<sup>1</sup>; <sup>1</sup>Chongqing University of Science and Technology

5:15 PM Concluding Comments

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmentally Assisted Cracking: Theory and Practice — Corrosion Fatigue and Cracking

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Jenifer Locke, Ohio State University

Tuesday PM | March 25, 2025

167 | MGM Grand

**Session Chairs:** Ting Zhu, Georgia Institute of Technology; Stephen Raiman, University of Michigan

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2:30 PM Invited

**Multiscale Modeling of Fatigue Crack Growth and Environmental Effects:** *Ting Zhu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

3:00 PM

**Experimental Investigation of the Environmentally Assisted Fatigue Crack Initiation Mechanisms in Austenitic Stainless Steel 304L:** *Lucie Borowiack*<sup>1</sup>; Loic Signor<sup>2</sup>; Patrick Villechaise<sup>2</sup>; Frederic Delabrouille<sup>1</sup>; Gaelle Leopold Jean-Marie<sup>1</sup>; François Curtit<sup>1</sup>; Gilbert Henaff<sup>2</sup>; Florence Hamon<sup>2</sup>; Luc Doremus<sup>3</sup>; Laurent De Baglion<sup>3</sup>; <sup>1</sup>EDF R&D; <sup>2</sup>Institut Pprime; <sup>3</sup>Framatome

3:20 PM Invited

**Environmentally Assisted Cracking in Light Water Reactors and Molten Salt Reactors: Lessons From the Former Applied to the Latter:** *Stephen Raiman*<sup>1</sup>; <sup>1</sup>University of Michigan

3:50 PM Break

4:10 PM

**Effect of Strain Rate and Grain Size on the Oxidation-Assisted Intergranular Cracking of the Alloy 718 at 650 °C:** *Malo Jullien*<sup>1</sup>; *Damien Texier*<sup>1</sup>; Repayah Black<sup>2</sup>; Jean-Charles Stinville<sup>2</sup>; Marc Legros<sup>3</sup>; <sup>1</sup>Institut Clement Ader - Umr Cnrs 5312; <sup>2</sup>UIUC; <sup>3</sup>CEMES

4:30 PM

**The Role of pH in Corrosion Fatigue: Understanding how Alkaline and Acidic Environments Affect Corrosion Fatigue Crack Growth Rates in Aerospace Aluminum Alloys:** *Gabby Montiel*<sup>1</sup>; Jenifer Locke<sup>1</sup>; <sup>1</sup>The Ohio State University



## Friction Stir Welding and Processing XIII — Friction Stir Welding I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Niles Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Tuesday PM | March 25, 2025**  
**124 | MGM Grand**

**Session Chairs:** Arnold Wright, Bond Technologies; Kenneth Ross, Pacific Northwest National Laboratory

### 2:30 PM

**Friction Stir Welding of Haynes 282 Ni-Based Super Alloy by Using a Novel Hemispherical Tool:** *Abhishek Sharma*<sup>1</sup>; Yoshiaki Morisada<sup>2</sup>; Kohsaku Ushioda<sup>3</sup>; Hidetoshi Fujii<sup>1</sup>; <sup>1</sup>JWRI, Osaka University

### 2:50 PM

**The Simultaneous Double-Sided Friction Stir Welding (SDS-FSW) of Steel:** *Branislav Dzepina*<sup>1</sup>; Santonu Ghosh<sup>1</sup>; Richard Townsend<sup>1</sup>; Matthew Hackett<sup>1</sup>; Stephen Cater<sup>2</sup>; Muneo Matsushita<sup>3</sup>; Nicolaas Troost<sup>4</sup>; <sup>1</sup>Element Six; <sup>2</sup>TWI Ltd.; <sup>3</sup>JFE Steel Corporation; <sup>4</sup>Delft University of Technology

### 3:10 PM

**Development of High-Speed Double-Sided Friction Stir Welding Technology With Optimized Pre-Heating Process for Automotive Advanced High Strength Steels:** *Muneo Matsushita*<sup>1</sup>; Daiki Yamagishi<sup>1</sup>; Koichi Taniguchi<sup>1</sup>; Rinsei Ikeda<sup>2</sup>; Hidetoshi Fujii<sup>2</sup>; <sup>1</sup>JFE Steel Corporation; <sup>2</sup>Osaka University

### 3:30 PM

**Residual Stress in Friction Stir Welded Armor Steel:** *Jhoan Guzman*<sup>1</sup>; Kaue Riffel<sup>1</sup>; Martin McDonnell<sup>2</sup>; Owen Repp<sup>2</sup>; Matthew Rogers<sup>2</sup>; Michael Eff<sup>3</sup>; Jeffrey Rodelas<sup>4</sup>; Andrew Payzant<sup>5</sup>; Jeffrey Bunn<sup>6</sup>; Antonio Ramirez<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Ground Vehicle Systems Center - US Army; <sup>3</sup>EWI; <sup>4</sup>Sandia National Laboratories; <sup>5</sup>Oak Ridge National Laboratory

### 3:50 PM Break

### 4:10 PM

**Advancements for Thick Titanium FSW:** *Johnathon (John) Hunt*<sup>1</sup>; <sup>1</sup>Concurrent Technology Corporation (CTC)

### 4:30 PM

**Mitigating Solidification Cracking in Dissimilar Metal Welds (Mild Steel to Dual Phase Stainless Steel):** *Sojib Hossain*<sup>1</sup>; Jason Provines<sup>2</sup>; Stephen Sharp<sup>2</sup>; James Fitz-Gerald<sup>1</sup>; Sean R. Agnew<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Virginia Transportation Research Council

### 4:50 PM

**Effect of Tool Geometry on Process Forces for FSW in Stainless Steel:** *Jared Jackson*<sup>1</sup>; Joel Gibb<sup>1</sup>; Samuel Merritt<sup>1</sup>; Kenneth Ross<sup>2</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>BYU; <sup>2</sup>PNNL

## Functional Nanomaterials — Functional Nanomaterials I: Synthesis, Process, and Device Integration

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

**Tuesday PM | March 25, 2025**  
**365 | MGM Grand**

**Session Chair:** Wenzhuo Wu, Purdue University

### 2:30 PM Keynote

**Semiconductor Nanomaterials for Neural Interfaces:** *John Rogers*<sup>1</sup>; <sup>1</sup>Northwestern University

### 3:10 PM Invited

**Skin-Interfaced Wearable Nanobiosensors:** *Wei Gao*<sup>1</sup>; <sup>1</sup>California Institute of Technology

### 3:40 PM Invited

**Addressing Unmet Needs With 3D Printed Electronics:** *Yong Lin Kong*<sup>1</sup>; <sup>1</sup>Rice University

### 4:10 PM Break

### 4:30 PM Keynote

**The Utility of Liquid Metal Nanoparticles:** *Michael Dickey*<sup>1</sup>; <sup>1</sup>NC State University

### 5:10 PM Invited

**Acoustophoresis and Additive Manufacturing for Lithium-Ion Batteries:** *Corie Cobb*<sup>1</sup>; <sup>1</sup>University of Washington

## ADVANCED CHARACTERIZATION METHODS

## Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties — Processing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoungh Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

**Tuesday PM | March 25, 2025**  
**155 | MGM Grand**

**Session Chairs:** Peter Anderson, Ohio State University; Xinghang Zhang, Purdue University; Suveen Mathaudhu, Colorado School of Mines; Hang Yu, Virginia Polytechnic Institute and State University

### 2:30 PM Invited

**Extreme Processing of Binary NiTi Shape Memory Alloys:** *Peter Anderson*<sup>1</sup>; Noah Kohlhorst<sup>1</sup>; Daniel Hong<sup>1</sup>; Srirani Vijayan<sup>2</sup>; Nan Li<sup>3</sup>; Tomas Grejtak<sup>4</sup>; Daniel Huber<sup>1</sup>; Brian Thurston<sup>1</sup>; George Gray<sup>3</sup>; Jay Tiley<sup>4</sup>; Glenn Daehn<sup>1</sup>; Boyd Pantoni<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Michigan Technological University; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Oak Ridge National Laboratory

2:55 PM

**Extreme Strengthening of Ausformed M54® Through Ambient Temperature Rolling:** *Joshua Edwards*<sup>1</sup>; Nicholas Derimow<sup>2</sup>; Jake Benzing<sup>2</sup>; Thomas Kozmel<sup>3</sup>; Jeffrey Lin<sup>3</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>National Institute of Standards and Technology; <sup>3</sup>QuesTek Innovations LLC

3:15 PM Invited

**Additive Manufacturing of a Heterogeneous Al Alloy:** *Xinghang Zhang*<sup>1</sup>; Anyu Shang<sup>1</sup>; Kenyi Hernandez<sup>2</sup>; Pascal Bellon<sup>2</sup>; Haiyan Wang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Illinois, Urbana Champaign

3:40 PM

**Controlling the Formation of Gradient Structures in Pure Cobalt:** *Nathan Brown*<sup>1</sup>; Dave Field<sup>1</sup>; <sup>1</sup>Washington State University

4:00 PM Break

4:15 PM

**Customized Surface Heterostructuring:** *Hyoung Seop Kim*<sup>1</sup>; Rae Eon Kim<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology

4:35 PM Invited

**Heterostructured and Gradient Materials Through Skin-Pass Rolling:** *Joshua Edwards*<sup>1</sup>; Ruben Ochoa<sup>1</sup>; Adam Freund<sup>1</sup>; Nicholas Krienke<sup>1</sup>; Nicholas Derimow<sup>2</sup>; Jake Benzing<sup>2</sup>; Thomas Kozmel<sup>3</sup>; Jeffrey Lin<sup>3</sup>; *Suveen Mathaudhu*<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>National Institute of Standards and Technology; <sup>3</sup>Questek Innovations LLC

5:00 PM Invited

**Solid-State Additive Manufacturing of 3D Heterostructured and Mesostructured Materials:** *Hang Yu*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

5:25 PM Invited

**Heterostructured Materials Synthesized by Liquid Metal Dealloying:** *Soo-Hyun Joo*<sup>1</sup>; <sup>1</sup>Dankook University

5:50 PM

**Steel-Titanium Heterostructured Material Produced by Severe Plastic Deformation:** *Bartłomiej Pabich*<sup>1</sup>; Janusz Majta<sup>1</sup>; Marcin Kwiecień<sup>1</sup>; Kamil Cichocki<sup>1</sup>; Lukasz Madej<sup>1</sup>; *Krzysztof Muszka*<sup>1</sup>; <sup>1</sup>AGH University of Krakow

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Steel Design II

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

Tuesday PM | March 25, 2025  
302 | MGM Grand

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Adriana Eres-Castellanos, Colorado School of Mines

2:30 PM Invited

**Comparison of Cold-Forming 1500 MPa Ultra-High-Strength Steels for Automotive Applications:** *Jun Hu*<sup>1</sup>; Tobi Oriola<sup>1</sup>; Yeting Sun<sup>1</sup>; Eliseo Hernandez Duran<sup>1</sup>; Grant Thomas<sup>1</sup>; <sup>1</sup>Cleveland-Cliffs Inc.

3:00 PM

**Designing Interlath Austenite as Hydrogen Traps in PH17-4 Stainless Steel:** *Parth Khandelwal*<sup>1</sup>; Michela Geri<sup>1</sup>; Hyunsoek Oh<sup>1</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

3:20 PM

**Retained Austenite Stability in Bearing Steels:** *Mina Amir*<sup>1</sup>; Annika Borgenstam<sup>1</sup>; Per-Lennart Larsson<sup>1</sup>; Peter Hedström<sup>1</sup>; Junbiao Lai<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>SKF Research & Technology Development (RTD)

3:40 PM

**The Effect of Prior Austenite Grain Size on Rate of Temper Embrittlement in Nickel-Chromium-Molybdenum Steels:** *Aphrodite Strifas*<sup>1</sup>; Matthew Draper<sup>1</sup>; Sreeramamurthy Ankem<sup>2</sup>; <sup>1</sup>Naval Surface Warfare Center, Carderock Division; <sup>2</sup>University of Maryland

4:00 PM Break

4:20 PM Invited

**Improving Strength and Ductility Combination of Laser Powder Bed Fused TRIP-Assisted Steels:** *Amelia How*<sup>1</sup>; Sheng Huang<sup>1</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

4:50 PM

**Austenite Grain Growth in As-Cast Line Pipe Steels:** *Min-Yu Tseng*<sup>1</sup>; Joshua Swan<sup>1</sup>; Sabyasachi Roy<sup>1</sup>; Ruth Birch<sup>1</sup>; Warren Poole<sup>1</sup>; Matthias Militzer<sup>1</sup>; <sup>1</sup>The University of British Columbia

5:10 PM

**Dynamic Interplay of Sub-Grain Coarsening and M23C6 Precipitate Growth: Implications on Creep Behavior in Ferritic Martensitic Steels:** *Amey Parnaik*<sup>1</sup>; Pavan A. H. V.<sup>2</sup>; Lakshmi Narayan Ramasubramanian<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi; <sup>2</sup>Bharat Heavy Electricals Limited

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution — Data-Driven Modeling and Theory in Alloy Design

**Sponsored by:** TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Yunzhi Wang, Ohio State University; Wei Xiong, University of Pittsburgh; Jiamian Hu, University of Wisconsin Madison; Chuan Zhang, CompuTherm LLC

Tuesday PM | March 25, 2025  
357 | MGM Grand

**Session Chairs:** Lei Chen, University of Michigan-Dearborn; Yanzhou Ji, Ohio State University

2:30 PM Invited

**Phase-Field Models, Multiscale Models and Machine Learning:** *Kaushik Bhattacharya*<sup>1</sup>; <sup>1</sup>California Institute of Technology

2:55 PM Invited

**Microstructure-Aware Bayesian Alloy Design:** *Raymundo Arroyave*<sup>1</sup>; <sup>1</sup>Texas A&M University

3:20 PM Invited

**Grain Selection Growth of Alkali Metals in Electrochemical Processes: Thermodynamics and Phase-Field Model:** *Lei Chen*<sup>1</sup>; <sup>1</sup>University of Michigan-Dearborn

3:45 PM Invited

**Zentropy:** *Zi-Kui Liu*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

4:10 PM Break

4:20 PM Invited

**High-Throughput and Systematic Study of Phase Transformations and Microstructure Evolution Using Dual-Anneal Diffusion Multiples:** *Jess Garnett*<sup>1</sup>; *Ji-Cheng Zhao*<sup>2</sup>; <sup>1</sup>University of Maryland; <sup>2</sup>University of Connecticut

4:45 PM Invited

**Advanced Phase-Field Models of Solution Phases in CALPHAD Databases:** *Yanzhou Ji*<sup>1</sup>; Long-Qing Chen<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Penn State University

5:10 PM Invited

**Machine Learning Enhanced ICME Design for Alloy Development in Additive Manufacturing:** *Wei Xiong*<sup>1</sup>; <sup>1</sup>University of Pittsburgh

5:35 PM Invited

**Guiding the Design of Microstructure and Mechanical Properties of Alloys Using Integrated Phase-Field Simulation:** *Yuhong Zhao*<sup>1</sup>; <sup>1</sup>North University of China

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments — Superconductivity, Magnetism and Ferroelectricity

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Energy Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Composite Materials Committee

**Program Organizers:** Paolo Mele, Shibaura Institute of Technology; Julio Gutierrez Moreno, Barcelona Supercomputing Center; Hussein Assadi, RIKEN (The Institute of Physical and Chemical Research); Esmail Doustkhah, Istinye University; Marco Fronzi, The University of Sydney; Donna Guillen, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Tuan Nguyen, University of Queensland

Tuesday PM | March 25, 2025  
358 | MGM Grand

**Session Chair:** Paolo Mele, Shibaura Institute of Technology

2:30 PM Invited

**Magnetic Metasurfaces for Sustainable Information and Communication Technologies:** *Anna Palau*<sup>1</sup>; <sup>1</sup>ICMAB-CSIC

2:55 PM Invited

**Reaching New Frontiers to for Superconductors Using Pulsed High Magnetic Fields:** *Boris Maiorov*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

3:20 PM

**The Exploration of FeNiMoW-Based Alloys for High Value Magnetic Materials:** *Sarah O'Brien*<sup>1</sup>; Matthew Beck<sup>1</sup>; <sup>1</sup>University of Kentucky

3:40 PM

**From Prediction to Experimental Realization of Ferroelectric Wurtzite AlN-Based Alloys:** *Cheng-Wei Lee*<sup>1</sup>; Keisuke Yazawa<sup>2</sup>; Thi Nguyen<sup>1</sup>; Nate Bernstein<sup>1</sup>; Victoria Bradford<sup>3</sup>; Geoff Brennecke<sup>1</sup>; Prashun Gorai<sup>4</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>National Renewal Energy Laboratory; <sup>3</sup>University of Connecticut; <sup>4</sup>Rensselaer Polytechnic Institute

4:00 PM

**Unraveling the Effects of Dislocations on Ferroelectric Behavior by Molecular Dynamics Simulations:** *Sepideh Kavousi*<sup>1</sup>; Mohsen Asle Zaeem<sup>1</sup>; <sup>1</sup>Colorado School of Mines

4:20 PM Concluding Comments

## LIGHT METALS

### Light Elements Technology — Light Elements - Sodium, Li, Boron

**Sponsored by:** TMS Light Metals Division, TMS: Light Elements Technology Committee

**Program Organizers:** Alafara Baba, University of Ilorin; Neale Neelameggham, IND LLC; Onuralp Yücel, Istanbul Technical University; Kiran Solanki, Arizona State University

Tuesday PM | March 25, 2025  
110 | MGM Grand

**Session Chairs:** Kagan Benzesik, Istanbul Technical University; Alafara Baba, University of Ilorin

2:30 PM Introductory Comments

2:35 PM

**Sodium Resistance of Ceramic and Glass Materials – Na Thermo-Gravimetric Analysis and Liquid Na Exposure Test:** *Ole Kjos*<sup>1</sup>; Zhaohui Wang<sup>1</sup>; Kent-Robert Molvik<sup>1</sup>; Stein Rørvik<sup>1</sup>; Cathrine Solem<sup>1</sup>; Camilla Sommereth<sup>1</sup>; <sup>1</sup>SINTEF Industry

2:55 PM

**Development of Optimal Extraction Conditions of Indigenous Lepidolite Ore as Raw Material for Lithium-Ion Batteries:** *Alafara Baba*<sup>1</sup>; Daud Olaoluwa<sup>2</sup>; Aishat Abdulkareem<sup>3</sup>; Jude Majasan<sup>4</sup>; Adeniyi Aremu<sup>1</sup>; Rasheed Agava<sup>5</sup>; <sup>1</sup>University of Ilorin; <sup>2</sup>The Federal Polytechnic, P.M.B. 231; <sup>3</sup>National Mathematical Centre; <sup>4</sup>Electrochemical Innovation Laboratory; <sup>5</sup>National Agency for Science and Engineering Infrastructure (NASENI)

3:15 PM

**Spark Plasma Sintering of Combustion Synthesis Derived Lithium Orthosilicate Powders:** *Kagan Benzesik*<sup>1</sup>; Filiz Çınar Şahin<sup>1</sup>; Onuralp Yücel<sup>1</sup>; <sup>1</sup>Istanbul Technical University

3:35 PM

**Effect of Boron Addition to Steel on Mechanical Properties:** Levent Özmen<sup>1</sup>; Mehmet Çakıcı<sup>2</sup>; *Onuralp Yücel*<sup>3</sup>; <sup>1</sup>KARDEMİR Karabük Iron Steel Ind. Co.; <sup>2</sup>ÇE\_DAM Company; <sup>3</sup>Istanbul Technical University

3:55 PM Break

4:10 PM

**Production and Characterization of (B4C-TiB2)-GNP Composites by Spark Plasma Sintering Method:** Berkay Uygun<sup>1</sup>; Leyla Yanmaz<sup>1</sup>; *Filiz Sahin*<sup>1</sup>; <sup>1</sup>Istanbul Technical University

4:30 PM

**Spark Plasma Sintering and Characterization of B4C-ZrB2-GNP Composites:** Behrad Mokhtari<sup>1</sup>; Leyla Yanmaz<sup>1</sup>; Berkay Uygun<sup>1</sup>; *Filiz Sahin*<sup>1</sup>; <sup>1</sup>Istanbul Technical University

4:50 PM

**Research and Application of Direct Welding Technology on Super Large Section Conductor:** Xudong Wang<sup>1</sup>; *Yingwu Li*<sup>2</sup>; Zhongyuan Li<sup>2</sup>; <sup>1</sup>Zhengzhou Jingwei Technology Industry Co., Ltd; <sup>2</sup>Zhengzhou Jingwei Technology Industrial Co., Ltd.

## Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Characterization

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Tuesday PM | March 25, 2025**  
**352 | MGM Grand**

**Session Chairs:** Irene Beyerlein, University of California, Santa Barbara; Mitra Taheri, Johns Hopkins University

### 2:30 PM Invited

**Frontiers in Short Range Order—Measurement and Phenomenological Implications:** *Simon Ringer*<sup>1</sup>; <sup>1</sup>University of Sydney

### 3:00 PM Invited

**Total Scattering: A Powerful Technique for the Characterisation of Local Structure:** *Helen Playford*<sup>1</sup>; <sup>1</sup>ISIS Neutron and Muon Source

### 3:30 PM

**Probing Short Range Order of in Ni<sub>4</sub>Mo Through Total Scattering:** *Niels Schreiner*<sup>1</sup>; Philip Chater<sup>2</sup>; Lewis Owen<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>Diamond Light Source

### 3:50 PM Break

### 4:10 PM Invited

**Assessing and Quantifying Local Structure in Alloys Using Total Scattering:** *Lewis Owen*<sup>1</sup>; <sup>1</sup>University of Sheffield

### 4:40 PM

**Configurational Analysis of Local Order in CrFeCoNi to Elevated Temperatures: A Total Scattering Investigation:** *Benjamin Jolly*<sup>1</sup>; Chris Race<sup>1</sup>; Nick Jones<sup>2</sup>; Lewis Owen<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>University of Cambridge

### 5:00 PM

**Thermodynamical and Kinetic Aspects of Stacking Fault Segregation:** *Andreas Bezold*<sup>1</sup>; Nicolas Karpstein<sup>2</sup>; Jan Vollhüter<sup>2</sup>; Erdmann Spiecker<sup>2</sup>; Michael Mills<sup>1</sup>; Steffen Neumeier<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg

### 5:20 PM

**How Far Away is the Quenched Multi-Principal Element Alloy From a Random Solid Solution?:** *Yongwen Sun*<sup>1</sup>; Ying Han<sup>1</sup>; Hangman Chen<sup>2</sup>; Judith Yang<sup>3</sup>; Wen Chen<sup>4</sup>; Penghui Cao<sup>2</sup>; Yang Yang<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of California, Irvine; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>University of Massachusetts, Amherst

## Magnesium Technology 2025 — Deformation Mechanisms

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Tuesday PM | March 25, 2025**  
**115 | MGM Grand**

**Session Chairs:** Kristian Mathis, Charles University; Dietmar Letzig, Helmholtz-Zentrum Hereon

### 2:30 PM Keynote

**Combination of In-Situ Synchrotron Diffraction and Acoustic Emission Experiments to Understand Plastic Deformation of Magnesium Alloys:** *Gerardo Garces*<sup>1</sup>; Pablo Pérez Zubiaur<sup>1</sup>; Judit Medina<sup>1</sup>; Kristian Mathis<sup>2</sup>; Andreas Stark<sup>3</sup>; Norbert Schell<sup>3</sup>; Paloma Adeva<sup>1</sup>; <sup>1</sup>CENIM-CSIC; <sup>2</sup>Charles University; <sup>3</sup>HEREON

### 3:10 PM

**Deformation Behavior, Microstructure Evolution and Phase Transformation of Dual-Phase Mg-Li-Zn-Sr-Ca Alloy Under Isothermal Compression:** *Guobing Wei*<sup>1</sup>; <sup>1</sup>Chongqing University

### 3:30 PM

**Correlation of r-Value With Texture and Formability in Magnesium Alloy Sheets:** *Seoungyooun Yur*<sup>1</sup>; Ying Ma<sup>1</sup>; Young Min Kim<sup>1</sup>; Sung Hyuk Park<sup>2</sup>; Byeong-Chan Suh<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science; <sup>2</sup>Kyungpook National University

### 3:50 PM

**Dilute Mg Alloys Comprised of Earth-Abundant Elements With High Strength Imparted by Thermomechanical Processing:** *Sean Agnew*<sup>1</sup>; Seth Faberman<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; Taisuke Sasaki<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>National Institute of Materials Science

### 4:10 PM Break

### 4:30 PM

**Mechanical Properties and Deformation Mechanism of Mg Indented by Tips of Different Angles:** *Reza Motallebi*<sup>1</sup>; Kelvin Xie<sup>1</sup>; <sup>1</sup>Texas A&M University

### 4:50 PM

**Understanding the Role of Crystallographic Grain Orientation and Interfaces on Cyclic Stress Strain Behavior and Crack Initiation in Weakly Textured Magnesium Alloys:** *Arianna Mena*<sup>1</sup>; Justin Smith<sup>1</sup>; Aerial Murphy-Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University



## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions — Aging and Compatibility of Polymers

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bishnu Khanal, Sandia National Laboratories; Michael Melia, Sandia National Laboratories; Coby Davis, Sandia National Laboratories; Kerri Blobaum, Lawrence Livermore National Laboratory; Anthony Van Buuren, Lawrence Livermore National Laboratory; Nan Butler, Sandia National Laboratories

**Tuesday PM | March 25, 2025**  
**308 | MGM Grand**

**Session Chairs:** Nicholas Wyatt, Sandia National Laboratories; Michael Melia, Sandia National Laboratories

#### 2:30 PM Invited

**Towards High-Throughput Materials Advancement: Thinking About Database Management in Our Studying-Polymers-On-A-Chip (SPOC) Platform:** *Johanna Schwartz*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 3:10 PM

**Accelerated Oxidation of Epoxy Thermosets With Increased O<sub>2</sub> Pressure:** Mathew Celina<sup>1</sup>; *Carl Linde*<sup>2</sup>; Matija Barrett<sup>2</sup>; Lisa Ko<sup>2</sup>; <sup>1</sup>Los Alamos National Lab (visiting); <sup>2</sup>Sandia National Laboratories

#### 3:30 PM

**Predicting Photo-Oxidative Embrittlement of a Semicrystalline Thermoplastic From Micromechanical Damage:** *Kenneth Cundiff*<sup>1</sup>; Amine Benzerga<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Texas A&M University

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Molten Salt Electrochemistry and Redox Control

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Tuesday PM | March 25, 2025**  
**165 | MGM Grand**

**Session Chair:** Amanda Leong, Virginia Polytechnic Institute

#### 2:30 PM

**Electrochemical Analysis and Corrosion Behavior of Ni-Cr Alloy in Molten LiCl-KCl:** *Peyman Asghari-Rad*<sup>1</sup>; Nathan D. Smith<sup>1</sup>; Sanghyeok Im<sup>1</sup>; Hojong Kim<sup>1</sup>; <sup>1</sup>Pennsylvania State University

#### 2:50 PM

**Electrochemical Characterization of Molten Salt Fuel Systems With Boron-Doped Diamond:** Hannah Patenaude<sup>1</sup>; *Nastasija Damjanovic*<sup>2</sup>; Jarom Chamberlain<sup>1</sup>; Charles Lhermitte<sup>1</sup>; Kenneth Czerwinski<sup>2</sup>; Marisa Monreal<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Nevada, Las Vegas

#### 3:10 PM

**Redox Control Measurement in Sodium, Beryllium, Uranium Bearing Salt:** *Nagihan Karakaya*<sup>1</sup>; Amanda Leong<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Tech

#### 3:30 PM

**In-situ Monitoring of Molten Chloride Salt Chemistry and Corrosion Using Microelectrode:** Changkyu Kim<sup>1</sup>; *Adrien Couet*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

#### 3:50 PM

**Thermochemical Measurements of FeCl<sub>2</sub> in Molten LiCl Environment:** *Jarrod Gesualdi*<sup>1</sup>; Timothy Lichtenstein<sup>1</sup>; Eva Schneiderlochner<sup>1</sup>; Krista Hawthorne<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 4:10 PM Break

#### 4:30 PM

**Utilizing Multi-Modal Approach to Investigate Local Structure and Speciation of Metal Solutes in Molten Salt Systems:** *Nirmalendu Patra*<sup>1</sup>; Alejandro Ballesteros<sup>2</sup>; Santanu Roy<sup>3</sup>; Ruchi Gakhar<sup>2</sup>; Vyacheslav Bryantsev<sup>3</sup>; Anatoly Frenkel<sup>1</sup>; James Wishart<sup>1</sup>; Simerjeet Gill<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

#### 4:50 PM

**Metal Redox Control in Molten NaF-BeF<sub>2</sub>-UF<sub>4</sub>-ZrF<sub>4</sub> Salt for Corrosion Mitigation:** *Woohyuk Lee*<sup>1</sup>; Amanda Leong<sup>1</sup>; Jaewoo Park<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Tech

#### 5:10 PM

**Enhanced Electrochemical Method for Detecting Dissolved Non-Metallic Contaminants in Molten Salts:** *Nathan Bradshaw*<sup>1</sup>; Antoine Allanore<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

#### 5:30 PM

**Thermochemical Measurements of Electroactive Species in Molten Salts Using Cathodic Decomposition Electrodes:** Timothy Lichtenstein<sup>1</sup>; *Jarrod Gesualdi*<sup>1</sup>; Eva Schneiderlochner<sup>1</sup>; Krista Hawthorne<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Materials for Sustainable Hydrogen Energy — Hydrogen Embrittlement and Hydrogen Diffusion I

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

**Tuesday PM | March 25, 2025**  
**169 | MGM Grand**

**Session Chairs:** Wenwen Song, University of Kassel; Binhan Sun, East China University of Science and Technology; Jinwoo Kim, Korea Institute Of Science And Technology (Kist); Enrique Galindo-Nava, University College London

#### 2:30 PM Introductory Comments

#### 2:35 PM Invited

**New Characterisation Methods for High Pressure Hydrogen Facing Materials:** *Peter Felfer*<sup>1</sup>; <sup>1</sup>Fau Erlangen-Nurnberg

#### 3:05 PM

**Hydrogen Embrittlement Mechanisms and Mitigation Strategy in a High-Mn and High-Al Two-Phase Lightweight Steel:** *Xizhen Dong*<sup>1</sup>; Ali Tehrani<sup>1</sup>; Dirk Ponge<sup>1</sup>; Binhan Sun<sup>2</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max-Planck-Institut für Sustainable Materials GmbH; <sup>2</sup>Key Laboratory of Pressure Systems and Safety, East China University of Science and Technology

3:25 PM

**Effect on Hydrogen Trapping in Laser Welded Advanced High Strength Steels:** *Madyson Canulette*<sup>1</sup>; Gregory Thompson<sup>2</sup>; Luke Brewer<sup>2</sup>; <sup>1</sup>University of Alabama Birmingham; <sup>2</sup>University of Alabama

3:45 PM Invited

**Microscopic Characterization of Hydrogen Distribution and Hydrogen Embrittlement in Steels:** *Eason Yi-Sheng Chen*<sup>1</sup>; <sup>1</sup>Nanyang Technological University

4:05 PM Break

4:20 PM

**Investigation of Hydrogen Embrittlement Effect Using Ex-Situ Impact and In-Situ Slow Rate Charpy Tests on an X65 Steel and Weld:** *Xin Pang*<sup>1</sup>; Su Xu<sup>1</sup>; Daichi Izumi<sup>2</sup>; Nobuyuki Ishikawa<sup>2</sup>; <sup>1</sup>Canmetmaterials; <sup>2</sup>JFE Steel Corporation

4:40 PM

**Role of Cyclic Predeformation on Hydrogen Embrittlement in an Austenitic Stainless Steel:** *Vishnu Anilkumar*<sup>1</sup>; Frans Palmert<sup>2</sup>; Lars Nyborg<sup>3</sup>; Johan Ahlström<sup>1</sup>; Yu Cao<sup>1</sup>; <sup>1</sup>Chalmers University of Technology; <sup>2</sup>Siemens Energy AB, Finspång, Sweden

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## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Performance of Ceramics and Other Materials in Nuclear Systems

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

Tuesday PM | March 25, 2025  
160 | MGM Grand

**Session Chair:** Assel Aitkaliyeva, University of Florida

2:30 PM Invited

**Radiation Effects in High-Entropy Ceramics:** *Izabela Szlufarska*<sup>1</sup>; Waqas Qureshi<sup>1</sup>; Shuguang Wei<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

3:00 PM

**Shear and Delamination Behaviour of Basal Planes in Zr<sub>3</sub>AlC<sub>2</sub> MAX Phase Studied by Micromechanical Testing:** *Siyang Wang*<sup>1</sup>; Oriol Gavalda-Diaz<sup>1</sup>; Jack Lyons<sup>1</sup>; Finn Giuliani<sup>1</sup>; <sup>1</sup>Imperial College London

3:20 PM

**Studying the Localized Deformation Behavior of Hydride Containing Zircaloy-4 Getter Tubes for TPBAR Applications:** *Tanvi Ajantiwalay*<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Mayur Pole<sup>1</sup>; Joshua Silverstein<sup>1</sup>; Ewa Ronnebro<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

3:40 PM

**Size Effect Investigation of Nuclear Grade ET-10 Graphite:** *Spencer Doran*<sup>1</sup>; Jacob Whisler<sup>1</sup>; Ian Ferguson<sup>1</sup>; Johnathan Gonyaw<sup>1</sup>; Pierre Alexandre Juan<sup>2</sup>; Brandon Haugh<sup>2</sup>; Tianyi Chen<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Kairos Power

4:00 PM Break

4:20 PM

**Microstructural Related Mechanical Properties and Fracture Behavior in Nuclear Graphite:** *Gongyuan Liu*<sup>1</sup>; Aman Haque<sup>1</sup>; Jing Du<sup>1</sup>; William Windes<sup>2</sup>; Arvin Cunningham<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Idaho National Laboratory

4:40 PM

**Mapping the Swelling Behavior of Pure Chromium as a Function of Stress & Damage Through a Combination of Four-Point Bending, Finite Element Analysis, and Ion Irradiation:** *Rijul Chauhan*<sup>1</sup>; Yinyin Hong<sup>1</sup>; Kenneth Cooper<sup>1</sup>; Yongchang Li<sup>1</sup>; Artur Santos Paixao<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

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## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Grain Boundaries I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

Tuesday PM | March 25, 2025  
369 | MGM Grand

**Session Chairs:** Subin Lee, Karlsruhe Institute of Technology; Nathan Mara, University of Minnesota

2:30 PM

**Simulating Plastic Flow in Bicrystals With a Discrete Dislocation Dynamics Framework:** *Mujan Seif*<sup>1</sup>; <sup>1</sup>University of Oxford

2:50 PM

**Partially Active Grain-Boundary Segregation and Maximum Tensile Strengths in Nanocrystalline Silver-Copper Alloys:** *Pavel Nikitin*<sup>1</sup>; *Frederic Sanzoz*<sup>2</sup>; <sup>1</sup>University of Vermont

3:10 PM

**Phase Field Dislocation Dynamics Formulation Coupled With Fourier-Based Micromechanics Solver: Application to Grain Boundary-Dislocation Interactions:** *Brayan Murgas Portilla*<sup>1</sup>; Janel Chua<sup>1</sup>; Nithin Mathew<sup>1</sup>; Abigail Hunter<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

3:30 PM Invited

**On the Impact of Individual Grain Boundaries in Cu on Electrical Conductivity and Strength:** *Gerhard Dehm*<sup>1</sup>; <sup>1</sup>MPI for Sustainable Materials

4:00 PM Break

4:20 PM

**Grain Boundary Segregation and Its Effect on the Mechanical Performance of NbMoW Studied Using Atomistic Simulations:** *Samuel Wagers*<sup>1</sup>; Adib Samin<sup>1</sup>; <sup>1</sup>Air Force Institute of Technology

4:40 PM

**Understanding Grain Boundary-Dislocation Interactions in MoNbTi and Their Role Mediating**

**Low Temperature Ductility:** *Glenn Balbus*<sup>1</sup>; Byron McArthur<sup>2</sup>; Oleg Senkov<sup>1</sup>; Samuel Kuhr<sup>2</sup>; Todd Butler<sup>2</sup>; <sup>1</sup>MRL Materials Resources LLC; <sup>2</sup>Air Force Research Laboratory

5:00 PM Invited

**Scale Bridging Characterization of Grain Boundary Engineered Thermoelectric Materials:** *Christina Scheu*<sup>1</sup>; Ruben Bueno Villoro<sup>1</sup>; Chanwon Jung<sup>1</sup>; Dominique Mattlat<sup>1</sup>; Duncan Zavanelli<sup>2</sup>; Jeff Snyder<sup>2</sup>; <sup>1</sup>Max-Planck-Institut Fuer Eisenforschung GmbH; <sup>2</sup>Northwestern University

## Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Manufacturing-Related Characterisation

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

**Tuesday PM | March 25, 2025**  
**366 | MGM Grand**

**Session Chair:** Josh Kacher, Georgia Institute of Technology

### 2:30 PM Invited

**Data Acquisition and Modeling to Enable Microstructure Tailorability in Wire Arc Additive Manufacturing:** Mikhail Khrenov<sup>1</sup>; Lauren Fitzwater<sup>1</sup>; Moon Tan<sup>1</sup>; Michelle Hobdari<sup>1</sup>; P. Chris Pistorius<sup>1</sup>; Sneha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 3:00 PM

**Exploring Unusual Lüders Deformation in UFG high-Mn Austenitic Steel:** Suhyoung Hwang<sup>1</sup>; Hirokazu Kato<sup>1</sup>; Kazuho Okada<sup>2</sup>; Myeong-Heom Park<sup>1</sup>; Nobuhiro Tsuji<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Research Center for Structural Materials, National Institute for Materials Science (NIMS)

### 3:20 PM

**Influence of Non-Uniaxial Bending on Twinning and Phase Transformation in Molybdenum Nanowires:** Sicheng Qian<sup>1</sup>; Afnan Mostafa<sup>1</sup>; Feitao Li<sup>2</sup>; Eugen Rabkin<sup>2</sup>; Niaz Abdolrahim<sup>1</sup>; <sup>1</sup>University of Rochester; <sup>2</sup>Technion - Israel Institute of Technology

### 3:40 PM

**Investigation of Dislocation-Grain Boundary Interactions Through In-Situ Direct Tensile Testing With High-Resolution Electron Backscatter Diffraction:** Dongyue Xie<sup>1</sup>; Muh-Jang Chen<sup>1</sup>; Saryu Fensin<sup>1</sup>; Mohammed Zikry<sup>1</sup>; Nan Li<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

### 4:00 PM Break

### 4:20 PM Invited

**Spatial and Temporal Deformation Behaviour of Hybrid Wrought – Additively Manufactured Inconel 718:** Jalal Al-Lam<sup>1</sup>; Abdalrhman Koko<sup>2</sup>; Shreya Mistry<sup>1</sup>; Minh-Son Pham<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>National Physical Laboratory

### 4:50 PM

**Laboratory-Scale Simulation and Combined Modelling of Hot Multi-Directional Open-Die Forging and Cogging:** David Connolly<sup>1</sup>; Mathieu Fabris<sup>2</sup>; Giribaskar Sivaswamy<sup>2</sup>; Salaheddin Rahimi<sup>2</sup>; Vassili Vorontsov<sup>1</sup>; <sup>1</sup>University of Strathclyde; <sup>2</sup>Advanced Forming Research Centre

### 5:10 PM

**The Influence of Concurrent Structural Mechanics and Fluid Flow in Microstructure Solidification Modelling:** Peter Soar<sup>1</sup>; Andrew Kao<sup>1</sup>; Koulis Pericleous<sup>1</sup>; <sup>1</sup>University of Greenwich

## Meeting Materials Challenges for the Future of Fusion Energy — Environmental Effects II

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusioneering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

**Tuesday PM | March 25, 2025**  
**158 | MGM Grand**

**Session Chairs:** James Haag, Pacific Northwest National Laboratory; Weicheng Zhong, Oak Ridge National Laboratory

### 2:30 PM Keynote

**Irradiation Experiments for Fusion Blanket Materials:** Chase Taylor<sup>1</sup>; Thomas Fuerst<sup>1</sup>; Hanns Gietl<sup>1</sup>; Masashi Shimada<sup>2</sup>; Patrick Calderoni<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

### 3:00 PM

**Simulating Plasma-Surface Interactions with Deuterium Beams Experiments: Effect of Tungsten Oxidation:** Aleksandr Afonin<sup>1</sup>; Axel Dunand<sup>1</sup>; Florin Ghiorgiu<sup>1</sup>; Mykola Ialovega<sup>2</sup>; Matthieu Latournerie<sup>1</sup>; Eric Salomon<sup>1</sup>; Marco Minissale<sup>3</sup>; Céline Martin<sup>1</sup>; Thierry Angot<sup>1</sup>; Etienne Hodille<sup>4</sup>; Régis Bisson<sup>1</sup>; <sup>1</sup>Aix-Marseille University; <sup>2</sup>University of Wisconsin-Madison; <sup>3</sup>CNRS; <sup>4</sup>CEA IRFM

### 3:20 PM

**Annealing of Neutron Irradiated Tungsten to Assess the Stability of Irradiation Induced Transmutant Solute Clusters:** Kieran Rivers<sup>1</sup>; Andrew London<sup>2</sup>; Michael Moody<sup>1</sup>; Paul Bagot<sup>1</sup>; David Armstrong<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>UK Atomic Energy Authority

### 3:40 PM

**Responses of Dispersion-Strengthened Tungsten to High Heat Flux and High Fluence Helium Irradiation:** Xing Wang<sup>1</sup>; Ashrakat Saefan<sup>1</sup>; Chase Hargrove<sup>1</sup>; <sup>1</sup>Pennsylvania State University

### 4:00 PM Break

### 4:20 PM

**Defect Phase Diagrams and Structure-Property Relationships for Screw Dislocations of Tungsten in the Presence of Hydrogen Studied by Atomistic Simulations:** Benjamin Helman<sup>1</sup>; Adib Samin<sup>1</sup>; <sup>1</sup>Air Force Institute of Technology

### 4:40 PM

**High Throughput Self-Ion Irradiation and Characterization of Pure Tungsten:** Nicholas Crnkovich<sup>1</sup>; Nathan Curtis<sup>1</sup>; Zilong Hua<sup>2</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Idaho National Laboratory

### 5:00 PM

**Impact Dynamics of High-Velocity Tungsten Dust in Fusion Reactors: A Molecular Dynamics Study:** Prashant Dwivedi<sup>1</sup>; Alberto Fraile<sup>2</sup>; Tomáš Polcar<sup>1</sup>; <sup>1</sup>Ceske Vysoke Ucení Technické V Praze; <sup>2</sup>Material Physics Center (MPC) / Centro de Física de Materiales (CFM) CSIC-UPV/EHU

## LIGHT METALS

### Melt Processing, Casting and Recycling — Furnace Operation and Recycling & Continuous Casting and Safety

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Arild Hakonsen, Hycast As; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**109 | MGM Grand**

**Session Chairs:** Ray Peterson, Real Alloy; Samuel Wagstaff, Oculatus Consulting

#### 2:30 PM Introductory Comments

##### 2:35 PM

**Removal of Zn and Other Volatile Elements from Molten Al by Vacuum Refining:** *Sarina Bao*<sup>1</sup>; Martin Syvertsen<sup>2</sup>; Anne Kvithyld<sup>2</sup>; Kai Tang<sup>2</sup>; Zala Qazi<sup>3</sup>; Signe Ljungquist<sup>3</sup>; Sunniva Walle<sup>3</sup>; <sup>1</sup>SINTEF Materials & Chemistry; <sup>2</sup>SINTEF; <sup>3</sup>Norwegian University of Science and Technology

##### 3:00 PM

**ThermaSiC Coating for Applications in Contact with Molten Aluminum:** *Nicholas Smith-Hanssen*<sup>1</sup>; Stian Sannes<sup>1</sup>; Ali Ebrahimi<sup>2</sup>; Jeremy Rydberg<sup>3</sup>; Hunter Boroff<sup>3</sup>; Sarina Bao<sup>2</sup>; <sup>1</sup>Seram Coatings AS; <sup>2</sup>SINTEF; <sup>3</sup>Atlas Machine and Supply Inc.

##### 3:25 PM

**Optimizing Solid and Liquid Loading Times in Aluminium Melting Furnaces: Enhancing Efficiency and Process Control with SmartMelt Technology:** *Amin Rostamian*<sup>1</sup>; Marc Bertherat<sup>2</sup>; <sup>1</sup>Novamet Sarl; <sup>2</sup>Constellium

##### 3:50 PM

**Modeling and Simulation of Cold Hearth Continuous Casting of Titanium Alloys:** *Arul Mozhi Varman Jayaraman Palanivel*<sup>1</sup>; Tharmalingam Sivarupan<sup>1</sup>; Georgarakis Konstantinos<sup>1</sup>; Konstantinos Salonitis<sup>1</sup>; Mark Jolly<sup>1</sup>; <sup>1</sup>Cranfield University

#### 4:15 PM Break

##### 4:30 PM

**Review of Recent Catastrophic Molten Metal Explosions and Their Causes:** *Alex Lowery*<sup>1</sup>; <sup>1</sup>Wise Chem LLC

##### 4:55 PM

**Development of Numerical Model of Plasma Burner for Primary Aluminium Casthouses:** *Akash Pakanati*<sup>1</sup>; Knut Tveito<sup>1</sup>; Eirik Manger<sup>2</sup>; Martin Lorentzon<sup>3</sup>; <sup>1</sup>Hydro Research and Development Center; <sup>2</sup>Hydro Aluminium, Technology and Operational Support; <sup>3</sup>Hydro Aluminium, Projects

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Microstructural Evolution and Material Properties: Session II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

**Tuesday PM | March 25, 2025**  
**303 | MGM Grand**

**Session Chairs:** Nathan Mara, University of Minnesota; Curt Bronkhorst, University of Wisconsin-Madison

#### 2:30 PM Invited

**Enabling 3D Multiscale Materials Characterization Using Machine Learning:** *Reeju Pokharel*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 3:00 PM Invited

**An Overview of Synchrotron X-ray Microscopies: From Macro to Nano:** *Robert Suter*; <sup>1</sup>

#### 3:30 PM Invited

**Experimental and Numerical Studies on Melt Pools in Metal Additive Manufacturing:** *Yoon Suk Choi*<sup>1</sup>; Seulbi Lee<sup>2</sup>; Jaewoong Kim<sup>2</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>LG Energy Solution, Ltd.

#### 4:00 PM Break

#### 4:20 PM

**From Synthetic Microstructures to SERVES for Manufacturing and Engineering Design:** *Dennis Dimiduk*<sup>1</sup>; Mike Jackson<sup>1</sup>; Steve Niezgoda<sup>2</sup>; <sup>1</sup>BlueQuartz Software LLC; <sup>2</sup>The Ohio State University

#### 4:40 PM

**Explicit Cracking in Microstructure-based Simulations of Failure Mechanisms:** *Benjamin Anglin*<sup>1</sup>; <sup>1</sup>Naval Nuclear Laboratory



## Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Thermal Properties and Performance of Nuclear Fuels

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Tuesday PM | March 25, 2025**  
**159 | MGM Grand**

**Session Chair:** Miaomiao Jin, Pennsylvania State University

### 2:30 PM Invited

**Understanding the Impact That the  $\text{UO}_2$  Radial Microstructural Evolution has on Temperature Transient Performance in LWR Pellets:** Casey McKinney<sup>1</sup>; Jesse Werden<sup>1</sup>; Chad Parish<sup>1</sup>; Lauryn Reyes<sup>1</sup>; Matthew Jones<sup>1</sup>; Tyler Gerczak<sup>1</sup>; Jason Harp<sup>1</sup>; Nathan Capps<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 3:00 PM

**Implications of Accurate Point Defects Estimation on  $\text{UO}_2$  Thermal Conductivity and Fission Gas Release for Accelerated Fuel Irradiation:** Mutaz Alshannaq<sup>1</sup>; Charlie Owen<sup>2</sup>; Joshua Ferrigno<sup>1</sup>; Marat Khafizov<sup>1</sup>; Hany S. Abdel-Khalik<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Purdue University

### 3:20 PM

**An Irreducible Derivatives Approach to Improve Empirical Interatomic Potentials for Thermophysical Property Predictions: the Case of  $\text{ThO}_2$  and  $\text{UO}_2$ :** Shuxiang Zhou<sup>1</sup>; Chao Jiang<sup>1</sup>; Enda Xiao<sup>2</sup>; Sasaank Bandi<sup>2</sup>; Michael Cooper<sup>3</sup>; Miaomiao Jin<sup>4</sup>; David Hurley<sup>5</sup>; Marat Khafizov<sup>6</sup>; Chris Marianetti<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Columbia University; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pennsylvania State University; <sup>5</sup>The Ohio State University

### 3:40 PM

**First Principle Based Modeling of the Impact of Dislocation Loops on the Thermal Transport of Nuclear Fuels:** Saqeeb Adnan<sup>1</sup>; Erika Nosal<sup>1</sup>; Marat Khafizov<sup>1</sup>; <sup>1</sup>Ohio State University

### 4:00 PM Break

### 4:20 PM

**Investigating Microstructural and Local Thermal Conductivity Changes in Irradiated U-Zr Annular Fuel:** Mary Severt<sup>1</sup>; Daniele Salvato<sup>2</sup>; Mitchell Mika<sup>1</sup>; Fei Xu<sup>2</sup>; Tiankai Yao<sup>2</sup>; Luca Capriotti<sup>2</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

### 4:40 PM

**In-Situ Thermal Conductivity of Uranium Nitride (UN) and SIMFUEL Composites Under Irradiation:** Elina Charatsidou<sup>1</sup>; Maria Giamouridou<sup>1</sup>; Robert Frost<sup>2</sup>; Michael Short<sup>3</sup>; Pär Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Uppsala University; <sup>3</sup>Massachusetts Institute of Technology

### 5:00 PM

**Thermal Properties Degradation in Proton Irradiated Cr-Doped  $\text{UO}_2$ :** Adrien Terricabras<sup>1</sup>; Rijul Chauhan<sup>2</sup>; John Proctor<sup>3</sup>; Oran Lori<sup>3</sup>; Lin Shao<sup>2</sup>; Sarah Finkeldei<sup>3</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Texas A&M University; <sup>3</sup>University of California Irvine

## Nanostructured Materials in Extreme Environments III — Novel Structure for Extremes

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

**Tuesday PM | March 25, 2025**  
**166 | MGM Grand**

**Session Chair:** Douglas Stauffer, Bruker Nano Surfaces & Metrology

### 2:30 PM Invited

**Thermal Stability of Nanocrystalline Metallic Materials:** Xinghang Zhang<sup>1</sup>; Yifan Zhang<sup>2</sup>; Nicholas Richter<sup>1</sup>; Haiyan Wang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Clemson University

### 2:55 PM Invited

**Dislocation Defect Phases as a Pathway for the Manipulation of Higher Order Mechanical Properties:** Timothy Rupert<sup>1</sup>; <sup>1</sup>Johns Hopkins University

### 3:20 PM Invited

**Synergistic Grain Boundary Segregation and Nanodispersoid Induced Stabilization of Ultrafine Grained Tungsten Microstructures:** Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University

### 3:45 PM Break

**4:05 PM Introductory Comments:** Young Leaders International Scholar – KIM Lecture

### 4:10 PM Invited

**Young Leaders International Scholars– KIM Lecture: Aluminum-Carbon Thin Films with High Strength and Ductility:** Gi-Dong Sim<sup>1</sup>; <sup>1</sup>KAIST

### 4:40 PM Invited

**Ultra-Strong and Corrosion-Resistant Crystalline-Amorphous Nanostructured Metals:** Xusheng Yang<sup>1</sup>; <sup>1</sup>Hong Kong Polytechnic University

### 5:00 PM

**Investigating the Carbon Effect on the Tensile Strength in 6061 Aluminum Alloy-C Thin Films:** Zion Lee<sup>1</sup>; Hojang Kim<sup>1</sup>; Sunkun Choi<sup>1</sup>; Injong Oh<sup>1</sup>; Jaehong Park<sup>2</sup>; Gi-Dong Sim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology; <sup>2</sup>Hyundai Motors

### 5:20 PM

**Microstructural Stability in Fe-W Nanomultilayers with Crystalline and Amorphous Interfaces:** Ariel Capote Sanchez<sup>1</sup>; Kyle Russell<sup>1</sup>; Jason Trelewicz<sup>2</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Stony Brook University

## Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV — Emerging Technology

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Yu-Chen Liu, National Cheng Kung University; Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Yee-wen Yen, National Taiwan University of Science and Technology; Chih-Ming Chen, National Chung Hsing University; Chao-hong Wang, National Chung Chung University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, Korea Institute of Industrial Technology; Ping-Chuan Wang, Suny New Paltz; Yu-An Shen, Feng Chia University

**Tuesday PM | March 25, 2025**  
**359 | MGM Grand**

**Session Chairs:** Chih-Ming Chen, National Chung Hsing University; Ping-Chuan Wang, Suny New Paltz

### 2:30 PM Keynote

**Electrochemical Evaluation of Plating Parameters in Anomalous Codeposition Behavior of Invar Electroplating:** Na-Young Kang<sup>1</sup>; Jaeho Lee<sup>1</sup>; <sup>1</sup>Hongik University

### 3:05 PM Invited

**Li and Na Interaction in Intercalation Materials:** Chong Liu<sup>1</sup>; <sup>1</sup>University of Chicago

### 3:35 PM Invited

**Effect of Interfacial Microstructure on Mechanical and Electrical Properties in Ultrasonically-Welded Ni/Al/Ni Lamellar Structure:** Jheyu Lin<sup>1</sup>; Kuan-Chieh Hu<sup>1</sup>; <sup>1</sup>National Taipei University of Technology

### 4:05 PM Break

### 4:25 PM

**Striped Strain-Induced Coherency Loss Leading to Metastable Nanoprecipitate Phase Transformation in Al-Zn-Mg Alloys:** Yu-ning Chiu<sup>1</sup>; Tsai-fu Chung<sup>2</sup>; Chung-yi Yu<sup>3</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>National Yang Ming Chiao Tung University; <sup>3</sup>China Steel Corporation (CSC)

### 4:45 PM

**Synergistic Inhibition Effect of Nitrides and Metal Ions on Corrosion of Copper:** Yen-Ju Chu<sup>1</sup>; Po-Cheng Chou<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; Tsung-Hao Yang<sup>2</sup>; Kai-Hui Tsai<sup>2</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>Char May Advance Chemical Corporation (CMAC)

## Phase Transformations and Microstructural Evolution — Steels II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

**Tuesday PM | March 25, 2025**  
**123 | MGM Grand**

**Session Chairs:** Vitor Vieira Rielli, UNSW Sydney; Sriswaroop Dasari, University of Texas at El Paso

### 2:30 PM

**Mechanism Behind the Creation of Ultrafine Grains at Machined Surface of 0.45% Carbon Steel During High-Speed Turning Process:** Hyung-Won Park<sup>1</sup>; Masaki Matsuda<sup>1</sup>; Kanji Ishitaka<sup>1</sup>; Shinichi Funase<sup>1</sup>; Atsushi Tomizawa<sup>1</sup>; Akira Hosokawa<sup>1</sup>; Jun Yanagimoto<sup>2</sup>; Takashi Ueda<sup>1</sup>; <sup>1</sup>Komatsu University; <sup>2</sup>University of Tokyo

### 2:55 PM

**Effects of Cooling Rate and Nitrogen Content on Morphologies and Precipitation of Widmanstätten Austenite in Welds of Duplex Stainless Steels:** Yunxing Xia<sup>1</sup>; Fumikazu Miyasaka<sup>2</sup>; Hisashi Serizawa<sup>3</sup>; Hiroaki Mori<sup>2</sup>; <sup>1</sup>Hisaka Works, Ltd.; <sup>2</sup>Osaka University; <sup>3</sup>Joining and Welding Research Institute, Osaka University

### 3:15 PM

**ε-Carbide Induced Fresh Martensite to Produce Dual Phase Microstructure in Low Carbon Steel:** Jo Won Hu<sup>1</sup>; Cho Hyeon Lee<sup>1</sup>; Seonghyeon Yang<sup>2</sup>; Muhammad Ishtiaq<sup>1</sup>; Tiwari Saurabh<sup>1</sup>; Taehyeong Kim<sup>3</sup>; Junseok Lee<sup>3</sup>; Seong-Tak Oh<sup>4</sup>; Yong-Min Hyun<sup>4</sup>; Jae Wung Bae<sup>3</sup>; Jae Bok Seol<sup>1</sup>; <sup>1</sup>Kookmin University; <sup>2</sup>Gyeongsang National University; <sup>3</sup>Pukyong National University; <sup>4</sup>Hyundai-steel

### 3:35 PM

**Warm Rolling for Enhanced Strength-Ductility and Yielding Behavior in Low-Density, Medium-Mn Steels:** Tomas Scuseria<sup>1</sup>; Dean Pierce<sup>2</sup>; Kelcey Garza<sup>3</sup>; Amy Clarke<sup>4</sup>; Kester Clarke<sup>4</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Cleveland-Cliffs; <sup>4</sup>Los Alamos National Laboratory

### 3:55 PM

**Magnetic Field-Assisted Processing of Martensitic Steels:** Megan Hurley<sup>1</sup>; Ramon Padin-Monroig<sup>1</sup>; Alex Donald<sup>1</sup>; James Hamlin<sup>1</sup>; Michael Kesler<sup>2</sup>; Michele Manuel<sup>1</sup>; Mark Meisel<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Oak Ridge National Laboratory

### 4:15 PM Break

### 4:30 PM

**Correlative Microscopic Analysis of B-Alloyed Fe-Mn-Al-Ni-C High-Specific Strength Steels:** Rajdeep Banik<sup>1</sup>; K G Pradeep<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Madras

### 4:50 PM

**Alloy Design of Low Carbon Low Alloy Carbide Free Bainitic-Ferrite Steel:** B Mohan Rao; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>IIT Kharagpur

## Powder Materials Processing and Fundamental Understanding — Additive Manufacturing I: High Energy-Based

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

**Tuesday PM | March 25, 2025**  
**105 | MGM Grand**

**Session Chairs:** Charles Maniere, CNRS; Michael Titus, Purdue University

### 2:30 PM

**A Novel Method for Reconditioning Reused Laser Powder Bed Fusion Alloy Powder:** Xiaoling Shen<sup>1</sup>; Ching-Chien Chen<sup>1</sup>; Dina Wael Samir Khattab<sup>1</sup>; Paul Mort<sup>1</sup>; Jeffrey Youngblood<sup>1</sup>; *Michael Titus<sup>1</sup>*; <sup>1</sup>Purdue University

### 2:50 PM

**A Multiscale Thermomechanical Model for Simulating Sintering Distortions in 3D Printed Parts with Internal Lattice Structures:** *Charles Maniere<sup>1</sup>*; Joseph Sambasen Diatta<sup>2</sup>; Sylvain Marinel<sup>1</sup>; <sup>1</sup>CNRS - Laboratoire Crismat; <sup>2</sup>Assane Seck University

### 3:10 PM

**Parametric Study of Additive Manufacturing using Martian Regolith Metals Recovered with Ionic Liquids:** *Blake Stewart<sup>1</sup>*; Mary Mederos<sup>1</sup>; Shiraz Mujahid<sup>1</sup>; Dawn Van Iderstine<sup>1</sup>; Jennifer Edmunson<sup>2</sup>; Jeffrey Mehan<sup>3</sup>; Kagen Crawford<sup>2</sup>; Paul Hintze<sup>2</sup>; Chris Henry<sup>2</sup>; Eric Fox<sup>2</sup>; Jennifer Jones<sup>2</sup>; Curtis Hill<sup>4</sup>; Steven Burlingame<sup>2</sup>; Morgan Abney<sup>2</sup>; Hongjoo Rhee<sup>1</sup>; <sup>1</sup>Mississippi State University; <sup>2</sup>National Aeronautics and Space Administration; <sup>3</sup>Aerodyne Industries; <sup>4</sup>Jacobs Space Exploration

### 3:30 PM

**Direct Vat Photopolymerisation of Hierarchically Porous SiC Loaded With Co/Ni Based Catalysts by Utilising Pickering Emulsions:** *Terence Ho<sup>1</sup>*; Kah Sheng Pung<sup>1</sup>; Daniel Wen Hao Lock<sup>1</sup>; Zehui Du<sup>1</sup>; Chee Lip Gan<sup>1</sup>; <sup>1</sup>Nanyang Technological University

### 3:50 PM

**Characterization of Surface Integrity in Post-Processed Ti-5Al-5Mo-5V-3Cr Parts Fabricated via Laser Bed Fusion:** *David Yan<sup>1</sup>*; Roman Bolzowski<sup>1</sup>; <sup>1</sup>San Jose State University

### 4:10 PM Break

### 4:20 PM

**Powder Flowability of Elemental Niobium, C103, and Other Structural Materials for Powder Bed Fusion:** Dina Wael Samir Khattab<sup>1</sup>; Xiaoling Shen<sup>1</sup>; Jake Kim<sup>1</sup>; Ching-Chien Chen<sup>1</sup>; Paul Mort<sup>1</sup>; Jeffrey Youngblood<sup>1</sup>; *Michael Titus<sup>1</sup>*; <sup>1</sup>Purdue University

### 4:40 PM

**Development and Optimization of a Nanoscale ZrO<sub>2</sub> Suspension for Ceramic Stereolithography: Investigating Rheological Properties and Printing Parameters:** *Aymeric Jugan<sup>1</sup>*; Sylvain Marinel<sup>1</sup>; Loic Lepluart<sup>2</sup>; Romuald Herbinet<sup>2</sup>; Charles Maniere<sup>1</sup>; <sup>1</sup>CRISMAT; <sup>2</sup>LCMT

### 5:00 PM

**Fabrication of Ti6Al4V Spherical Powders for Additive Manufacturing from Recycled Shavings:** *Zeynep Ege Uysal<sup>1</sup>*; Sertac Altinok<sup>2</sup>; Yunus Eren Kalay<sup>1</sup>; Tayfur Öztürk<sup>1</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Turkish Aerospace Industries

### 5:20 PM

**Comparison of DED Nozzles' Performance via In Situ Synchrotron Radiography:** Imogen Cowley<sup>1</sup>; *Harry Chapman<sup>1</sup>*; Sebastian Marussi<sup>2</sup>; Kai Zhang<sup>3</sup>; Robert Atwood<sup>2</sup>; Martyn Jones<sup>3</sup>; Chu Lun Alex Leung<sup>1</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Diamond Light Source; <sup>3</sup>Rolls-Royce plc.

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

## Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics III - 1D/2D Materials & Dry Printing

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, Rice University; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ethan Secor, Iowa State University

**Tuesday PM | March 25, 2025**  
**361 | MGM Grand**

**Session Chairs:** Harrison Loh, West Virginia University; Changyong Cao, Case Western Reserve University

### 2:30 PM Invited

**Laser Ablation and Sintering Enabled (LASED) Dry Printing Electronics and Functional Devices:** Aarsh Patel<sup>1</sup>; Adib Taba<sup>1</sup>; Suman Jaiswal<sup>1</sup>; Sharouz Zamani Khalajabadi<sup>1</sup>; *Masoud Mahjouri-Samani<sup>1</sup>*; <sup>1</sup>Auburn University

### 2:55 PM Invited

**Beyond Solution-Based Printing: Unveiling Innovations and Advancements in Solvent-Free Printing Technologies:** V. Vinay K. Doddapaneni<sup>1</sup>; Chuankai Song<sup>1</sup>; Ningmo Cheng<sup>1</sup>; Isaac Camp<sup>1</sup>; Jeffrey Dhas<sup>1</sup>; Alvin Chang<sup>1</sup>; Changqing Pan<sup>1</sup>; Brian Paul<sup>1</sup>; Somayeh Pasebani<sup>1</sup>; Zhenxing Feng<sup>1</sup>; Konstantinos Sierros<sup>2</sup>; *Chih-Hung Chang<sup>1</sup>*; <sup>1</sup>Oregon State University; <sup>2</sup>West Virginia University

### 3:20 PM Invited

**Metal-MXene Composites: Enhancing Conductivity and Mechanical Properties via Advanced Processing:** *Zachary Hood<sup>1</sup>*; <sup>1</sup>Argonne National Laboratory

### 3:45 PM Break

### 4:05 PM Invited

**Ultraconductive Copper-Carbon Nanotube Composite for Advanced Conductors:** *Kai Li<sup>1</sup>*; Michael McGuire<sup>1</sup>; Huixin Jiang<sup>1</sup>; Andrew Lupini<sup>1</sup>; Fred List<sup>1</sup>; James Haynes<sup>1</sup>; Kashif Nawaz<sup>1</sup>; Tolga Aytug<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 4:30 PM Invited

**Probing Inter- and Intra-Flake Contributions to Reduced Electrical Properties in Percolated Flake Networks:** *Harrison Loh<sup>1</sup>*; Alan Bristow<sup>1</sup>; Konstantinos Sierros<sup>1</sup>; <sup>1</sup>West Virginia University

### 4:55 PM

**Enhancing Electrical Conductivity of Laser-Induced Graphene Electrodes by Relasing and Dual-Wavelength Control:** *Soumalya Ghosh<sup>1</sup>*; Moataz Abdulhafez<sup>2</sup>; Thomas Kisiel<sup>1</sup>; Mostafa Bedewy<sup>1</sup>; <sup>1</sup>University of Pittsburgh

## MATERIALS SYNTHESIS AND PROCESSING

### REWAS 2025: Sustainable Practices in Strategic and Critical Raw Materials: Exploring Supply Chain Resilience and Recycling Innovations — Towards Resource Potential, Upcycling Industrial and Urban Byproducts

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Christina Meskers, SINTEF; Elsa Olivetti, Massachusetts Institute of Technology

**Tuesday PM | March 25, 2025**  
**117 | MGM Grand**

**Session Chair:** Mertol Gokelma, Izmir Institute of Technology

#### 2:30 PM Introductory Comments

##### 2:35 PM Invited

**Mycomining: Using Fungi to Forge the Future of Critical Materials:** *Andrew Hoffman*<sup>1</sup>; <sup>1</sup>Catalyst Science Solutions

##### 3:05 PM Invited

**Remanufacturing as a Tactic to Increase the Resilience of Raw Materials' Availability:** *Christina Meskers*<sup>1</sup>; <sup>1</sup>SINTEF

##### 3:35 PM

**Comparative Life Cycle Assessment of Novel Steel Section Design with Wire Arc Additive Manufacturing:** *Lidiana Arrè*<sup>1</sup>; *Emanuele Pagone*<sup>2</sup>; *Vittoria Laghi*<sup>1</sup>; *Filomeno Martina*<sup>3</sup>; *Michele Palermo*<sup>1</sup>; <sup>1</sup>University of Bologna; <sup>2</sup>Cranfield University; <sup>3</sup>WAAM3D Ltd.

##### 3:55 PM

**Metso eScrap Solutions: Unlocking the Value of a Critical Resource:** *Stephen Hughes*<sup>1</sup>; <sup>1</sup>Metso Australia Limited

##### 4:15 PM Break

##### 4:35 PM

**Comparative Study of Different Acid Reagents for Metal Recovery from Municipal Solid Waste Incineration Fly Ash:** *Edzhe Soylu*<sup>1</sup>; *Linus Meistad*<sup>1</sup>; *Elif Emil Kaya*<sup>1</sup>; *Kai Erik Ekström*<sup>2</sup>; *Inge Johansson*<sup>2</sup>; *Gabriella Tranell*<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>NOAH AS

##### 4:55 PM

**Recovery Potential of Spent Magnesite-Chrome Refractories from Copper and Nickel Industries:** *Kerrin Witt*<sup>1</sup>; *Stefan Steinlechner*<sup>1</sup>; *Thomas Howard*<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Actinide Chemistry

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Tuesday PM | March 25, 2025**  
**163 | MGM Grand**

**Session Chair:** Rebecca Abergel, University of California Berkeley

#### 2:30 PM Invited

**Investigating Radiation-Induced Actinide Species in Solution:** *Amy Kynman*<sup>1</sup>; *Travis Grimes*<sup>1</sup>; *Stephen Mezyk*<sup>2</sup>; *Jacy Conrad*<sup>1</sup>; *Simon Pimblott*<sup>1</sup>; *Bobby Layne*<sup>3</sup>; *Andrew Cook*<sup>3</sup>; *Brian Rotermund*<sup>4</sup>; *Gregory Holmbeck*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>California State University, Long Beach; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>Colorado School of Mines

#### 3:00 PM Invited

**Transplutonium Compounds Isolated from Aqueous Solutions:** *Jennifer Wacker*<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

#### 3:30 PM

**A Rare Bird: U+5 and U+6 in Uranium Sulfides:** *Anna Berseneva*<sup>1</sup>; *Hanno-Conrad Zur Loye*<sup>2</sup>; <sup>1</sup>NREL; <sup>2</sup>University of South Carolina

#### 3:50 PM Break

#### 4:10 PM

**Microstructural Characterization of U/Pu Particulates:** *John Mayer*<sup>1</sup>; *Matthew Wellons*<sup>2</sup>; *Bryan Foley*<sup>2</sup>; *Michael Bronikowski*<sup>2</sup>; *Spencer Scott*<sup>2</sup>; *Lorianne Shultz-Johnson*<sup>2</sup>; *Christopher Barrett*<sup>2</sup>; *Assel Aitkaliyeva*<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Savannah River National Laboratory

#### 4:30 PM

**Impact of Neodymium Ions on the Chemical Kinetic Behavior of Radiolytic Transients in Molten LiCl-KCl-NdCl<sub>3</sub> Salt Mixtures:** *Stephanie Castro Baldivieso*<sup>1</sup>; *Gregory Holmbeck*<sup>1</sup>; *Ruchi Gakhar*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

#### 4:50 PM

**Understand Behavior of Tungsten and Tantalum Components During Actinide Pyroprocessing:** *Elise Shauf*<sup>1</sup>; *Adam Burak*<sup>1</sup>; *Stephen Raiman*<sup>1</sup>; <sup>1</sup>University of Michigan

#### 5:10 PM

**Corrosion Testing of Chemically Modified Tantalum Coupons in a Molten Salt Environment with Chlorine and Oxygen Gases:** *Gregory Dan Chipman*<sup>1</sup>; *Tatiana Ayers*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory



## MECHANICS OF MATERIALS

### Spatially Tailored Materials: Processing-Structure-Properties — Thermal Evolution of Gradient Microstructures

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois; Ian Mccue, Northwestern University; J.C. Stinville, University of Illinois Urbana-Champaign

**Tuesday PM | March 25, 2025**  
**351 | MGM Grand**

**Session Chairs:** J.C. Stinville, University of Illinois Urbana-Champaign; Ian Mccue, Northwestern University

#### 2:30 PM

**Measurement of the Temperature Dependence of Plastic Deformation Localization for Rapid Microstructure-Property Relationships Identification Across Temperatures:** M. Calvat<sup>1</sup>; C. Bean<sup>1</sup>; R.L. Black<sup>1</sup>; D. Anjaria<sup>1</sup>; J.C. Stinville<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

#### 2:50 PM

**Oxygen-Induced Elemental Segregation as a Pathway for Evolving New Microstructures in IV-Based BCC Refractory Alloys:** Ravit Silverstein<sup>1</sup>; Florent Mignerot<sup>1</sup>; Nicoló della Ventura<sup>1</sup>; Jeremiah Thomas<sup>1</sup>; Julia Pürstl<sup>1</sup>; Anton Van Der Ven<sup>1</sup>; Carlos Levi<sup>1</sup>; Tresa Pollock<sup>1</sup>; Daniel Gianola<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

#### 3:10 PM

**Oxygen-Induced Hierarchical Heterogeneities and Enhanced Hardness in RMPEAs:** David Beaudry<sup>1</sup>; Michael Waters<sup>2</sup>; Gianna Valentino<sup>3</sup>; Daniel Foley<sup>1</sup>; Elaf Anber<sup>1</sup>; Nathan Smith<sup>2</sup>; Jean-Philippe Couzinie<sup>4</sup>; Loic Perriere<sup>4</sup>; Keith Knipling<sup>5</sup>; Patrick Callahan<sup>6</sup>; Toshihiro Aoki<sup>6</sup>; Benjamin Redemann<sup>1</sup>; Tyrel McQueen<sup>1</sup>; Christopher Wolverton<sup>2</sup>; James Rondinelli<sup>2</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Northwestern University; <sup>3</sup>University of Maryland; <sup>4</sup>University Paris Est Creteil; <sup>5</sup>U.S. Naval Research Laboratory; <sup>6</sup>University of California, Irvine

#### 3:30 PM

**Impact of Heat Treatments on the Microstructure and Mechanical Properties of  $\gamma'$  Ni-Based Superalloys Produced by DED Processes:** Guillaume Burlet<sup>1</sup>; Abel Rapetti<sup>1</sup>; Jonathan Cormier<sup>1</sup>; Alice Cervellon<sup>2</sup>; Sophie Gillet<sup>2</sup>; <sup>1</sup>Institut Pprime; <sup>2</sup>Safran Aircraft Engines

#### 3:50 PM Break

#### 4:10 PM

**Dissolution Zone Model of the Oxide Structure in Additively Manufactured Dispersion-Strengthened Alloys:** Wenyan Hou<sup>1</sup>; Zachary Cordero<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

#### 4:30 PM

**Effect of Zr and Sc Additions on Coarsening- and Creep Resistance of Laser-Melted AlSi10Mg:** Ismael Coello Ramirez<sup>1</sup>; Jennifer Glerum<sup>1</sup>; Clement Ekaputra<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

#### 4:50 PM

**Solute Redistribution in Functionally Graded Materials: An Operando Study of Cu-Al Alloys:** Steve Gaudez<sup>1</sup>; Zhilang Zhang<sup>2</sup>; Andaç Özsoy<sup>1</sup>; William Hearn<sup>1</sup>; Yunhui Chen<sup>3</sup>; Alexander Rack<sup>4</sup>; Mohamadreza Afrasiabi<sup>2</sup>; Markus Bambach<sup>2</sup>; Steven Van Petegem<sup>1</sup>

<sup>1</sup>Paul Scherrer Institute; <sup>2</sup>ETH Zurich; <sup>3</sup>RMIT; <sup>4</sup>ESRF

#### 5:10 PM

**The Role of Heterogeneous Microstructure on the Corrosion Resistance of Wire-Arc Directed Energy Deposited Iron-Based High Entropy Alloys:** Tanaji Paul<sup>1</sup>; Tyler Dolmetsch<sup>1</sup>; Blanca Palacios<sup>1</sup>; Sohail Mohammed<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

## NUCLEAR MATERIALS

### Spectroscopic Methods and Analysis for Nuclear Energy Related Materials — Spectroscopy Methods and Irradiation Damage of Materials for Nuclear Energy

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Scarlett Widgeon Paisner, Los Alamos National Laboratory; Arjen van Veelen, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Farida Selim, Arizona State University; Maik Lang, University of Tennessee; Dong (Lilly) Liu, University of Oxford

**Tuesday PM | March 25, 2025**  
**161 | MGM Grand**

**Session Chairs:** Xiaofeng Guo, Washington State University; Dong (Lilly) Liu, University of Oxford

#### 2:30 PM Invited

**Complementarity of Neutrons and Positrons in Assessing Material Damage for Nuclear Applications:** Joe Kelleher<sup>1</sup>; <sup>1</sup>ISIS Pulsed Neutron & Muon Source

#### 2:55 PM

**The Surprising Beneficial Effect of Low-Dose Proton Radiation on Suppressing the Corrosion Reactivity of Thermally Oxidized Iron:** Ho Lun Chan<sup>1</sup>; Aaron Kohnert<sup>2</sup>; Shivani Srivastava<sup>3</sup>; Yujun Xie<sup>3</sup>; Maciej Liedke<sup>4</sup>; Rasheed Auguste<sup>3</sup>; Elena Romanovskaia<sup>1</sup>; Franziska Schmidt<sup>2</sup>; Maik Butterling<sup>4</sup>; Valentin Romanovski<sup>1</sup>; Yongqiang Wang<sup>2</sup>; Farida Selim<sup>5</sup>; Eric Hirschmann<sup>4</sup>; Andreas Wagner<sup>4</sup>; Blas Uberuaga<sup>2</sup>; Mark Asta<sup>3</sup>; Peter Hosemann<sup>3</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of California, Berkeley; <sup>4</sup>Helmholtz-Zentrum Dresden-Rossendorf; <sup>5</sup>Arizona State University

#### 3:15 PM

**Observing Radiation Enhanced Diffusion in Model Fe-Cr Alloys and Their Oxides Using Atom Probe Tomography:** Kayla Yano<sup>1</sup>; Aaron Kohnert<sup>2</sup>; Tiffany Kaspar<sup>1</sup>; Jijo Christudasjustus<sup>1</sup>; Hyosim Kim<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Sandra Taylor<sup>1</sup>; Daniel Schreiber<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Los Alamos National Laboratory

#### 3:35 PM

**In Situ Helium Implantation and Rutherford Backscattering Analysis of Helium Retention in Amorphous SiOC:** Benjamin Mejia Diaz<sup>1</sup>; Zhihan Hu<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 3:55 PM Break

#### 4:15 PM Invited

**Investigating Nuclear Materials via Laser Based and Positron Annihilation Spectroscopy Techniques to Understand Their Performance:** Peter Hosemann<sup>1</sup>; Chai Peddeti<sup>1</sup>; Sebastian Lam<sup>1</sup>; Farida Selim<sup>1</sup>; Oskar Liedke<sup>1</sup>; Scarlett Widgeon Paisner<sup>1</sup>; <sup>1</sup>University of California, Berkeley

#### 4:40 PM

**Quantification of Total Irradiation Damage in Nuclear Graphite Using Raman Spectroscopy:** Ming Jiang<sup>1</sup>; Chris Densham<sup>2</sup>; Kavin Ammigan<sup>3</sup>; George Lolov<sup>3</sup>; Frederique Pellemoine<sup>3</sup>; Dong (Lilly) Liu<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>Science and Technology Facilities Council;

<sup>3</sup>Fermi National Accelerator Laboratory

5:00 PM

**ToF-SIMS Analysis of Irradiated U-Zr Using Spectra Cluster Analysis:** *Mitchell Mika*<sup>1</sup>; Arnold Pradhan<sup>2</sup>; Mario Mattos<sup>2</sup>; Tanner Mauseth<sup>2</sup>; Luca Capriotti<sup>2</sup>; Tiankai Yao<sup>2</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

5:20 PM

**Vapor Analysis by Combination Spectroscopy in a Novel Optical Cell:** *Robin Roper*<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; Ammon Williams<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Steels in Extreme Environments — Steels Under Corrosive/Oxidative/Fatigue Conditions / Unique Steel Structures

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Hyunseok Oh, University of Wisconsin - Madison; Lawrence Cho, Colorado School of Mines; Jeongho Han, Hanyang University; Motomichi Koyama, Tohoku University; Peeyush Nandwana, Oak Ridge National Laboratory; Fnu Kasturi Narasimha Sasidhar, University of Wisconsin - Madison

Tuesday PM | March 25, 2025  
168 | MGM Grand

**Session Chairs:** May Martin, National Institute of Standards and Technology; Lawrence Cho, Colorado School of Mines

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2:30 PM Invited

**Steel Corrosion in Supercritical CO<sub>2</sub>-Saturated Aqueous Environments:** *Jing Liu*<sup>1</sup>; <sup>1</sup>University of Alberta

2:50 PM

**Corrosion Behaviour of ODS Austenitic Steels with Y<sub>2</sub>O<sub>3</sub> Addition:** *Anna Dobkowska*<sup>1</sup>; Kalyan Das<sup>1</sup>; Irena Paulin<sup>2</sup>; Crtomir Donik<sup>2</sup>; Jiri Kubasek<sup>3</sup>; David Necas<sup>3</sup>; Matjaz Godec<sup>2</sup>; <sup>1</sup>Warsaw University of Technology; <sup>2</sup>Institute of Metals and Technology; <sup>3</sup>University of Chemistry and Technology (VSCHT)

3:10 PM

**High Temperature Oxidation of 304 SS at 630°C in Combustion Atmospheres:** *Alexander Donchev*<sup>1</sup>; Fang Cao<sup>2</sup>; Mathias Galetz<sup>1</sup>; <sup>1</sup>DEHEMA-Forschungsinstitut; <sup>2</sup>Exxon Mobil

3:30 PM

**CO<sub>2</sub> Oxidation and Carburisation Evolution in Fe<sub>9</sub>Cr<sub>1</sub>Mo Steels for Advanced Gas-Cooled Reactors:** Peter Thomas<sup>1</sup>; Mariia Zimina<sup>1</sup>; *Lawrence Coghlan*<sup>1</sup>; Aya Shin<sup>2</sup>; Jonathan Pearson<sup>2</sup>; Peter Flewitt<sup>1</sup>; Tomas Martin<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>EDF UK

3:50 PM Break

4:10 PM

**Novel Steel Composite Metal Foam in Extreme Environment of Heat and Load:** *Afsaneh Rabiei*<sup>1</sup>; <sup>1</sup>North Carolina State University

4:30 PM Invited

**Ultrafine-Grained and Nanocrystalline Steels in Extreme Environments:** *Haiming Wen*<sup>1</sup>; Joshua Rittenhouse<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

4:50 PM

**Doubling Fatigue Limit by Eliminating Crack Embryo in 1.6 GPa-Grade As-Quenched Martensitic Steel:** *Kazuho Okada*<sup>1</sup>; Eri Nakagawa<sup>1</sup>; Kaneaki Tsuzaki<sup>1</sup>; Akinobu Shibata<sup>1</sup>; <sup>1</sup>National Institute for Materials Science (NIMS)

5:10 PM

**The Dynamic Behavior of Rebar Corrosion: Coupled Point Defect Theory, Machine Learning and Experimental Validation:** *Yakun Zhu*<sup>1</sup>; Digby Macdonald<sup>2</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>University of California, Berkeley

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## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Technological and Industrial Use

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Soper, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

Tuesday PM | March 25, 2025  
367 | MGM Grand

**Session Chair:** Jan Schroers, Yale University

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2:30 PM Introductory Comments

2:35 PM Invited

**Pushing the Limits of High-Performance Components with Thermoplastic Forming of Bulk Metallic Glasses:** *Evgenia Pekarskaya*<sup>1</sup>; Jan Schroers<sup>2</sup>; <sup>1</sup>Supercool Metals; <sup>2</sup>Yale University

3:05 PM Invited

**Bulk Metallic Glasses: Applications and Challenges:** *Atakan Peker*<sup>1</sup>; <sup>1</sup>Washington State University

3:35 PM Invited

**Metallic Glass: Poised for Prevalence:** *Marios Demetriou*<sup>1</sup>; <sup>1</sup>Glassimetal Technology

4:05 PM Question and Answer Period: Community Discussion on Opportunities to Promote the Technological and Industrial Potential of Metallic Glasses

4:20 PM Break

4:40 PM Invited

**Commercial Considerations for the Manufacturing of Bulk Metallic Glasses for Spacecraft Applications:** *Douglas Hofmann*<sup>1</sup>; <sup>1</sup>NASA Jet Propulsion Laboratory

5:05 PM

**The Key to High-Quality Metallic Glass Casting: Influence of Mold Temperature and Interfacial Reactions:** *Jurgen Eckert*<sup>1</sup>; Zhishuai Jin<sup>2</sup>; Chaojun Zhang<sup>2</sup>; Parthiban Ramasamy<sup>1</sup>; Devinder Singh<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science; <sup>2</sup>Harbin Institute of Technology

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Phase Diagrams Applied to Materials Design and Processing: An FMD/SMD Symposium Honoring Rainer Schmid-Fetzer — Advanced Experimental Methods as Cornerstones of Thermodynamic and Kinetic Databases

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Shuanglin Chen, CompuTherm LLC; Ji-Cheng Zhao, University of Connecticut; Ursula Kattner, National Institute of Standards and Technology; Greta Lindwall, KTH Royal Institute of Technology; Alan Luo, Ohio State University; Arthur Pelton, Ecole Polytechnique; John Agren, Royal Institute of Technology; Sinn-wen Chen, National Tsing Hua University

**Tuesday PM | March 25, 2025**  
**350 | MGM Grand**

**Session Chairs:** Shuanglin Chen, CompuTherm LLC; Sinn-wen Chen, National Tsing Hua University

#### 2:30 PM Invited

**Essentiality of Impurity (Dilute) Diffusion Coefficients in Establishing Reliable Diffusion and Atomic Mobility Databases:** *Ji-Cheng Zhao*<sup>1</sup>; <sup>1</sup>University of Connecticut

#### 2:55 PM Invited

**Utilizing Synchrotron Radiation for Phase Identification in Mg Alloys:** Domonkos Tolnai<sup>1</sup>; Gabor Szakacs<sup>1</sup>; Björn Wiese<sup>1</sup>; Norbert Hort<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon

#### 3:20 PM Invited

**Miscibility Gaps in Multicomponent Systems:** *Sinn-wen Chen*<sup>1</sup>; Yung-Chun Tsai<sup>1</sup>; Yung-Jen Chuang<sup>1</sup>; Hsin-Chieh Huang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

#### 3:45 PM Invited

**A Thermodynamic Evaluation of the U-Zr-N System:** *Yulia Mishchenko*<sup>1</sup>; Denise Adorno Lopes<sup>2</sup>; Malin Selleby<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Oak Ridge National Laboratory

#### 4:10 PM Break

#### 4:30 PM Invited

**Phase Diagram and Barycentric Coordinate System:** *Shuanglin Chen*<sup>1</sup>; <sup>1</sup>CompuTherm LLC

## MATERIALS SYNTHESIS AND PROCESSING

### Thin Films and Coatings: Properties, Processing and Applications — Thin Films and Coatings for Tribological Applications

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougou, CNRS, Is2m; Brandon Krick, Florida A&M University-Florida State University

**Tuesday PM | March 25, 2025**  
**101 | MGM Grand**

**Session Chairs:** Tomas Grejtak, Oak Ridge National Laboratory; Tomas Babuska, Sandia National Laboratories

#### 2:30 PM Invited

**Linking Pt-Au Alloy Composition and Surface Mechanocatalytic Activity:** *Filippo Mangolini*<sup>1</sup>; Camille Edwards<sup>1</sup>; Tomas Babuska<sup>2</sup>; John Curry<sup>2</sup>; Frank DelRio<sup>2</sup>; Jason Killgore<sup>3</sup>; Hsu-Ming Lien<sup>1</sup>; Brad Boyce<sup>2</sup>; Michael Dugger<sup>2</sup>; <sup>1</sup>University of Texas at Austin; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>National Institute of Standards and Technology

#### 3:00 PM

**Exploring the Mechano-Chemical Response of Pt-based Thin Films using Automated High Throughput Testing:** *Tomas Babuska*<sup>1</sup>; Justin Hall<sup>1</sup>; Joyce Custer<sup>1</sup>; Sadhvikas Addamane<sup>1</sup>; David Adams<sup>1</sup>; Brad Boyce<sup>1</sup>; Frank DelRio<sup>1</sup>; John Curry<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 3:20 PM Invited

**Carbon Nanotube Coating for Tribological and Thermal Applications:** *Chanaka Kumara*<sup>1</sup>; Michael Lance<sup>1</sup>; Hsin Wang<sup>1</sup>; Jun Qu<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:50 PM

**Tribosintering of Nanocrystals – Manufacturing Wear-resistant TiO<sub>2</sub> Coatings at Ambient Temperature:** *Pranjal Nautiyal*<sup>1</sup>; Michael Moriarty<sup>2</sup>; Parker LaMascus<sup>2</sup>; Andrew Jackson<sup>2</sup>; Robert Wiacek<sup>3</sup>; Robert Carpick<sup>2</sup>; <sup>1</sup>Oklahoma State University; <sup>2</sup>University of Pennsylvania; <sup>3</sup>Pixelligent Technologies LLC

#### 4:10 PM Break

#### 4:30 PM Invited

**Developing Functional Metrics to Predict Performance & Aging Properties of MoS<sub>2</sub> Thin Films:** *John Curry*<sup>1</sup>; Tomas Babuska<sup>1</sup>; Alex Mings<sup>1</sup>; Steven Larson<sup>1</sup>; Donald Robinson<sup>1</sup>; Michael Leveille<sup>1</sup>; Debasis Banerjee<sup>1</sup>; Frank DelRio<sup>1</sup>; Michael Dugger<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 5:00 PM

**A Plasma Diagnostic Based Approach to Accelerate the Process Development of High Performance MoS<sub>2</sub>:** *Alex Mings*<sup>1</sup>; Steven Larson<sup>1</sup>; Tomas Babuska<sup>1</sup>; Michael Dugger<sup>1</sup>; Frank DelRio<sup>1</sup>; Mark Rodriguez<sup>1</sup>; Robert Kolasinski<sup>1</sup>; John Curry<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 5:20 PM

**Effects of Environmental Species on Tribological Properties of MoS<sub>2</sub>: Using Simulations to Interpret Experimental Observations:** *Scott Bobbitt*<sup>1</sup>; John Curry<sup>1</sup>; Tomas Babuska<sup>1</sup>; Michael Chandross<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

5:40 PM

**Influence of HFCVD Diamond Coatings on the Friction and Adhesion in Aluminum and Magnesium Extrusion:** *Stefan Lechner*<sup>1</sup>; Sören Müller<sup>1</sup>; <sup>1</sup>Technische Universität Berlin, Extrusion Research and Development Center FZS

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#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials — ML & Data-Driven Methods

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates; Saikumar Reddy Yeratapally, Science and Technology Corporation; Kirubel Teferra, Naval Research Laboratory; Diwakar Naragani, Cornell University

**Tuesday PM | March 25, 2025**  
**354 | MGM Grand**

**Session Chairs:** Joshua Pribe, Analytical Mechanics Associates; Diwakar Naragani, Cornell University

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**2:30 PM Invited**

**An Open-Source Framework for Data Augmentation and Emulation: Application to Process Optimization in AM:** Amin Yousefpour<sup>1</sup>; Sanaz Zanjani Foumani<sup>1</sup>; *Ramin Bostanabad*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**3:00 PM Invited**

**Quantifying Error in Machine Learning Predictions of Macroscopic Yield Surfaces of Polycrystalline Materials:** *Matt Kasemer*<sup>1</sup>; Lloyd van Wees<sup>1</sup>; Karthik Shankar<sup>1</sup>; Mark Obstalecki<sup>2</sup>; Paul Shade<sup>2</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Air Force Research Laboratory

**3:30 PM Invited**

**Predicting Mechanical Properties of Ti-6Al-4V Alloy Using a Physics-Informed Neural Network (PINN) for Crystal Plasticity Modeling:** *Mohamed Elleithy*<sup>1</sup>; Zekeriya Eger<sup>1</sup>; Pinar Acar<sup>1</sup>; <sup>1</sup>Virginia Tech

**4:00 PM**

**Physics-Informed Neural Networks with LuGre Model for Friction Force Analysis in Tribological Systems:** *Huajing Song*<sup>1</sup>; Andrew Boyne<sup>1</sup>; <sup>1</sup>Pratt & Whitney, RTX

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#### ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### 2D Materials – Preparation, Properties, Modeling & Applications — Preparation, Properties, Modeling & Applications III

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nugehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Wednesday AM | March 26, 2025**  
**362 | MGM Grand**

**Session Chairs:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Mengqiang Zhao, New Jersey Institute Of Technology

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#### 8:30 AM Introductory Comments

**8:40 AM**

**Next Generation Supercapacitors Using MXene-Infiltrated Porous Silica Electrodes:** *Mert Arslanoglu*<sup>1</sup>; Bin Yuan<sup>1</sup>; Burak Ozdoganlar<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**9:00 AM Invited**

**Synthesis and Properties of Semiconducting Tellurium Nano-Wire and 2D Plates:** *Choong-un Kim*<sup>1</sup>; <sup>1</sup>University of Texas at Arlington

**9:20 AM Keynote**

**The Shape Effect: Influence of 1D and 2D Boron Nitride Nanostructures on the Radiation Shielding, Thermal, and Damping Properties of High-Temperature Epoxy Composites:** *Arvind Agarwal*<sup>1</sup>; Kazue Orikasa<sup>1</sup>; <sup>1</sup>Florida International University

**9:45 AM Invited**

**Synthesis of Novel and Chemically Complex 2D Carbide MXenes:** Brian Wyatt<sup>1</sup>; Anupma Thakur<sup>1</sup>; *Babak Anasori*<sup>1</sup>; <sup>1</sup>Purdue University

**10:05 AM Break**

**10:15 AM Invited**

**Theory of the Electronic Structure of Buckled MoS<sub>2</sub>:** Meshal Alawein<sup>1</sup>; Joel Ager<sup>1</sup>; Ali Javey<sup>1</sup>; *Daryl Chrzan*<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

**10:35 AM Keynote**

**Laser Processing of Novel 2D Materials:** *Jagdish Narayan*<sup>1</sup>; <sup>1</sup>North Carolina State University

**11:00 AM Invited**

**Tuning the Properties of TMDCs Through Alloying and Doping:** *Stephen McDonnell*<sup>1</sup>; Tinsae Alem<sup>1</sup>; Lee Kendall<sup>1</sup>; Daniel Stokes<sup>1</sup>; Abir Hasan<sup>1</sup>; Gabrielle Abad<sup>1</sup>; Yaw Obeng<sup>2</sup>; Giovanni Zangari<sup>1</sup>; Nikhil Shukla<sup>1</sup>; Kory Burns<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>National Institute of Standards and Technology

**11:20 AM Invited**

**Ultrafast Laser Based Synthesis of Nanoparticles Doped 2 Dimensional Materials:** *Nirmala Kandada*<sup>1</sup>; <sup>1</sup>Oregon State University

**11:40 AM Invited**

**Understanding and Reducing Point Defects in 2D Transition Metal Dichalcogenides:** *Daniel Rhodes*<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison



## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/ Wire Processing of Multifunctional Materials — Ni- and Cu-Based Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

**Wednesday AM | March 26, 2025**  
**315 | MGM Grand**

**Session Chair:** Pierangeli Rodriguez De Vecchis, University of Pittsburgh

#### 8:30 AM Invited

**Small-Scale Multi-Material Additive Manufacturing Using Micron-Sized Wire-Fed Electron Beam Deposition:** *Christian Leinenbach*<sup>1</sup>; Marc Leparoux<sup>2</sup>; Fahrizal Nanda<sup>3</sup>; Patrik Hoffmann<sup>1</sup>; <sup>1</sup>Empa, Swiss Federal Laboratories for Materials Science and Technology

#### 9:00 AM

**Production and Characterization of Cu-Ti-Ni Alloy Powders:** *Federico Gobber*<sup>1</sup>; Antonio Pennacchio<sup>1</sup>; Marco Actis Grande<sup>2</sup>; <sup>1</sup>Politecnico Di Torino

#### 9:20 AM

**Physics-Based Approach to Optimize Powder Bed Fusion (PBF) Additive Manufacturing of Cu and Cu-CNT:** Leila Ladani<sup>1</sup>; *Nguyen Chi Ho*<sup>1</sup>; Jonathan Schaefer<sup>1</sup>; <sup>1</sup>Arizona State University

#### 9:40 AM

**Microstructure of Pure Copper Using Material Extrusion Additive Manufacturing (MEX) Process and Its Mechanical and Electrical Conductivity Properties:** *Na Yoon Yee*<sup>1</sup>; So-Yeon Park<sup>1</sup>; Michelle Baek<sup>2</sup>; Kee-Ahn Lee<sup>1</sup>; <sup>1</sup>Inha University; <sup>2</sup>Markforged (J&Tek)

#### 10:00 AM Break

#### 10:15 AM

**Optimizing DED Printing of Nickel-Silicon-Based Alloys Using Functionally Graded Inconel 625 Base Layers:** Ibrahim Mohammad<sup>1</sup>; Geir Grasmø<sup>1</sup>; *Ragnhild Aune*<sup>2</sup>; <sup>1</sup>University of Agder; <sup>2</sup>Norwegian University of Science and Technology

#### 10:35 AM

**Composition Tailoring for Avoidance of Crack-Inducing Liquid Miscibility Gap in Inconel 718 and GRCo-42 Joints:** Jakub Preis<sup>1</sup>; Stephanie Lawson<sup>1</sup>; *Somayeh Pasebani*<sup>1</sup>; <sup>1</sup>Oregon State University

#### 10:55 AM

**Characterizing Flowability and Printability of Water Atomized Powders for Laser Powder Bed Fusion Additive Manufacturing:** *Sarah Birchall*<sup>1</sup>; Junwon Seo<sup>1</sup>; Srujana Yaras<sup>2</sup>; Bryan Webler<sup>1</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>General Electric Aerospace Research

## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning — AM Modeling with AI/ML I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Changwon National University

**Wednesday AM | March 26, 2025**  
**311 | MGM Grand**

**Session Chairs:** Charles Fisher, Naval Surface Warfare Center - Carderock; Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

#### 8:30 AM

**Anomaly Detection Via In-Situ Monitoring and Machine Learning:** *Annika Bauman*<sup>1</sup>; Michael Heiden<sup>2</sup>; Dan Bolintineanu<sup>3</sup>; Anthony Garland<sup>1</sup>; <sup>1</sup>Sandia National Laboratory

#### 8:50 AM

**Additive Manufacturing Digital Twin (AMDT): Part Level Process Map Characterization Using Physics Based Simulation and Machine Learning:** *Peter Pak*<sup>1</sup>; Francis Ogoke<sup>1</sup>; Amir Barati Farimani<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 9:10 AM

**Additive Manufacturing Process Modeling with Multi-Output Gaussian Processes:** *Sudipta Biswas*<sup>1</sup>; Som Dhulipala<sup>1</sup>; Peter German<sup>1</sup>; Andrea Jokisaari<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

#### 9:30 AM

**AlloyGPT: An Agent-Based LLM Framework for the Design of Additively Manufactured Structural Alloys in Extreme Environments:** *S. Mohadeseh Taheri-Mousavi*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 9:50 AM

**Application of Multi-Physics Simulations and Machine Learning to Predict Spatter in Laser Powder Bed Fusion:** *Olabode Ajenifujah*<sup>1</sup>; Francis Ogoke<sup>1</sup>; Jack Beuth<sup>1</sup>; Amir Barati Farimani<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 10:10 AM Break

#### 10:30 AM

**Generative Property Optimization of Stochastic Microstructures:** *Patxi Fernandez-Zelaia*<sup>1</sup>; Jason Mayeur<sup>1</sup>; Jiahao Cheng<sup>1</sup>; Guannan Zhang<sup>1</sup>; Neil Zhang<sup>1</sup>; Amir Ziabari<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 10:50 AM Invited

**Interpretable Machine Learning Approach for Exploring Process-Structure-Property Relationships in Metal Additive Manufacturing:** *Xiaopeng Li*<sup>1</sup>; <sup>1</sup>University of New South Wales

#### 11:10 AM

**Physics-Based and Data-Driven ICME for Metal Additive Manufacturing: from Feedstock to Process Optimization:** *Jinhui Yan*<sup>1</sup>; Jim Lua<sup>2</sup>; Nam Phan<sup>3</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>Global Engineering Material, Inc; <sup>3</sup>Naval Air Systems Command

11:30 AM

**Real-Time Detection of Keyhole Pore Generation in Laser Powder Bed Fusion Via a Multi-Sensor System and Physics-Informed Machine Learning:** *Jiayun Shao*<sup>1</sup>; *Zhongshu Ren*<sup>2</sup>; *Tao Sun*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Brookhaven National Laboratory

11:50 AM

**Quantification of Defects in Additively Manufactured Steel Using Unsupervised Machine Learning:** *Hariharan Saravanan*<sup>1</sup>; *Pooja Maurya*<sup>1</sup>; *Alex Gaudio*<sup>1</sup>; *Asim Smailagic*<sup>1</sup>; *P. Chris Pistorius*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of High-Entropy Alloys, Functionally Graded Materials and Use of Computational Tools for Refractory Metal AM

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Faramarz Zarandi, RTX Corporation; Jeffrey Sowards, NASA Marshall Space Flight Center; Antonio Ramirez, Ohio State University; Eric Brizes, NASA Glenn Research Center; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias; Ian Mccue, Northwestern University; Zachary Sims, Small Business Consulting Corporation

**Wednesday AM | March 26, 2025**  
**316 | MGM Grand**

**Session Chairs:** Eric Brizes, NASA Glenn Research Center; Antonio Ramirez, Ohio State University

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8:30 AM Invited

**Computational Design of Graded Refractory Metal Structures:** *Bernard Gaskey*<sup>1</sup>; *Omar Mireles*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:00 AM

**Joining Niobium Refractory Alloy with Titanium Alloy in Direct Energy Deposition Additive Manufacturing Process:** *Olexandr Grydin*<sup>1</sup>; *Yevgen Karakash*<sup>1</sup>; *Olena Karpovych*<sup>1</sup>; *Sven Gr nder*<sup>2</sup>; *Mirko Schaper*<sup>2</sup>; *Florian Hengsbach*<sup>2</sup>; <sup>1</sup>SKYRORA Ltd; <sup>2</sup>Paderborn University

9:20 AM

**Thermomechanical Model Based Approach to Mitigate Crack Susceptibility in Additive Manufactured Refractory Material:** *Rohit Randhavan*<sup>1</sup>; *Shashank Sharma*<sup>1</sup>; *Narendra Dahotre*<sup>1</sup>; <sup>1</sup>University of North Texas

9:40 AM

**Atomistic and Phase Field Simulations of Rapid Solidification Towards Refractory High Entropy Alloys:** *Joni Kaipainen*<sup>1</sup>; *Tatu Pinomaa*<sup>1</sup>; *Kate Elder*<sup>2</sup>; *Scott Peters*<sup>2</sup>; *Joseph McKeown*<sup>2</sup>; *Anssi Laukkanen*<sup>1</sup>; <sup>1</sup>VTT Technical Research Centre of Finland; <sup>2</sup>Lawrence Livermore National Laboratory

10:00 AM Break

10:20 AM

**Design and Development of a Refractory Complex Concentrated Alloy for Additive Manufacturing of Advancing Space Propulsion Components:** *Fuyao Yan*<sup>1</sup>; *John Aristeidakis*<sup>1</sup>; *Savya Sachi*<sup>1</sup>; *David Linder*<sup>1</sup>; *Ida Berglund*<sup>1</sup>; <sup>1</sup>Questek Europe AB

10:40 AM

**Hafnium-Based Refractory High Entropy Alloy Structures Produced Via Additive Manufacturing for Extreme Temperature Applications:** *Thomas Berfield*<sup>1</sup>; *Justin Gillham*<sup>1</sup>; *Suyash Niraula*<sup>1</sup>; *Brendon Dodge*<sup>1</sup>; <sup>1</sup>University of Louisville

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Incorporating Breakthrough Functionalities for Building Large Scale Components — Advances in Processing, Control, and Feedstock I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Jonah Klemm-Toole, Colorado School of Mines; Soumya Nag, Oak Ridge National Laboratory; John Carpenter, Los Alamos National Laboratory; Sougata Roy, Iowa State University; Peeyush Nandwana, Oak Ridge National Laboratory; Sneha Prabha Narra, Carnegie Mellon University; Lang Yuan, University of South Carolina; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Alex Kitt, Edison Welding Institute; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC

**Wednesday AM | March 26, 2025**  
**301 | MGM Grand**

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University

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8:30 AM Invited

**Material and Process Control Development for Enhancing Wire-DED Printing Capability:** *Nicholas Bagshaw*<sup>1</sup>; *Chris Jasien*<sup>1</sup>; *Arrianna Matthews*<sup>1</sup>; <sup>1</sup>Fortius Metals Inc.

9:10 AM

**Integrated Deposition and Thermal Processing: a Pathway for Controlled As-Printed Performance:** *Daniel Codd*<sup>1</sup>; *Joseph McCrink*<sup>2</sup>; *Stephen Taller*<sup>3</sup>; <sup>1</sup>University of San Diego; <sup>2</sup>KVA Technologies; <sup>3</sup>ORNL

9:30 AM

**Enabling Multi-Resolution Droplet-On-Demand Metal Jetting Through Tailored Pulsing:** *Viktor Sukhotshiy*<sup>1</sup>; *Andrew Pascall*<sup>1</sup>; *Jason Jeffries*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

9:50 AM

**Atomic Layer Deposition (ALD) for Nanoscale SiC AM Feedstock Improvement:** *Chris Gump*<sup>1</sup>; *Dane Lindblad*<sup>1</sup>; *Guillermo Rojas*<sup>1</sup>; *Casey Christopher*<sup>1</sup>; *Joseph Gauspohl*<sup>1</sup>; *Arrelaine Dameron*<sup>1</sup>; <sup>1</sup>Forge Nano

10:10 AM Break

10:30 AM

**Evaluation of Process Performance and Mechanical Properties in Convergent Electroslag Additive Manufacturing (ESAM):** *Adam Stevens*<sup>1</sup>; *Paritosh Mhatre*<sup>1</sup>; *Vanshika Singh*<sup>1</sup>; *Charles Savage*<sup>1</sup>; *Luke Pinion*<sup>1</sup>; *Rangasayee Kannan*<sup>1</sup>; *Alex Roschli*<sup>1</sup>; *Dave Hebble*<sup>2</sup>; *Peeyush Nandwana*<sup>1</sup>; *Soumya Nag*<sup>1</sup>; *Sarah Graham*<sup>1</sup>; *Sudarsanam Babu*<sup>3</sup>; *Brian Post*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Arc Specialties; <sup>3</sup>University of Tennessee, Knoxville

10:50 AM

**Haynes 282 Wire Directed Energy Deposition Hot and Cold Wire Microstructure Analysis:** *Dennis Gilbert*<sup>1</sup>; *Andrew Wessman*<sup>1</sup>; *Mohammed Shafae*<sup>1</sup>; *Mohammed Ibrahim*<sup>1</sup>; *Ethan Valentine*<sup>1</sup>; <sup>1</sup>University of Arizona

11:10 AM

**Fundamental Study of High-Throughput Refining Electrosag Additive Manufacturing (RESAM):** Adam Stevens<sup>1</sup>; Vanshika Singh<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Yiyu Wang<sup>1</sup>; Brian Hicks<sup>1</sup>; Bryan Lim<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; Sarah Graham<sup>1</sup>; Soumya Nag<sup>1</sup>; Brian Post<sup>1</sup>; Sudarsanam Babu<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee, Knoxville

## BIOMATERIALS

### Advanced Biomaterials for Biomedical Implants — Bio-Response to Medical Implants

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Penn State; Vinoy Thomas, University of Alabama at Birmingham

Wednesday AM | March 26, 2025  
308 | MGM Grand

**Session Chair:** Fariborz Tavangarian, Penn State

8:30 AM

**A Plasma-3D Print Duo Platform for Reliable Materio-Biological Screening In Vitro:** Vinoy Thomas<sup>1</sup>; <sup>1</sup>University of Alabama at Birmingham

9:00 AM

**Biocompatibility and Biocorrosion Behavior of Resoloy for Absorbable Vascular Implants:** Roger Guillory II<sup>1</sup>; Petra Maier<sup>2</sup>; Berit Zeller-Plumhoff<sup>3</sup>; Huu Trinh<sup>4</sup>; Roman Menze<sup>4</sup>; <sup>1</sup>Medical College of Wisconsin; <sup>2</sup>Stralsund University of Applied Sciences; <sup>3</sup>Helmholtz-Zentrum Hereon; <sup>4</sup>MeKo Manufacturing

9:20 AM

**Biofunctionalization of the Ti-25Ta-xNb Alloy System:** Carlos Grandini<sup>1</sup>; Fernanda Quadros<sup>1</sup>; Celio Fernandes<sup>2</sup>; Pedro Kuroda<sup>3</sup>; Diego Correa<sup>1</sup>; <sup>1</sup>UNESP/Bauru; <sup>2</sup>UNESP/Botucatu; <sup>3</sup>UNILA

9:40 AM

**Biomimetic Collagen-Based 3D Printed Poly (Glycerol Sebacate) Composite Scaffold to Enhance Cartilage Defect Repair:** Yuyao Liu<sup>1</sup>; Claudio Intini<sup>2</sup>; Marko Dobricic<sup>2</sup>; Fergal O'Brien<sup>2</sup>; Mónica Echeverry-Rendón<sup>3</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>RCSI; <sup>3</sup>IMDEA Materials Institute

10:00 AM Break

10:20 AM

**Mechanical Testing of Implantable Neuromodulation Components and the Open Source Community:** Jerry Yang<sup>1</sup>; Juan Garcia<sup>1</sup>; Janet Gbur<sup>1</sup>; <sup>1</sup>Case Western Reserve University

10:40 AM

**In-Vitro Comparative Study of Composite Coatings for Magnesium-Based Bone Implants:** Hamdy Ibrahim<sup>1</sup>; Bryce Williams<sup>2</sup>; Abdelrahman Amin<sup>1</sup>; Mostafa Elsaadany<sup>2</sup>; <sup>1</sup>University of Tennessee Chattanooga; <sup>2</sup>University of Arkansas

11:00 AM

**An Overview of the Microstructural, Physical, Mechanical, and Tribological Performance of Beta-Type Titanium Alloys for Total Hip Replacement:** Marwa Dahmani<sup>1</sup>; Naouel Hezil<sup>2</sup>; Mamoun Fellah<sup>2</sup>; Mohamed Cherif Benoudia<sup>1</sup>; Hasan Kotan<sup>3</sup>; Alejandro Perez Larios<sup>4</sup>; Gamal A. El-Hiti<sup>5</sup>; <sup>1</sup>National Higher School of Technology and Engineering; <sup>2</sup>Abbes Laghrour-University, Khenchela; <sup>3</sup>Bursa Technical University; <sup>4</sup>University of Guadalajara; <sup>5</sup>King Saud University

11:20 AM

**Influence of Forging Temperature on Microstructure and Texture Evolution and Its Implication on Mechanical, Corrosion, Antibacterial and In Vivo Biocompatibility of Mg-Zr-Sr-Ce Alloy:** Satyabrata Sahoo<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Kharagpur

## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — Mechanical Testing

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

Wednesday AM | March 26, 2025  
122 | MGM Grand

**Session Chairs:** C. Tasan, Massachusetts Institute of Technology; Edoardo Rossi, Roma Tre University

8:30 AM

**Deformation Micromechanisms in Different Generation Ni-Based Single Crystal Superalloys During Tensile Testing:** Benoit Mansoz<sup>1</sup>; Pierre Caron<sup>2</sup>; Jonathan Cormier<sup>3</sup>; Florence Pettinari-Sturmelt<sup>1</sup>; <sup>1</sup>CEMES - Université de Toulouse; <sup>2</sup>Retired; <sup>3</sup>Institut PPrime, ISAE-ENSMA

8:50 AM

**Predicting Strength in Steel Wire Welds Using Three-Dimensional Pore Porosity Measurements:** Daniel Sinclair<sup>1</sup>; Nikhilesh Chawla<sup>2</sup>; W. Brendan Goodwin<sup>3</sup>; Adam Tomkins<sup>2</sup>; Rebecca Jennings<sup>2</sup>; Max Berman<sup>2</sup>; Jacob Stegmann<sup>2</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Purdue University; <sup>3</sup>Chick-Fil-A Engineering Center

9:10 AM

**Validation of Damage Mechanisms in Carbon Foam Using Finite Element Analysis for Tensile Loading:** William Downs<sup>1</sup>; Cheosung O'Brien<sup>1</sup>; Jason Trembly<sup>1</sup>; Yahya Al-Majali<sup>1</sup>; Muhammed Ali<sup>1</sup>; <sup>1</sup>Ohio University

9:30 AM

**A Novel Multi-Scale Characterization Approach for the Development of Advanced Nanocomposite Ceramics with Improved Toughness:** Edoardo Rossi<sup>1</sup>; Marco Sebastiani<sup>1</sup>; Bartolomeo Coppola<sup>2</sup>; Paola Palmero<sup>2</sup>; Laura Montanaro<sup>2</sup>; <sup>1</sup>Roma Tre University; <sup>2</sup>Politecnico di Torino

9:50 AM Break

10:10 AM

**The Impact of Ultrafine Grain Size on ZnAlAg Alloy on Hall-Petch Effect Under Severe Compression Process:** Juan Prado-Lázaro<sup>1</sup>; Israel Aguilera-Navarrete<sup>2</sup>; Jorge Verduzco-Martinez<sup>3</sup>; <sup>1</sup>Michoacana University of San Nicolás de Hidalgo; <sup>2</sup>Consejo Nacional de Humanidades, Ciencias y Tecnologías; <sup>3</sup>Michoacana University of San Nicolás de Hidalgo

10:30 AM

**Screening for Tensile Ductility and Other Bulk Mechanical Properties Via Scratch Analysis:** Erik DeMeyere<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Hailong Huang<sup>1</sup>; Maria Wagner<sup>1</sup>; Kevin Jacob<sup>2</sup>; Ryan Ott<sup>1</sup>; Emrah Simsek<sup>1</sup>; Iver Anderson<sup>1</sup>; Nicolas Argibay<sup>1</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University

10:50 AM

**Investigating Texture Effects on Wear Resistance in Cu Alloys: A Multi-Scale Analysis:** *Minho Yun*<sup>1</sup>; C. Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

11:10 AM

**Quantifying and Differentiating Metal Nanoparticle Deformation Mechanisms in Molecular Dynamics Simulation:** *Claire Zhang*<sup>1</sup>; Ting Liu<sup>1</sup>; Ruikang Ding<sup>2</sup>; Amit Prasad<sup>2</sup>; Tevis Jacobs<sup>2</sup>; Ashlie Martini<sup>1</sup>; <sup>1</sup>University of California, Merced; <sup>2</sup>University of Pittsburgh

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Materials for Energy Conversion and Storage II

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

Wednesday AM | March 26, 2025  
356 | MGM Grand

**Session Chairs:** Srikanth Gopalan, Boston University; Yu Zhong, Worcester Polytechnic Institute

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8:30 AM Invited

**High-Throughput DFT Simulations of Doped LaCoO<sub>3</sub> Using Neural Network Potential:** Guangchen Liu<sup>1</sup>; Songge Yang<sup>1</sup>; Yu Zhong<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

9:00 AM

**Solution-Processed Sb<sub>2</sub>(S,Se)<sub>3</sub> Nanoseeds on CdS Buffer Layer for High-Efficiency Superstrated Sb<sub>2</sub>Se<sub>3</sub> Thin Film Solar Cell:** *Al Amin*<sup>1</sup>; Feng Yan<sup>1</sup>; <sup>1</sup>Arizona State University

9:20 AM

**The Effects of Current Density on Mechanical Stresses During Electrodeposition of Lithium Metal Anodes:** *Matt Pharr*<sup>1</sup>; <sup>1</sup>Texas A&M University

9:40 AM

**Influence of Oxidant and Dopant on the Electrochemical Performance of Polyaniline:** Okechukwu Okafor<sup>1</sup>; Abimbola Popoola<sup>1</sup>; Olawale Popoola<sup>1</sup>; Samson Adeosun<sup>1</sup>; Mercy Ogbonnaya<sup>2</sup>; *Oluwashina Gbenedor*<sup>3</sup>; <sup>1</sup>Tshwane University of Technology; <sup>2</sup>Tshwane University of Technology, Pretoria, South Africa; <sup>3</sup>University of Lagos

10:00 AM Break

10:15 AM

**Multiscale Modeling of Quasi-1D Transition Metal Oxide Nanoscrolls for Photocatalysis and H<sub>2</sub> storage:** *Adway Gupta*<sup>1</sup>; Arunima Singh<sup>1</sup>; <sup>1</sup>Arizona State University

10:35 AM

**Multi-Oxide Thermite Impregnated Thermoplastic:** *Benjamin Firestone*<sup>1</sup>; Zachary Stutsman<sup>1</sup>; Alvin Strauss<sup>1</sup>; <sup>1</sup>Vanderbilt University

10:55 AM

**The Performance of Sr<sub>2-x</sub>VMoO<sub>6</sub> in SOFC Application: Evaluating MIEC Fuel Electrodes for Enhanced Stability, Conductivity, and Electrocatalysis:** *Stephen Heywood*<sup>1</sup>; Julia Esakoff<sup>1</sup>; David Driscoll<sup>1</sup>; Stephen Sofie<sup>1</sup>; <sup>1</sup>Montana State University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances and Discoveries in Non-Equilibrium Driven Nanomaterials and Thin Films — Quantum and Photonic Nanoscale Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Ritesh Sachan, Oklahoma State University; Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University; Shikhar Jha, Indian Institute of Technology Kanpur

Wednesday AM | March 26, 2025  
354 | MGM Grand

**Session Chairs:** Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University

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8:30 AM Introductory Comments

8:35 AM Keynote

**Discovery of Novel Q-Phases of Materials and Impact on Technology:** *Jagdish Narayan*<sup>1</sup>; <sup>1</sup>North Carolina State University

9:00 AM Invited

**Perspective on Diamond for Quantum Applications (Invited):** Lakshmi Ramasubramanian<sup>1</sup>; *Raj Singh*<sup>1</sup>; <sup>1</sup>Oklahoma State University

9:20 AM Invited

**Tensile-Strained Self-Assembly for Novel Quantum and Photonic Nanomaterials:** *Paul Simmonds*<sup>1</sup>; <sup>1</sup>Tufts University

9:40 AM

**Characterization of High Quality Epitaxially Grown Diamond Thin Films:** *Pranay Kalakonda*<sup>1</sup>; Ratnakar Vispute<sup>2</sup>; Naveen Narasimhachar Joshi<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Blue Wave Semiconductors Inc

10:00 AM Break

10:20 AM Invited

**Aggregation Dynamics in Nanoceria Under Polymerization of Ce Ions:** *Sudipta Seal*<sup>1</sup>; Yifei Fu<sup>1</sup>; Craig Neal<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Joanna Wojewoda-Budka<sup>2</sup>; Natalia Sobczak<sup>2</sup>; Lidia Litynska-Dobrzynska<sup>2</sup>; Ishaan Patel<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Polish Academy of Sciences

10:40 AM Invited

**Exploring Equilibrium and Non-Equilibrium Bi-Metallic Materials with Unique Magneto-Optical Properties:** *Philip Rack*<sup>1</sup>; <sup>1</sup>University of Tennessee

11:00 AM Invited

**Hybrid Organic-Inorganic Thin Film Deposition by Resonant Infrared, Matrix-Assisted Pulsed Laser Evaporation:** *Adrienne Stiff-Roberts*<sup>1</sup>; <sup>1</sup>Duke University

11:20 AM

**Electron Beam Holography and Characterization of Defects in Multilayered Semiconductor Thin Films:** *Ramasis Goswami*<sup>1</sup>; Margo Strauch<sup>1</sup>; Syed Qadri<sup>1</sup>; <sup>1</sup>Naval Research Laboratory



## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — Ceramic-Matrix Composite Materials and Processes

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

**Wednesday AM | March 26, 2025**  
**106 | MGM Grand**

**Session Chairs:** Ruigang Wang, Michigan State University; Chen Ailiang, Central South University

**8:30 AM**

**Friction and Wear Characteristics of Polymer-Derived SiOC Ceramics:** *Kathy Lu*<sup>1</sup>; Mubina Shaik<sup>1</sup>; William Bennett<sup>2</sup>; Min Zou<sup>2</sup>; <sup>1</sup>University of Alabama Birmingham; <sup>2</sup>University of Arkansas

**8:50 AM**

**Transformation-Induced Strains in Glass-Ceramics Through Complex Thermo-Mechanical Histories:** *Kenneth Cundiff*<sup>1</sup>; Kevin Strong<sup>1</sup>; Thomas Diebold<sup>1</sup>; Brian Lester<sup>1</sup>; Kevin Long<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**9:10 AM**

**Deep Removal of Arsenic From NiSO<sub>4</sub> Solution Using Tungstate-Loaded D301 Resin:** *Bing Liu*<sup>1</sup>; Meng-Xi Chen<sup>1</sup>; Xi-Jun Zhang<sup>2</sup>; Xing-yu Chen<sup>1</sup>; Ai-liang Chen<sup>1</sup>; Feng-long Sun<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>State Key Laboratory of Nickel and Cobalt

**9:30 AM**

**Volume Stability of Gypsum-Cement Based Composite Cementitious Material and the Preparation of High-Performance Mortar:** *Li Wang*<sup>1</sup>; <sup>1</sup>Beijing New Building Material PCL

**9:50 AM**

**Behavior of Chlorine-Containing CaO-SiO<sub>2</sub>-CaCl<sub>2</sub> Slag System at High Temperatures:** *Hanxing Ren*<sup>1</sup>; Sohn Il<sup>1</sup>; <sup>1</sup>Yonsei University

**10:10 AM Break**

**10:20 AM**

**The Fracture Behavior and Morphology of Transition Metal Carbides:** *Christopher Weinberger*<sup>1</sup>; Sajjad Hossain<sup>1</sup>; Alyssa Stubbers<sup>2</sup>; Gregory Thompson<sup>2</sup>; <sup>1</sup>Colorado State University; <sup>2</sup>University of Alabama

**10:40 AM**

**Double-Tough Ceramics:** *Diletta Giuntini*<sup>1</sup>; <sup>1</sup>Eindhoven University of Technology

**11:00 AM**

**Xenotime-Based Minerals as Environmental Barrier Coatings:** *Elizabeth Opila*<sup>1</sup>; Imoen Stack<sup>1</sup>; <sup>1</sup>University of Virginia

**11:20 AM**

**Eco-Friendly Additive Manufacturing of SiN Aqueous Suspensions via Robocasting:** *Flavie Lebas*<sup>1</sup>; Elisa Jaumouille<sup>1</sup>; Sylvain Marinel<sup>1</sup>; Romuald Herbinet<sup>1</sup>; Loïc Le Pluart<sup>1</sup>; Charles Manière<sup>1</sup>; <sup>1</sup>CRISMAT

**11:40 AM**

**A Facile and Versatile Process for Creating Bioinspired Ceramic-Metal Hierarchical Structures:** *Sourabh Kumar*<sup>1</sup>; Rohit Pratyush Behera<sup>1</sup>; Hortense Le Ferrand<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — Grain Boundary Engineering and Particle Size Control

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

**Wednesday AM | March 26, 2025**  
**363 | MGM Grand**

**Session Chairs:** Ikenna Nlebedim, Ames Laboratory; Alexander Ruediger, Extrusion Research and Development Center Fzs, Tu Berlin

**8:30 AM**

**Correlative Microscopic Analysis of Grain Boundary Engineered Nd-Fe-B Permanent Magnets:** *Pradeep Konda Gokuldoss*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Madras

**8:50 AM**

**Grain Size Optimization for Sm<sub>2</sub>Fe<sub>17</sub>N<sub>3</sub>:** *Rambabu Kuchi*<sup>1</sup>; Ihor Hlova<sup>1</sup>; Xubo Liu<sup>1</sup>; Olena Palasyuk<sup>1</sup>; Jordan Schlagel<sup>1</sup>; Devo Schlagel<sup>1</sup>; Andrew Piersol<sup>1</sup>; *Matthew Kramer*<sup>2</sup>; <sup>1</sup>Ames Laboratory

**9:10 AM**

**Studies of Sintered Nb-Doped MM-(FeCo)-B-Based Magnets with the Addition of RE-Cu Grain Boundary Modification Alloys:** *Wei Tang*<sup>1</sup>; Jing Wang<sup>1</sup>; Chaochao Pan<sup>1</sup>; Yatin Varma<sup>1</sup>; Ryan Ott<sup>1</sup>; Jun Cui<sup>1</sup>; <sup>1</sup>Ames Laboratory

**9:30 AM**

**Protecting Ultrafine Grained Dy-Free Nd-Fe-B Sintered Magnets with Varied Passivation Techniques:** *Belle Finney*<sup>1</sup>; Baozhi Cui<sup>1</sup>; Wei Tang<sup>1</sup>; *Matthew Kramer*<sup>2</sup>; Iver Anderson<sup>1</sup>; <sup>1</sup>Ames Laboratory

**9:50 AM**

**Influence of Synthetic and Washing Protocols on Phase Purity and Magnetic Properties of Nd<sub>2</sub>Fe<sub>14</sub>B Powders Prepared by Calciothermic Reduction:** *Rambabu Kuchi*<sup>1</sup>; Ihor Hlova<sup>1</sup>; Jordan Schlagel<sup>1</sup>; Yaroslav Mudryk<sup>1</sup>; <sup>1</sup>Ames National Laboratory of US DOE

**10:10 AM Break**

**10:30 AM**

**Microstructure-Property Relationship for Hot Deformed Fine-Grained NdFeB Magnet with High Magnetic Properties Through Two-Step Spark Plasma Sintering:** *Ziyi Wu*<sup>1</sup>; Dong Zhao<sup>1</sup>; Baozhi Cui<sup>2</sup>; Lian Jie<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>Ames National Laboratory

**10:50 AM**

**Processing and Magnetic Properties of Nd/PrFeB Ring Magnets Produced by Extrusion:** *Alexander Ruediger*<sup>1</sup>; Sören Müller<sup>1</sup>; <sup>1</sup>Extrusion Research And Development Center Fzs, Tu Berlin

**11:10 AM**

**Effect of Dy Substitution at Nd Sites in Melt-Spun Nd-Fe-B Permanent Magnet Ribbons: A Magnetic System for Electric Vehicles:** *Shrantik Dey*<sup>1</sup>; Shampa Aich<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**11:30 AM**

**Magnetic Iron Disilicide Nanostructures: Computational Studies:** *Matthew Sisson*<sup>1</sup>; Alyssa Horne<sup>1</sup>; Liwei Geng<sup>1</sup>; Sahil Dhoka<sup>1</sup>; Ranjit Pati<sup>1</sup>; *Yongmei Jin*<sup>1</sup>; <sup>1</sup>Michigan Technological University

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Structures and Characterization

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Wednesday AM | March 26, 2025  
368 | MGM Grand

**Session Chairs:** E-Wen Huang, National Yang Ming Chiao Tung University; Klaus-Dieter Liss, University of Tennessee, Knoxville

#### 8:30 AM Invited

**Short Range Chemical Ordering in HEA Investigated by X-Ray Diffuse and Resonant Scattering:** *Wojciech Dmowski*<sup>1</sup>; Takeshi Egami<sup>2</sup>; Chae Woo Ryu<sup>2</sup>; Hyunseok Oh<sup>3</sup>; Cemal Tasan<sup>4</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Hongik University; <sup>3</sup>University Wisconsin at Madison; <sup>4</sup>MIT

#### 8:50 AM Invited

**Stoichiometry and Microstructure-Dependent Hardness-Mapping Prediction and Verification for High-Entropy Alloys:** *E-Wen Huang*<sup>1</sup>; Tu-Ngoc Lam<sup>2</sup>; Fu-Shiang Yang<sup>1</sup>; Wen-Jay Lee<sup>3</sup>; <sup>1</sup>National Yang Ming Chiao Tung University; <sup>2</sup>Can Tho University; <sup>3</sup>National Center for High-Performance Computing

#### 9:10 AM

**Nanoindentation and AFM-Based Evaluation of Cold-Sprayed Stable Nanocrystalline High-Entropy Alloy Coatings:** *Kasimuthumanian Subramanian*<sup>1</sup>; Moses Adaan-Nyia<sup>1</sup>; Philip Egberts<sup>1</sup>; Ahmed Tiarniyu<sup>1</sup>; <sup>1</sup>University of Calgary

#### 9:30 AM Invited

**Formation of Local Chemical Ordering in FCC HEAs and Its Effect on the Deformation Behaviors:** *Kooknoh Yoon*<sup>1</sup>; Hyunseok Oh<sup>2</sup>; Juhyun Oh<sup>1</sup>; Miyoung Kim<sup>1</sup>; Batiste Gault<sup>3</sup>; Dierk Raabe<sup>3</sup>; *Eun Soo Park*<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>University of Wisconsin-Madison; <sup>3</sup>Max-Planck-Institut für Eisenforschung

#### 9:50 AM Invited

**Short Range Order and the Evolution of Deformation Mechanisms in the CrCoNi Medium Entropy Alloy:** *Andrew Minor*<sup>1</sup>; <sup>1</sup>University of California Berkeley

#### 10:10 AM Break

#### 10:30 AM Invited

**Exploring Innovative Nanoscale Structures and Phases in High-Entropy Alloy Nanoparticles Through Femtosecond Laser Ablation:** *Anming Hu*<sup>1</sup>; K. Yin<sup>2</sup>; D. Fieser<sup>1</sup>; S. Hugh<sup>1</sup>; J. Zuo<sup>2</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>University of Illinois, Urbana-Champaign

#### 10:50 AM Invited

**Neutron and Synchrotron Diffraction Methods for Unveiling Structural Evolution in Complex and Off-Equilibrium Alloys:** *Klaus-Dieter Liss*<sup>1</sup>; Megumi Kawasaki<sup>2</sup>; <sup>1</sup>University of Tennessee, Knoxville; <sup>2</sup>Oregon State University

#### 11:10 AM Invited

**Strong and Ductile High Temperature Multicomponent Soft Magnet Through Widmanstätten Precipitates:** *Liuliu Han*<sup>1</sup>; Fernando Maccari<sup>2</sup>; Ivan Soldatov<sup>3</sup>; Rudolf Schäfer<sup>3</sup>; Nicolas Peter<sup>1</sup>; Oliver Gutfleisch<sup>2</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max Planck Institute For Iron Research; <sup>2</sup>Technical University of Darmstadt; <sup>3</sup>IFW Dresden

#### 11:30 AM Invited

**Scanning Tunneling Microscopy for High Entropy Materials:** *Teyu Chien*<sup>1</sup>; <sup>1</sup>University of Wyoming

#### 11:50 AM Invited

**CMT-Associated Superior Mechanical Properties in Multi-Principal Element Alloys:** *Yandong Wang*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

## LIGHT METALS

### Advances in Titanium Technology — Advanced Manufacturing of Titanium-Based Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

Wednesday AM | March 26, 2025  
108 | MGM Grand

**Session Chair:** Stoichko Antonov, National Energy Technology Laboratory

#### 8:30 AM Invited

**Gradient Ti-Based Alloys: Their Modeling, Manufacturing, and Design:** *Matt Dolde*<sup>1</sup>; Fatih Sikan<sup>1</sup>; Nicholas Oldham<sup>1</sup>; Thomas Ales<sup>1</sup>; Brian Martin<sup>1</sup>; Maria Jose Quintana<sup>1</sup>; *Peter Collins*<sup>1</sup>; <sup>1</sup>Iowa State University

#### 9:00 AM

**Gradient Approach to Characterizing Deformation Mechanisms in Titanium Alloys:** *Mathew Cohen*<sup>1</sup>; Brian Welk<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Paraic O'Kelly<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>The Ohio State University

#### 9:20 AM

**Processing of Sputter Deposited Compositionally Graded Ti-Based Binary Systems:** *Rayna Mehta*<sup>1</sup>; Jackson Goedjen<sup>1</sup>; Rohit Berlia<sup>1</sup>; Thomas Voisin<sup>2</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Lawrence Livermore National Laboratory

#### 9:40 AM

**Understanding the Processing-Composition-Microstructure-Properties Relation of the Ti-xCo-yB System Created via Powder Bed Additive Manufacturing:** *Jonathan Zaugg*<sup>1</sup>; Maria Quintana<sup>1</sup>; Peter Collins<sup>1</sup>; <sup>1</sup>Iowa State University

#### 10:00 AM Break

#### 10:10 AM

**Influence of Oxygen and Zirconium Additions on Oxidation Resistance and Mechanical Properties of Ti-Al and Ti-Al-Zr Alloys:** *Michal Kuris*<sup>1</sup>; Maria Tsoutsouva<sup>1</sup>; Thomas Vaubois<sup>2</sup>; Zhao Huvelin<sup>1</sup>; Agnes Locq<sup>1</sup>; Catherine Riot<sup>1</sup>; Nicolas Horezan<sup>1</sup>; Pierre Sallot<sup>2</sup>; Marc Thomas<sup>1</sup>; Jean-Philippe Monchoux<sup>3</sup>; Frédéric Habiaryemye<sup>3</sup>; <sup>1</sup>The French Aerospace Lab - ONERA; <sup>2</sup>Safran Tech; <sup>3</sup>CEMES-Center for Materials Elaboration and Structural Studies

10:30 AM

**The Oxidation Behavior of Near  $\alpha$ -Ti Alloy- $\gamma$ -TiAl Composites Processed via Powder Metallurgy Routes:** *Jishnu Bhattacharyya*<sup>1</sup>; YunJo Ro<sup>1</sup>; William Moffat<sup>1</sup>; Sean Agnew<sup>1</sup>; Haydn Wadley<sup>1</sup>; <sup>1</sup>University of Virginia

10:50 AM

**Development of TiAl Alloys for High Temperature Applications:** *Seong-Woong Kim*<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

11:10 AM

**Activation Energy Estimations of Titanium-Copper Core-Shells in High-Rate Heating Conditions:** *Camilo Bedoya Lopez*<sup>2</sup>; Santiago Vargas Giraldo<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Experimental Data Processing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Wednesday AM | March 26, 2025**  
**320 | MGM Grand**

**Session Chair:** Ashley Spear, University of Utah

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8:30 AM Invited

**Adaptive Latent Space Tuning to Enable Characterizing Materials Dynamics Using Bragg Coherent Diffraction Imaging:** *Alexander Scheinker*<sup>1</sup>; Reeru Pokharel<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:10 AM

**Deep Learning-Based Image Denoising for Enhanced CT Image Reconstruction:** Parisa Asadi<sup>1</sup>; Zeyu Zhou<sup>1</sup>; Andriy Andreyev<sup>1</sup>; Matthew Andrew<sup>1</sup>; <sup>2</sup>Zeiss

9:30 AM

**Implications of X-CT Reliability to Determine Anomaly Distribution for Fatigue Assessment:** *Stefano Beretta*<sup>1</sup>; Behnam Salehnasab<sup>1</sup>; Shaharyar Baig<sup>1</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

9:50 AM Break

10:00 AM

**Boosting Recyclable Plastic Sorting with AI-Generated Images and Vision Technology:** *Kanishka Tyagi*<sup>1</sup>; Isha Maun<sup>1</sup>; Nalin Kumar<sup>1</sup>; <sup>1</sup>UHV Technologies

10:20 AM

**Quantifying Error and Uncertainty in Transmission Electron Microscopy Images of Irradiation Defects:** *Gabriella Bruno*<sup>1</sup>; Matthew Lynch<sup>1</sup>; Ryan Jacobs<sup>2</sup>; Dane Morgan<sup>2</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Wisconsin

10:40 AM

**Quantifying Uncertainty of Object Detection Models in Electron Microscopy:** *Ni Li*<sup>1</sup>; Ryan Jacobs<sup>1</sup>; Matthew Lynch<sup>2</sup>; Vidit Agrawal<sup>1</sup>; Kevin Field<sup>2</sup>; Dane Morgan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of Michigan

11:20 AM

**Prediction of Nitrogen Content in Converter Based on an LLE-RF Model:** *Xianwu Zhang*<sup>1</sup>; Mingmei Zhu<sup>1</sup>; Chenghong Li<sup>1</sup>; Zhengjiang Yang<sup>1</sup>; <sup>1</sup>Chongqing University

11:00 AM

**Advancing Automated Classification of Crystallographic Structures Using Synthetic Two-Dimensional X-Ray Diffraction Patterns and Deep Learning:** *Ayoub Shahnazari*<sup>1</sup>; Zeliang Zhang<sup>1</sup>; Sachith Dissanayake<sup>1</sup>; Chenliang Xu<sup>1</sup>; Niaz Abdolrahim<sup>1</sup>; <sup>1</sup>University of Rochester

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Microstructure Simulations Across Scales

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Wednesday AM | March 26, 2025**  
**319 | MGM Grand**

**Session Chairs:** Sam Reeve, Oak Ridge National Laboratory; Jeremy Mason, University of California, Davis

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8:30 AM

**Non-Schmid Continuum Slip Crystal Plasticity with Implications for Dissipation Rate:** *Ankit Srivastava*<sup>1</sup>; Alan Needleman<sup>1</sup>; <sup>1</sup>Texas A&M University

8:50 AM

**Developing a Stress-Sensitive Nucleation Model Beyond Classical Nucleation Theory:** *Khanh Dang*<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:10 AM

**Dislocation Dynamics During Deformation of Metals: Direct Coupling Between 3D Experimental and 3D Simulated Movies:** *Sina Borgi*; Henning Poulsen<sup>1</sup>; Grethe Winther<sup>1</sup>; <sup>1</sup>Technical University of Denmark

9:30 AM

**Generating a Database of Dislocation Predictions from Classical Interatomic Potentials:** *Lucas Hale*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

9:50 AM

**Implementation of a Stress Corrosion Cracking Model in the Large-Strain Elasto-Viscoplastic Fast Fourier Transform Modeling Framework:** *Ryan Beishline*<sup>1</sup>; Benjamin Anglin<sup>2</sup>; Miroslav Zecevic<sup>3</sup>; Ricardo Lebensohn<sup>3</sup>; Marko Knezevic<sup>1</sup>; <sup>1</sup>University of New Hampshire; <sup>2</sup>Naval Nuclear Laboratory; <sup>3</sup>Los Alamos National Laboratory

10:10 AM Break

10:30 AM

**Thermally Activated Dislocation Ensembles: Maximum Dissipation and Scaling Relations:** *David McDowell*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

10:50 AM

**Thermodynamic Integration for Dynamically Unstable Systems Using Interatomic Force Constants Without Molecular Dynamics:** *Junsoo Park<sup>1</sup>; Zhigang Wu<sup>1</sup>; John Lawson<sup>1</sup>; <sup>1</sup>NASA Ames Research Center*

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Advanced Fabrication, Modeling, and Material Design

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

**Wednesday AM | March 26, 2025**  
**355 | MGM Grand**

**Session Chairs:** Wan-Ting Chiu, Institute of Science Tokyo; I-Lun Jen, National Yang Ming Chiao Tung University

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#### 8:30 AM Invited

**Exploration of Novel Thermoelectric Materials and Devices via Informatics Approaches:** *Isao Ohkubo<sup>1</sup>; <sup>1</sup>National Institute for Materials Science*

#### 8:50 AM Invited

**Investigation of Martensite Variant Reorientation Behaviors of the Ni-Mn-Ga Particles Composite Materials:** *Wan-Ting Chiu<sup>1</sup>; Pimpet Sratong-On<sup>2</sup>; DongKeun Han<sup>1</sup>; Masaki Tahara<sup>1</sup>; Volodymyr Chernenko<sup>3</sup>; Hideki Hosoda<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology; <sup>2</sup>Thai-Nichi Institute of Technology; <sup>3</sup>BCMaterials*

#### 9:10 AM Invited

**Monte Carlo Simulation of Transient and Steady-State Electron Gas Thermodynamic Cycle:** *Mona Zebajadi<sup>1</sup>; Farjana Tonni<sup>1</sup>; Kazuaki Yazawa<sup>2</sup>; Ali Shakouri<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Purdue University*

#### 9:30 AM Invited

**Resonant Scattering in Metallic and Semiconducting Thermoelectrics: Similarities and Differences:** *Kacper Pryga<sup>1</sup>; Bartłomiej Wiendlocha<sup>1</sup>; <sup>1</sup>AGH University of Krakow*

#### 9:50 AM Invited

**Off-Stoichiometry: A Tool to Enhance the Thermoelectric Performance of Heusler Compounds:** *Fabian Garmroudi<sup>1</sup>; Takao Mori<sup>1</sup>; Ernst Bauer<sup>1</sup>; Alexander Riss<sup>1</sup>; Michael Parzer<sup>1</sup>; <sup>1</sup>Vienna University of Technology-Retired*

#### 10:10 AM Break

#### 10:25 AM

**Modulation of Crystal Structure and Thermoelectric Properties of Medium-Entropy GeTe-Based Compounds with Sb and Se Alloying:** *Cheng-Ruei Wu<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University*

#### 10:45 AM

**A Study of Interfacial Reaction of Ni(P)/SnS Couples:** *Wei Ching Lai<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University*

#### 11:05 AM

**Optimizing ZT and Conversion Efficiency of p-Type Bi<sub>2</sub>Te<sub>3</sub> via Light-Doping and Defect Engineering:** *Cheng-Yu Tsai<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University*

11:25 AM

**Miscibility Gaps in the Ag-Cu-Se-Te Quaternary System:** *Yung-Chun Tsai<sup>1</sup>; Yung-Jen Chuang<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University*

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Materials and Process Modelling

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

**Wednesday AM | March 26, 2025**  
**114 | MGM Grand**

**Session Chairs:** Peter Lee, University College London; Abdallah Elsayed, University of Guelph

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#### 8:30 AM Keynote

**Two-Phase Flow Simulation for Distinguishing Deformable Particles with a LiMCA System:** *Xiaodong Wang<sup>1</sup>; Xiaokang Guo<sup>1</sup>; Fuhai Wang<sup>1</sup>; Mihaiela Isac<sup>2</sup>; Roderick Guthrie<sup>2</sup>; <sup>1</sup>University of Chinese Academy of Science; <sup>2</sup>McGill University*

#### 8:55 AM

**Three-Dimensional Mathematical Modelling of Casting Thin Strips of Aluminum Alloys (AA6111, AA2024, AA5182, And AA7069) Using the Horizontal Single Belt Casting (HSBC Process):** *Daniel Ricardo Gonzalez Morales<sup>1</sup>; Mihaiela Isac<sup>1</sup>; Roderick Guthrie<sup>1</sup>; <sup>1</sup>McGill University*

#### 9:20 AM

**Investigation of Fe-Rich Intermetallics, Solidification Porosities, and Cooling Dynamics in 6061 Aluminum Alloy by Multiscale Characterization, Synchrotron X-ray Tomography, and ICME Approaches:** *Kai-Yu Liang<sup>1</sup>; Hao-Chuan Huang<sup>1</sup>; Ching-Yao Tseng<sup>1</sup>; Chun-Yeh Chen<sup>1</sup>; Ying-Shuo Tseng<sup>2</sup>; Yen-Fang Song<sup>2</sup>; Gung-Chian Yin<sup>2</sup>; Te-Cheng Su<sup>1</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>National Synchrotron Radiation Research Center*

#### 9:45 AM

**Predicting Yield Strength of Aluminum Alloys Based on Composition:** *Clinton Waite<sup>1</sup>; Luca Montanelli<sup>2</sup>; Elsa Olivetti<sup>2</sup>; Eric Homer<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Massachusetts Institute of Technology*

#### 10:10 AM Break

#### 10:25 AM Keynote

**Advances in Al-Mg-Si Extrusions for Automotive Applications:** *Warren Poole<sup>1</sup>; Andrew Zang<sup>1</sup>; Mojtaba Mansouri Arani<sup>1</sup>; Paul Rometsch<sup>2</sup>; Nick Parson<sup>2</sup>; <sup>1</sup>University of British Columbia; <sup>2</sup>Rio Tinto*

#### 10:50 AM

**Optimization of RFI Performances in Large Furnaces Through Mathematical Simulations:** *Bruno Blais<sup>1</sup>; Sylvain Tremblay<sup>2</sup>; <sup>1</sup>Polytechnique Montreal; <sup>2</sup>STAS*

#### 11:15 AM

**Development of Process Control for Ultrasonic Metal Welding of Aluminum Automotive Wires Based on Machine Learning:** *Andreas Gester<sup>1</sup>; Guntram Wagner<sup>1</sup>; Tom Kühne<sup>1</sup>; Peter Gluchowski<sup>1</sup>; <sup>1</sup>Chemnitz University of Technology*



## LIGHT METALS

### Aluminum Reduction Technology — Environmental, Alumina Dissolution and Industry 4.0 Applied to Aluminium Smelters I

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

**Wednesday AM | March 26, 2025**  
**113 | MGM Grand**

**Session Chair:** Ole Kjos, SINTEF AS

#### 8:30 AM Introductory Comments

##### 8:35 AM

**Pot Integrated Abart (PIA) Long Term Performance During Continuous Operation:** Ole Kjos<sup>1</sup>; Thomas Simonsen<sup>1</sup>; Andres Sørhuus<sup>2</sup>; Håvard Olsen<sup>2</sup>; Ellen Bromstad Myrvold<sup>3</sup>; Isak Fossan<sup>3</sup>; Helene Eng Granlund<sup>3</sup>; Kim Elstad<sup>3</sup>; Asbjørn Solheim<sup>1</sup>; Egil Skybakmoen<sup>1</sup>; <sup>1</sup>SINTEF Industry; <sup>2</sup>REEL Norway AS; <sup>3</sup>Alcoa Norway ANS

##### 9:00 AM

**Hybrid Digital Twin for Stable Fluoride Content in Potroom Alumina Feed:** Sudi Jawahery<sup>1</sup>; Are Dyrøy<sup>2</sup>; Filippo Remonato<sup>3</sup>; Jan Gunnar Dyrset<sup>1</sup>; Stein O. Wasbø<sup>1</sup>; <sup>1</sup>Cybernetica AS; <sup>2</sup>Hydro Aluminium Metal; <sup>3</sup>SINTEF Digital

##### 9:25 AM

**Optimization of Alumina Feeding in Electrolysis Cells using Multi-Physics Modeling and Deep Learning Surrogate:** Kevin Patouillet<sup>1</sup>; Nadia Chailly<sup>1</sup>; Bertrand Allano<sup>1</sup>; Alan Clark<sup>2</sup>; John Perry<sup>2</sup>; Matias Vasquez<sup>2</sup>; <sup>1</sup>Rio Tinto / Aluminium Technology Solutions; <sup>2</sup>PhysicsX

##### 9:50 AM Break

##### 10:05 AM

**Industry Case Study: Optimisation of Alumina Feed Cycle According to Anode Process Operation:** Andre Van Haaren<sup>1</sup>; Hanno Vogel<sup>1</sup>; Nicholas Hahn<sup>1</sup>; Roman Düssel<sup>1</sup>; <sup>1</sup>TRIMET Aluminium SE

##### 10:30 AM

**Ultrafine Droplet Horizontal Desulfurization Technology for Aluminum Reduction Flue Gas and Its Demonstration Application:** Xuejiao Li; Haichen Song<sup>1</sup>; Ze Yuan<sup>2</sup>; Michael Ren<sup>3</sup>; <sup>1</sup>Shenyang Aluminum and Magnesium Engineering and Research Institute Co., Ltd.; <sup>2</sup>Footecarbon (Beijing) Technology Co., Ltd.; <sup>3</sup>Sunlightmetal Consulting Inc.

##### 10:55 AM

**Numerical Simulation and Analysis of Pot Tightness, Heat Transfer, and Airflow in Aluminum Reduction Cells:** Mouhamadou Diop<sup>1</sup>; Zhaowen Wang<sup>1</sup>; Nan Zou<sup>1</sup>; Zhongning Shi<sup>1</sup>; <sup>1</sup>Northeastern University (NEU)

##### 11:20 AM Concluding Comments

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Artificial Intelligence Applications in Integrated Computational Materials Engineering — AI-Driven Materials Design and Optimization

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Wenwu Xu, San Diego State University; Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University; Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University; Avani Mishra, Los Alamos National Laboratory; Victoria Miller, University of Florida; Ghanshyam Pilania, General Electric (GE Aerospace Research)

**Wednesday AM | March 26, 2025**  
**351 | MGM Grand**

**Session Chairs:** Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University

#### 8:30 AM Invited

**Developing Machine Learning Interatomic Potential for Fe-Cr-Ni Alloys:** Shiqiang Hao<sup>1</sup>; Saro San<sup>1</sup>; Yi Wang<sup>1</sup>; Michael Gao<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

#### 9:00 AM Invited

**Sustainable Aluminum Alloy Design via Computer Vision:** Fatih Sen<sup>1</sup>; Saikrishna Sanniboina<sup>1</sup>; Aaditya Lakshmanan<sup>1</sup>; Heath Murphy<sup>1</sup>; Paul Nolan<sup>1</sup>; Sazol Das<sup>1</sup>; <sup>1</sup>Novelis

#### 9:30 AM

**A Bayesian Approach for Constitutive Model Selection and Calibration Using Diverse Material Responses:** Bekassyl Battalgazy<sup>1</sup>; Danial Khatamsaz<sup>1</sup>; Zahra Ghasemi<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Ankit Srivastava<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 9:50 AM

**Conditional Diffusion Models for Interlocking Metasurface Design:** Nathan Brown<sup>1</sup>; Ben Young<sup>1</sup>; Brad Boyce<sup>1</sup>; Philip Noell<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 10:10 AM Break

#### 10:30 AM

**Design of High-Strength Steel Using Machine Learning Techniques:** Rajani Jaiswal<sup>1</sup>; Shiv Singh<sup>1</sup>; Saurabh Kundu<sup>2</sup>; Itishree Mohanty<sup>2</sup>; <sup>1</sup>IIT Kharagpur; <sup>2</sup>Tata Steel

#### 10:50 AM

**Towards Automatic Alloy Design via Large Language Model Powered Multi-Agent Collaborations:** Bo Ni<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 11:10 AM

**Tuning Fracture Characteristics for Chiral Aperiodic Monotile Based Composites by Employing Multi-Objective Bayesian Optimization:** Jiyoung Jung<sup>1</sup>; Kundo Park<sup>1</sup>; Grace Gu<sup>1</sup>; <sup>1</sup>University of California, Berkeley

#### 11:30 AM

**Machine Learning and High-Throughput Computations Guided Development of High Temperature Oxidation-Resisting Ni-Co-Cr-Al-Fe High-Entropy Alloys:** Xingru Tan<sup>1</sup>; William Trehern<sup>2</sup>; Aditya Sundar<sup>2</sup>; Yi Wang<sup>2</sup>; Saro San<sup>2</sup>; Tianwei Lu<sup>1</sup>; Fan Zhou<sup>1</sup>; Ting Sun<sup>1</sup>; Youyuan Zhang<sup>1</sup>; Yuying Wen<sup>1</sup>; Zhichao Liu<sup>1</sup>; Michael Gao<sup>2</sup>; Shanshan Hu<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>National Energy Technology Laboratory

## MECHANICS OF MATERIALS

### Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — Fundamentals III

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

**Wednesday AM | March 26, 2025**  
**370 | MGM Grand**

**Session Chair:** Jason Trelewicz, Stony Brook University

#### 8:30 AM

**Stability of High Energy Faults in Ni-Based Superalloys:** *Valery Borovikov<sup>1</sup>; Mikhail Mendelev<sup>1</sup>; Timothy Smith<sup>1</sup>; John Lawson<sup>1</sup>; <sup>1</sup>NASA*

#### 8:50 AM Invited

**Mechanistic Transitions Governing Strength and Stability in Grain Boundary Segregation Strengthened Nanocrystalline Aluminum Alloys:** *Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University*

#### 9:20 AM Invited

**Universal Interatomic Potential and Simulation of Kinetics:** *Ju Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

#### 9:50 AM

**Twin Boundary Engineering in Ni-Based Superalloy Thin Films:** *Aoyan Liang<sup>1</sup>; Mohammad Hadi Yazdani<sup>1</sup>; Diana Farkas<sup>2</sup>; Andrea Hodge<sup>1</sup>; Paulo Branicio<sup>1</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Virginia Tech*

#### 10:10 AM Break

#### 10:30 AM Invited

**Integrating Atomistic Simulations with Experimental Characterization to Understand Dislocation Mechanisms in Nanoscale Dual-Phase Alloys:** *Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan*

#### 11:00 AM

**Solid State Dewetting of Co-Sputtered Thin Mo-Cu Films Accompanied by Phase Separation:** *Feitao Li<sup>1</sup>; Afnan Mostafa<sup>2</sup>; Niaz Abdolrahim<sup>2</sup>; Jonathan Zimmerman<sup>1</sup>; Zhao Liang<sup>1</sup>; Leonid Klinger<sup>1</sup>; Jeyun Yeom<sup>3</sup>; Jolanta Janczak-Rusch<sup>3</sup>; *Eugen Rabkin<sup>1</sup>; <sup>1</sup>Technion; <sup>2</sup>University of Rochester; <sup>3</sup>Empa, Swiss Federal Laboratories for Materials Science and Technology**

#### 11:20 AM

**CRSS for Slip in Titanium: Theoretical Predictions and In-Situ Experimental Measurements:** *Orcun Koray Celebi<sup>1</sup>; Tolga Berkay Celebi<sup>2</sup>; Daegun You<sup>2</sup>; Ashley Bucsek<sup>3</sup>; Huseyin Sehitoglu<sup>2</sup>; <sup>1</sup>Bilkent University; <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>University of Michigan*

#### 11:40 AM

**Evaluation of Stacking Fault Energies and Microstructure Formation in Ni-Cr-Fe Alloys Using Molecular Statics and Dynamics:** *Mohammad Hadi Yazdani<sup>1</sup>; Aoyan Liang<sup>1</sup>; Diana Farkas<sup>2</sup>; Andrea Hodge<sup>1</sup>; Paulo Branicio<sup>1</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Virginia Tech*

## LIGHT METALS

### Bauxite Residue Valorization and Best Practices — Valorization from Policy, Zero-Emission and Systemic Perspectives

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Tobias Hertel, Ku Leuven; Christina Meskers, SINTEF; Efthymios Balomenos, Metlen Energy and Metals; Casper Van Der Eijk, SINTEF; Brajendra Mishra, Worcester Polytechnic Institute; Yiannis Pontikes, Ku Leuven R&D

**Wednesday AM | March 26, 2025**  
**111 | MGM Grand**

**Session Chair:** Tobias Hertel, Ku Leuven

#### 8:30 AM

**Developments in EGA's Bauxite Residue Roadmap:** *Steven Rosenberg<sup>1</sup>; Markus Graefe<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium*

#### 8:50 AM Question and Answer Period

#### 8:55 AM

**Bauxite Residue Valorisation in a Zero Emission, Zero Waste and Sustainability Policy Context:** *Christina Meskers<sup>1</sup>; Casper Van der Eijk<sup>1</sup>; <sup>1</sup>SINTEF*

#### 9:15 AM Question and Answer Period

#### 9:20 AM

**BR Valorisation: Can We See It Differently?:** *Yiannis Pontikes<sup>1</sup>; <sup>1</sup>Ku Leuven*

#### 9:40 AM Question and Answer Period

#### 9:45 AM

**Optimising Bauxite Residue for Use as a Soil Component:** *Markus Graefe<sup>1</sup>; Lucky Zaman<sup>1</sup>; Virender Kumar<sup>1</sup>; Steven Rosenberg<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium*

#### 10:05 AM Question and Answer Period

#### 10:10 AM Break

#### 10:20 AM

**Pelletization and Hydrogen Reduction of Bauxite Residue in Pilot Scale:** *Casper Van Der Eijk<sup>1</sup>; Arijit Biswas<sup>2</sup>; Frida Vollen<sup>1</sup>; <sup>1</sup>SINTEF; <sup>2</sup>Tata Steel*

#### 10:40 AM Question and Answer Period

#### 10:45 AM

**Innovative Hydrometallurgical Methods for Extracting Metallic Oxides from Bauxite Residue:** *Himanshu Tanvar<sup>1</sup>; Brajendra Mishra<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute*

#### 11:05 AM Question and Answer Period

#### 11:10 AM

**Hydrogen-Driven Sustainable Multi-Metal Recovery Approaches for Bauxite Residue: A Comparative Analysis:** *Ganesh Pilla<sup>1</sup>; Tobias Hertel<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>Ku Leuven*

#### 11:30 AM Question and Answer Period

#### 11:35 AM

**Activated Bauxite Residue Application in Wastewater Treatment:** *Scott Berggren<sup>1</sup>; Brajendra Mishra<sup>2</sup>; Himanshu Tanvar<sup>2</sup>; <sup>1</sup>GRON Metallic Group, Inc.; <sup>2</sup>Worcester Polytechnic Institute*

#### 11:55 AM Question and Answer Period

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## BIOMATERIALS

### Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hannes Schniepp, William & Mary; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University; David Kisailus, University of California-Irvine

**Wednesday AM | March 26, 2025**  
**307 | MGM Grand**

**Session Chairs:** Hannes Schniepp, William & Mary; Candan Tamerler, University of Kansas

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**8:30 AM**

**The Strength and Toughness of Spider Silk Nanofibrils: Origin of the Outstanding Performance of One of the Most Impressive Biogenic Structural Materials:** *Hannes Schniepp*<sup>1</sup>; <sup>1</sup>William & Mary

**8:55 AM Invited**

**Fabrication of Low Density Polyethylene Polymer Films Reinforced with Modified Fish Scale Powder:** Matthew Bonzu Ackah<sup>1</sup>; *Vijaya Rangari*<sup>2</sup>; <sup>1</sup>Tuskegee University

**9:25 AM Invited**

**Biocompatibility and Cell Response to Microstructured Bioinspired Ceramic Composites:** *Hortense Le Ferrand*<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**9:45 AM Break**

**10:00 AM Keynote**

**Natural Medicine Nanocarriers in 3D-Printed Scaffolds for Bone Regeneration:** *Susmita Bose*<sup>1</sup>; <sup>1</sup>Washington State University

**10:40 AM Invited**

**Synthesis of Ternary Quantum Dots for Selective Sensing of Chromium (iii) Ion and Its Conjugation to Porphyrin for Improved Photodynamic Therapy Application:** *Samuel Oluwafemi*<sup>1</sup>; <sup>1</sup>University of Johannesburg

**11:10 AM**

**Biomimetic Design of Antibacterial Chimeric Peptides: Engineered Peptides for Next-Generation Dental Restorations:** *Nur Ceren Kabakci*<sup>1</sup>; Aya Cloyd<sup>1</sup>; Kyle Boone<sup>1</sup>; Paulette Spencer<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas

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## BIOMATERIALS

### Biological Materials Science — Multi-Scale Characterization of Biomaterials

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Wednesday AM | March 26, 2025**  
**306 | MGM Grand**

**Session Chairs:** Grace Gu, University of California, Berkeley; Ning Zhang, Baylor University

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**8:30 AM Invited**

**Dynamics of Topological Defects and Structural Synchronization in Forming Nacre:** *Igor Zlotnikov*<sup>1</sup>; <sup>1</sup>Technische Universität Dresden

**9:00 AM**

**Study of the Relationship Between Microstructural Alterations and Elastic Properties in Teeth with Dentinogenesis Imperfecta:** *Shangaya Touraivane*<sup>1</sup>; Nicolas Roubier<sup>1</sup>; Thomas Reiss<sup>1</sup>; Elsa Vennat<sup>1</sup>; Claire Acevedo<sup>2</sup>; <sup>1</sup>Laboratoire de Mécanique Paris-Saclay (LMPS), CentraleSupélec, ENS Paris-Saclay, Université Paris-Saclay, CNRS; <sup>2</sup>University of California San Diego

**9:20 AM**

**Harnessing Natural Materials for Tailored Bone Graft:** *Yu Jun Tan*<sup>1</sup>; <sup>1</sup>National University of Singapore

**9:40 AM Invited**

**Atomistic Investigation of Interfacial Interactions in Wood Coated with Layered Double Hydroxides-Induced Stearic Acid:** *Yuqi Feng*<sup>1</sup>; *David Lau*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**10:10 AM Break**

**10:30 AM**

**Accelerating Bioinspired Cellulose Nanocomposite Design Through the Development of a Coarse-Grained Molecular Dynamics Approach:** *Sharmi Mazumder*<sup>1</sup>; *Ning Zhang*<sup>1</sup>; <sup>1</sup>Baylor University

**10:50 AM**

**Retrieval-Augmented Generation Platform to Enable Machine Learning Predictive Models of Biomedical Alloys:** *Victor Villapun Puzas*<sup>1</sup>; Hasan Sayeed<sup>2</sup>; Sophie Cox<sup>1</sup>; Taylor Sparks<sup>2</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>University of Utah

**11:10 AM**

**Novel Characterization of Zeta Potential and Electrochemical Interactions between Cells and Microplastics:** *Jeffrey Bates*<sup>1</sup>; <sup>1</sup>University of Utah

WEDNESDAY AM

## Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Multiscale Modeling of Dislocations and Mechanical Behavior

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Wednesday AM | March 26, 2025**  
**353 | MGM Grand**

**Session Chair:** Liang Qi, University of Michigan

### 8:30 AM Invited

**Peierls-Nabarro Modeling of Dislocations in High Entropy Alloys:** X. Liu<sup>1</sup>; T. Moran<sup>1</sup>; B. Aymon<sup>1</sup>; *William Curtin*<sup>2</sup>; <sup>1</sup>École Polytechnique Fédérale de Lausanne; <sup>2</sup>École Polytechnique Fédérale de Lausanne; Brown University

### 9:00 AM

**Molecular Dynamic Studies of Strain Rate Effects on Screw Dislocation Mobility in BCC Metals:** *Subhendu Chakraborty*<sup>1</sup>; Liang Qi<sup>1</sup>; <sup>1</sup>University of Michigan

### 9:20 AM Invited

**Mechanism-Based Data-Driven Exploration of Complex Concentrated Alloys with Enhanced Mechanical Performance:** Yi Yao<sup>1</sup>; Jonathan Cappola<sup>1</sup>; Zhengyu Zhang<sup>2</sup>; Wenjun Cai<sup>2</sup>; *Lin Li*<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Virginia Polytechnic Institute and State University

### 9:50 AM

**Computational Studies on Statistical Features of Dislocation Glide Energetics in Refractory Complex Concentrated Alloys:** *Jierui Zhao*<sup>1</sup>; Yang Chen<sup>1</sup>; Liang Qi<sup>1</sup>; <sup>1</sup>University of Michigan, Ann Arbor

### 10:10 AM Break

### 10:30 AM Invited

**Atomistically-Informed Discrete Dislocation Dynamics Simulations of Shock in Aluminum:** Andre Archer<sup>1</sup>; Cameron Frampton<sup>1</sup>; *Douglas Spearot*<sup>1</sup>; <sup>1</sup>University of Florida

### 11:00 AM

**Developing Data-Driven Dislocation Mobility Laws for BCC Metals:** *Nicole Aragon*<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Eric Rothchild<sup>1</sup>; Hojun Lim<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

### 11:20 AM

**A Dislocation Density-Based Crystal Plasticity Finite Element Model for Predicting Creep Behavior in Lamellar Titanium-Aluminum Alloys:** *Karel Ziminsky*<sup>1</sup>; Cheng Sun<sup>1</sup>; <sup>1</sup>Clemson University

## Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Materials Processing Analysis and Characterization

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Wednesday AM | March 26, 2025**  
**121 | MGM Grand**

**Session Chairs:** Kelvin Xie, Texas A&M University; Yunus Kalay, Middle East Technical University

### 8:30 AM

**Novel In-Situ Characterization of Uranium Diboride via Thermal Imaging:** *Jordan Stone*<sup>1</sup>; Mira Khair<sup>1</sup>; Jennifer Stansby<sup>2</sup>; Natasha Engel<sup>1</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>University of Texas San Antonio; <sup>2</sup>University of New South Wales

### 8:50 AM

**Chemo-Mechanical Characterization of V2O5 Single Crystals Via Nanoindentation and In Situ Lithiation:** *Victor Balcorta*<sup>1</sup>; Rachel Lee<sup>1</sup>; Raj Pattel<sup>1</sup>; Samantha Kotze<sup>1</sup>; Arnab Maji<sup>1</sup>; John Ponis<sup>1</sup>; Christopher Walker<sup>1</sup>; Kelvin Xie<sup>1</sup>; George Pharr<sup>1</sup>; Sarbajit Banerjee<sup>1</sup>; Matt Pharr<sup>1</sup>; <sup>1</sup>Texas A&M University

### 9:10 AM

**Novel Acoustic Characterization Techniques for Lithium-Ion Battery Materials:** *Antanas Daugela*<sup>1</sup>; Jurgis Daugela<sup>2</sup>; Maria Daugela<sup>1</sup>; <sup>1</sup>Nanometronix LLC; <sup>2</sup>Johns Hopkins University

### 9:30 AM

**Shock Compression Impact on Covalently-Bonded Materials:** *Boya Li*<sup>1</sup>; Alex Li<sup>1</sup>; Shiteng Zhao<sup>2</sup>; Marc Meyers<sup>1</sup>; <sup>1</sup>University of California San Diego; <sup>2</sup>Beihang University

### 9:50 AM

**Uncovering Fast Thermal Effects in Metals by In-Situ MEMS Heating in SEM:** *Christina Koenig*<sup>1</sup>; Alice Bastos da Silva<sup>1</sup>; Joerg Jinschek<sup>1</sup>; <sup>1</sup>Technical University of Denmark - DTU Nanolab

### 10:10 AM Break

### 10:20 AM

**Coal-Based Colloidal Composite Binder: Characterization of a New Efficient Binder for Iron Ore Agglomeration:** *Jin Zhang*<sup>1</sup>; Xin Zhang<sup>1</sup>; Chengzhi Wei<sup>1</sup>; Rui Song<sup>1</sup>; Yesheng Cheng<sup>1</sup>; Canglong Li<sup>1</sup>; Guanghui Li<sup>1</sup>; Tao Jiang<sup>1</sup>; <sup>1</sup>Central South University

### 10:40 AM

**Influence of Functional-Gradation on the Energy Absorption Performance of Triply Periodic Minimal Surface (TPMS) Lattice Structures:** *Yehan Rajapakse*<sup>1</sup>; *Juan Escobedo-Diaz*<sup>2</sup>; Jianshen Wang<sup>1</sup>; Damith Mohotti<sup>1</sup>; Hongxu Wang<sup>1</sup>; Paul Hazell<sup>1</sup>; <sup>1</sup>University of New South Wales

### 11:00 AM

**In-Situ Grain Growth Analysis With Quenching Dilatometry and Non-Destructive Laser Ultrasound:** *Heng Wang*<sup>1</sup>; Florian Linseis<sup>1</sup>; <sup>1</sup>Linseis Inc.



11:20 AM

**Characterizing Microstructural Texture of Polycrystalline Materials Using Ultrasonic Scattering:** *Showmic Islam*<sup>1</sup>; Joseph Turner<sup>1</sup>; Nathaniel Matz<sup>1</sup>; <sup>1</sup>University of Nebraska-Lincoln

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Grain Boundary Chemistry and Dynamics

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Wednesday AM | March 26, 2025**  
**304 | MGM Grand**

**Session Chairs:** Flynn Walsh, Lawrence Livermore National Laboratory; Daniel Moore, Lehigh University

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**8:30 AM Invited**

**Atomic Cluster Expansion for Accurate Simulations of Interfaces:** *Ralf Drautz*<sup>1</sup>; <sup>1</sup>Icams / Ruhr-University Bochum

**9:00 AM**

**Realistic Interface Thermodynamics With Grand Canonical Monte Carlo:** *Flynn Walsh*<sup>1</sup>; Timofey Frolov<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**9:20 AM**

**Dislocation Pattern and Motion Mechanisms of Twist Grain Boundaries in High-Entropy Alloys:** *Wanjuan Zou*<sup>1</sup>; Diran Apelian<sup>1</sup>; Timothy Rupert<sup>1</sup>; Xiaoqing Pan<sup>1</sup>; Penghui Cao<sup>1</sup>; <sup>1</sup>University of California, Irvine

**9:40 AM Invited**

**Influence of Irradiation Damage on the Mechanical Properties and Stability of Grain Boundaries in Ultrafine-Grained Gold Thin Films:** *Josh Kacher*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**10:10 AM Break**

**10:30 AM**

**Atomistic Simulations for Grain Boundary Migration and Texture Evolution in Mg Alloys:** *Vaidehi Menon*<sup>1</sup>; Liang Qi<sup>1</sup>; <sup>1</sup>University of Michigan

**10:50 AM**

**Interplay Between Dislocation Type and Local Structure in Dislocation-Twin Boundary Reactions in Cu:** *Khanh Dang*<sup>1</sup>; Avanish Mishra<sup>1</sup>; Sumit Suresh<sup>1</sup>; Nithin Mathew<sup>1</sup>; Edward Kober<sup>1</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**11:10 AM**

**Grain Boundaries in NiTi Shape Memory Alloys as Host Sites for Martensite Nuclei:** *Gabriel Plummer*<sup>1</sup>; Mikhail Mendelev<sup>1</sup>; Othmane Benafan<sup>2</sup>; John Lawson<sup>1</sup>; <sup>1</sup>Nasa Ames Research Center; <sup>2</sup>NASA Glenn Research Center

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## NUCLEAR MATERIALS

### Composite Materials for Nuclear Applications III — Composites for Fusion Applications: Tungsten, Metals, and Shielding

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Composite Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Anne Campbell, Oak Ridge National Laboratory; Dong (Lilly) Liu, University of Oxford; Rick Ubig, Boise State University; Lauren Garrison, Commonwealth Fusion Systems; Peng Xu, Idaho National Laboratory; Johann Riesch, Max Planck Institute For Plasma Physics; James Wade-Zhu, UKAEA

**Wednesday AM | March 26, 2025**  
**164 | MGM Grand**

**Session Chairs:** Johann Riesch, Max Planck Institute For Plasma Physics; Lauren Garrison, Commonwealth Fusion Systems

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**8:30 AM Invited**

**Development of Tungsten Fiber-Reinforced Tungsten Composites for Fusion Application:** *Yiran Mao*<sup>1</sup>; Jan Coenen<sup>1</sup>; Johann Riesch<sup>2</sup>; Xiaoyue Tan<sup>3</sup>; Rudolf Neu<sup>2</sup>; Christoph Broeckmann<sup>4</sup>; Juan Du<sup>5</sup>; Wolfgang Pantleon<sup>6</sup>; Yucheng Wu<sup>3</sup>; Bernhard Unterberg<sup>1</sup>; Christian Linsmeier<sup>1</sup>; <sup>1</sup>Forschungszentrum Juelich GmbH; <sup>2</sup>Max-Planck-Institut für Plasmaphysik; <sup>3</sup>School of Mechanical Engineering, Hefei University of Technology; <sup>4</sup>Institut für Werkstoffanwendungen im Maschinenbau (IWM), RWTH Aachen University; <sup>5</sup>Southwest Institute of Physics; <sup>6</sup>Technical University of Denmark

**8:55 AM Invited**

**Thermal Stability of Powder Metallurgically Manufactured Tungsten Fiber-Reinforced Tungsten Composites at 1450 °C:** *Svitlana Rudchenko*<sup>1</sup>; Yiran Mao<sup>2</sup>; *Wolfgang Pantleon*<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>Forschungszentrum Jülich GmbH

**9:20 AM**

**Determination of Interface Properties of W/EUROFER Coating on Steel Substrate by Phased Array Ultrasonic and Fracture Mechanical Testing:** *Ashwini Kumar Mishra*<sup>1</sup>; Jarir Aktaa<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology (KIT), Institute for Applied Materials

**9:40 AM Invited**

**Additively Manufactured Transition Layer Design for Fusion Reactor Components:** *Tim Graening*<sup>1</sup>; Ibrahim Karaman<sup>2</sup>; Deniz Ebeperi<sup>2</sup>; Alberico Talignani<sup>3</sup>; Morris Wang<sup>3</sup>; Philip DePond<sup>4</sup>; Jianchao Ye<sup>4</sup>; Ishtiaque Robin<sup>5</sup>; Ying Yang<sup>4</sup>; Christopher Ledford<sup>1</sup>; Michael Kirka<sup>1</sup>; Yutai Kato<sup>1</sup>; <sup>1</sup>ORNL; <sup>2</sup>Texas A&M; <sup>3</sup>UCLA; <sup>4</sup>LLNL; <sup>5</sup>UTK

**10:05 AM Break**

**10:25 AM**

**Radiation Resistance of Nanostructured Ferritic Alloys Produced via Various Methods:** *Eda Aydogan*<sup>1</sup>; Dalong Zhang<sup>1</sup>; Xiang Wang<sup>1</sup>; Jens Darsell<sup>1</sup>; Xiao Li<sup>1</sup>; Osman EL-Atwani<sup>1</sup>; Kurt Lavender<sup>1</sup>; Mark Rhodes<sup>1</sup>; Justin Olson<sup>1</sup>; Kayla Yano<sup>1</sup>; Tingkun Liu<sup>1</sup>; Ramprasad Prabhakaran<sup>1</sup>; Iver Anderson<sup>1</sup>; Stuart Maloy<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:45 AM**

**Tritium Breeder Composites for Fusion Applications:** *Michael Moorehead*<sup>1</sup>; Priyanshi Agrawal<sup>1</sup>; Stephanie Pitts<sup>1</sup>; Larry Aagesen<sup>1</sup>; Pierre-Clément Simon<sup>1</sup>; Chase Taylor<sup>1</sup>; Jorgen Rufner<sup>1</sup>; Timothy Yoder<sup>1</sup>; Danny Hermawan<sup>2</sup>; Edwin Garcia<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Purdue University

WEDNESDAY AM

11:05 AM

**Analyzing Advanced Composite Shield Materials for Fusion and Space Reactor Applications:** *Mediha Merve Karatas<sup>1</sup>*; Steven John Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

11:25 AM

**Microstructural Evolution of Tungsten Boride Neutron Shielding Materials Under Radiation:** *Tamas Zagyva<sup>1</sup>*; Mashu Harada<sup>1</sup>; Samuel Humphry-Baker<sup>1</sup>; <sup>1</sup>Imperial College London

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Methods for Accelerated Simulations, and Defect Thermodynamics & Kinetics

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Wednesday AM | March 26, 2025**  
**305 | MGM Grand**

**Session Chairs:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne; Mohammad Younes Araghi, University of Oklahoma

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8:30 AM Invited

**Super-Cell Random APproximates (SCRAPs) – Improved Tool to Rapidly Generate Models of High-Entropy Alloys and Intermetallics for Materials Design:** *Duane D Johnson<sup>1</sup>*; Dhruv Raturi<sup>1</sup>; Prashant Singh<sup>1</sup>; Andrey Smirnov<sup>1</sup>; William A Shelton<sup>2</sup>; Kirill Kovnir<sup>3</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Louisiana State University; <sup>3</sup>Iowa State University

9:00 AM Invited

**The Strength of Refractory High Entropy Alloys and Its Connection to Atomic Size Imperfections:** *Jaime Marian<sup>1</sup>*; <sup>1</sup>University of California, Los Angeles

9:30 AM

**Unraveling the Thermodynamics of Precipitation Hardenable Multi-Component Refractory Alloys:** *Anirudh Raju Natarajan<sup>1</sup>*; <sup>1</sup>École Polytechnique Fédérale de Lausanne

9:50 AM

**GPR-Assisted Ab-Initio Approach for Identifying Transition States in Dynamically Stabilized, Structurally Unstable Phases:** *Seyyedfaridoddin Fattahpour<sup>1</sup>*; Sara Kadkhodaei<sup>1</sup>; <sup>1</sup>University of Illinois at Chicago

10:10 AM Break

10:30 AM Invited

**Mechanistic Understanding of Vacancy Formation Energies in FCC HEAs From DFT Calculations:** *Nathan Linton<sup>1</sup>*; *Dilpuneet Aidhy<sup>1</sup>*; <sup>1</sup>Clemson University

11:00 AM Invited

**Vacancy Diffusion Barrier Spectrum and Diffusion Correlation in Multicomponent Alloys:** *Penghui Cao<sup>1</sup>*; <sup>1</sup>University of California, Irvine

11:30 AM

**Investigating Temperature-Dependent Crack Susceptibility in Nickel-Based Superalloys Using Thermo-Calc and Machine Learning:** *Mohammad Younes Araghi<sup>1</sup>*; Shuozhi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma

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## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Processing I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

**Wednesday AM | March 26, 2025**  
**317 | MGM Grand**

**Session Chairs:** Christopher Hutchinson, Monash University; Dorte Juul Jensen, Technical University of Denmark

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8:30 AM Invited

**Microstructural Engineering of Additively Manufactured Metals:** *Dorte Juul Jensen<sup>1</sup>*; <sup>1</sup>Technical University of Denmark

9:00 AM

**Effect of Wire Melting State on Solidification Microstructures of Alloys in Wire-Laser Directed Energy Deposition:** *Lin Gao<sup>1</sup>*; *Tao Sun<sup>2</sup>*; <sup>1</sup>University of Virginia; <sup>2</sup>Northwestern University

9:20 AM

**Site Specific Control of Microstructure in Electron Beam Powder Bed Fusion via Power-Field Optimization:** *Mikhail Khrenov<sup>1</sup>*; Lauren Fitzwater<sup>1</sup>; Moon Tan<sup>1</sup>; Michelle Hobdari<sup>1</sup>; P. Chris Pistorius<sup>1</sup>; Sneha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

9:40 AM Invited

**Printing Architected Materials Through Spatial Control of Mesostructure in Laser Powder Bed Fusion (LPBF):** *Christopher Hutchinson<sup>1</sup>*; <sup>1</sup>Monash University

10:10 AM Break

10:30 AM

**Site-Specific Microstructural Control of High Manganese Steel Processed by Laser Powder Bed Fusion:** *Miroslav Smid<sup>1</sup>*; Michal Jambor<sup>1</sup>; Helena Van Swygenhoven<sup>1</sup>; Filip Grygar<sup>2</sup>; Daniel Koutny<sup>2</sup>; <sup>1</sup>Institute of Physics of Materials, CAS; <sup>2</sup>Brno University of Technology

10:50 AM

**Laser Powder Bed Fusion Processing of Oxide Dispersion-Strengthened (ODS) Pure Copper for High-Resolution and High-Strength Complex-Geometry 3D Components:** *Shuo Qu<sup>1</sup>*; *Xu Song<sup>2</sup>*; <sup>1</sup>Chinese University of Hong Kong; <sup>2</sup>The Chinese University of Hong Kong

11:10 AM

**New Insights Into the Microstructural Evolution and Mechanical Properties of 17-4PH SS Developed During Laser Powder Bed Fusion:** *Mahsa Amir<sup>1</sup>*; Zahra Zanjani Foumani<sup>1</sup>; Penghui Cao<sup>1</sup>; Ramin Bostanabad<sup>1</sup>; Lorenzo Valdevit<sup>1</sup>; <sup>1</sup>University of California, Irvine

11:30 AM

**Powder-Size Driven Facile Microstructure Control for Enhanced Mechanical Performance of 3D-Printed Stainless Steel:** *Xipeng Tan<sup>1</sup>*; <sup>1</sup>National University of Singapore

11:50 AM

**Engineering Gradient Microstructure via Laser-Directed Energy Deposition for Superior Dynamic Mechanical Properties:** *Shanmukha Guraja<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Rajiv S. Mishra<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas*

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## SPECIAL TOPICS

### DMM5: A Decade of Creating Inclusion and Belonging for Diversity in the Minerals, Metals, and Materials Professions — Physical & Cognitive Diversity

**Sponsored by:** TMS: Membership Diversity & Development Committee, TMS: Diversity, Equity, and Inclusion Committee

**Program Organizers:** Ben Britton, University of British Columbia; Lauren Garrison, Commonwealth Fusion Systems; Keith Bowman, University of Maryland Baltimore County; Katelyn Jones; Suveen Mathaudhu, Colorado School of Mines; Ashley Paz y Puente, University of Cincinnati; Soumya Varma, KLA Corporation; Eva Zarkadoulia; Danielle White, University of Southern California

Wednesday AM | March 26, 2025  
150 | MGM Grand

**Session Chair:** Ben Britton, University of British Columbia

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**9:20 AM Introductory Comments:** Introduction to Celebrating and Accommodating Physical and Cognitive Disabilities in Materials Science

**9:30 AM Panel Discussion:** Perspectives on Physical and Cognitive Disability Needs in the Workplace - Panelist include Jennifer Carter, Case Western Reserve University, and Gee Abraham, Gee Abraham Edits

**10:10 AM Break**

**10:30 AM**

**Creating a Trauma Informed Environment: A Survivors Perspective:** *Andrew Hoffman<sup>1</sup>; <sup>1</sup>Catalyst Science Solutions*

**11:00 AM Interactive Session with Andrew Hoffman**

**11:30 AM Concluding Comments and Group Discussion**

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## LIGHT METALS

### Electrode Technology for Aluminum Production — Anode Performance

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Egil Skybakmoen, SINTEF Industry; Les Edwards, Rain Carbon Inc.

Wednesday AM | March 26, 2025  
112 | MGM Grand

**Session Chairs:** Edouard Mofor, Emirates Global Aluminium; Egil Skybakmoen, SINTEF Industry

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**8:30 AM Introductory Comments**

**8:35 AM**

**Electrochemical Characterization of Bubble Behaviour on Pilot Anodes With Varying Porosity and Coke Quality:** *Goril Jahrsengene<sup>1</sup>; Arne Petter Ratvik<sup>1</sup>; Lorentz Petter Lossius<sup>2</sup>; Ann Mari Svensson<sup>3</sup>; <sup>1</sup>SINTEF; <sup>2</sup>Hydro Aluminium AS; <sup>3</sup>NTNU Norwegian University of Science and Technology*

9:00 AM

**Novel 3D X-Ray Microscopy Technique to Unlock the Detail of Internal Coke Structures:** *Howard Childs<sup>1</sup>; Sara Enstrom<sup>1</sup>; Barbara Cramer<sup>1</sup>; Barry Sadler<sup>2</sup>; <sup>1</sup>Bp Coke; <sup>2</sup>Net Carbon Consulting Pty Ltd*

9:25 AM

**The Anode Baking Level Measurement Scale - Ensuring Harmonization When Using the ISO 17499 Method With Different Green Cokes:** *Lorentz Petter Lossius<sup>1</sup>; Viktorija Tomkute<sup>1</sup>; Kirsti Gulbrandsen<sup>1</sup>; Odd Einar Frosta<sup>1</sup>; Maia Hunt<sup>2</sup>; Les Edwards<sup>2</sup>; <sup>1</sup>Hydro Aluminium Metal; <sup>2</sup>Rain Carbon Inc.*

9:50 AM

**Screening Pyrolysis Bio-Oil for Bio-Binder Synthesis in Aluminum Production:** *Yazhe Wang<sup>1</sup>; Sirui Liu<sup>1</sup>; Hanmin Yang<sup>1</sup>; Nora Eriksen<sup>2</sup>; Viktorija Tomkute<sup>2</sup>; Sophia Peter<sup>2</sup>; Martin Walderhaug<sup>2</sup>; Aekjuthon Phounglamcheik<sup>3</sup>; Weihong Yang<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Norsk Hydro; <sup>3</sup>Envigas*

**10:15 AM Break**

**10:30 AM**

**The Impact of Chamfered Anode Sides on Cost and Carbon Consumption:** *Edouard Mofor<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium*

**10:55 AM**

**TeqMapping: A Test Developed to Map the Impact of Baking Temperatures on Calcined Petroleum Cokes (CPC):** *Viktorija Tomkute<sup>1</sup>; Lorentz Petter Lossius<sup>1</sup>; Kirsti Gulbrandsen<sup>1</sup>; Odd Einar Frosta<sup>1</sup>; <sup>1</sup>Hydro Aluminium AS*

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Reliability in Electronic Packaging

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

Wednesday AM | March 26, 2025  
360 | MGM Grand

**Session Chairs:** Praveen Kumar, Indian Institute of Science; Hannah Fowler, Sandia National Laboratories

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**8:30 AM**

**Reliability of Solder Joints Under Extreme Conditions of Elevated and Cryo Temperatures for In-Space Applications:** *Manish Kumar<sup>1</sup>; Sid Pathak<sup>1</sup>; Ralph Napolitano<sup>1</sup>; <sup>1</sup>Iowa State University*

**8:50 AM**

**Comparative Research on Reliability Characteristics of Combined Pb-Free Solder Joints With Sn-Ag-Cu and Sn-Bi-Ag:** *Jahyeon Kim<sup>1</sup>; Taeyoon Im<sup>1</sup>; Won Bin Im<sup>2</sup>; Yong-Ho Ko<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology (KITECH); <sup>2</sup>Hanyang University*

**9:10 AM**

**Study of Electromigration-Induced Voids Formation in Solder Microbumps by Using 3D X-Ray Microscopy:** *Shih-Chi Yang<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University*

**9:30 AM**

**Assessment of Solder Alloy for High Reliability Device:** *Wei-Ting Lin<sup>1</sup>; Kelvin Li<sup>2</sup>; Watson Tseng<sup>2</sup>; Chang-Meng Wang<sup>2</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>National Central University; <sup>2</sup>Shenmao Technology INC.*

9:50 AM

**Electromigration Behavior of Direct-Bonded Nano-Twinned Ag-Cu Bumps:** Yung-Pei Lin<sup>1</sup>; Peng Hsiang Hsu<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

10:10 AM Break

10:30 AM

**Reliability and Lifetime Predictions of Fine Pitch Ball Grid Arrays in Thermal Cycling:** Hannah Fowler<sup>1</sup>; Ryan Smith<sup>1</sup>; Robert Buarque de Macedo<sup>1</sup>; Joshua Minster<sup>1</sup>; Deborah Hagen<sup>1</sup>; Jessica Buckner<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

10:50 AM

**Impact of Cryogenic Thermal Cycling on Solder Interconnect Mechanical Stability:** Ande Kitamura<sup>1</sup>; Yujin Park<sup>2</sup>; Gnyaneshwar Ramakrishna<sup>2</sup>; Tae-Kyu Lee<sup>2</sup>; <sup>1</sup>Portland State University; <sup>2</sup>Cisco Systems

11:10 AM

**Investigation of Electromigration Lifetime for Cu-Cu Joints With Various Microstructures:** Hsin-Yu Tsai<sup>1</sup>; Chih Chen<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

11:30 AM

**Electrochemical Migration Behavior and Its Improvement of Fine-Pitch Ag Interconnects:** Hung-Lin Chen<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

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## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Advanced Techniques for Elucidating Radiation Effects in Structural Materials II

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

Wednesday AM | March 26, 2025  
162 | MGM Grand

**Session Chair:** Mukesh Bachhav, Idaho National Laboratory

8:30 AM Invited

**A Multi-Technique Approach to Understand the Materials Under Extreme Environments:** Deodatta Shinde<sup>1</sup>; Sudip Kumar Sarkar<sup>1</sup>; Sarita Ahlawat<sup>1</sup>; Vishwanadh Bathula<sup>1</sup>; Kamlesh Chandra<sup>1</sup>; Debasis Sen<sup>1</sup>; Priya Maheshwari<sup>1</sup>; Aniruddha Biswas<sup>1</sup>; Raghavendra Tewari<sup>1</sup>; <sup>1</sup>Bhabha Atomic Research Centre

9:00 AM Invited

**Irradiation Damage in Advanced Pressure Vessel Steels:** Elaine West<sup>1</sup>; Nathan Almirall<sup>2</sup>; Alexander Chang<sup>1</sup>; Raymond Stofanak<sup>1</sup>; <sup>1</sup>NNL; <sup>2</sup>GE Aerospace

9:30 AM

**Cavity and Dislocation Loop Evolution in Neutron Irradiated 800H Alloy:** Antoine Waegert<sup>1</sup>; Xingyu Liu<sup>1</sup>; Xing Wang<sup>1</sup>; Arthur Motta<sup>1</sup>; <sup>1</sup>Pennsylvania State University

9:50 AM

**An Irradiation Microstructure Challenge Problem for Accelerated Irradiation Effects Qualification:** Stephen Toller<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Timothy Lach<sup>1</sup>; Andrea Jokisaari<sup>3</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Idaho National Laboratory

10:10 AM Break

10:25 AM

**Microstructural Investigation of Grade 92 Steel After Fast Neutron Irradiation to 16 - 87 dpa at 380 – 530°C:** Emily Proehl<sup>1</sup>; Weicheng Zhong<sup>2</sup>; Steven Zinkle<sup>1</sup>; Stephen Toller<sup>2</sup>; <sup>1</sup>University of Tennessee-Knoxville; <sup>2</sup>Oak Ridge National Laboratory

10:45 AM

**Predictions of Precipitate Morphologies at Dislocations and Grain Boundaries Under Irradiation:** Nicholas Saunders<sup>1</sup>; Robert Averback<sup>1</sup>; Pascal Bellon<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

11:05 AM

**Effect of Processing-Induced Precipitates on Nanoprecipitation and Radiation-Induced Segregation in Electron Beam Welded PM-HIP Low-Alloy Steel:** Grayson Nemets<sup>1</sup>; Elliot Marrero<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Janelle Wharry<sup>1</sup>; Maria Okuniewski<sup>1</sup>; Zhongxia Shang<sup>1</sup>; Yu Lu<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Center for Advanced Energy Studies

11:25 AM

**Heterogeneous Void Formation in Irradiated AM 316L and AM316H Stainless Steels:** Wei-Ying Chen<sup>1</sup>; Sanjoy Mazumder<sup>2</sup>; Stephen Toller<sup>3</sup>; Andrea Jokissari<sup>2</sup>; Rongjie Song<sup>2</sup>; Yiren Chen<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Idaho National National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

11:45 AM

**Real-Time Neutron Diffraction to Support Interpretation of DSC Results on Zr-2.5Nb for Reactor Pressure Tubes:** Sven Vogel<sup>1</sup>; Amy I. Fluke<sup>2</sup>; Daniel J. Savage<sup>1</sup>; Toshiro Tomida<sup>3</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Canadian Nuclear Laboratories; <sup>3</sup>Frontier Research Center for Applied Atomic Sciences, Ibaraki University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Multiple Principal Component Materials — Aqueous Corrosion and Embrittlement

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Wenjun Cai, Virginia Polytechnic Institute and State University; XiaoXiang Yu, Novelis Inc.; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Kit; Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

Wednesday AM | March 26, 2025  
169 | MGM Grand

**Session Chairs:** Wenbo Wang, Oak Ridge National Laboratory; Dennis Boakye, University of Manitoba

8:30 AM Invited

**Corrosion and Passivation of Multi-Principal Element Alloys in Aqueous Solutions:** John Scully<sup>1</sup>; Samuel Inman<sup>1</sup>; Debashish Sur<sup>1</sup>; Peter Connors<sup>1</sup>; Catherine Lynch<sup>1</sup>; Katie Anderson<sup>1</sup>; <sup>1</sup>University of Virginia

8:50 AM

**Hydrogen Interaction With Stacking Faults in CoCrNiW Alloy: Insights From In-Situ ECCI During Tensile Testing:** Parth Khandelwal<sup>1</sup>; Cemal Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology



9:10 AM

**Hydrogen Solution in a TiNbZr Medium-Entropy Alloy:** *Chengguang Wu<sup>1</sup>; Yilun Gong<sup>1</sup>; Yan Ma<sup>1</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max-Planck Institute for Sustainable Materials*

9:30 AM

**Optimizing Strength-Corrosion Properties in Sulphuric Acid Environment via Tailoring V-Cr Composition in Medium-Entropy VCrCoNi Alloys:** *Hyun Chung<sup>1</sup>; Gukhyun Lim<sup>2</sup>; Seungjin Nam<sup>1</sup>; Hoon-Hwe Cho<sup>3</sup>; Jihyun Hong<sup>2</sup>; Seok Su Sohn<sup>1</sup>; <sup>1</sup>Korea University; <sup>2</sup>Korea Institute of Science and Technology (KIST); <sup>3</sup>Hanbat National University*

9:50 AM Invited

**Coincident Design and Processing of Alloy and “Coating” in Multiprincipal Element Alloys:** *Mitra Taheri<sup>1</sup>; David Beaudry<sup>1</sup>; Elaf Anber<sup>1</sup>; Emily Holcombe<sup>2</sup>; Tyrel McQueen<sup>1</sup>; Ben Redemann<sup>1</sup>; Loic Perriere<sup>3</sup>; Jean-Philippe Couzinie<sup>3</sup>; Debashish Sur<sup>4</sup>; John Scully<sup>4</sup>; Charlie Brandenburg<sup>4</sup>; Elizabeth Opila<sup>4</sup>; Michael Waters<sup>5</sup>; James Rondinelli<sup>5</sup>; Nathan Smith<sup>5</sup>; Christopher Wolverton<sup>5</sup>; Karl Sieradzki<sup>6</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University; Naval Surface Warfare Center Carderock; <sup>3</sup>CNRS & Universite Paris Est Creteil; <sup>4</sup>University of Virginia; <sup>5</sup>Northwestern University; <sup>6</sup>Arizona State University*

10:10 AM Break

10:30 AM

**Investigating the Synergistic Effects of Al on Aqueous Passivation of Cr Containing (FeCoNi)-Cr<sub>x</sub>Al<sub>y</sub> Compositionally Complex Alloys (CCAs):** *Debashish Sur<sup>1</sup>; William Blades<sup>2</sup>; Ben Redemann<sup>3</sup>; Nathan Smith<sup>4</sup>; Emily Holcombe<sup>3</sup>; Mitra Taheri<sup>3</sup>; Chris Wolverton<sup>4</sup>; Tyrel McQueen<sup>3</sup>; Karl Sieradzki<sup>5</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Juniata College; <sup>3</sup>Johns Hopkins University; <sup>4</sup>Northwestern University; <sup>5</sup>Arizona State University*

10:50 AM Invited

**Recent Updates on Corrosion Behaviors of High Entropy Alloys:** *Peter Liaw<sup>1</sup>; Lia Amalia<sup>1</sup>; Rui Feng<sup>2</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>National Energy Technology Laboratory*

11:10 AM

**Investigation of Corrosion Behavior of FeCoNiCuZn High Entropy Alloy in H<sub>2</sub>SO<sub>4</sub>, NaCl, and KOH Electrolyte Solution:** *Mo Rizwan Ahmad Qureshi<sup>1</sup>; Gobinda Chandra Mohanty<sup>2</sup>; Chandra Sekhar Tiwary<sup>2</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar; <sup>2</sup>Indian Institute of Technology Kharagpur*

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmentally Assisted Cracking: Theory and Practice — Corrosion and Degradation in Harsh Environments

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bai Cui, University of Nebraska Lincoln; Raul Rebak, GE Global Research; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Jenifer Locke, Ohio State University

Wednesday AM | March 26, 2025  
167 | MGM Grand

**Session Chairs:** Xiaolei Guo, Colorado School of Mines; Srujan Rokkam, Advanced Cooling Technologies, Inc.

8:30 AM Invited

**Pitting Corrosion of Stainless Steel 304 in Concentrated MgCl<sub>2</sub> Solution:** *Xiaolei Guo<sup>1</sup>; Yuxuan Shui<sup>2</sup>; Irem Efe<sup>2</sup>; Jenifer Locke<sup>2</sup>; Gerald Frankel<sup>2</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>The Ohio State University*

9:00 AM

**Corrosion Behavior and Basic Microstructure of As-Cast Al-Mg-Ce Alloys in 0.6 M NaCl:** *Adam Thompson<sup>1</sup>; Khaing Khaing Aye<sup>1</sup>; William Musinski<sup>2</sup>; Zachary Harris<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of Wisconsin-Milwaukee*

9:20 AM

**The Competition Between Atmospheric Oxidation and Embrittlement of Aluminum in Gallium-Based Liquid Metal Environments:** *Michael Mizak<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida*

9:40 AM Break

10:00 AM Invited

**Corrosion Cracking and Fracture Modeling via a Meshless Peridynamics Framework:** *Srujan Rokkam<sup>1</sup>; Masoud Behzadinasab<sup>2</sup>; Max Gunzburger<sup>3</sup>; Sachin Shanbhag<sup>3</sup>; Nam Phan<sup>4</sup>; <sup>1</sup>Advanced Cooling Technologies, Inc.; <sup>2</sup>PTC; <sup>3</sup>Florida State University; <sup>4</sup>Naval Air Systems Command*

10:30 AM

**Influence of Void Position and Density on Fracture Initiation From Phase-Field Simulation:** *An Ta<sup>1</sup>; Yixi Shen<sup>1</sup>; R. Seaton Ullberg<sup>1</sup>; Michael Tonks<sup>1</sup>; Simon Phillpot<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida*

10:50 AM

**How Solute Atoms Control Aqueous Corrosion of Al-Alloys:** *Huan Zhao<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University*

11:10 AM

**Efficacy of Laser Surface Treatment on Corrosion-Induced Fatigue of AA5456-H116 Alloys in Humid Air Environment:** *Rajaguru Jeyamohan<sup>1</sup>; Mohammed Shabana<sup>1</sup>; Ji Ma<sup>1</sup>; James Burns<sup>1</sup>; <sup>1</sup>University of Virginia*

## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Advanced Experimental Characterization of Microstructurally Driven Fatigue Behavior

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

Wednesday AM | March 26, 2025  
318 | MGM Grand

**Session Chair:** Brian Wisner, Ohio University

8:30 AM

**Deformation Mechanisms and Crack Initiation Sites in Haynes 244® Under Low-Cycle Fatigue:** *Ignacio Escobar-Moreno<sup>1</sup>; Zheng Ye<sup>2</sup>; Eugenia Nieto-Valeiras<sup>1</sup>; Biaobiao Yang<sup>1</sup>; Victoria A. Tucker<sup>3</sup>; Michael Titus<sup>3</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>University of Science and Technology Beijing and IMDEA Materials Institute; <sup>3</sup>Purdue University*

8:50 AM

**Fatigue Assessment of Metals – Bridging Production and Performance to Ensure Component Longevity:** Simon Strodick<sup>1</sup>; Kai Donnerbauer<sup>2</sup>; Johannes Otto<sup>1</sup>; Hanigah Kanagarajah<sup>1</sup>; Lars Lingnau<sup>1</sup>; Lukas Sauer<sup>1</sup>; Julian Roze Vasquez<sup>2</sup>; Matthias von Pavel<sup>2</sup>; Alexander Koch<sup>1</sup>; *Frank Walther*<sup>1</sup>; <sup>1</sup>TU Dortmund University; <sup>2</sup>TU Dortmund University and Institute for Research and Transfer (RIF)

9:10 AM

**Fatigue Crack Growth of Welded Steel Gusset Plate Joints by X-Ray Microtomography:** *Poonchezian Vishnu Prakash*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; Koji Kinoshita<sup>2</sup>; Yuki Banno<sup>2</sup>; Shohei Yamada<sup>3</sup>; Mototaka Saeki<sup>3</sup>; Yoshihiro Watanabe<sup>4</sup>; Mark Gruninger<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Gifu University; <sup>3</sup>Yamada Infra Technos Co. Ltd.; <sup>4</sup>TOYO SEIKO Co., Ltd

9:30 AM

**Mesoscale Cantilever Testing of High Cycle Fatigue Crack Initiation and Short Crack Growth in Ti-6Al-4V:** *Lazuardi Suryolaksone Pujilaksone*<sup>1</sup>; Jicheng Gong<sup>2</sup>; Angus Wilkinson<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>King's College London

9:50 AM Break

10:10 AM

**Strain Localization Near Grain and Twin Boundaries During Fatigue Studied Using In-Situ ECCI and HR-EBSD in Stainless Steel 316L:** *Yang Su*<sup>1</sup>; Josh Kacher<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

10:30 AM

**Synchrotron In Situ Characterization of Fatigue Crack Initiation Influenced by Intentionally Seeded Porosity in an Additively Manufactured Superalloy:** *Krzysztof Stopka*<sup>1</sup>; Jose Solano<sup>1</sup>; Peter Kenesei<sup>2</sup>; Jun-Sang Park<sup>2</sup>; Hemant Sharma<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Advanced Photon Source

10:50 AM

**Unsupervised Learning to Cluster Fatigue Life Based on Fatigue Fracture Surfaces:** *Katelyn Jones*<sup>1</sup>; Paul Shade<sup>2</sup>; Reji John<sup>2</sup>; Patrick Golden<sup>2</sup>; Elizabeth Holm<sup>3</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>University of Michigan, Ann Arbor

11:10 AM

**Probing Fatigue Crack Growth and Initiation Using Microscale Specimens:** M. H. Shahini<sup>1</sup>; A. Kaveh<sup>1</sup>; B. Zhang<sup>1</sup>; X. Zhang<sup>1</sup>; *Wen Meng*<sup>1</sup>; <sup>1</sup>Louisiana State University

## MATERIALS SYNTHESIS AND PROCESSING

### Friction Stir Welding and Processing XIII — Friction Stir Welding II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

Wednesday AM | March 26, 2025  
124 | MGM Grand

**Session Chairs:** Muneo Matsushita, Jfe Steel Corporation; Johnathon (John) Hunt, Concurrent Technology Corporation (CTC)

8:30 AM

**Industrial Production of Thick-Walled and Highly Loaded Aluminium Structures for Railroad Applications With FSW:** *Axel Meyer*<sup>1</sup>; <sup>1</sup>RIFTEC GmbH

8:50 AM

**Friction Stir Lap Welding for High-Strength Aluminum Automotive Components:** *Piyush Upadhyay*<sup>1</sup>; Hrishikesh Das<sup>1</sup>; Mitch Blocher<sup>1</sup>; Shivakant Shukla<sup>1</sup>; Jorge Dos Santos<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

9:10 AM

**Characterizing Welds and Parameters of Ultra High-Speed Friction Stir Welding in the Lap Welding Configuration:** *Todd Lainhart*<sup>1</sup>; Josh Scheffield<sup>1</sup>; Dallin Gariety<sup>1</sup>; Kate Namola<sup>2</sup>; Russell Steel<sup>3</sup>; Jeremy Coyne<sup>2</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Toyota; <sup>3</sup>Mazak/MegaStir

9:30 AM

**The improvement of Corner Stationary Shoulder FSW:** *Hideki Okada*<sup>1</sup>; <sup>1</sup>Kawasaki Heavy Industries.ltd

9:50 AM Break

10:10 AM

**Effect of Welding Speed on Tensile Shear Strength of Friction Stir Lap Weld of Wrought AA5052 to Die-Cast A383:** *Yutaka Sato*<sup>1</sup>; Asaki Tamura<sup>1</sup>; Shun Tokita<sup>1</sup>; Kengo Yamamoto<sup>2</sup>; Koji Murakami<sup>2</sup>; Ryoga Shiotsu<sup>2</sup>; Kazuo Shiramizu<sup>2</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>Yamamoto Metal Technos Co., Ltd.

10:30 AM

**Two-Layer Build-Up Friction Stir Welding of 6061 Aluminum Alloy Using Externally Supplied Bulk Material:** *Kohei Hamana*<sup>1</sup>; Masakatsu Maeda<sup>1</sup>; <sup>1</sup>Nihon University

10:50 AM

**Influence of Friction Stir Welding on the Corrosion Resistance of AL6061:** *Ahmed Ali*<sup>1</sup>; Ahmad Bawagnih<sup>1</sup>; Filmon Surafiel<sup>1</sup>; Fadi El-Badour<sup>1</sup>; Rami Suleiman<sup>1</sup>; Necar Merah<sup>1</sup>; <sup>1</sup>King Fahd University of Petroleum and Minerals (KFUPM)

11:10 AM

**A Novel Approach to Friction Stir Welding (FSW): Repairing Cracks in AA6061-T6 Aluminium Alloy Using Aluminium Filler Rod and SiC Nanoparticles:** *Ahmed Ali*<sup>1</sup>; Ahmad Bawagnih<sup>1</sup>; Filmon Surafiel<sup>1</sup>; *Fadi El-Badour*<sup>1</sup>; Rami Suleiman<sup>1</sup>; Necar Merah<sup>1</sup>; <sup>1</sup>King Fahd University of Petroleum and Minerals (KFUPM)

## SPECIAL TOPICS

**Frontiers of Materials Award Symposium: Manufacturing Structural and Functional Materials with Complexity: Lessons from Nature — Frontiers of Materials Award Symposium: Manufacturing Structural and Functional Materials with Complexity: Lessons from Nature**

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizer:** Ling Li, University of Pennsylvania

Wednesday AM | March 26, 2025  
116 | MGM Grand

**Session Chair:** Ling Li, University of Pennsylvania

8:30 AM Invited

**Biomaterialized Structures With Porosity: Structure, Mechanics, Multifunctionality, and Formation Mechanisms:** *Ling Li*<sup>1</sup>; <sup>1</sup>University of Pennsylvania

8:55 AM Invited

**From Biological Crystal Growth to Functional Bio-Inspired Crystals:** *Boaz Pokroy*<sup>1</sup>; <sup>1</sup>Technion Israel Institute of Technology

9:20 AM Invited

**Make It With Minerals! Self-Organizing Complex Functional Materials:** *Willem Noorduin*<sup>1</sup>; <sup>1</sup>AMOLF / University of Amsterdam

9:45 AM Invited

**Recruiting Unicellular Algae for the Mass Production of Nanostructured Perovskites:** *Igor Zlotnikov*<sup>1</sup>; <sup>1</sup>Technische Universität Dresden

10:10 AM Break

10:30 AM Invited

**Butterfly Cells Employ Mechanics to Form Wing Scales:** Anthony McDougal<sup>1</sup>; Jan Totz<sup>1</sup>; Peter So<sup>1</sup>; Jörn Dunkel<sup>1</sup>; Bodo Wilts<sup>2</sup>; *Mathias Kolle*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Salzburg

10:55 AM Invited

**Synthesis of Architected Biological Materials With Nanoscale Precision and Translation to Bio-Inspired Structures:** *David Kisailus*<sup>1</sup>; <sup>1</sup>University of California-Irvine

11:20 AM Invited

**Structural Materials Design: Perspectives From Bioinspiration and Artificial Intelligence:** *Grace Gu*<sup>1</sup>; <sup>1</sup>University of California, Berkeley

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials — Functional Nanomaterials II: 2D Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

Wednesday AM | March 26, 2025  
365 | MGM Grand

**Session Chair:** Michael Cai Wang, University of South Florida

8:30 AM Keynote

**Van der Waals Superlattices: The Bo(u)ndless Frontier:** *Xiangfeng Duan*<sup>1</sup>; <sup>1</sup>University of California, Los Angeles

9:10 AM Invited

**III-Nitrides and 2D Chalcogenides for Next Generation Electronics:** *Deep Jariwala*<sup>1</sup>; <sup>1</sup>University of Pennsylvania

9:40 AM Invited

**Solution-Processable 2D Materials Based In-Memory Optical Sensing and Computing:** *Nazek El-Atab*<sup>1</sup>; *Bashayr Alqahtani*<sup>1</sup>; <sup>1</sup>King Abdullah University of Science and Technology

10:10 AM Break

10:30 AM Keynote

**Synthesis and Assembly of MXene-Based Materials With a Multitude of Functionalities:** *Yury Gogotsi*<sup>1</sup>; <sup>1</sup>Drexel University

11:10 AM Invited

**Novel Properties of Two-Dimensional Weyl Semimetal States Achieved by Thickness-Dependent Topological Phase Transition in Bi<sub>0.96</sub>Sb<sub>0.04</sub> Thin Films and Applications:** *Suk-Ho Cho*<sup>1</sup>; <sup>1</sup>Kyung Hee University

11:40 AM Introductory Comments: JIMM Young Leader International

Scholar

11:45 AM Invited

**Young Leaders International Scholars – JIMM Lecture: Spin Current Generation Driven by Altermagnetism and Its Spintronic Applications:** *Shutaro Karube*<sup>1</sup>; <sup>1</sup>Kyoto University

## ADVANCED CHARACTERIZATION METHODS

### Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties — Structure and Properties I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoung Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

Wednesday AM | March 26, 2025  
155 | MGM Grand

**Session Chairs:** Amit Misra, University of Michigan; Liliana Romero Resendiz, Bournemouth University; Xiaozhou Liao, University of Sydney; Zengbao Jiao, The Hong Kong Polytechnic University

8:30 AM Invited

**Microstructures and Mechanical Behavior of Additively Manufactured Fe-Cr-Ni Alloys**  
: *Amit Misra*<sup>1</sup>; <sup>1</sup>University of Michigan

8:55 AM

**Strong and Ductile High-Entropy Alloys With Coherent Nanolamellar Structures:** *Zengbao Jiao*<sup>1</sup>; <sup>1</sup>The Hong Kong Polytechnic University

9:15 AM

**Effect of Surface Roughness on the Mechanical Properties in Gradient Structured Pure Copper:** *Xinkun Zhu*<sup>1</sup>; <sup>1</sup>Kunming University of Science and Technology

9:35 AM Invited

**Strengthening of Refractory High-Entropy Alloy Over a Broad Temperature Range via the Formation of Heterostructures:** *Aomin Huang*<sup>1</sup>; *Enrique Lavernia*<sup>1</sup>; *Calvin Belcher*<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of California, Irvine

10:00 AM Break

10:15 AM Invited

**Improved Cryogenic Mechanical Properties of Heterostructured CrCoNi Multicomponent Alloy:** *Liliana Romero Resendiz*<sup>1</sup>; *Muhammad Naeem*<sup>2</sup>; *Xun-Li Wang*<sup>3</sup>; *Yuntian Zhu*<sup>3</sup>; <sup>1</sup>Bournemouth University; <sup>2</sup>University of Birmingham; <sup>3</sup>City University of Hong Kong

10:40 AM Invited

**Improving Mechanical Properties Through Heterogeneous Structures Fabricated by Additive Manufacturing:** *Xiaozhou Liao*<sup>1</sup>; <sup>1</sup>University of Sydney

11:05 AM Invited

**Recrystallized Hard Zone and Resultant Tri-Modal Microstructure Produces Superior Mechanical Properties in a Single-Phase Heterostructured High-Entropy Alloy:** *Shu-Yi Tung*<sup>1</sup>; *Ting-En Hsu*<sup>1</sup>; *Yuntian Zhu*<sup>2</sup>; *Ming-Hung Tsa*<sup>1</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>City University of Hong Kong

11:30 AM Invited

**Twist Proximity Endowed Quantum Phenomena in van der Waals Heterostructures:** *Pritam Deb*<sup>1</sup>; <sup>1</sup>Tezpur University (Central University)

11:55 AM

**Ultrahigh Strength and Good Ductility Induced by Heterostructure in TC21 Alloy:** Z.H. Jiang<sup>1</sup>; *Yongfeng Shen*<sup>1</sup>; W.Y. Xue<sup>2</sup>; N. Jia<sup>1</sup>; <sup>1</sup>Northeastern University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Modeling

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

Wednesday AM | March 26, 2025  
302 | MGM Grand

**Session Chairs:** Krista Limmer, DEVCOM Army Research Laboratory; C. Tasan, Massachusetts Institute of Technology

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8:30 AM Invited

**Data-Driven Prediction Model for Surface Hardness Distribution in Nitrided Steel:** *Goro Miyamoto*<sup>1</sup>; Sayaka Sekida<sup>1</sup>; Tadashi Furuhashi<sup>1</sup>; <sup>1</sup>Tohoku University

9:00 AM

**Influence of Microalloyed Steel Slab Reheating Conditions on the Evolution of Austenite Structure:** *Andrei Chastukhin*<sup>1</sup>; Hongjoo Rhee<sup>1</sup>; Shiraz Mujahid<sup>1</sup>; Dawn Van Iderstine<sup>1</sup>; Tim Shaw<sup>1</sup>; <sup>1</sup>Mississippi State University

9:20 AM

**Physics-Coupled Data-Driven Design of Advanced Alumina-Forming Austenitic Stainless Steel:** *Dongwon Shin*<sup>1</sup>; Sun Yong Kwon<sup>1</sup>; Peng Jian<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; Michael Brady<sup>1</sup>; James Haynes<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:40 AM

**A Phase-Field Modeling on API X60 Steel for Characterizing Pearlitic Phase Transformation With Experimental Validation:** *Mohammad Younes Araghi*<sup>1</sup>; Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma

10:00 AM

**Multi-Phase Field Modelling for Austenite Conditioning and Bainite Transformation:** Ashish Dhole<sup>1</sup>; Ali Khajezade<sup>1</sup>; *Matthias Militzer*<sup>1</sup>; <sup>1</sup>The University of British Columbia, Vancouver

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Hume-Rothery Symposium on Thermodynamics of Microstructure Stability and Evolution — Modeling Degradation and Evolution in Energy Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Yunzhi Wang, Ohio State University; Wei Xiong, University of Pittsburgh; Jiamian Hu, University of Wisconsin Madison; Chuan Zhang, CompuTherm LLC

Wednesday AM | March 26, 2025  
357 | MGM Grand

**Session Chairs:** Shenyang Hu, Pacific Northwest National Laboratory; You-Hai Wen, Us Doe - Netl

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8:30 AM Invited

**High-Temperature Dealloying in Molten Environments: Insights on Grain Boundary Effects From Phase-Field Modeling:** Nathan Bieberdorf<sup>1</sup>; Xueyang Bogdanova<sup>2</sup>; Laurent Capolungo<sup>2</sup>; *Mark Asta*<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Los Alamos National Laboratory

8:55 AM Invited

**Microstructural Mechanisms of Performance and Degradation of Materials for Hydrogen Storage and Production – Mesoscale Modeling:** *Tae Wook Heo*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

9:20 AM Invited

**Phase-Field Modeling of Damage Evolution in Environmental Barrier Coating – Ceramic Matrix Composite Systems:** Tianle Cheng<sup>1</sup>; Fei Xue<sup>1</sup>; *You-Hai Wen*<sup>1</sup>; <sup>1</sup>US DOE - NETL

9:45 AM Invited

**Dynamical Phase-Field Simulation of the THz Light-Matter Interaction in Ferroelectrics:** *Jiamian Hu*<sup>1</sup>; Yujie Zhu<sup>1</sup>; Taorui Chen<sup>1</sup>; Shihao Zhuang<sup>1</sup>; Bo Wang<sup>2</sup>; Aiden Ross<sup>3</sup>; Xiangwei Guo<sup>1</sup>; Venkatraman Gopalan<sup>3</sup>; Long-Qing Chen<sup>3</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>The Pennsylvania State University

10:10 AM Break

10:20 AM Invited

**Phase-Field Modeling of Hydride Behavior in the Vicinity of Grain Boundary of Zr Matrix:** Woosob Shin<sup>1</sup>; *Kunok Chang*<sup>1</sup>; <sup>1</sup>Kyung Hee University

10:45 AM Invited

**Stress-Induced Reaction Heterogeneity in Battery Electrodes:** *Ming Tang*<sup>1</sup>; <sup>1</sup>Rice University

11:10 AM Invited

**Accounting for the Alloying Effect in Electrochemical Equilibrium:** *Yue Qi*<sup>1</sup>; <sup>1</sup>Brown University

11:35 AM Invited

**A Mesoscale Integrated Model of Microstructure Evolution and Property Degradation in Nuclear Fuels:** *Shenyang Hu*<sup>1</sup>; Zirui Mao<sup>1</sup>; Benjamin Beeler<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>North Carolina State University

12:00 PM Concluding Comments



## Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Characterization and Modeling

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Wednesday AM | March 26, 2025**  
**352 | MGM Grand**

**Session Chairs:** Rodrigo Freitas, Massachusetts Institute of Technology; Megan McCarthy, Sandia National Laboratories

### 8:30 AM Invited

**Imaging of Short Range Order With Electron Microscopy: From High Performance Alloys to Semiconductor Thin Films:** *Andrew Minor*<sup>1</sup>; <sup>1</sup>University of California Berkeley

### 9:00 AM Invited

**Characterization of Ordering and Metastability in Multi-Principal Element Alloys:** *Michael Kaufman*<sup>1</sup>; Nelson Delfino De Campos Neto<sup>1</sup>; Robert Field<sup>1</sup>; Cody Miller<sup>2</sup>; Pedro Oliveira<sup>3</sup>; Francisco Coury<sup>3</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Federal University of São Carlos

### 9:30 AM

**Influence of Irradiation-Induced Ordering on Defect Evolution in BCC MPEAs:** *Annie Barnett*<sup>1</sup>; Emily Mang<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Jaime Marian<sup>3</sup>; Patrick Callahan<sup>4</sup>; Michael Falk<sup>1</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>University of California Los Angeles; <sup>4</sup>Naval Research Laboratory

### 9:50 AM Break

### 10:10 AM Invited

**Formation of the B2 Phase Among Refractory Metals:** Junxin Wang<sup>1</sup>; Ali Barooni<sup>1</sup>; Bryan Crossman<sup>1</sup>; Jean-Philippe Couzinie<sup>2</sup>; Michael Mills<sup>1</sup>; *Maryam Ghazisaeidi*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University Paris-Est Creteil

### 10:40 AM

**On the Formation of Interstitial Solute Ordered Complexes in bcc High-Entropy Alloys From First-Principles:** *Pedro Borges*<sup>1</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley

### 11:00 AM

**Statistical Analysis of the Yield Strength of Random Alloys:** *Xing Liu*<sup>1</sup>; Ting Zhu<sup>2</sup>; <sup>1</sup>New Jersey Institute of Technology; <sup>2</sup>Georgia Institute of Technology

### 11:20 AM

**The Effects of Short-Range Order on Defect Energy Statistics in Concentrated Solid Solutions:** *Matthew Daly*<sup>1</sup>; Ritesh Jagatramka<sup>1</sup>; Akash Baski<sup>1</sup>; Novin Rasooli<sup>1</sup>; <sup>1</sup>University of Illinois-Chicago

## Magnesium Technology 2025 — Primary Production, Corrosion and Recycling

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Wednesday AM | March 26, 2025**  
**115 | MGM Grand**

**Session Chairs:** Norbert Hort, Helmholtz-Zentrum Hereon; Adam Griebel, Fort Wayne Metals

### 8:30 AM Keynote

**Domestic Magnesium Production and Research:** *Christopher Schooler*<sup>1</sup>; <sup>1</sup>Department of Energy/EERE

### 9:10 AM

**Primary Magnesium Production for an Era of Localization and Decarbonization:** *Melissa Zirps*<sup>1</sup>; <sup>1</sup>Magrathea

### 9:30 AM

**An Energy-Efficient and Environmentally Friendly Reductant in Magnesium Metal Production: AlDross:** *Onuralp Yucel*<sup>1</sup>; Umut Satılmış<sup>1</sup>; Mehmet Buğdaycı<sup>2</sup>; Ahmet Turan<sup>3</sup>; <sup>1</sup>Istanbul Technical University; <sup>2</sup>Yalova University; <sup>3</sup>Yeditepe University

### 9:50 AM

**Research Progress of Magnesium Extraction and Purification:** *Dong Liang*<sup>1</sup>; Tingzhuang Ma<sup>1</sup>; Rong Yu<sup>1</sup>; Yang Tian<sup>1</sup>; Bin Yang<sup>1</sup>; Baoqiang Xu<sup>1</sup>; Wenlong Jiang<sup>1</sup>; <sup>1</sup>Kunming University of Science and Technology

### 10:10 AM Break

### 10:30 AM

**Development of Low-Density Floating Flux for Magnesium Recycling Process:** *Jun Ho Bae*<sup>1</sup>; Byeong Gi Moon<sup>1</sup>; Young Hoon Moon<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

### 10:50 AM

**Study on Recycling of Magnesium Alloy Scrap by Vacuum Method:** *Lipeng Wang*<sup>1</sup>; Yang Tian<sup>1</sup>; Dong Liang<sup>1</sup>; Tingzhuang Ma<sup>1</sup>; Rong Yu<sup>1</sup>; Bin Yang<sup>1</sup>; Baoqiang Xu<sup>1</sup>; Wenlong Jiang<sup>1</sup>; <sup>1</sup>Kunming University of Science and Technology

### 11:10 AM

**Continuous Aluminothermic Reduction of MgO With Molten Aluminum Recycled From Post-Consumed Scrap:** *Varuzan Kevorkijan*<sup>1</sup>; <sup>1</sup>Impol R in R d.o.o.

### 11:30 AM

**Efficient Recycling of Magnesium Alloys via Partial Distillation Using Gravity-Multiple Effect Thermal System (G-METS):** *Daniel McArthur Sehar*<sup>1</sup>; Kenichi Saito<sup>2</sup>; Armaghan Telgerafchi<sup>1</sup>; Maya Gallego<sup>1</sup>; Meera Sridhar<sup>1</sup>; Artem Iurkovskiy<sup>1</sup>; Adam Powell<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Shibaura Institute of Technology

## Materials and Chemistry for Molten Salt Systems — Applications of Molten Salts

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Wednesday AM | March 26, 2025**  
**165 | MGM Grand**

**Session Chair:** Weiyue Zhou, Massachusetts Institute of Technology

**8:30 AM Invited**

**Chemistry Control for Fluoride Salt-Cooled High-Temperature Reactors:** Ryan Gallagher<sup>1</sup>; Francesco Carotti<sup>1</sup>; Sam Mossadeghian<sup>1</sup>; Tristan Johnson<sup>1</sup>; Jacob McMurray<sup>1</sup>; Jake Quincey<sup>1</sup>; *Gus Merwin*<sup>1</sup>; Alan Kruienga<sup>1</sup>; <sup>1</sup>Kairos Power

**8:55 AM Invited**

**Research Progress of the FLiBe Liquid Blanket at the Commonwealth Fusion System:** *Guiqiu Zheng*<sup>1</sup>; <sup>1</sup>Commonwealth Fusion Systems

**9:20 AM**

**Controlling Tritium Speciation in Molten Salts: Insights From the Liquid Immersion Blanket Robust Accountancy (LIBRA) Experiment:** *Nikola Goles*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Remi Delaporte-Mathurin<sup>1</sup>; Kevin Woller<sup>1</sup>; <sup>1</sup>Plasma Science and Fusion Center, MIT

**9:40 AM**

**Gaseous Fission Product Scrubbing Using Eutectic NaOH-KOH Molten Salts:** *Lukas Metzger*<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Tech, Nuclear Materials and Fuel Cycle Center

**10:00 AM Break**

**10:20 AM Invited**

**Magnesium Chloride Salt/Graphite Foam Composites for Thermal Energy Storage:** *Dileep Singh*<sup>1</sup>; <sup>1</sup>Argonne National Lab

**10:45 AM**

**Influence of Moisture on the Thermo-Mechanical Performance of the Thermal Energy Storage Systems:** *Abhishek Bhesania*<sup>1</sup>; Mark Messner<sup>1</sup>; Dileep Singh<sup>1</sup>; Emin Varghese<sup>2</sup>; Santanu Chaudhuri<sup>2</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>University of Illinois Chicago

**11:05 AM**

**Performance and Characterization of Precious Metal Alloys and Coatings as Anodes for Pyroprocessing:** *Craig Moore*<sup>1</sup>; Thomas Selmi<sup>1</sup>; Dev Chidambaram<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**11:25 AM**

**Electrolytic Reduction of Nuclear Oxide Fuels Using Precious Group Metal Anodes:** *Md Ikram Khan*<sup>1</sup>; Stephanie Baldvieso<sup>2</sup>; Hojong Kim<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Idaho National Laboratory

## Materials for Sustainable Hydrogen Energy — Hydrogen Embrittlement and Hydrogen Diffusion II

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

**Wednesday AM | March 26, 2025**  
**359 | MGM Grand**

**Session Chairs:** Binhan Sun, East China University of Science and Technology; Jinwoo Kim, Korea Institute Of Science And Technology (Kist); Enrique Galindo-Nava, University College London; Wenwen Song, University of Kassel

**8:30 AM Invited**

**Leveraging Macroscale Experiments to Elucidate Microscale Insights Into Hydrogen Concentration Effects on Plastic Deformation in Structural Metals:** Mohammad Alam<sup>1</sup>; Alfredo Zafra<sup>2</sup>; Emilio Martinez-Paneda<sup>2</sup>; *Zachary Harris*<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of Oxford

**9:00 AM**

**A Coupled Crystal Plasticity-Hydrogen Adsorption-Diffusion-Desorption Model for Investigating Hydrogen Retention in Austenitic Steel:** *Jiahao Cheng*<sup>1</sup>; Saket Thapliyal<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:20 AM**

**The Less Known Impact of High Temperature (> 400 °C) Hydrogen Induced Degradation of Steels and Ni-Based Alloys:** *Rishi Pillai*<sup>1</sup>; Brandon Johnston<sup>1</sup>; Marie Romedenne<sup>1</sup>; Dean Pierce<sup>1</sup>; J.A. Haynes<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:40 AM**

**Modeling Hydrogen Influence on Ni201 Plastic Behavior and Calibration Using Coupon-Based and In-Situ X-Ray Diffraction Microscopy Experimental Data:** *Leonidas Zisis*<sup>1</sup>; Krzysztof Stopka<sup>1</sup>; Marco Zambolin<sup>1</sup>; Mohammad Alam<sup>2</sup>; Zachary Harris<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Pittsburgh

**10:00 AM Break**

**10:15 AM Invited**

**Manipulating the Location of Hydride in / Titanium Alloy:** Sheng Huang<sup>1</sup>; Amelia How<sup>1</sup>; *Cemal Cem Tasan*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**10:45 AM**

**Fundamental Atomistic Study of H-Defect Interactions to Predict H Segregation Energy Spectra:** *Matthew Melfi*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

## Materials Processing Fundamentals: Thermodynamics and Rate Phenomena — Thermodynamic and Kinetic Considerations in Metallurgical Processing

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Allie Anderson, RHI Magnesita; Adrian Sabau, Oak Ridge National Laboratory; Chukwunwike Iloeje, Argonne National Laboratory; Adamantia Lazou, National Technical University of Athens; Kayla Molnar, Los Alamos National Laboratory

**Wednesday AM | March 26, 2025**  
**103 | MGM Grand**

**Session Chairs:** Chukwunwike Iloeje, Argonne National Laboratory; Allie Anderson, RHI Magnesita

### 8:30 AM Introductory Comments

#### 8:35 AM

**SnOx Solubility in CaO-FeOx-Cu2O Slag Under Copper Saturation:** Naoyuki Hashimoto<sup>1</sup>; Shigeru Ishikawa<sup>1</sup>; Fumito Tanaka<sup>1</sup>; <sup>1</sup>Mitsubishi Materials Corporation

#### 8:55 AM

**Novel Approach to Measure the Thermodynamic Property of Tri-Calcium Phosphate Using the Phase Relation in the CaO-SiO<sub>2</sub>-P<sub>2</sub>O<sub>5</sub> Ternary System:** Keijiro Saito<sup>1</sup>; Kazuki Morita<sup>1</sup>; Masakatsu Hasegawa<sup>2</sup>; <sup>1</sup>The University of Tokyo; <sup>2</sup>Kyoto University

#### 9:15 AM

**A Study of the Time Dependence of Secondary Phase Formation:** Rahul Basu<sup>1</sup>; Shubhayan Mukherjee<sup>2</sup>; <sup>1</sup>UGC, JNTU; <sup>2</sup>National Cheng Kung University

#### 9:35 AM

**Non-Metallic Inclusions in a High Manganese Steel Rail:** Zi Ye<sup>1</sup>; Jujin Wang<sup>1</sup>; Weijian Wang<sup>1</sup>; Lifeng Zhang<sup>1</sup>; <sup>1</sup>North China University of Technology

### 9:55 AM Concluding Comments

## Mechanical Behavior of Nuclear Reactor Materials and Components IV — Weld Materials and Creep Performance

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**Wednesday AM | March 26, 2025**  
**160 | MGM Grand**

**Session Chairs:** Tanvi Ajantiwalay, Pacific Northwest National Laboratory; Kayla Yano, Pacific Northwest National Laboratory

### 8:30 AM Invited

**Mechanical Behavior and Microstructure of Stainless Steel/Titanium Dissimilar Metal Welds Utilizing Vanadium Interlayers:** Erin Barrick<sup>1</sup>; Brett Roper<sup>1</sup>; Jack Herrmann<sup>1</sup>; Austin Pisani<sup>1</sup>; Andrew Kustas<sup>1</sup>; Don Susan<sup>1</sup>; Pat Carrion<sup>1</sup>; Amanda Jones<sup>1</sup>; <sup>1</sup>Sandia National Labs

#### 9:00 AM

**Creep Rupture and Microstructural Analysis of Dissimilar Welded Joints of P92 Steel and Alloy 617:** Amit Kumar<sup>1</sup>; Chandan Pandey<sup>1</sup>; Kalpana Gupta<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur

#### 9:20 AM

**High-Temperature Tensile Testing of Electron Beam Welded Dissimilar Metals P91 Steel and Incoloy 800HT:** Vishwa Bhanu<sup>1</sup>; Shailesh Pandey<sup>2</sup>; Ankur Gupta<sup>1</sup>; Chandan Pandey<sup>1</sup>; <sup>1</sup>IIT Jodhpur; <sup>2</sup>NIT Patna

#### 9:40 AM

**A Solid Mechanics Evaluation of Distortion in Laser Arc Hybrid Welding for Thick Walled Pressure Vessels: Process Validation and Metallurgical Characteristics:** Dominic Piccone<sup>1</sup>; Elizabeth Smith<sup>1</sup>; Edmundo Corona<sup>1</sup>; Jeffrey Rodelas<sup>1</sup>; Christopher Finrock<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

### 10:00 AM Break

#### 10:20 AM

**Accelerated Evaluation of Creep Behavior in Nuclear Reactor Structural Alloys:** Minh-Tam Hoang<sup>1</sup>; Eric Hintsala<sup>2</sup>; Kevin Schmalbach<sup>2</sup>; Douglas Stauffer<sup>2</sup>; Jobin Joy<sup>3</sup>; Anjana Talapatra<sup>3</sup>; Laurent Capolungo<sup>3</sup>; John Carpenter<sup>3</sup>; Benjamin Eftink<sup>3</sup>; Nathan Mara<sup>1</sup>; <sup>1</sup>University of Minnesota-Twin Cities; <sup>2</sup>Bruker Nano Surfaces; <sup>3</sup>Los Alamos National Laboratory

#### 10:40 AM

**Creep Testing of Uranium Mononitride:** Andre Broussard<sup>1</sup>; Kevin Yan<sup>1</sup>; Nathaniel Cavanaugh<sup>1</sup>; Erofil Kardoulaki<sup>2</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>Los Alamos National Laboratory

#### 11:00 AM

**Mechanisms-Based Creep-Fatigue Analysis and Alloy Design for Advanced High-Temperature Nuclear Applications:** Mahmud Hasan Ovi<sup>1</sup>; Tamim Hossain<sup>1</sup>; Intisher Al-Tahmid Omi<sup>1</sup>; Hoon Lee<sup>1</sup>; James Stubbins<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

#### 11:20 AM

**Predicting Irradiation Creep Behavior of T91 Steel Using a Physics-Based Crystal Plasticity Model:** Vignesh Vivekanandan<sup>1</sup>; Aaron Kohnert<sup>1</sup>; Andrea Rovinelli<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

## Mechanical Behavior Related to Interface Physics IV — Grain Boundaries II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

**Wednesday AM | March 26, 2025**  
**369 | MGM Grand**

**Session Chairs:** Ralph Spolenak, ETH Zurich; Glenn Balbus, MRL Materials Resources LLC

**8:30 AM**

**Modeling Grain Boundary Mediated Plasticity With Massively Parallel Atomistic Simulations:** *Timofey Frolov*<sup>1</sup>; Flynn Walsh<sup>1</sup>; Nicolas Bertin<sup>1</sup>; A. Chernov<sup>1</sup>; Ian Winter<sup>2</sup>; Tomas Oppelstrup<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Sandia National Laboratories

**8:50 AM**

**Examining the Role of Grain Boundaries on the Influence of Screw Dislocation Mobility in Bcc Metals:** Xiochuan Tang<sup>1</sup>; Gregory Thompson<sup>2</sup>; *Christopher Weinberger*<sup>1</sup>; <sup>1</sup>Colorado State University; <sup>2</sup>University of Alabama

**9:10 AM**

**Understanding Deformation Mechanisms in the Grain Boundary Weakening Regime of Nanocrystalline Ni-W Alloys:** *Keerti Pandey*<sup>1</sup>; Atul Chokshi<sup>2</sup>; <sup>1</sup>Indian Institute of Science, Bombay; <sup>2</sup>Indian Institute of Science, Bangalore

**9:30 AM Invited**

**Insights Into the Grain Boundary Sliding Behavior of a Ni Bicrystal:** *Subin Lee*<sup>1</sup>; Divya Bandla<sup>1</sup>; Christoph Kirchlechner<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology

**10:00 AM Break**

**10:20 AM**

**Creep-Induced Segregation at Grain Boundaries of Alloys – A Compelling Experimental Evidence for Diffusional Creep:** Sriswaroop Dasari<sup>1</sup>; Chaitanya Bhav<sup>1</sup>; Shehab Shousha<sup>2</sup>; Jana Howard<sup>3</sup>; Advika Chesetti<sup>4</sup>; Ninad Mohale<sup>1</sup>; Benjamin Beeler<sup>2</sup>; Sourabh Kadambi<sup>1</sup>; *Boopathy Kombaiah*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>North Carolina State University; <sup>3</sup>Boise State University; <sup>4</sup>University of North Texas

**10:40 AM**

**Studying Grain Boundary Regions in Polycrystalline Tantalum Using Spherical Nano-Indentation:** *Olajesu Olanrewaju*<sup>1</sup>; Kevin Jacob<sup>1</sup>; Curt Bronkhorst<sup>2</sup>; Nan Chen<sup>2</sup>; Marko Knezevic<sup>3</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Wisconsin; <sup>3</sup>University of New Hampshire

**11:00 AM Invited**

**Understanding the Relationship Between Grain-Boundary Segregation and Mechanical Properties Using Interfacial Phase Diagrams:** *Chongze Hu*<sup>1</sup>; <sup>1</sup>University of Alabama

## Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Small Scale Characterisation

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

**Wednesday AM | March 26, 2025**  
**366 | MGM Grand**

**Session Chair:** Jagannathan Rajagopalan, Arizona State University

**8:30 AM Invited**

**Characterizing Phenomena in Metals and Alloys at the Single Defect Level:** *Daniel Gianola*<sup>1</sup>; <sup>1</sup>University of California-Santa Barbara

**9:00 AM**

**CRSS Determination in  $\alpha$ -Ti: Modelling and In-Situ TEM study:** *Tolga Berkay Celebi*<sup>1</sup>; Orcun Koray Celebi<sup>1</sup>; Sidharth Ravi<sup>1</sup>; Ashley Bucsek<sup>2</sup>; Huseyin Sehitoglu<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign; <sup>2</sup>University of Michigan

**9:20 AM**

**In Situ MicroCT Radiograph Corrections for Sub-Micron Scale Digital Volume Correlation:** *Alex Arzoumanidis*<sup>1</sup>; Brian Bay<sup>2</sup>; André Phillion<sup>3</sup>; <sup>1</sup>Psylotech Inc; <sup>2</sup>Oregon State University; <sup>3</sup>McMaster University

**9:40 AM**

**In Situ Nanomechanical Testing at Cryogenic Temperatures:** *Kevin Schmalbach*<sup>1</sup>; Eric Hintsala<sup>1</sup>; Douglas Stauffer<sup>1</sup>; Sanjit Bhowmick<sup>1</sup>; <sup>1</sup>Bruker Nano

**10:00 AM**

**Investigation of Size Effect in the Elastic Regime Through Micro-Scale Cantilever Bending Experiments:** *Jae-Hoon Choi*<sup>1</sup>; Hyemin Ryu<sup>1</sup>; Kwang-Hyeok Lim<sup>1</sup>; Ji-Young Kim<sup>1</sup>; Hojang Kim<sup>1</sup>; Gi-Dong Sim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

**10:20 AM Break**

**10:40 AM**

**Mapping Strain, Stress and Orientation in Metals in 3D:** *Nils Henningsson*<sup>1</sup>; Mustafacan Kutsal<sup>1</sup>; Jonathan Wright<sup>2</sup>; Wolfgang Ludwig<sup>2</sup>; Henning Osholm<sup>3</sup>; Stephen Hall<sup>4</sup>; Grethe Winther<sup>1</sup>; Henning Poulsen<sup>1</sup>; <sup>1</sup>Technical University of Denmark - DTU; <sup>2</sup>European Synchrotron Radiation Facility; <sup>3</sup>Xnovo Technology ApS; <sup>4</sup>Lund University

**11:00 AM**

**Wear Mechanisms in Vacuum and Air: An In-Situ Comparative Study:** *Berk Soykan*<sup>1</sup>; Cemal Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**11:20 AM Invited**

**In-Situ Scanning Electron Microscopy Testing of Metallic Materials: New Methods & Insights:** *C. Tasan*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology



## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Modeling and Simulation

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusion Engineering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

**Wednesday AM | March 26, 2025**  
**158 | MGM Grand**

**Session Chairs:** Tianyi Chen, Oregon State University; Krishna Pitike, Pacific Northwest National Laboratory

#### 8:30 AM Keynote

**Hierarchical Multiscale Modeling Framework to Predict Surface Morphology of Plasma Facing Components:** *Brian Wirth*<sup>1</sup>; <sup>1</sup>University of Tennessee

#### 9:00 AM Invited

**Impact of Soret Effect on Hydrogen and Helium Retention in PFC Tungsten Under ELM-Like Conditions:** *Enrique Martinez Saez*<sup>1</sup>; Sanad Alturk<sup>1</sup>; Jacob Jeffries<sup>1</sup>; Muhammed Kose<sup>1</sup>; <sup>1</sup>Clemson University

#### 9:30 AM

**Effect of Transmutation Products on Point Defect Energies in Tungsten From First-Principles and Machine Learning:** *Anus Manzoor*<sup>1</sup>; Spencer Thomas<sup>1</sup>; Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University

#### 9:50 AM Break

#### 10:10 AM

**Development of Machine Learned Interatomic Potentials for Modeling Transmutation Products in Fusion First Wall Materials:** *Mary Alice Cusentino*<sup>1</sup>; Anus Manzoor<sup>2</sup>; Yusheng Jin<sup>2</sup>; Thomas Spencer<sup>2</sup>; Krishna Pitike<sup>3</sup>; Wahyu Setyawan<sup>3</sup>; Rafi Ullah<sup>4</sup>; Izabela Szlufarska<sup>4</sup>; Jason Trelewicz<sup>2</sup>; Jaime Marian<sup>5</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Stony Brook University; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>University of Wisconsin; <sup>5</sup>University of California Los Angeles

#### 10:30 AM

**A Machine Learned Potential for H Behavior in Dispersion-Strengthened W:** *Ember Salas*<sup>1</sup>; Mary Alice Cusentino<sup>1</sup>; Charles Rackley<sup>2</sup>; Meg McCarthy<sup>1</sup>; James Goff<sup>1</sup>; Aidan Thompson<sup>1</sup>; Mitch Wood<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Florida A&M University

#### 10:50 AM

**Development of Machine Learning Potential to Study Tritium Behavior in V-Alloy Blanket with Liquid Lithium Breeder:** *Krishna Pitike*<sup>1</sup>; Prashanth Srinivasan<sup>2</sup>; Duc Nguyen<sup>2</sup>; Mark Gilbert<sup>2</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>United Kingdom Atomic Energy Authority

## LIGHT METALS

### Melt Processing, Casting and Recycling — Molten Metal Cleanliness

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Arild Hakonsen, Hycast As; Les Edwards, Rain Carbon Inc.

**Wednesday AM | March 26, 2025**  
**109 | MGM Grand**

**Session Chair:** Mark Badowski, Hydro Aluminium Deutschland GmbH

#### 8:30 AM Introductory Comments

#### 8:35 AM

**Dynamics of Hydrogen in Aluminium in Contact with Humid Atmosphere:** *Martin Syvertsen*<sup>1</sup>; Halvor Dalaker<sup>1</sup>; <sup>1</sup>SINTEF Industry

#### 9:00 AM

**On the Influence of Oxide Layer Formation and Alloying in the Mg Vapor Pressure for Ternary Dilute Al-Mg Alloys:** *Antonio Vazquez Prudencio*<sup>1</sup>; Mehdi Maghsoudi<sup>2</sup>; Qing Chen<sup>3</sup>; Anne Kvithyld<sup>4</sup>; Snorri Ingvarsson<sup>1</sup>; Kristjan Leosson<sup>2</sup>; <sup>1</sup>University of Iceland; <sup>2</sup>DTE ehf.; <sup>3</sup>Thermo-Calc Software AB; <sup>4</sup>SINTEF

#### 9:25 AM

**Oxidation of Aluminium Melts in Dry and Moist Atmospheres:** *Halvor Dalaker*<sup>1</sup>; Martin Syvertsen<sup>1</sup>; <sup>1</sup>Sintef

#### 9:50 AM

**Removal of Metallic Impurities from Aluminum Alloy Using Gravity Sedimentation Technique:** *Manish Sinha*<sup>1</sup>; Brajendra Mishra<sup>1</sup>; Subodh Das<sup>2</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Phinix LLC

#### 10:15 AM Break

#### 10:30 AM

**Sedimentation of Inclusions In Melts of Aerospace Structural Aluminium Alloy Castings: A Sustainable Approach:** *Tharmalingam (Siva) Sivarupan*<sup>1</sup>; Arul Mozhi Varman Jayaraman Palanivel<sup>1</sup>; Konstantinos Georgarakis<sup>1</sup>; John Forde<sup>2</sup>; Joseph Rawding<sup>3</sup>; Ben Shaw<sup>3</sup>; Konstantinos Salonitis<sup>1</sup>; Mark Jolly<sup>1</sup>; <sup>1</sup>Cranfield University; <sup>2</sup>JF Advanced Technology Solutions Ltd; <sup>3</sup>Sylatech Ltd

#### 10:55 AM

**Removal Efficiencies of Hydrogen and Inclusions in a Combined Filter with De-Gassing and CFF:** *Terje Haugen*<sup>1</sup>; Arild Hakonsen<sup>1</sup>; <sup>1</sup>Hycast As

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Microstructural Evolution and Material Properties: Session III

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

**Wednesday AM | March 26, 2025**  
**303 | MGM Grand**

**Session Chairs:** Sukbin Lee, Ulsan National Institute Of Science And Technology; Ricardo Lebensohn, Los Alamos National Laboratory

**8:30 AM Invited**

**Adventures Exploring Five-Dimensional Space with Tony Rollett:** Gregory Rohrer<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**9:00 AM Invited**

**Connecting Structure and Processing Through Simulation: Statistics, Machine Learning, and Future Directions in Inverse Materials Design:** Sean Donegan<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

**9:30 AM**

**Development of Coherent X-Ray Imaging for Nanometer Scale Strain Dynamics at Grain Boundaries:** Richard Sandberg<sup>1</sup>; Stephan Hruszkewycz<sup>2</sup>; Ross Harder<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Argonne National Laboratory

**9:50 AM**

**Finite-Element Predictions of Forming of Single Crystal and Polycrystalline Aluminum Alloy Sheets Based on a Recent Crystal Model:** Oana Cazacu<sup>1</sup>; Benoit Revil-Baudard<sup>1</sup>; <sup>1</sup>University of Arizona

**10:10 AM Break**

**10:30 AM**

**Building Microstructural Digital Twins and Their Applications to Materials Properties:** Jaehyung Cho<sup>1</sup>; Veerendra Chitturi<sup>1</sup>; Geon Yeong Lee<sup>2</sup>; Hyo-Sun Jang<sup>1</sup>; Shi-Hoon Choi<sup>2</sup>; <sup>1</sup>Korea Institute of Materials Science; <sup>2</sup>Sunchon National University

**10:50 AM Invited**

**Practical Benefits from Spherical Indexing of EBSD Patterns for Microstructure Characterization:** Stuart Wright<sup>1</sup>; William Lenthe<sup>1</sup>; Matthew Nowell<sup>1</sup>; René de Kloe<sup>1</sup>; <sup>1</sup>EDAX

**11:20 AM Invited**

**Toward Microstructure-Aware Processing at Scale:** Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**11:50 AM**

**Integration of Phase-Field Model and Fast Fourier Transform-Based Crystal Plasticity With Geometrically Necessary Dislocations to Simulate Microstructure Evolution During the Manufacturing of Gradient Grained Metals:** Lei Chen<sup>1</sup>; Xinxin Yao<sup>1</sup>; <sup>1</sup>University of Michigan-Dearborn

## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Next-Generation Fuels I: Nitride, Carbide, Boride, and Others

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Wednesday AM | March 26, 2025**  
**159 | MGM Grand**

**Session Chair:** Jennifer Watkins, Idaho National Laboratory

**8:30 AM Invited**

**Westinghouse Perspective on Accelerated Fuel Qualification:** Antoine Claisse<sup>1</sup>; Edward Lahoda<sup>2</sup>; Jorge Carvajal<sup>2</sup>; Kathryn Metzger<sup>2</sup>; Anthony Schoedel<sup>2</sup>; <sup>1</sup>Westinghouse Electric Sweden; <sup>2</sup>Westinghouse Electric Corporation

**9:00 AM**

**Direct Modeling of Irradiation Driven Microstructure Evolution and Swelling in Uranium Nitride:** Par Olsson<sup>1</sup>; Qiuguo Yang<sup>1</sup>; Ida Andersson Neretnieks<sup>1</sup>; Jonas Planck<sup>1</sup>; Aymeric Le Harivel de Gonneville<sup>2</sup>; Ebrahim Mansouri<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Ecole Polytechnique

**9:20 AM**

**UN-UB2 Fuel Material: A Path to UN Use in LWRs:** Joel Turner<sup>1</sup>; <sup>1</sup>University of Manchester

**9:40 AM**

**Bayesian Calibration of Ab-Initio Based Self- and Fission Gas Diffusivity in UN Nuclear Fuel:** Anton Schneider<sup>1</sup>; Pieterjan Robbe<sup>2</sup>; David Andersson<sup>1</sup>; Christopher Matthews<sup>1</sup>; Michael Cooper<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Sandia National Laboratories

**10:00 AM Break**

**10:20 AM**

**Fission Product Migration and Speciation in Uranium Mononitride SIMFUEL:** Patrick Warren<sup>1</sup>; Mira Khair<sup>1</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio

**10:40 AM**

**Synthesis of Uranium Dinitride by Ammonolysis of Uranium Tetrafluoride:** Scarlett Widgeon Paisner<sup>1</sup>; Hannah Patenaude<sup>1</sup>; Scott Parker<sup>1</sup>; Edward Lahoda<sup>2</sup>; Antoine Claisse<sup>3</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Westinghouse Electric Company LLC; <sup>3</sup>Westinghouse Electric Sweden

**11:00 AM**

**Arc-Melt Synthesis of Uranium Borides: A New Approach to Volatilization:** Jennifer Stansby<sup>1</sup>; Mira Khair<sup>1</sup>; Pio Bragado<sup>1</sup>; Melody Ranger<sup>2</sup>; Vanessa Peterson<sup>3</sup>; Edward Obbard<sup>2</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>UTSA; <sup>2</sup>UNSW Nuclear Innovation Centre; <sup>3</sup>ANSTO

**11:20 AM**

**Room Temperature Oxidation Mechanisms of Uranium Monocarbide:** Adrian Wagner<sup>1</sup>; Jennifer Watkins<sup>1</sup>; Boone Beausoleil<sup>1</sup>; Tiankai Yao<sup>1</sup>; Seongtae Kwon<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing — Joint Session with "Additive Manufacturing: Length Scale Phenomena in Mechanical Response"

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Electronic Packaging and Interconnection Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Alain Reiser, KTH Royal Institute of Technology; Wendy Gu, Stanford University; Yu Zou, University of Toronto; Mostafa Hassani, Cornell University; Ming Chen, University of Nevada, Reno

**Wednesday AM | March 26, 2025**  
**310 | MGM Grand**

**Session Chairs:** Xuan Zhang, Argonne National Laboratory; Ming Chen, University of Nevada, Reno

#### 8:30 AM Introductory Comments

##### 8:35 AM

**Multi-Scale Mechanical Microscopy Using High-speed Nanoindentation:** *Jeffrey Wheeler*<sup>1</sup>; <sup>1</sup>Oxford Instruments

##### 9:05 AM

**Nanoscratch Testing: A Tool for Evaluating the Bonding Strength of Laser Cladding Coatings:** *Keivan Davami*<sup>1</sup>; *Alireza Doroudi*<sup>1</sup>; *Sadie Beck*<sup>1</sup>; *Ali Beheshti*<sup>2</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>George Mason University

##### 9:25 AM

**Strength of Microparticle Impact-Induced Metallic Bonds:** *Qi Tang*<sup>1</sup>; *David Veyssset*<sup>2</sup>; *Hamid Assadi*<sup>3</sup>; *Yuji Ichikawa*<sup>4</sup>; *Mostafa Hassani*<sup>1</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Wellman Center for Photomedicine, Harvard Medical School, Massachusetts General Hospital; <sup>3</sup>Brunel Centre for Advanced Solidification Technology, Brunel University London; <sup>4</sup>Fracture and Reliability Research Institute, Tohoku University

##### 9:45 AM

**Ultrafast Bubble Dynamics in Metal Additive Manufacturing with Operando Nanoscale Transmission X-Ray Microscopy:** *Lichao Fang*<sup>1</sup>; *Zane Taylor*<sup>1</sup>; *Tharun Reddy*<sup>1</sup>; *Matt Seaberg*<sup>2</sup>; *Matthieu Chollet*<sup>2</sup>; *Tim Driel*<sup>2</sup>; *Adrian Lew*<sup>1</sup>; *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>SLAC National Accelerator Laboratory

#### 10:05 AM Break

##### 10:25 AM Invited

**Room Temperature Micro Cold Spray of Ceramic Thick Films:** *Desi Kovar*<sup>1</sup>; <sup>1</sup>University of Texas at Austin

##### 10:55 AM

**Microstructural and Micro-Mechanical Characterization of Isothermally Heat-Treated Al6061 Cold Spray Deposits:** *Kyle Wade*<sup>1</sup>; *Tyler Flanagan*<sup>1</sup>; *Benjamin Bedard*<sup>1</sup>; *Victor Champagne*<sup>2</sup>; *Avinash Dongare*<sup>1</sup>; *Seok-Woo Lee*<sup>1</sup>; *Mark Aindow*<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>DEVCOM, Army Research Lab

##### 11:15 AM

**On the Ductility of Highly Pure Cold-Sprayed Copper: An Investigation of the Interplay Between Hierarchical Defects and Their Heterogeneous Spatial Arrangements and Morphology:** *Bosco Yu*<sup>1</sup>; *Jason Tam*<sup>2</sup>; *Liyang Zheng*<sup>3</sup>; *Dominique Poirier*<sup>4</sup>; *Jason Giallonardo*<sup>5</sup>; *Yu Zou*<sup>3</sup>; *Jane Howe*<sup>3</sup>; *Uwe Erb*<sup>3</sup>; <sup>1</sup>University of Victoria; <sup>2</sup>University of Tokyo; <sup>3</sup>University of Toronto; <sup>4</sup>National Research Council Canada (NRC); <sup>5</sup>The Nuclear Waste Management Organization (NWMO)

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments III — Mechanical Extreme

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

**Wednesday AM | March 26, 2025**  
**166 | MGM Grand**

**Session Chair:** Haiming Wen, Missouri University of Science and Technology

#### 8:30 AM Invited

**Dynamic Nano and Microscale Processes in Hydrogen Charged Metals and Alloys:** *Wendy Gu*<sup>1</sup>; *Andrew Lee*<sup>2</sup>; *Adam Barsotti*<sup>1</sup>; *Jiyun Kang*<sup>1</sup>; <sup>1</sup>Stanford University

#### 8:55 AM Invited

**New Rules of Coupled Severe Plastic Deformations, Phase Transformations, and Microstructure Evolution Under High Pressure: In-Situ Experiments and Four-Scale Theory:** *Valery Levitas*<sup>1</sup>; <sup>1</sup>Iowa State University

#### 9:20 AM

**Nanoscale Compositional Homogenization by Severe Plastic Deformation-Induced Twinning for Achieving Desensitization in Stainless Steel:** *Kasturi Sasidhar*<sup>1</sup>; *Robert Ulfig*<sup>2</sup>; *Kumar Sridharan*<sup>1</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>CAMECA Instruments, Inc.

#### 9:40 AM Invited

**Role of Interfaces in Phase Decomposition of CoCrNi Alloy:** *Sakshi Bajpai*<sup>1</sup>; *Xin Wang*<sup>2</sup>; *Bijun Xie*<sup>3</sup>; *Calvin Belcher*<sup>1</sup>; *Benjamin MacDonald*<sup>1</sup>; *Julia Ivanisenko*<sup>3</sup>; *Yu Zhong*<sup>4</sup>; *Penghui Cao*<sup>1</sup>; *Enrique Lavernia*<sup>5</sup>; *Diran Apelian*<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>University of Alabama, Tuscaloosa; <sup>3</sup>Karlsruhe Institute for Technology; <sup>4</sup>Worcester Polytechnic Institute; <sup>5</sup>Texas A&M University

#### 10:05 AM Break

#### 10:25 AM Invited

**Nanocrystalline Structures in HEAs by Extreme Deformation:** *Carlos Ruestes*<sup>1</sup>; *Marc Meyers*<sup>2</sup>; *Aomin Huang*<sup>3</sup>; *Enrique Lavernia*<sup>3</sup>; <sup>1</sup>Universidad Politecnica de Madrid; <sup>2</sup>University of California, San Diego; <sup>3</sup>Texas A&M University

#### 10:50 AM

**Progress Toward High Strain Rate Nanoindentation:** *Benoit Merle*<sup>1</sup>; *Mohammed Tahir Abba*<sup>1</sup>; <sup>1</sup>Kassel University

11:10 AM

**Shock Response of an Additively Manufactured Eutectic High Entropy Alloy Under Compression and Release:** *Anirudh Hari<sup>1</sup>; Kento Katagiri<sup>1</sup>; Paul Specht<sup>2</sup>; Tharun Reddy<sup>1</sup>; Sara Irvine<sup>4</sup>; Laura Madril<sup>1</sup>; Sophie Parsons<sup>1</sup>; Jie Ren<sup>3</sup>; Wuxian Yang<sup>3</sup>; Suzanne Ali<sup>4</sup>; Alexis Amouretti<sup>5</sup>; Yuichi Inubushi<sup>6</sup>; Ryosuke Kodama<sup>5</sup>; Alex Li<sup>7</sup>; Boya Li<sup>7</sup>; Kohei Miyanishi<sup>8</sup>; Hirotaka Nakamura<sup>5</sup>; Yusuke Nakanishi<sup>5</sup>; Yusuke Seto<sup>9</sup>; Masato Ota<sup>10</sup>; Sota Takagi<sup>11</sup>; Yuhei Umeda<sup>1</sup>; Yuhei Umeda<sup>12</sup>; Takuo Okuchi<sup>12</sup>; Norimasa Ozaki<sup>5</sup>; Gaia Righi<sup>4</sup>; Tadashi Togashi<sup>6</sup>; Makina Yabashi<sup>8</sup>; Toshinori Yabuuchi<sup>8</sup>; Yogesh Vohra<sup>13</sup>; Wen Chen<sup>3</sup>; Leora Dresselhaus-Marais<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>University of Massachusetts Amherst; <sup>4</sup>Lawrence Livermore National Laboratory; <sup>5</sup>Osaka University; <sup>6</sup>Japan Synchrotron Radiation Research Institute; <sup>7</sup>University of California San Diego; <sup>8</sup>RIKEN SPring-8 Center; <sup>9</sup>Osaka Metropolitan University; <sup>10</sup>National Institute for Fusion Science; <sup>11</sup>Carnegie Institution for Science; <sup>12</sup>Kyoto University; <sup>13</sup>University of Alabama Birmingham*

#### ADVANCED CHARACTERIZATION METHODS

### Neutron and X-Ray Scattering in Materials Science and Engineering — Lattice and Spin Dynamics in Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Michael Manley, Oak Ridge National Laboratory; Chen Li, University of California-Riverside; Hillary Smith, Swarthmore College; Jennifer Niedziela, Oak Ridge National Laboratory

Wednesday AM | March 26, 2025  
156 | MGM Grand

**Session Chair:** George Yumnam, Oakridge National Laboratory

8:30 AM Invited

**The Invar Effect Explained by Nuclear Resonant X-Ray Scattering from Phonons and Spins:** *Brent Fultz<sup>1</sup>; Stefan Lohaus<sup>1</sup>; Pedro Guzman<sup>1</sup>; <sup>1</sup>California Institute of Technology*

9:00 AM Invited

**Scattering Study of Spin-Lattice Interactions in Chromia:** *Chen Li<sup>1</sup>; Qiyang Su<sup>1</sup>; Yaokun Su<sup>1</sup>; Douglas Abernathy<sup>2</sup>; António Dos Santos<sup>2</sup>; Bianca Habert<sup>2</sup>; <sup>1</sup>University of California-Riverside; <sup>2</sup>Oak Ridge National Laboratory*

9:30 AM

**The Role of Vibrational Entropy Across Magnetostructural Transition in Heusler Alloys:** *Saqeeb Adnan<sup>1</sup>; Ibrahim Karaman<sup>2</sup>; Daniel Mula<sup>2</sup>; Raymundo Arroyave<sup>2</sup>; Raphael Hermann<sup>3</sup>; Douglas Abernathy<sup>3</sup>; Michael Manley<sup>3</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Texas A&M University; <sup>3</sup>Oak Ridge National Laboratory*

9:50 AM Invited

**Vibrational Thermodynamics of the Giant Elastocaloric Effect in NiCoMnTi Alloys:** *Michael Manley<sup>1</sup>; Raymundo Arroyave<sup>2</sup>; Ibrahim Karaman<sup>2</sup>; Douglas Abernathy<sup>1</sup>; Raphael Hermann<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Texas A&M University*

10:20 AM Break

10:30 AM

**Phonon Dynamics and Thermal Transport in  $\text{Ti}_3\text{VSe}_4$ :** *Yoel Lencina Wendt<sup>1</sup>; Qingan Cai<sup>1</sup>; Brian Sales<sup>2</sup>; Ayman Said<sup>3</sup>; Chen Li<sup>1</sup>; <sup>1</sup>UCR; <sup>2</sup>Oak Ridge National Lab; <sup>3</sup>Argonne National Lab*

10:50 AM

**Impact of Electric Fields on Local Structure, Phonons, and Thermal Transport in a Relaxor Ferroelectric:** *Puspa Upreti<sup>1</sup>; Douglas Abernathy<sup>1</sup>; Raffi Sahul<sup>2</sup>; Raphael Hermann<sup>1</sup>; Michael Manley<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Amphenol Corporation*

11:10 AM

**Investigating Thermal Transport in Nuclear Materials Using Neutron Scattering:** *Shaofei Wang<sup>1</sup>; Zilong Hua<sup>1</sup>; Hao Ma<sup>1</sup>; Adam Aczel<sup>1</sup>; Michael E. Manley<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory*

11:30 AM Invited

**Operando Inelastic Neutron Scattering Measurements of Glass Dynamics:** *Hillary Smith<sup>1</sup>; Wuqian Zhang<sup>1</sup>; Yiyang Jin<sup>1</sup>; Grady Savage<sup>1</sup>; <sup>1</sup>Swarthmore College*

#### SPECIAL TOPICS

### Nix Award and Lecture Symposium VI: Recent Developments in Investigating the Flow Mechanisms of Crystalline Solids — Recent Developments in Investigating the Flow Mechanisms of Crystalline Solids

**Sponsored by:** No Sponsors Found!

**Program Organizers:** Seung Min Han, KAIST; Daniel Gianola, University of California, Santa Barbara

Wednesday AM | March 26, 2025  
170 | MGM Grand

**Session Chairs:** Daniel Gianola, University of California, Santa Barbara; Seung Min Han, KAIST

8:30 AM Keynote

**Investigations of Flow Mechanisms in Crystalline Solids with an Emphasis on the Role of Grain Size:** *Terence Langdon<sup>1</sup>; <sup>1</sup>University of Southampton*

9:30 AM Invited

**Flow Mechanisms of Heterostructured Materials:** *Yuntian Zhu<sup>1</sup>; <sup>1</sup>City University of Hong Kong*

10:00 AM Break

10:20 AM Invited

**Metastable Formation and Thermal Stability of Bulk Nanostructured Metals: Insights From Diffraction Methods:** *Megumi Kawasaki<sup>1</sup>; <sup>1</sup>Oregon State University*

10:50 AM Invited

**Sample Length Scale Effects on Power Law Creep: Implications for Creep Rate Measurements:** *Praveen Kumar<sup>1</sup>; <sup>1</sup>Indian Institute of Science*

11:20 AM Invited

**Crucial Role of Nanoindentation in Novel Structural Materials Research:** *Jae-il Jang<sup>1</sup>; <sup>1</sup>Hanyang University*



## ADVANCED CHARACTERIZATION METHODS

### Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques — FAIR Data

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory; Austin Mcdannald, National Institute of Standards and Technology; Fan Zhang, National Institute of Standards and Technology; Sarshad Rommel, University of Connecticut

Wednesday AM | March 26, 2025  
157 | MGM Grand

**Session Chairs:** Sriram Vijayan, Michigan Technological University; Austin Mcdannald, National Institute of Standards and Technology

#### 8:30 AM Invited

**Advanced Computational and Data Management Approaches at the Advanced Photon Source:** *Nicholas Schwarz*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 8:55 AM Invited

**Characterization within an Automated Lab for Solid State Synthesis - Challenges and Solutions for Data Handling and Interpretation:** *Anubhav Jain*<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

#### 9:20 AM Invited

**Directing Flow: Pipelines for 3D Data:** *Andrew Polonsky*<sup>1</sup>; Paul Chao<sup>1</sup>; Chad Hovey<sup>1</sup>; Alexandre Bordas<sup>1</sup>; Rhianna Oakley<sup>1</sup>; Julia Deitz<sup>1</sup>; John Emery<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 9:45 AM Invited

**Strategies for Accelerated Collection, and Data Curation of Multi-Modal Serial-Sectioning Experiments:** *David Rowenhorst*<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory

#### 10:10 AM Break

#### 10:30 AM Panel Discussion FAIR Data

## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Shape Memory and Super Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

Wednesday AM | March 26, 2025  
123 | MGM Grand

**Session Chairs:** Sriswaroop Dasari, University of Texas at El Paso; Hui-Chia Yu, Michigan State University

#### 8:30 AM

**Effects of Chemistry, Precipitation, and Microcleanliness on The Structural Degradation of NiTiHf High-Temperature Shape Memory Alloys:** *Roberto Orrostita*<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 8:50 AM

**In-Phase/Out-Of-Phase Thermo-Mechanical Loading in High Temperature Shape Memory Alloys:** *Adrien Cassagne*<sup>1</sup>; Dimitris Lagoudas<sup>1</sup>; Jean Briac Le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

#### 9:10 AM

**On the Effects of Micro-Scale Concentration Gradients on Martensitic Transformations in NiTi Shape Memory Alloys:** *Jan Frenzel*<sup>1</sup>; Oluwaseyi Oluwabi<sup>1</sup>; Gunther Eggeler<sup>1</sup>; <sup>1</sup>Ruhr University Bochum

#### 9:30 AM

**Tailoring the Shape-Memory and Superelastic Behaviors in NiTi with Nb Inclusion with Coherent and Semi-Coherent Interfaces Using MD Simulations:** *Adiba Sumaiya Khan*<sup>1</sup>; Xiang Chen<sup>1</sup>; Sakib Al Razi Khan<sup>1</sup>; <sup>1</sup>University of North Carolina Charlotte

#### 9:50 AM

**Shape Memory Effect in the CrFeCo and CrMnFeCoNi Multi-Component System:** Jinsurang Lim<sup>1</sup>; Hwi Yun Jeong<sup>1</sup>; Hyunseok Oh<sup>2</sup>; *Je In Lee*<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>University of Wisconsin-Madison

#### 10:10 AM Break

#### 10:25 AM

**Diffusional-Displacive Mixed-Mode Transformation from Ferrite Parent Phase to Form an Intermetallic Nanocomposite in a Fe-Mo Alloy:** *Rama Srinivas Varanas*<sup>1</sup>; Srikakulapu Kiranbabu<sup>2</sup>; Reina Utsumi<sup>3</sup>; Hiroyuki Saitoh<sup>3</sup>; Ronald Schnitzer<sup>2</sup>; Eiji Akiyama<sup>1</sup>; Motomichi Koyama<sup>1</sup>; <sup>1</sup>Institute for Materials Research, Tohoku University; <sup>2</sup>Montanuniversität Leoben; <sup>3</sup>National Institutes for Quantum Science and Technology

#### 10:45 AM

**Microstructural Evolution in a New Low-Cost Polycrystalline Ni-Base Superalloy for Elevated Temperature Structural Applications:** *George Wise*<sup>1</sup>; Paul Mignanelli<sup>2</sup>; Mark Hardy<sup>2</sup>; Nicholas Jones<sup>1</sup>; Howard Stone<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Rolls-Royce plc.

#### 11:05 AM

**Novel Co-Based Superalloys Strengthened via Local Phase Transformation at Microtwins and Stacking Faults:** *Ashton Egan*<sup>1</sup>; Andreas Bezold<sup>2</sup>; Longsheng Feng<sup>3</sup>; Christopher Zenk<sup>1</sup>; Yunzhi Wang<sup>2</sup>; Michael Mills<sup>2</sup>; Steffen Neumeier<sup>1</sup>; Erdmann Spiecker<sup>1</sup>; Mathias Göken<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-Universität (FAU) Erlangen-Nürnberg; <sup>2</sup>The Ohio State University; <sup>3</sup>Lawrence Livermore National Laboratory

#### 11:25 AM

**Strengthening Superalloys via an Extreme Density of Locally Transformed Stacking Fault Phases:** *Andreas Bezold*<sup>1</sup>; Nicolas Karpstein<sup>2</sup>; Lukas Amon<sup>2</sup>; Jan Vollhüter<sup>2</sup>; Erdmann Spiecker<sup>2</sup>; Michael Mills<sup>1</sup>; Steffen Neumeier<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg

#### 11:45 AM

**The Effect of Ti:Ta Ratio on the Microstructure and Elemental Phase Partitioning in High Co-Containing Powder-Processed Polycrystalline Ni-Based Superalloys for Turbine Disc Applications:** *Frances Synnott*<sup>1</sup>; Paraskevas Kontis<sup>2</sup>; Lewis Owen<sup>1</sup>; Nick Jones<sup>3</sup>; Howard Stone<sup>3</sup>; Mark Hardy<sup>4</sup>; Katerina Christofidou<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>NTNU Norwegian University of Science and Technology; <sup>3</sup>University of Cambridge; <sup>4</sup>Rolls-Royce plc.

## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Additive Manufacturing II: Sintering-Based

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

**Wednesday AM | March 26, 2025**  
**105 | MGM Grand**

**Session Chairs:** Elisa Torresani, San Diego State University; Monica Campos, University Carlos III De Madrid

**8:30 AM**

**Sustainable Reconditioning of Stainless-Steel Powder via Disk Milling:** Zachary Lyon<sup>1</sup>; Gerardo Gamboa<sup>2</sup>; Narendra Dahotre<sup>1</sup>; Marcus Young<sup>1</sup>; Sameehan Joshi<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Emerson Electric Co.

**8:50 AM**

**Effects of Powder Morphology and Capillary Phenomena in Liquid Phase Sintering of Binder Jet Additively Fabricated WC-Co Composite:** Karnakanti Chaithanya Kumar<sup>1</sup>; Mohan Sai Ramalingam<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Shashank Sharma<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**9:10 AM**

**Dimensional and Geometrical Changes During Sintering of Binder Jetted Components:** Elisa Torresani<sup>1</sup>; Thomas Grippi<sup>1</sup>; Alberto Cabo Rios<sup>2</sup>; Marco Zago<sup>3</sup>; Ilaria Cristofolini<sup>3</sup>; Alberto Molinari<sup>3</sup>; Eugene Olevsky<sup>1</sup>; <sup>1</sup>San Diego State University; <sup>2</sup>Chalmers University of Technology; <sup>3</sup>University of Trento

**9:30 AM**

**Microstructural and Mechanical Properties of 6061 Aluminum Alloy Produced Through the Bound-Metal FFF Additive Manufacturing Process:** Eric Faierson<sup>1</sup>; Benjamin Nelson<sup>1</sup>; <sup>1</sup>Iowa State University

**9:50 AM Break**

**10:10 AM**

**Net Shape Hydroxyapatite Components via 3D-Printing and Sintering:** Maryam Ghorbani<sup>1</sup>; Elisa Torresani<sup>1</sup>; Thomas Grippi<sup>1</sup>; Eugene Olevsky<sup>1</sup>; <sup>1</sup>San Diego State University

**10:30 AM**

**Powder Alloys for Green Body Printing and Sintering:** Yannick Naunheim<sup>1</sup>; Christopher A. Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Northwestern University

**10:50 AM**

**Sustainable Fe/FexOy for SMCs: Effects of Fe Powder Feedstock, Morphology and Particle Size:** Lucia Garcia de la Cruz<sup>1</sup>; Paula Alvaredo<sup>1</sup>; Monica Campos<sup>1</sup>; <sup>1</sup>Universidad Carlos III de Madrid

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics IV - Printed Sensors and Devices

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, Rice University; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ethan Secor, Iowa State University

**Wednesday AM | March 26, 2025**  
**361 | MGM Grand**

**Session Chairs:** Masoud Mahjouri-Samani, Auburn University; Yong Lin Kong, Rice University

**8:30 AM Invited**

**Printed Sensors for Extreme Environments:** Kiyo Fujimoto<sup>1</sup>; Malwina Wilding<sup>1</sup>; Michael McMurtrey<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Brian Jaques<sup>2</sup>; Dave Estrada<sup>2</sup>; Zhangxian Deng<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Boise State University

**8:55 AM Invited**

**3D Electronics Fabricated by Synergized Multimaterial Printing and Freeform Laser Induction:** Jian Lin<sup>1</sup>; <sup>1</sup>University of Missouri, Columbia

**9:20 AM Invited**

**High-Throughput and Hybrid Printing of Multifunctional Materials and Devices:** Yanliang Zhang<sup>1</sup>; <sup>1</sup>University of Notre Dame

**9:45 AM Break**

**10:05 AM Invited**

**Micro Additive Manufacturing of Functional Hydrogels:** Xiangfan Chen<sup>1</sup>; <sup>1</sup>Arizona State University

**10:30 AM Invited**

**Printing Multifunctional Hydrogel Devices with Tunable Adhesion and Stretchability for Human-Machine Interfaces:** Yifan Wang<sup>1</sup>; <sup>1</sup>Nanyang Technological University

## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Rare Earth Elements and Other Rare Metals Extraction

**Sponsored by:** TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; Athanasios Karamalidis, Pennsylvania State University; Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland; Hojong Kim, Pennsylvania State University

**Wednesday AM | March 26, 2025**  
**104 | MGM Grand**

**Session Chairs:** Kerstin Forsberg, KTH Royal Institute of Technology; Athanasios Karamalidis, Pennsylvania State University; Takanari Ouchi, University of Tokyo

#### 8:30 AM Keynote

**Challenges in Recycling of Rare Earth Elements Containing Permanent Magnets:** *Bengi Yagmurlu*<sup>1</sup>; <sup>1</sup>Technical University of Clausthal

#### 8:50 AM

**Microstructural Observation on NdFeB Magnets During Pretreatments:** *Kwangsuk Park*<sup>1</sup>; Bosung Seo<sup>1</sup>; Eun Bin Cha<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

#### 9:10 AM

**A Novel Oxidative Leaching of NdCeFeB Magnets for Selective Recovery of Rare Earth Elements:** Venkata Lakshmi Borra<sup>1</sup>; Thupakula Ghana Visarada<sup>2</sup>; Prakash Venkatesan<sup>3</sup>; Mehmet Ali Recai Onal<sup>4</sup>; *Chenna Rao Borra*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur; <sup>2</sup>TATA Steel Ltd.; <sup>3</sup>Universite libre de Bruxelles; <sup>4</sup>Genomines

#### 9:30 AM

**Sustainable Hydrometallurgical Rare Earth Elements Recovery from Waste NdFeB Magnet:** *Huseyin Eren Obuz*<sup>1</sup>; Bengi Yagmurlu<sup>1</sup>; <sup>1</sup>TU Clausthal

#### 9:50 AM

**Recycling Rare Earth Permanent Magnets via Liquid Magnesium Leaching and Distillation:** *Emmanuel Opoku*<sup>1</sup>; Chinenye Chinwago<sup>1</sup>; Adam Powell<sup>1</sup>; Brajendra Mishra<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### 10:10 AM Break

#### 10:30 AM

**Sustainable Supercritical Fluid Extraction of Rare Earth Elements from Canadian Ores: A Cleaner Technology for Resource Recovery:** *Gisele Azimi*<sup>1</sup>; Maziar Sauber<sup>2</sup>; Sicheng Li<sup>1</sup>; Maxwell Etherington-Rivas<sup>1</sup>; <sup>1</sup>University of Toronto; <sup>2</sup>NRCan, Canmeet MINING

#### 10:50 AM

**Extraction of Rare Earth Elements from Bastnasite Ore, and Separation of Heavy REEs and Light REEs by Solvent Extraction:** Sevki Samet Kaplan<sup>1</sup>; *Mehmet Seref Sonmez*<sup>1</sup>; Martina Petranikova<sup>2</sup>; <sup>1</sup>Istanbul Technical University; <sup>2</sup>Chalmers University of Technology

#### 11:10 AM

**Preparation of High-Grade Sodium Tungstate from a Wolframite Ore for Catalytic Applications by Hydrometallurgical Process:** *Alafara Baba*<sup>1</sup>; Sadiu Girigisu<sup>2</sup>; Abdullah Ibrahim<sup>3</sup>; Fausat Akanji<sup>4</sup>; Folahan Adekola<sup>1</sup>; <sup>1</sup>University of Ilorin; <sup>2</sup>Federal Polytechnic, Offa; <sup>3</sup>Federal Polytechnic, Aiyede; <sup>4</sup>SHEDA Science and Technology Complex

#### 11:30 AM

**Design of a Process Route to Recover Antimony Ore Concentrate from the Sand Residue of Nigeria Ondo Tar Sand:** Samson Adegbola<sup>1</sup>; *Ayodele Daniyan*<sup>1</sup>; Abraham Adeleke<sup>1</sup>; Rukayat Akande<sup>1</sup>; Simeon Ibitoye<sup>1</sup>; Kunle Oluwasegun<sup>1</sup>; <sup>1</sup>Obafemi Awolowo University

## MATERIALS SYNTHESIS AND PROCESSING

### Recent Advances in Titanium Science and Technology: MPMD/SMD Symposium Honoring Professor Dipankar Banerjee — Dwell Fatigue in Titanium Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Phase Transformations Committee, TMS: Titanium Committee

**Program Organizers:** Yufeng Zheng, University of North Texas; Abhishek Sharma, University of North Texas; Adam Pilchak, Pratt & Whitney; Rajarshi Banerjee, University of North Texas; Yunzhi Wang, Ohio State University

**Wednesday AM | March 26, 2025**  
**107 | MGM Grand**

**Session Chairs:** Tresa Pollock, University of California - Santa Barbara; Hamish Fraser, Ohio State University

#### 8:30 AM Invited

**Opening Remarks to the MPMD/SMD Symposium Honoring Dipankar Banerjee:** *James Williams*<sup>1</sup>; <sup>1</sup>The Ohio State University

#### 9:00 AM Invited

**Insights on Dwell Fatigue from In-Situ and 3D Microstructural Investigations:** Joe Wendorf<sup>1</sup>; Madeline Vailhe<sup>1</sup>; McLean Echlin<sup>1</sup>; Jean Charles Stinville<sup>2</sup>; Samuel Hemery<sup>3</sup>; *Tresa Pollock*<sup>1</sup>; <sup>1</sup>University of California - Santa Barbara; <sup>2</sup>University of Illinois; <sup>3</sup>Institute P'Prime Ecole Nationale Supérieure de Mécanique et d'Aérotechnique

#### 9:30 AM Invited

**Advances in Understanding Cold Dwell Fatigue in Titanium Alloys:** *Vasisht Venkatesh*<sup>1</sup>; Adam Pilchak<sup>1</sup>; David Furrer<sup>1</sup>; Sergei Burlatsky<sup>2</sup>; <sup>1</sup>Pratt & Whitney; <sup>2</sup>RTX Technology Research Center

#### 10:00 AM Break

#### 10:20 AM Invited

**Dwell Fatigue Deformation Studies in Ti-6246 Alloy:** Yukthesh Venkat Suriseti<sup>1</sup>; Vasisht Venkatesh<sup>2</sup>; Michael Mills<sup>1</sup>; *G. Babu Viswanathan*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Pratt & Whitney

#### 10:50 AM Invited

**Microstructural Dependence of Dwell Fatigue in Titanium Alloys:** *Satyam Suwas*<sup>1</sup>; S. Tejanath Reddy<sup>1</sup>; <sup>1</sup>Indian Institute of Science

#### 11:20 AM Invited

**A Mechanism-Based Model for Fatigue Life Prediction of Titanium Alloys:** *Adam Pilchak*<sup>1</sup>; Michael Schiavone<sup>1</sup>; <sup>1</sup>Pratt & Whitney

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2025 — RHEA and Molybdenum

**Sponsored by:** TMS Structural Materials Division, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Matthew Osborne, Global Advanced Metals; Paul Rottmann, University of Kentucky; Gianna Valentino, University of Maryland

**Wednesday AM | March 26, 2025**  
**168 | MGM Grand**

**Session Chair:** Matthew Osborne, Global Advanced Metals

**8:30 AM Invited**

**Refractory Alloy Microstructure Development with Processing Variations:** *Amy Clarke*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:10 AM**

**High-Throughput Design, Synthesis, and Characterization of Refractory Multi-Principal Element Alloys (MPEAs):** *Cafer Melik Ensar Acemi*<sup>1</sup>; Eli Norris<sup>1</sup>; Brent Vela<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:30 AM**

**New Microscopic Insights on the High Temperature Deformation Mechanisms in Refractory Metals and Alloys:** *Mo-Rigen He*<sup>1</sup>; Sharon Park<sup>1</sup>; Michael Patullo<sup>1</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**9:50 AM Break**

**10:10 AM Invited**

**Creep Resistant Refractory Multiple-Principal-Element Alloy:** *Gaoyuan Ouyang*<sup>1</sup>; Prashant Singh<sup>1</sup>; Hailong Huang<sup>1</sup>; Nicolas Argibay<sup>1</sup>; Matthew Kramer<sup>1</sup>; Duane Johnson<sup>2</sup>; Jun Cui<sup>2</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>Iowa State University

**10:40 AM**

**The Development of New Thermodynamic Databases for Niobium and Molybdenum Alloys:** Liangyan Hao<sup>1</sup>; Weiwei Zhang<sup>1</sup>; Paul Mason<sup>1</sup>; <sup>1</sup>Thermo-Calc Software Inc.

**11:00 AM**

**Microstructure and Mechanical Properties of a Mo-Si-B-Ti Alloy Manufactured by Laser Powder Bed Fusion:** *Longfei Liu*<sup>1</sup>; Liam Wood<sup>1</sup>; Phalgun Nelaturu<sup>1</sup>; Dan Thoma<sup>1</sup>; John Perepezko<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

## MATERIALS SYNTHESIS AND PROCESSING

### REWAS 2025: Sustainable Practices in Strategic and Critical Raw Materials: Exploring Supply Chain Resilience and Recycling Innovations — Uncovering the Circular Supply of Strategic and Critical Metals

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Christina Meskers, SINTEF; Elsa Olivetti, Massachusetts Institute of Technology

**Wednesday AM | March 26, 2025**  
**117 | MGM Grand**

**Session Chair:** Edzhe Soylu, Norwegian University of Science and Technology

**8:30 AM Introductory Comments**

**8:35 AM Invited**

**Low-Cost High Throughput Solution for Creating a Supply Chain of CMMs from E-Waste Using Artificial Intelligence:** *Isha Maun*<sup>1</sup>; Nalin Kumar<sup>1</sup>; Kanishka Tyagi<sup>1</sup>; <sup>1</sup>UHV Technologies Inc

**9:05 AM**

**From Waste to High-Purity Silicon: Refining of Silicon by Directional Solidification and Crystal Pulling Method:** *Katarina Jakovljevic*<sup>1</sup>; Eivind Johannes Øvrelid<sup>2</sup>; Nagarajan Somi Ganesan<sup>2</sup>; Pål Tettlie<sup>2</sup>; Casper Van der Eijk<sup>2</sup>; Maria Wallin<sup>1</sup>; Gabriella Tranell<sup>1</sup>; <sup>1</sup>Norwegian University Of Science And Technology; <sup>2</sup>SINTEF Industry

**9:25 AM**

**Opportunities for Cerium Valorization in the Rare Earth Supply Chain:** *Alfred Amon*<sup>1</sup>; Scott McCall<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**9:45 AM**

**Rare Earth Metals Production Through Metallurgical Reduction: Preparation of Anhydrous Salt and Reduction Using Sodium Metal:** *Himanshu Tanvar*<sup>1</sup>; Diana Aksenova<sup>2</sup>; Jared Gordon<sup>2</sup>; Richard VanLieshout<sup>2</sup>; Philip Keller<sup>3</sup>; Brock O'Kelley<sup>4</sup>; Andrew Matheson<sup>5</sup>; Jon Siddall<sup>5</sup>; Brajendra Mishra<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Creative Engineers, Inc.; <sup>3</sup>Energy Fuels Resources Inc.; <sup>4</sup>Fiftyseven71 rare earth consulting; <sup>5</sup>Nanoscale Powders

**10:05 AM Break**

**10:25 AM**

**Investigating Niobium Coating Removal Techniques from Tool Steel Substrates:** *Akanksha Gupta*<sup>1</sup>; Brajendra Mishra<sup>2</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Worcester Polytechnic Institute

**10:45 AM**

**Screening Alternative Sources of Critical Metals via Alkaline Fusion: The Effect of Flux on Digestion Efficiency:** *Vikram Kumar*<sup>1</sup>; John Scott<sup>1</sup>; Linduo Zhao<sup>1</sup>; Margarita Bargon<sup>1</sup>; Aniruddha Baral<sup>1</sup>; Jeffery Roesler<sup>1</sup>; Brajendra Sharma<sup>2</sup>; Nishant Garg<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>US Department of Agriculture



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## LIGHT METALS

### Scandium Extraction and Use in Aluminum Alloys — Aluminum Scandium Alloys I

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Timothy Langan, Sunrise Energy Metals; Les Edwards, Rain Carbon Inc.

**Wednesday AM | March 26, 2025**  
**110 | MGM Grand**

**Session Chair:** Timothy Langan, Sunrise Energy Metals

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#### 8:30 AM Introductory Comments

##### 8:35 AM Invited

**L12-Strengthened Aluminum Alloys for Conventional and Additive Manufacturing:** Amir Farkoosh<sup>1</sup>; David Dunand<sup>1</sup>; David Seidman<sup>2</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Northwestern University; Northwestern University Center for Atom-Probe Tomography (NUCAPT)

##### 9:25 AM

**Precipitation Behaviour in Al-Cu-Li Alloys Containing Sc And Zr:** Lu Jiang<sup>1</sup>; Katrin Mester<sup>1</sup>; Timothy Langan<sup>2</sup>; Matthew Barnett<sup>1</sup>; Thomas Dorin<sup>1</sup>; <sup>1</sup>Deakin University; <sup>2</sup>Sunrise Energy Metals

##### 9:50 AM

**Effect of Sc/Zr and Thermomechanical Processing on the Microstructure and Properties of AA5083 Rolled Products:** Ahmed Algendy<sup>1</sup>; Paul Rometsch<sup>2</sup>; X. Grant Chen<sup>1</sup>; <sup>1</sup>University of Quebec at Chicoutimi; <sup>2</sup>Rio Tinto Aluminum

##### 10:15 AM Break

##### 10:30 AM

**The Effect of Sc and Zr Dispersoids on the Final Properties of a 6xxx Series Extrusion Alloy:** Eli Harma<sup>1</sup>; Paul Sanders<sup>1</sup>; <sup>1</sup>Michigan Technological University

##### 10:55 AM

**Study of Precipitates Formed During Solidification and Post-Solidification Stage in Low-Sc Al-Mg-Sc Alloys:** Anderson Thadeu Nunes<sup>1</sup>; Conrado Ramos Moreira Afonso<sup>1</sup>; Jose Spinelli<sup>1</sup>; <sup>1</sup>Federal University of Sao Carlos Brazil

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## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Actinide Material Sciences

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Wednesday AM | March 26, 2025**  
**163 | MGM Grand**

**Session Chair:** Assel Aitkaliyeva, University of Florida

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##### 8:30 AM

**Understanding Irradiation Effect on Thermal Conductivity of UO<sub>2</sub>, ThO<sub>2</sub>, U-ThO<sub>2</sub>:** Ella Pek<sup>1</sup>; Zilong Hua<sup>1</sup>; Amey Khanolkar<sup>1</sup>; Saqeeb Adnan<sup>2</sup>; Shuxiang Zhou<sup>1</sup>; Kaustubh Bawane<sup>1</sup>; Marat Khafizov<sup>2</sup>; David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Ohio State University

##### 9:00 AM

**Diffusion in the Uranium-Techneium Binary System:** Josephine Libero-Cruzado<sup>1</sup>; Rebecca Manns<sup>1</sup>; Daniel Koury<sup>1</sup>; <sup>1</sup>University of Nevada Las Vegas

##### 9:20 AM

**Understanding Radiation Effects on the Thermodynamic Behavior of Aged Pu Alloys:** Najeb Abdul-Jabbar<sup>1</sup>; Shane Mann<sup>1</sup>; Kristen Pace<sup>1</sup>; Sarah Hernandez<sup>2</sup>; David Wayne<sup>1</sup>; Jeremy Mitchell<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

##### 9:40 AM Break

##### 10:00 AM

**Probing Phonon Anharmonicity Effects at Elevated Temperatures in Actinide Oxides and Surrogates Using Raman Spectroscopy:** Amey Khanolkar<sup>1</sup>; Saqeeb Adnan<sup>2</sup>; Md Minaruzzaman<sup>2</sup>; Linu Malakkal<sup>1</sup>; David Hurley<sup>1</sup>; Marat Khafizov<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>The Ohio State University

##### 10:20 AM

**Thermal Stability of Aged Plutonium Alloys:** Jeremy Mitchell<sup>1</sup>; Shane Mann<sup>1</sup>; Sarah Hernandez<sup>2</sup>; Kristen Pace<sup>1</sup>; Najeb Abdul-Jabbar<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

##### 10:40 AM

**Interplay Between Phonon and Magnetic Excitations & its Impact on Low-temperature Thermal Transport in Thorium-uranium Mixed Oxides:** Saqeeb Adnan<sup>1</sup>; Zilong Hua<sup>2</sup>; Puspa Upreti<sup>3</sup>; Michael Manley<sup>3</sup>; David Hurley<sup>2</sup>; Marat Khafizov<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

##### 11:00 AM

**Superconductivity in the High Entropy Alloy (NbTa)<sub>0.67</sub>(MoWTh)<sub>0.33</sub>:** Piotr Sobota<sup>1</sup>; Rafal Topolnicki<sup>1</sup>; Tomasz Ossowski<sup>1</sup>; Tomasz Pikula<sup>2</sup>; Daniel Gnida<sup>3</sup>; Rafal Idczak<sup>1</sup>; Adam Pikul<sup>3</sup>; <sup>1</sup>Institute of Experimental Physics, University of Wroclaw; <sup>2</sup>Institute of Electronics and Information Technology, Lublin University of Technology; <sup>3</sup>Institute of Low Temperature and Structure Research, Polish Academy of Sciences

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## NUCLEAR MATERIALS

### Special Topics in Nuclear Materials: Lessons Learned; Non-Energy Systems; and Coupled Extremes — Lessons Learned in Nuclear Materials Science

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Charles Hirst, University of Wisconsin-Madison; Timothy Lach, Oak Ridge National Laboratory; Caleb Clement, Westinghouse Electric Company; Stephen Taller, Oak Ridge National Laboratory; Janelle Wharry, University of Illinois; Jason Trelewicz, Stony Brook University

**Wednesday AM | March 26, 2025**  
**161 | MGM Grand**

**Session Chairs:** Stephen Taller, Oak Ridge National Laboratory; Janelle Wharry, University of Illinois

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##### 8:30 AM Invited

**Best Practices for Irradiation Experiment Design For Nuclear Fuels and Materials Research:** Richard Howard<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:00 AM

**Energy Dispersive X-Ray Spectroscopy (EDS) Induced Defects and Implantation Induced Impurities in Uranium Nitride (UN) and SIMFUEL Pellets:** *Elina Charatsidou<sup>1</sup>; Maria Giamouridou<sup>1</sup>; Nils Wikström<sup>2</sup>; Robert Frost<sup>2</sup>; Gyula Nagy<sup>2</sup>; Petter Ström<sup>2</sup>; Daniel Primetzhof<sup>2</sup>; Pär Olsson<sup>1</sup>*; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Uppsala University

9:20 AM Invited

**Developing a High-Performance Cluster Dynamics Code: Challenges and Lessons Learned:** *Sophie Blondel<sup>1</sup>; Philip Fackler<sup>2</sup>; Philip Roth<sup>2</sup>; David Bernholdt<sup>2</sup>; Brian Wirth<sup>1</sup>*; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

9:50 AM Break

10:10 AM

**Comparison of Hardening and Microstructures of Structural Alloys Irradiated with Fast Neutrons and Dual Ions:** *July Reyes-Zacarias<sup>1</sup>; Stephen Toller<sup>2</sup>; Steven Zinkle<sup>1</sup>*; <sup>1</sup>University of Tennessee Knoxville/Oak Ridge National Laboratory; <sup>2</sup>Oak Ridge National Laboratory

10:30 AM

**Small Scale Tests, Big Lessons Learned:** *Eric Lang<sup>1</sup>; Brad Boyce<sup>2</sup>; Khalid Hattar<sup>3</sup>*; <sup>1</sup>University of New Mexico; <sup>2</sup>Sandia National Labs; <sup>3</sup>University of Tennessee - Knoxville

## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Brittle Versus Plastic Behavior

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Soper, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

Wednesday AM | March 26, 2025  
367 | MGM Grand

**Session Chair:** Daniel Soper, Erich Schmid Institute

8:30 AM Invited

**Are Metallic Glasses Brittle or Ductile?:** *Jan Schroers<sup>1</sup>; Sungwoo Sohn<sup>1</sup>; Ethen Lund<sup>1</sup>*; <sup>1</sup>Yale University

8:55 AM

**Avoiding Annealing-Induced Embrittlement of Metallic Glasses:** *A. Lindsay Greer<sup>1</sup>*; <sup>1</sup>University of Cambridge

9:15 AM Invited

**Improvement of Brittleness by Tailoring a Glassy State Distribution in a Monolithic Metallic Glass Through Thermal Process:** *Rui Yamada<sup>1</sup>; Wookha Ryu<sup>2</sup>; Haruka Isano<sup>1</sup>; Tomohiro Yoshikawa<sup>1</sup>; Keisuke Tabaru<sup>1</sup>; Junji Saida<sup>1</sup>*; <sup>1</sup>Tohoku University; <sup>2</sup>Seoul National University

9:40 AM

**Mitigating Relaxation-Induced Embrittlement in Metallic Glasses with Multi-Component Microalloying:** *Miguel Costa<sup>1</sup>; Owain Houghton<sup>1</sup>; A. Lindsay Greer<sup>1</sup>*; <sup>1</sup>University of Cambridge

10:00 AM Break

10:20 AM Invited

**Reaching the Yield Point of a Glass During X-Ray Irradiation:** *Giulio Monaco<sup>1</sup>*; <sup>1</sup>University of Padova

10:45 AM Invited

**Heterogeneity and Its Roles in Hardening and Toughening of Metallic Glasses:** *Mo Li<sup>1</sup>*; <sup>1</sup>Georgia Institute of Technology

11:10 AM Invited

**Rejuvenation of Metallic Glass Through Memory Effect in the Relaxed Fe Based Amorphous Alloys:** *Yi Li<sup>1</sup>*; <sup>1</sup>Shenyang National Laboratory For Materials Science

## MATERIALS SYNTHESIS AND PROCESSING

### Sustainability of High Temperature Alloys — Rethink

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Mark Hardy, Rolls-Royce Plc; Caspar Schwalbe, MTU Aero Engines AG; Jeremy Rame, Naarea; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Martin Detrois, National Energy Technology Laboratory; Katerina Christofidou, University of Sheffield

Wednesday AM | March 26, 2025  
102 | MGM Grand

**Session Chairs:** Mark Hardy, Rolls-Royce Plc; Jeremy Rame, Naarea; Katerina Christofidou, University of Sheffield; Jonah Klemm-Toole, Colorado School of Mines

9:00 AM Introductory Comments

9:05 AM

**Effects of Fe Substitution on CoNi-Based Superalloys:** *Steffen Neumeier<sup>1</sup>; Andreas Bezold<sup>2</sup>; Mathias Göken<sup>1</sup>*; <sup>1</sup>University of Erlangen Nuernberg; <sup>2</sup>The Ohio State University

9:30 AM

**Simulation of the Mechanical Behavior During Solidification and Possible Recrystallization During Heat Treatment Stages of a Nickel-Based Single-Crystal Superalloys:** *Louise Grau<sup>1</sup>; Jonathan Cormier<sup>2</sup>; Patrick Villechaise<sup>2</sup>; Besnik Sadriji<sup>3</sup>; Florent Mauget<sup>2</sup>*; <sup>1</sup>Safran Aircraft Engines - Institut Pprime; <sup>2</sup>Institut Pprime; <sup>3</sup>Safran Aircraft Engines

9:50 AM

**Relationship Between Manufacturing Parameters and Creep Performance of Inconel 718 Fasteners:** *Cyril Lavogiez<sup>1</sup>; Josselin Paturaud<sup>1</sup>; Gildas Boleis<sup>2</sup>*; <sup>1</sup>R&D LISI Aerospace; <sup>2</sup>BAT - LISI Aerospace

10:10 AM Break

10:30 AM

**Frequency and Directionality of the Onset of Heteroepitaxial Recrystallization:** *Yonguk Lee<sup>1</sup>; Victoria Miller<sup>1</sup>*; <sup>1</sup>University of Florida

10:50 AM

**Temperature and Size Dependent Mechanical Properties of Additively Manufactured GRX-810:** *Mehrdad Pourjam<sup>1</sup>; Gabriel Demeneghi<sup>2</sup>; Danial Salehi<sup>1</sup>; Paul Gradl<sup>2</sup>; Kavan Hazeli<sup>1</sup>*; <sup>1</sup>University of Arizona; <sup>2</sup>National Aeronautics and Space Administration

11:10 AM

**Novel Environmentally Friendly Cr-Si Slurry Coatings for Turbine Applications:** *Michael Kerbstadt<sup>1</sup>; Emma Marie White<sup>1</sup>; Kan Ma<sup>2</sup>; Alexander Knowles<sup>2</sup>; Mathias Christian Galetz<sup>1</sup>*; <sup>1</sup>Dechema-Forschungsinstitut; <sup>2</sup>University of Birmingham

## Thin Films and Coatings: Properties, Processing and Applications — Thin Films for Nanotechnology and Electronics I

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougin, CNRS, Is2m; Brandon Krick, Florida A&M University-Florida State University

**Wednesday AM | March 26, 2025**  
**101 | MGM Grand**

**Session Chairs:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Karine Mougin, CNRS, Is2m; Tomas Grejtak, Oak Ridge National Laboratory

**8:30 AM Invited**

**Spectro-Microscopy of the Local Chemistry and Structure of Thin Films:** *Jerzy Sadowski*<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory

**9:00 AM**

**Effect of Sol-Gel-Based Dielectric Coatings on Silicon Radiative Properties:** *Sufian Abedrabbo*<sup>1</sup>; Ali Abdullah<sup>1</sup>; Anthony Fiory<sup>2</sup>; Nuggehalli Rvindra<sup>3</sup>; <sup>1</sup>Khalifa University; <sup>2</sup>Integron Solutions LLC.; <sup>3</sup>New Jersey Institute of Technology

**9:20 AM**

**A New Electrochemical Sensor for Lithium Hexafluorophosphate Detection:** *Karine Mougin*<sup>1</sup>; Wejden Gongi<sup>1</sup>; <sup>1</sup>Cnrs, Is2m

**9:40 AM**

**Low-Cost Chemical Deposition Techniques of Various Thin Films onto Various Substrates with Enhanced Properties:** *Nicole Ray*<sup>1</sup>; Alexander Rouhani<sup>2</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Rayn Innovations

**10:00 AM Break**

**10:20 AM**

**2D Simulation of Silicon Solar Cells:** *Allyson Tarifa*<sup>1</sup>; Nuggehalli Ravindra<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

**10:40 AM**

**Charge Redistribution Around Threading Dislocations in III-Nitride Epilayers:** *Roman Groger*<sup>1</sup>; Jan Fikar<sup>1</sup>; <sup>1</sup>Institute of Physics of Materials, Czech Academy of Sciences

## 2D Materials – Preparation, Properties, Modeling & Applications — Preparation, Properties, Modeling & Simulation IV

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nuggehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

**Wednesday PM | March 26, 2025**  
**362 | MGM Grand**

**Session Chairs:** Nuggehalli Ravindra, New Jersey Institute of Technology; Hesam Askari, University of Rochester

**2:00 PM Introductory Comments**

**2:10 PM Invited**

**Ultrafast Synchrotron X-Ray Imaging and Multiphysics Modelling of Ultrasound Assisted Liquid Phase Exfoliation in Viscous Fluids:** *Ling Qin*<sup>1</sup>; Jiawei Mi<sup>2</sup>; <sup>1</sup>University of Wyoming; <sup>2</sup>University of Hull

**2:30 PM Invited**

**Understanding Defects and Dopants in 2D Materials Coupling Ab-Initio Calculations with Experiments:** *Richard Hennig*<sup>1</sup>; Preston Vargas<sup>1</sup>; Luke Holtzman<sup>2</sup>; Anne Marie Tan<sup>3</sup>; Biswas Rijal<sup>1</sup>; Christoph Freysoldt<sup>4</sup>; Bruno Schuler<sup>5</sup>; Joshua Robinson<sup>6</sup>; Katayun Barmak<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Columbia University; <sup>3</sup>Institute of High Performance Computing; <sup>4</sup>Max Planck Institute for Sustainable Materials; <sup>5</sup>Swiss Federal Laboratories for Materials Science and Technology; <sup>6</sup>Pennsylvania State University

**2:50 PM Invited**

**Wafer-Scale Epitaxial MoS<sub>2</sub> Monolayers Grown by Metalorganic Chemical Vapor Deposition: Effects of Growth Temperature and Pre-Growth Annealing:** *Chen Chen*<sup>1</sup>; Nicholas Trainor<sup>1</sup>; Shalini Kumari<sup>1</sup>; Henrik Myja<sup>2</sup>; Tilmar Kümmell<sup>2</sup>; Zhiyu Zhang<sup>1</sup>; Yuxi Zhang<sup>1</sup>; Anuj Bisht<sup>3</sup>; Muhtasimul Sadaf<sup>1</sup>; Najam Sakib<sup>1</sup>; Ying Han<sup>1</sup>; Thomas McKnight<sup>1</sup>; Andrew Graves<sup>1</sup>; Meghan Leger<sup>1</sup>; Nicholas Redwing<sup>1</sup>; Myeongok Kim<sup>4</sup>; Dorota Kowalczyk<sup>5</sup>; Gerd Bacher<sup>2</sup>; Nasim Alem<sup>1</sup>; Yang Yang<sup>1</sup>; Saptarshi Das<sup>1</sup>; Joan Redwing<sup>1</sup>; <sup>1</sup>Penn State University; <sup>2</sup>University of Duisburg-Essen; <sup>3</sup>Indian Institute of Technology Kharagpur; <sup>4</sup>The University of Tokyo; <sup>5</sup>University of Lodz

**3:10 PM**

**Wafer-Scale Integration and Extraordinary Functional Properties of Q-Carbon Thin Films:** *Naveen Narasimhachar Joshi*<sup>1</sup>; Pranay Kalakonda<sup>1</sup>; Roger Narayan<sup>1</sup>; Jagdish Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:30 PM Break**

**3:40 PM**

**CO<sub>2</sub> Capture Using Zeolitic Imidazolate Frameworks:** Jamal Oyegoke<sup>1</sup>; Obembe Oluwafunke<sup>2</sup>; Ikhazuagbe Ifijen<sup>3</sup>; Gregory Onaiwu<sup>4</sup>; Bala Anegbe<sup>5</sup>; Joshua Onaifo<sup>6</sup>; Akinola Olugbemide<sup>7</sup>; Danjuma Ibrahim<sup>3</sup>; <sup>1</sup>Sam Houston State University; <sup>2</sup>Universite Paris-Cite; <sup>3</sup>Rubber Research Institute of Nigeria; <sup>4</sup>Benson Idahosa University; <sup>5</sup>Western Delta University; <sup>6</sup>Ambrose Ali University; <sup>7</sup>Auchi Polytechnic

4:00 PM Invited

**Toward Industrial Production of Linde Type A Zeolite for Various Applications from Nigerian Kaolin Deposit: A First Attempt at Investigation of Process Variables:** *Abdulsalami Kovo*<sup>1</sup>; Raheed Agava<sup>2</sup>; Memunat Yusuf<sup>2</sup>; <sup>1</sup>Federal University of Technology; <sup>2</sup>National Agency for Science and Engineering Infrastructure

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## MECHANICS OF MATERIALS

### Accelerated Discovery and Insertion of Next Generation Structural Materials — Accelerated Discovery of High Temperature Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Andrew Bobel, General Motors Corporation; Bharat Gwalani, North Carolina State University; Jonah Klemm-Toole, Colorado School of Mines; Antonio Ramirez, Ohio State University; Matthew Steiner, University of Cincinnati; Janelle Wharry, University of Illinois

**Wednesday PM | March 26, 2025**  
**364 | MGM Grand**

**Session Chairs:** Soumya Nag, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines

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2:00 PM Invited

**Accelerated Development of Co-Based Superalloys for High Temperature Applications:** *Whitney Tso*<sup>1</sup>; Carelyn Campbell<sup>2</sup>; David Seidman<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>National Institute of Standards and Technology

2:30 PM

**High Entropy Alloys to High Entropy Conventional Alloys:** Saurabh Nene<sup>1</sup>; *A. Dutta*<sup>1</sup>; A. Balpande<sup>1</sup>; D. Mishra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur

2:50 PM

**Modeling of Microstructural Effects on Mechanical Properties of High Entropy Alloys at Mesoscale:** Thomas Ralph<sup>1</sup>; Manish Vasoya<sup>2</sup>; Vahid Attari<sup>1</sup>; *Dimitris Lagoudas*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Rutgers University

3:10 PM

**Structural, Mechanical and Electronic Properties of BCC Refractory Binary Alloys:** *Surya Bijjala*<sup>1</sup>; Susan Atlas<sup>1</sup>; Pankaj Kumar<sup>1</sup>; <sup>1</sup>University of New Mexico

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Innovative Materials, Processing and Characterization

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

**Wednesday PM | March 26, 2025**  
**350 | MGM Grand**

**Session Chair:** Henry Colorado, Universidad de Antioquia

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2:00 PM Invited

**Melt Mixing and Element Vaporization During Laser Powder Directed Energy Deposition:** *Joerg Volpp*<sup>1</sup>; <sup>1</sup>University West

2:30 PM

**Mechanistic Insights into Ultrasonic Atomization and Grain Refinement Via Cavitation-Induced Shock Waves:** Abhinav Priyadarshi<sup>1</sup>; Lukasz Zrodowski<sup>2</sup>; James Broughton<sup>1</sup>; Dmitry Eskin<sup>3</sup>; *Iakovos Tzanakis*<sup>1</sup>; <sup>1</sup>Oxford Brookes University; <sup>2</sup>Amazemet Sp. z o.o.; <sup>3</sup>Brunel University London

2:50 PM

**Tailoring the Transition Microstructure of Bimetallic Builds Via Additive Manufacturing with High-Intensity Ultrasound:** *Xianqiang Fan*<sup>1</sup>; Harry Chapman<sup>1</sup>; Catherine Tonry<sup>2</sup>; Ivars Krastins<sup>2</sup>; Kai Zhang<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Samuel Clark<sup>3</sup>; Alexandar Rack<sup>4</sup>; Chu Lun Alex Leung<sup>1</sup>; Andrew Kao<sup>2</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>University of Greenwich; <sup>3</sup>X-ray Science Division, Argonne National Laboratory; <sup>4</sup>ESRF-The European Synchrotron

3:10 PM

**Unravelling Particle-Melt Pool Impact Dynamics and In-Flight Laser-Powder Stream Interaction in Laser Directed Energy Deposition Process:** Akash Aggarwal<sup>1</sup>; Roland Richter<sup>1</sup>; Jian Yang<sup>1</sup>; Karol Kuglarz<sup>1</sup>; Marc Leparoux<sup>1</sup>; Otto Lippmann<sup>2</sup>; G. Abreu-Faria<sup>2</sup>; *Christian Leinenbach*<sup>1</sup>; <sup>1</sup>Empa - Swiss Federal Laboratories for Materials Science and Technology; <sup>2</sup>Helmholtz Centre Hereon, Institute of Materials Physics

3:30 PM Break

3:45 PM

**Powder Flow Characterization with the Powder Spreading Testbed (PST):** *Aniruddha Das*<sup>1</sup>; Jesse Redford<sup>1</sup>; Eric Whinton<sup>1</sup>; <sup>1</sup>NIST

4:05 PM

**Damage Tolerance in Heterogeneous Carbide Ceramics Produced via Multi-Material Additive Manufacturing:** *Marc Meyers*<sup>1</sup>; Joshua Pelz<sup>2</sup>; Nicholas Ku<sup>3</sup>; Jeffrey Swab<sup>3</sup>; Matthew Guziewski<sup>3</sup>; Lionel Gonzalez<sup>3</sup>; Samuel Figueroa<sup>1</sup>; Taylor Shoulders<sup>3</sup>; <sup>1</sup>University of California, San Diego; <sup>2</sup>Limber Prosthetics; <sup>3</sup>US Army Research Laboratory

4:25 PM

**Modeling Electrospray of Water and Liquid Metals:** *Amanda Smith*<sup>1</sup>; Robert Hyers<sup>2</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Worcester Polytechnic Institute

4:45 PM

**Directed Energy Deposition of Heterostructured Steels for Optimal Mechanical Properties:** *Xiao Shang*<sup>1</sup>; Soumya Dash<sup>1</sup>; Tianyi Lyu<sup>1</sup>; Haitao Wen<sup>1</sup>; Evelyn Li<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University Of Toronto



## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning — Modeling of AM Properties and Microstructures I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Changwon National University

Wednesday PM | March 26, 2025  
311 | MGM Grand

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Jing Zhang, Purdue University

#### 2:00 PM

**Accelerating Crystal Plasticity Fatigue Simulations of Additively Manufactured Metals Using the "Materialize" Framework:** *George Weber*<sup>1</sup>; Joshua Pribe<sup>2</sup>; Brodan Richter<sup>1</sup>; Saikumar Yeratapally<sup>3</sup>; Patrick Leser<sup>1</sup>; Andrew Kitahara<sup>2</sup>; Somnath Ghosh<sup>4</sup>; Edward Glaessgen<sup>1</sup>; <sup>1</sup>NASA Langley Research Center; <sup>2</sup>Analytical Mechanics Associates; <sup>3</sup>Science and Technology Corporation; <sup>4</sup>Johns Hopkins University

#### 2:20 PM

**Modeling Fatigue Crack Initiation and Propagation Life in Additively Manufactured Alloys Across Fatigue Regimes:** *Krzysztof Stopka*<sup>1</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University

#### 2:40 PM

**Revisiting the Stefan Problem for Accurate AM Modeling:** *Dilip Banerjee*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

#### 3:00 PM

**Thermo-Mechanical Modeling and Validation of Residual Stress During Metal Laser Powder Bed Fusion and Post-Build Stress Relief Heat Treatment Processes:** *Prataprao Patil*<sup>1</sup>; Alon Mazon<sup>1</sup>; Bartłomiej Pielacha<sup>2</sup>; Yan Gao<sup>1</sup>; <sup>1</sup>GE Aerospace Research; <sup>2</sup>GE Aerospace

#### 3:20 PM

**Preventing Substrate Distortion Using Hybrid Additive and Subtractive Approach:** *Wen Dong*<sup>1</sup>; Blane Fillingim<sup>1</sup>; Bhagya Prabhune<sup>1</sup>; Lauren Heinrich<sup>1</sup>; Thomas Feldhausen<sup>1</sup>; Srdjan Simunovic<sup>1</sup>; Yousub Lee<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:40 PM Break

#### 4:00 PM

**Modeling and Simulation of the Shock Response of Additively Manufactured High-Performance Steel:** *Benoit Revil-Baudard*<sup>1</sup>; Oana Cazacu<sup>1</sup>; Peter Sable<sup>2</sup>; Sujeily Soto-Medina<sup>3</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Sandia National Lab; <sup>3</sup>Air Force Research Laboratory

#### 4:20 PM

**Microstructure Evolution and the Influence on Material Properties in Additive Manufacturing:** *Wei Huang*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Iron, Nickel, and Aluminum-Based Alloys II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Sezer Ozerinc, University of Illinois at Urbana-Champaign; Yu Zou, University of Toronto; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Pacific Northwest National Laboratory; Keivan Davami, University of Alabama

Wednesday PM | March 26, 2025  
310 | MGM Grand

**Session Chairs:** Keivan Davami, University of Alabama; Eda Aydogan, Pacific Northwest National Laboratory

#### 2:00 PM Invited

**High-Throughput Nanomechanical Evaluation of Fe-Ni-Cr Alloys at Cryogenic Temperatures:** *Samantha Manness*<sup>1</sup>; Jeff Wheeler<sup>2</sup>; Joerg Loeffler<sup>3</sup>; *David Dunand*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>FemtoTools AG; <sup>3</sup>ETH

#### 2:40 PM

**In Situ HRDIC-EBSD Analysis of the Deformation Mechanisms of a Zn-1wt%Mg Alloy Manufactured by Laser Power Bed Fusion:** *Nafiseh Mollaei*<sup>1</sup>; Alireza Rezaei<sup>2</sup>; Mónica Echeverry-Rendón<sup>2</sup>; Federico Sket<sup>2</sup>; Jon Molina-Aldareguia<sup>1</sup>; *Javier Llorca*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>IMDEA Materials Institute

#### 3:00 PM

**Analytical Additive Manufacturing for Microstructure Evolution and the Influence on Mechanical Behavior:** *Wei Huang*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

#### 3:20 PM

**Enhanced High-Temperature Performance of LPBF-Produced Inconel 718 Alloy through  $\delta$ -phase control:** *Hyokyung Sung*<sup>1</sup>; Sangyeol Ha<sup>2</sup>; Won-Seok Ko<sup>3</sup>; Jae Bok Seol<sup>1</sup>; <sup>1</sup>Kookmin University; <sup>2</sup>Myongji University; <sup>3</sup>Inha University

#### 3:40 PM Break

#### 4:00 PM Invited

**High-Temperature Behavior, Ductility Loss, and Deformation Mechanisms Transition in Additively Manufactured Haynes 214:** *Kavan Hazeli*<sup>1</sup>; <sup>1</sup>University of Arizona

#### 4:40 PM

**Comparative Study of Mechanical Properties and Deformation Mechanisms in Additively Manufactured Ti-6Al-4V and Ti-5Al-5V-5Mo-3Cr Alloys in Lattice Structure Topologies:** *Mehrdad Pourjam*<sup>1</sup>; Danial Salehi<sup>1</sup>; Thomas Voisin<sup>2</sup>; Kavan Hazeli<sup>1</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Lawrence Livermore National Laboratory

#### 5:00 PM

**Understanding and Predicting the Deformation Behavior and Failure Modes in Micro-Architected Materials with Gyroid Topologies:** *Holly Carlton*<sup>1</sup>; James Bellino<sup>1</sup>; Jonathan Lind<sup>1</sup>; Brandon Zimmerman<sup>1</sup>; Mukul Kumar<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Marine Materials and Structures — Adoption of Additive Manufacturing in the Marine Sector / Challenges of Additive Manufacturing in the Marine Industry

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Mohsen Mohammadi, University Of New Brunswick; Meysam Haghsheenas, University Of Toledo; Charles Fisher, Naval Surface Warfare Center - Carderock

**Wednesday PM | March 26, 2025**  
**315 | MGM Grand**

**Session Chairs:** Mohsen Mohammadi, University Of New Brunswick; Meysam Haghsheenas, University of Toledo

#### 2:00 PM Keynote

**Delivering on the Promise of Large-Scale Metal AM:** D. Mark Douglass<sup>1</sup>; Ben Schaeffer<sup>1</sup>; <sup>1</sup>Lincoln Electric

#### 3:00 PM

**Additive Friction Stir Deposition: A Novel Approach for Marine Alloys Fabrication:** Mandana Meisami Azad<sup>1</sup>; Edward Colvin<sup>1</sup>; John Beatty<sup>1</sup>; <sup>1</sup>MELD Manufacturing

#### 3:20 PM

**Dislocation--Precipitate Interactions in Wire-Arc Additive Manufactured Nickel Aluminum Bronze Alloy Through Micro-Pillar Deformation:** Faizan Hijazi<sup>1</sup>; Mostafa Omar<sup>1</sup>; Justin Norkett<sup>2</sup>; Charles Fisher<sup>2</sup>; David Rowenhorst<sup>3</sup>; Jaafar El Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Naval Surface Warfare Center, Carderock Division; <sup>3</sup>U.S. Naval Research Laboratory

#### 3:40 PM Break

#### 4:00 PM

**Additive Manufacturing For Maritiem Industry:** Dipak Banerjee<sup>1</sup>; Ashok Kumar<sup>1</sup>; <sup>1</sup>Welspun Tubular INc

#### 4:20 PM

**Influence of Build Direction and Part Size on the Microstructure and Mechanical Properties of 3D Printed 316 Stainless Steel:** Chase Gesteland<sup>1</sup>; Andrew Lewis<sup>2</sup>; Randall Doles<sup>2</sup>; David Boch<sup>2</sup>; Donald Tezbir<sup>2</sup>; Jonathan Ruffley<sup>2</sup>; Grace Gu<sup>1</sup>; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Naval Nuclear Laboratory

#### 4:40 PM

**High-Temperature Mechanical Properties of Wire Directed Energy Deposited Commercially Pure Titanium:** Blanca Palacios<sup>1</sup>; Sohail M.A.K. Mohammed<sup>1</sup>; Tanaji Paul<sup>1</sup>; Aleksander Aleman<sup>1</sup>; Sean Langan<sup>2</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>Solvus Global LLC

#### 5:00 PM

**Microstructure-Property Relationships of Wire-Arc Additively Manufactured 2205 Duplex Stainless Steels:** Grant Johnson<sup>1</sup>; Moon Tan<sup>2</sup>; Mikhail Khrenov<sup>2</sup>; Michelle Hobdari<sup>2</sup>; Maria Quintana<sup>3</sup>; Sougata Roy<sup>1</sup>; Sneha Narra<sup>2</sup>; Peter Collins<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Carnegie Mellon University

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Microstructural and Mechanical Long-Term Stability of AM Materials — Effects of Postprocessing: HIP

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; John Carpenter, Los Alamos National Laboratory; Eric Payton, University of Cincinnati; Emma White, DECHEMA Forschungsinstitut; Sudarsanam Babu, University of Maryland; Markus Chmielus, University of Pittsburgh

**Wednesday PM | March 26, 2025**  
**302 | MGM Grand**

**Session Chairs:** Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Markus Chmielus, University of Pittsburgh

#### 2:00 PM

**Microstructure Evolution and Creep Property of Laser Powder Bed Fused Hypereutectic Al-16Ce-1Mg Alloy:** Haijian Yang<sup>1</sup>; Thinh Huynh<sup>2</sup>; Yongho Sohn<sup>2</sup>; David Weiss<sup>3</sup>; Le Zhou<sup>1</sup>; <sup>1</sup>Marquette University; <sup>2</sup>University of Central Florida; <sup>3</sup>Vision Materials

#### 2:20 PM

**Electroplated Laser-Powder Bed Fusion and Bound Powder Extrusion Additive Manufactured 17-4 Stainless Steel:** Natalia Saiz<sup>1</sup>; Benjamin White<sup>1</sup>; Tylan Watkins<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 2:40 PM

**Effect of In-Situ Laser Remelting on Microstructural Evolution and Anisotropy in SS316L from Laser Directed Energy Deposition:** Rajendra Hodgir<sup>1</sup>; Ramesh Singh<sup>1</sup>; Soham Mujumdar<sup>1</sup>; <sup>1</sup>IIT Bombay

#### 3:00 PM

**Directed Energy Deposition of Modified PH 13-8 Mo Powder: Microstructure and Tensile Properties:** Gokce Aydin<sup>1</sup>; Fabian Hanning<sup>1</sup>; Joel Andersson<sup>1</sup>; Maria Asuncion Valiente Bermejo<sup>1</sup>; <sup>1</sup>University West

#### 3:20 PM Break

#### 3:40 PM

**Characterization of Build Parameters and Microstructure in Low Heat Input WA-DED of Ni-Based Superalloy Haynes 282:** Benjamin Adam<sup>1</sup>; Luis Pizano<sup>2</sup>; Rui Feng<sup>3</sup>; Robert Turpin<sup>1</sup>; Graham Tewksbury<sup>1</sup>; Chantal Sudbrack<sup>3</sup>; Wei Xiong<sup>2</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>University of Pittsburgh; <sup>3</sup>National Energy Technology Lab

#### 4:00 PM

**Effect of Hot Isostatic Pressing and Solution Treatment on Recrystallisation of Haynes 282 Built with Laser Powder Bed Fusion:** Kameshwaran Swaminathan<sup>1</sup>; Joel Andersson<sup>1</sup>; <sup>1</sup>University West

#### 4:20 PM

**Hot Deformation Behavior of Additively Manufactured Ti-6Al-4V:** Hanna Czarise Regidor<sup>1</sup>; Jubert Pasco<sup>1</sup>; Kudakwashe Nyamuchiwa<sup>1</sup>; Candy Mercado<sup>2</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>University of the Philippines

#### 4:40 PM

**Ti-6Al-4V L-PBF Lattices Compression Testing:** Shahrooz Nafisi<sup>1</sup>; John Arputharaj<sup>1</sup>; Reza Ghomashchi<sup>1</sup>; <sup>1</sup>University of Adelaide

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Incorporating Breakthrough Functionalities for Building Large Scale Components — Functionally Graded and Multimaterials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Jonah Klemm-Toole, Colorado School of Mines; Soumya Nag, Oak Ridge National Laboratory; John Carpenter, Los Alamos National Laboratory; Sougata Roy, Iowa State University; Peeyush Nandwana, Oak Ridge National Laboratory; Sneha Prabha Narra, Carnegie Mellon University; Lang Yuan, University of South Carolina; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Alex Kitt, Edison Welding Institute; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC

**Wednesday PM | March 26, 2025**  
**301 | MGM Grand**

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Sougata Roy, Iowa State University

**2:00 PM Invited**

**Melt Pool Monitoring in Functionally Gradient Materials Using Directed Energy Deposition:** Clayton Perbix<sup>1</sup>; Ariel Gluck<sup>1</sup>; Joy Gockel<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**2:40 PM**

**Testing of Multi-Material Interfaces Produced by Laser Powder Bed Fusion Using a Powder Binning Approach:** Suyash Niraula<sup>1</sup>; Justin Gillham<sup>1</sup>; Naiyer Shokri<sup>1</sup>; Thomas Berfield<sup>1</sup>; <sup>1</sup>University of Louisville

**3:00 PM**

**Multi-Material Fabrication and Part Repair with Powder Directed Energy Deposition Additive Manufacturing:** Justin Gillham<sup>1</sup>; Thomas Berfield<sup>1</sup>; <sup>1</sup>University of Louisville AMIST

**3:20 PM**

**Notch Strengthening of Powder-DED Processed 316L Stainless Steel with Inconel 718:** Kenneth DeGarmo<sup>1</sup>; Dwight Smith<sup>2</sup>; Calvin Stewart<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Nidec Machine Tool America

**3:40 PM Break**

**4:00 PM Invited**

**Large-Scale Additive Manufacturing of Alternating Dissimilar Aluminum Alloys via Additive Friction Stir Deposition:** Hang Yu<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute And State University

**4:40 PM**

**From Material Research to Industrial Application: Advanced Fabrication of FGM/Bimetallic Using DED Method with C103 and Ti-6Al-4V for Rocket Nozzle Extension:** Jihyun Jang<sup>1</sup>; Seokjin Shin<sup>1</sup>; Minseong Kim<sup>1</sup>; Jihun Kim<sup>1</sup>; Seunghwan Lim<sup>1</sup>; Hanzu Haller<sup>1</sup>; <sup>1</sup>InssTek

## BIOMATERIALS

### Advanced Biomaterials for Biomedical Implants — Advanced Hard-Tissue Alloy Implants

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Penn State; Vinoy Thomas, University of Alabama at Birmingham

**Wednesday PM | March 26, 2025**  
**308 | MGM Grand**

**Session Chair:** Fariborz Tavangarian, Penn State

**2:00 PM**

**Enhancing Structural Efficiency Through Design Tactics for Biomimetic Nested Cylindrical Frameworks:** Niloofer Fani<sup>1</sup>; Armaghan Hashemi Monfared<sup>1</sup>; Sorour Sadeghzade<sup>2</sup>; Fariborz Tavangarian<sup>3</sup>; <sup>1</sup>Penn State Harrisburg; <sup>2</sup>Westlake University; <sup>3</sup>Penn State

**2:20 PM**

**Machine Learning-Driven Magnesium Alloy Design for Biomedical Implants Through Process Optimization:** Sreenivas Raguraman<sup>1</sup>; Maitreyee Priyadarshini<sup>1</sup>; Adam Griebel<sup>2</sup>; Paulette Clancy<sup>1</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Fort Wayne Metals

**2:40 PM**

**Advancing Dental Implant Technologies: Characterizing Ti-Cu Alloys Using Core/Shell Structures for Enhanced Mechanical Properties and Corrosion Resistance:** Carlos Blank<sup>1</sup>; Camilo Bedoya<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**3:00 PM**

**From Corrosion to Mechanics: Evaluating Novel Magnesium Alloys for Biodegradable Wire Applications:** Beril Ulugun<sup>1</sup>; Sreenivas Raguraman<sup>1</sup>; Nana Osei-Owusu<sup>1</sup>; Sneha Raj<sup>1</sup>; Shivam Dixit<sup>1</sup>; Adam Griebel<sup>2</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Fort Wayne Metals

**3:20 PM**

**High Throughput Exploration of Mo-Ag Alloys for Antibacterial Coatings on Medical Implants:** Maria Watroba<sup>1</sup>; Peter Denninger<sup>1</sup>; Killang Pratama<sup>2</sup>; Caroline Hain<sup>1</sup>; Hendrik Jansen<sup>1</sup>; Clara Guarch Perez<sup>1</sup>; Qun Ren Zulian<sup>1</sup>; Jakob Schwiedrzik<sup>1</sup>; Johann Michler<sup>1</sup>; <sup>1</sup>Empa Swiss Federal Laboratories for Materials Science and Technology

**3:40 PM Break**

**3:55 PM**

**Influence of Laser Power and Scanning Speed on Performances of LPBF Fe-16Mn-0.7C for Bioabsorbable Stent Applications:** Maria Laura Gatto<sup>1</sup>; Paolo Mengucci<sup>1</sup>; Marcello Cabibbo<sup>1</sup>; Diego Mantovani<sup>2</sup>; Carlo Paternoster<sup>2</sup>; <sup>1</sup>Università Politecnica delle Marche; <sup>2</sup>Laval University

**4:15 PM**

**Innovative Biodegradable Zn Alloys Produced by Rapid Solidification:** Wiktor Bednarczyk<sup>1</sup>; Piotr Bata<sup>1</sup>; <sup>1</sup>AGH University of Science and Technology

**4:35 PM**

**Novel Surface Treatment of Ti-Containing Multiprincipal Element Alloys for Orthopedic Implants:** David Beaudry<sup>1</sup>; Nicholas Gigliotti<sup>1</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University

4:55 PM

**Enhancing IoMT with Biocompatible Triboelectric Nanogenerators for Sustainable Medical Device Powering:** *Andreia Pereira<sup>1</sup>; <sup>1</sup>i3S*

5:15 PM

**Low-Percentage Copper Doping To Optimize The Antimicrobial Properties Of Fluorapatite For Bone Scaffold Applications:** *Pooya Elahi<sup>1</sup>; <sup>1</sup>University of Utah*

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — High Strain Rates

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

**Wednesday PM | March 26, 2025**  
**170 | MGM Grand**

**Session Chairs:** Curt Bronkhorst, University of Wisconsin-Madison; Philip Eisenlohr, Michigan State University

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2:00 PM

**Dislocation Drag at Ultra-High Strain Rates Up to 109 s<sup>-1</sup>:** *Qi Tang<sup>1</sup>; Jianxiong Li<sup>1</sup>; Mostafa Hassan<sup>1</sup>; <sup>1</sup>Cornell University*

2:20 PM

**Microstructure Evolution in Quenched and Tempered (Q&T) Low Carbon Steel Under High Strain Rate Shear Deformation:** *Janith Wann<sup>1</sup>; Curt Bronkhorst<sup>1</sup>; Dan Thoma<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison*

2:40 PM

**Crystal Plasticity Modeling of BCC Metals with Novel Treatment for Dislocation Mobility and Cross-Slip:** *Cathy Bing<sup>1</sup>; Philip Eisenlohr<sup>1</sup>; <sup>1</sup>Michigan State University*

3:00 PM

**Dynamic Behavior of Materials Using Modified RMI Test:** *Gabriel Testa<sup>1</sup>; Nicola Bonora<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Sara Ricci<sup>1</sup>; Alberto Pagano<sup>1</sup>; Andrea Ceccacci<sup>1</sup>; <sup>1</sup>University of Cassino and Southern Lazio*

3:20 PM

**On the Role of Geometrically Necessary Dislocations in Void Formation and Growth in Response to Shock Loading Conditions in Wrought and Additively Manufactured Ta:** *James Lamb<sup>1</sup>; Kaitlyn Mullin<sup>1</sup>; Paul Christodoulou<sup>1</sup>; Wyatt Witzel<sup>1</sup>; McLean Echlin<sup>1</sup>; Irene Beyerlein<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara*

3:40 PM Break

4:00 PM

**Damage Nucleation at High Temperatures in OFHC Cu Under Impacts:** *Nicola Bonora<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; Gabriel Testa<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Sara Ricci<sup>1</sup>; Saryu Fensin<sup>2</sup>; George Gray<sup>2</sup>; <sup>1</sup>University of Cassino; <sup>2</sup>LANL*

4:20 PM

**Microstructural Evolution in OFHC Copper During Dynamic Tensile Extrusion: The Role of Temperature:** *Sara Ricci<sup>1</sup>; Nicola Bonora<sup>1</sup>; Gabriel Testa<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Andrea Ceccacci<sup>1</sup>; Alberto Pagano<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; <sup>1</sup>University of Cassino*

4:40 PM

**Modeling the Physical Process of Adiabatic Shear Banding:** *Curt Bronkhorst<sup>1</sup>; Jack Rees<sup>1</sup>; Janith Wann<sup>1</sup>; Dan Thoma<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison*

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Advanced Materials for Energy Conversion and Storage III

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

**Wednesday PM | March 26, 2025**  
**356 | MGM Grand**

**Session Chairs:** Maher Alghalayini, Lawrence Berkeley National Laboratory; Yaron Amouyal, Technion - Israel Institute of Technology; Regina Garcia-Mendez, Johns Hopkins University

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2:00 PM Invited

**Dimensionality Control of Li Transport by MOFs Based Quasi-Solid to Solid Electrolyte (Q-SSEs):** *Manuel Salado<sup>1</sup>; R. Fernández de Luis<sup>1</sup>; T. H. Smith<sup>1</sup>; Senentxu Lanceros Mendez<sup>1</sup>; M. Forsyth<sup>1</sup>; <sup>1</sup>BC Materials*

2:25 PM

**Fabrication and Characterization of Advanced Flexible and Wearable Thermoelectric Cooling Devices:** *Cuilei Li<sup>1</sup>; Lian Li<sup>1</sup>; Boyang Xiang<sup>1</sup>; Edward Fratto<sup>1</sup>; Jayant Kumar<sup>1</sup>; Ramaswamy Nagarajan<sup>1</sup>; Zhiyong Gu<sup>1</sup>; <sup>1</sup>University of Massachusetts Lowell*

2:45 PM

**Fabrication and Characterization of Si-TiO<sub>2</sub>-P3HT-MXene Photodetectors for High-Sensitivity Near-Infrared Biomarker Detection:** *Armando Correa<sup>1</sup>; Spencer Norvell<sup>1</sup>; Saquib Ahmed<sup>2</sup>; Sankha Banerjee<sup>1</sup>; <sup>1</sup>California State University, Fresno; <sup>2</sup>SUNY, Buffalo State*

3:05 PM

**Thermoelectric Energy Conversion at Elevated Temperatures by Applying Calcium-Manganate Oxides:** *Yaron Amouyal<sup>1</sup>; <sup>1</sup>Technion - Israel Institute of Technology*

3:25 PM Break

3:40 PM

**Optimizing the Chemistry of Hetero-Interfaces in Photovoltaics: A Combination of Electronic Structure Calculations and Machine Learning Approach:** *Yizhou Lu<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi*

4:00 PM

**Characterization of the Mercury Electrode - NaSICON Electrolyte Interface Towards the Development of a Low-Temperature Na - Hg Liquid Metal Battery:** *Jake Kattelman<sup>1</sup>; Jeremy Moon<sup>1</sup>; Dev Chidambaram<sup>1</sup>; <sup>1</sup>University of Nevada, Reno*

4:20 PM

**High Throughput Development of Cu-Al-Mn-Ni Based Elastocaloric Materials:** *Maria Lebedeva<sup>1</sup>; <sup>1</sup>Iowa State University*



## Advances and Discoveries in Non-Equilibrium Driven Nanomaterials and Thin Films — Functional Oxide Thin Films

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Ritesh Sachan, Oklahoma State University; Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University; Shikhar Jha, Indian Institute of Technology Kanpur

**Wednesday PM | March 26, 2025**  
**354 | MGM Grand**

**Session Chairs:** Ritesh Sachan, Oklahoma State University; Shikhar Jha, Indian Institute of Technology Kanpur

**2:00 PM Invited**

**From Oxide Epitaxy to Membranes: Opportunities and Challenges:** *Bharat Jalan*<sup>1</sup>; <sup>1</sup>University of Minnesota

**2:20 PM Invited**

**Design of Oxide Thin Films Towards Memristive Switching and Neuromorphic Computing:** *Aiping Chen*<sup>1</sup>; Sundar Kunwar<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**2:40 PM Invited**

**Integration of BaTiO<sub>3</sub> on Si: from Ferroelectricity to Giant Electrostriction:** *Pavan Nukala*<sup>1</sup>; <sup>1</sup>Indian Institute of Science

**3:00 PM Invited**

**Interfacial Coupling at Bismuthate-Titanate Heterointerfaces:** *Divine Kumah*<sup>1</sup>; Merve Baksi<sup>2</sup>; <sup>1</sup>Duke University; <sup>2</sup>North Carolina State University

**3:20 PM Invited**

**Thin Film Growth on Mica: Challenges, Opportunities, and Applications for Micatronics:** *Ashutosh Tiwari*<sup>1</sup>; <sup>1</sup>University of Utah

**3:40 PM Break**

**4:00 PM Invited**

**Process Dependent Work Function of Carbide Forming Refractory Metals:** *Stephen McDonnell*<sup>1</sup>; Adrian Kam<sup>1</sup>; Daniel Stokes<sup>1</sup>; Alyana Carrell<sup>2</sup>; Ariana Guzman<sup>2</sup>; Michael Groves<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>California State University Fullerton

**4:20 PM**

**Hydrogen Induced Resistive Switching in Perovskite Nickelate Thin Films:** *Sundar Kunwar*<sup>1</sup>; Nicholas Cucciniello<sup>1</sup>; Alessandro Mazza<sup>1</sup>; Aiping Chen<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:40 PM**

**Light Assisted Resistive Switching Behaviour of PLD Grown VO<sub>2</sub>/TiO<sub>2</sub> Thin Films:** *Chhotrai Soren*<sup>1</sup>; Rajesh Jha<sup>1</sup>; Ankur Goswami<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi

## Advances in Magnetism and Magnetic Materials — Advanced Materials and Sensing

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

**Wednesday PM | March 26, 2025**  
**363 | MGM Grand**

**Session Chairs:** Alexander Baker, LLNL; Yongmei Jin, Michigan Technological University

**2:00 PM Invited**

**Harnessing Interfacial Interactions in Perovskite Oxide Heterostructures:** *Yayoi Takamura*<sup>1</sup>; <sup>1</sup>University of California, Davis

**2:30 PM**

**Soft Magnetic Materials for Motor Applications:** *Przemyslaw Zackiewicz*<sup>1</sup>; Marcin Karpinski<sup>1</sup>; Aleksandra Kolano-Burian<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - IMN

**2:50 PM**

**Development and Crystallography of fcc-bcc and bcc-fcc Precipitation in Soft Magnetic HEAs:** *Robert Chulist*<sup>1</sup>; Wojciech Maziarz<sup>1</sup>; Anna Wojcik<sup>1</sup>; Arkadiusz Szewczyk<sup>1</sup>; Maciej Kowalczyk<sup>2</sup>; Norbert Schell<sup>3</sup>; Lukasz Hawelek<sup>4</sup>; <sup>1</sup>IMMS PAS; <sup>2</sup>Warsaw University of Technology; <sup>3</sup>Helmholtz-Zentrum Hereon; <sup>4</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals

**3:10 PM Break**

**3:30 PM**

**Enhanced Mass Sensitivity of Self-Biased Magnetoelastic Sensors by Annealing-Induced Nanocrystallization:** *Andoni Lasheras*<sup>1</sup>; J.S. Garitaonandia<sup>1</sup>; Iban Quintana<sup>2</sup>; Jose Luis Vilas<sup>1</sup>; Ana Catarina Lopes<sup>1</sup>; <sup>1</sup>University of the Basque Country; <sup>2</sup>Tekniker

**3:50 PM**

**Smart Microactuators Based on Shape Memory Heusler Microwires:** *Rastislav Varga*<sup>1</sup>; <sup>1</sup>RVmagnetics

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Characterization and Mechanical Properties

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brecht, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Wednesday PM | March 26, 2025  
368 | MGM Grand

**Session Chairs:** Jennifer Carter, Case Western Reserve University; Mingwei Zhang, University of California, Davis

#### 2:00 PM

**Short-Range Ordering and Local Elastic Properties in MoNbTaW:** *Andrea Fantin*<sup>1</sup>; Anna Maria Manzoni<sup>1</sup>; Reza Darvishi Kamachali<sup>1</sup>; Varalakshmi Somarouthu<sup>1</sup>; Julian Rosalie<sup>1</sup>; Robert Maass<sup>1</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM), Berlin, Germany

#### 2:20 PM Invited

**Characteristic Dislocation Slips in Polycrystalline HfNbTiZr Equi-Atomic Alloy:** Qiang He<sup>1</sup>; Shuhei Yoshida<sup>2</sup>; Shinji Okajyo<sup>3</sup>; Masaki Tanaka<sup>3</sup>; *Nobuhiro Tsuji*<sup>2</sup>; <sup>1</sup>Southern University of Science and Technology; <sup>2</sup>Kyoto University; <sup>3</sup>Kyushu University

#### 2:40 PM Invited

**Multiple Origins of Extra Electron Diffractions in FCC Multiple Principal Element Alloys:** *Mingwei Zhang*<sup>1</sup>; Flynn Walsh<sup>2</sup>; Robert Ritchie<sup>3</sup>; Mark Asta<sup>3</sup>; Andrew Minor<sup>3</sup>; <sup>1</sup>University of California, Davis; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>University of California, Berkeley

#### 3:00 PM Invited

**Single-Crystal Mechanical Properties of FCC High-Entropy Alloys:** Haruyuki Inui<sup>1</sup>; *Kyosuke Kishida*<sup>2</sup>; Le Li<sup>1</sup>; Zhenghao Chen<sup>1</sup>; <sup>1</sup>Kyoto University

#### 3:20 PM Invited

**Stability of the B2 Phase in Al-Nb-Ta-Ti-Zr Refractory High-Entropy Superalloys: Resolving Identification Conflicts and Offering Practical Solutions:** An-Chen Fan<sup>1</sup>; Yun-Syuan Chen<sup>1</sup>; Chong-Chi Chi<sup>2</sup>; Daniel Miracle<sup>3</sup>; Jessie Shiue<sup>4</sup>; Pai-Chia Kuo<sup>4</sup>; Chih-Hao Hsu<sup>1</sup>; Kai-Cheng Yang<sup>1</sup>; Ming-Yen Lu<sup>2</sup>; *Ming-Hung Tsai*<sup>5</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>National Tsing Hua University; <sup>3</sup>Air Force Research Laboratory; <sup>4</sup>Institute of Atomic and Molecular Sciences, Academia Sinica; <sup>5</sup>National Chung Hsing University; National Tsing Hua University

#### 3:40 PM Break

#### 4:00 PM

**Quantification of Lattice Distortions in Complex Concentrated Alloys by X-Ray Diffuse Scattering:** *Alexander deJong*<sup>1</sup>; Suchismita Sarker<sup>2</sup>; Hyun sang Park<sup>1</sup>; Todd Hufnagel<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Cornell University

#### 4:20 PM Invited

**Effects of Cerium Addition and Post-Annealing on Microstructures and Mechanical Properties of CoCrNi Medium Entropy Alloy Films:** *Chun-Hway Hsueh*<sup>1</sup>; Yvonne Lin<sup>1</sup>; <sup>1</sup>National Taiwan University

#### 4:40 PM

**Ductile and Plastic HfTaTiNbZr Refractory High Entropy Alloys Studied with In Situ Neutron Diffraction:** *Lia Amalia*<sup>1</sup>; John Whitlow<sup>1</sup>; Xuesong Fan<sup>1</sup>; Nathan Grain<sup>1</sup>; Eric Lass<sup>1</sup>; Yanfei Gao<sup>1</sup>; Ke An<sup>2</sup>; Yan Chen<sup>2</sup>; Dunji Yu<sup>2</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

#### 5:00 PM

**Ultrahigh Temperature Tensile Deformation Mechanisms of Multi-Principal Element Alloys:** *Michael Patullo*<sup>1</sup>; Syed I. A. Jalali<sup>1</sup>; Sharon Park<sup>1</sup>; Leah Mills<sup>2</sup>; David Beaudry<sup>1</sup>; Mitra Taheri<sup>1</sup>; Tresa Pollock<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California, Santa Barbara

## LIGHT METALS

### Advances in Titanium Technology — Near-Alpha and Alpha Titanium-Based Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

Wednesday PM | March 26, 2025  
108 | MGM Grand

**Session Chair:** Paraic O'Kelly, The Ohio State University

#### 2:00 PM

**Post Weld Heat Treatment For Enhancing Mechanical Properties of Ti-6Al-4V:** *Seongji Seo*<sup>1</sup>; Kyung Il Kim<sup>2</sup>; Jeongho Han<sup>3</sup>; Jiyong Park<sup>4</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Hanyang University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Hanyang University; <sup>4</sup>Korea Institute of Industrial Technology, Korea National University of Science and Technology (UST)

#### 2:20 PM

**Influence of Cooling Rate on Ti-6Al-4V Parts Fabricated by Wire Arc Additive Manufacturing:** *Annalena Meermeier*<sup>1</sup>; Sascha Berbalk<sup>2</sup>; Thomas Meyer<sup>2</sup>; Heinz Werner Höppel<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg; <sup>2</sup>HEGGEMANN AG

#### 2:40 PM

**Characterization and Optimization of Ti-6Al-4V Alloy Obtained by Additive Manufacturing Using Direct Wire Deposition:** *Elise Labruyère*<sup>1</sup>; Florence Pettinari-Sturmel<sup>2</sup>; Joel Douin<sup>3</sup>; Claude Archambeau<sup>1</sup>; Philippe Emile<sup>1</sup>; <sup>1</sup>AIRBUS; <sup>2</sup>CEMES - Univ. Toulouse; <sup>3</sup>CEMES-CNRS

#### 3:00 PM

**Microalloying Strategy: How Small Additions of Alloying Elements Can Significantly Boost the Strength of Titanium Alloys:** *Stephanie Delannoy*<sup>1</sup>; Piotr Kwasniak<sup>2</sup>; Fan Sun<sup>1</sup>; Philippe Vermaut<sup>1</sup>; Frédéric Prima<sup>1</sup>; <sup>1</sup>Chimie ParisTech, CNRS, Institut de Recherche de Chimie Paris, PSL Research University; <sup>2</sup>Multidisciplinary Research Center, Cardinal Stefan Wyszyński University in Warsaw

3:20 PM

**Compositional Effects on the Formation and Thermal Evolution of Oxygen-Ordered Precipitates in Ti-Zr-O Alloys: An In-Situ Synchrotron X-Ray Diffraction Study:** *Raphaelle Guillou<sup>1</sup>; Fabienne Amann<sup>2</sup>; Régis Poulain<sup>3</sup>; Stéphanie Delannoy<sup>2</sup>; Jean Philippe Couzinié<sup>3</sup>; Ivan Guillot<sup>3</sup>; Emmanuel Clouet<sup>4</sup>; Jean Luc Béchade<sup>4</sup>; Dominique Thiaudière<sup>5</sup>; Frédéric Prima<sup>2</sup>; <sup>1</sup>Université Paris-Saclay, CEA, Service de Recherche en Matériaux et procédés Avancés; <sup>2</sup>Université PSL, Chimie ParisTech-CNRS, Institut de recherche de Chimie Paris (UMR 8247); <sup>3</sup>Université Paris Est Creteil, Institut de Chimie et des Matériaux Paris-Est (UMR 7182) CNRS-UPEC; <sup>4</sup>Université Paris-Saclay, CEA, Service de recherche en Corrosion et Comportement des Matériaux, SRMP; <sup>5</sup>Synchrotron SOLEIL*

3:40 PM Break

4:00 PM

**High-Performance Powders via Powder2Powder Ultrasonic Atomization:** *Lukasz Zrodowski<sup>1</sup>;* <sup>1</sup>AMAZEMET

4:20 PM

**An Exploration of Powder Processing Methods for Novel Titanium Alloy Compositions:** *Rosie Mellor<sup>1</sup>; David Jarvis<sup>1</sup>;* <sup>1</sup>VSCA

4:40 PM

**Low-Energy Production of High-Quality Titanium Alloy Powders via Innovative DRA Process:** *MD Emran Hossain<sup>1</sup>; Pei Sun<sup>1</sup>; Zhigang Zak Fang<sup>1</sup>;* <sup>1</sup>University of Utah

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Predictive Mechanism Model Development

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Wednesday PM | March 26, 2025**  
**320 | MGM Grand**

**Session Chair:** Matt Kasemer, The University of Alabama

2:00 PM

**Uncertainty Quantification In Crystal Plasticity Simulations Using Multimodal High-Energy Synchrotron X-Ray Experiments:** *Divakar Naragani<sup>1</sup>;* Paul Shade<sup>2</sup>; Armand Beaudoin<sup>3</sup>; Donald Boyce<sup>4</sup>; <sup>1</sup>University of Dayton; <sup>2</sup>Air Force Research Lab; <sup>3</sup>University of Illinois at Urbana-Champaign; <sup>4</sup>Cornell University

2:40 PM

**A Novel Physics Informed Neural Network Framework for Solid State Phase Transformations:** *Asfandyar Khan<sup>1</sup>;* Mahmood Mamivand<sup>1</sup>; <sup>1</sup>Boise State University

3:00 PM

**Advanced Prediction of Crystalline Material Behavior Using Physics-Informed Neural Networks and Object-Oriented Crystal Plasticity Finite Element:** *Shahriyar Keshavarz<sup>1</sup>;* Andrew Reid<sup>1</sup>; Yuwei Mao<sup>2</sup>; Ankit Agrawal<sup>2</sup>; <sup>1</sup>NIST; <sup>2</sup>Northwestern University

3:20 PM

**Comparison of Phenomenological and Machine Learning Approaches to Model Inconel 718 Recrystallization Mechanisms:** *Romain Bordas<sup>1</sup>;* Yann Jansen<sup>1</sup>; Antoine Gomond<sup>2</sup>; Eric Georges<sup>1</sup>; <sup>1</sup>Aubert&Duval; <sup>2</sup>PhiMeca

3:40 PM Break

3:50 PM

**High-Throughput Bayesian Calibration of Elastic-Plastic-Damage Model Parameters Using a Small Punch Test:** *Raj Mahat<sup>1</sup>;* Surya Kalidindi<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

4:10 PM

**Physics-Informed Machine Learning of Thermal Stress Evolution in Laser Metal Deposition:** *Rahul Sharma<sup>1</sup>;* Yuebin Guo<sup>1</sup>; <sup>1</sup>Rutgers University

4:30 PM

**Machine Learning-Based Constitutive Model Parameter Estimation:** *Abhishek Bhesania<sup>1</sup>;* Mark Messner<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

4:50 PM

**Determination of Phase-Field Model Parameters Using Machine Learning Approach:** *Benjamin Rhoads<sup>1</sup>;* Shailee Yagnik<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Machine Learning Applications to Materials Simulations

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Wednesday PM | March 26, 2025**  
**319 | MGM Grand**

**Session Chairs:** Hojun Lim, Sandia National Laboratories; Remi Dingreville, Sandia National Laboratories

2:00 PM

**Strongly Physics Constrained Neural Networks: Applications in Solid Mechanics:** *Andreas Robertson<sup>1</sup>;* Vivek Oommen<sup>2</sup>; Remi Dingreville<sup>1</sup>; <sup>1</sup>Sandia National Laboratory; <sup>2</sup>Brown University

2:20 PM

**Multi-Fidelity Models for Time-Dependent Full-Field Predictions:** *Aditya Venkatraman<sup>1</sup>;* Ryan Katona<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Philip Noell<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

2:40 PM

**Recognizing and Characterizing Continuous Regions of Materials Design Spaces Through Stochastic Microstructure Representations:** *Simon Mason<sup>1</sup>;* Megna Shah<sup>2</sup>; Jeff Simmons<sup>2</sup>; Dennis Dimiduk<sup>3</sup>; Stephen Niezgoda<sup>4</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>Blue Quartz Software, LLC

3:00 PM

**Distances in the Microstructure State Space:** *Dylan Miley*<sup>1</sup>; Jeremy Mason<sup>1</sup>; Benjamin Schweinhart<sup>2</sup>; <sup>1</sup>University of California Davis; <sup>2</sup>George Mason University

3:20 PM

**Accelerating Large Multiscale Composite Simulations with a GNN/LSTM Microscale Surrogate:** *Joshua Stuckner*<sup>1</sup>; Trenton Ricks<sup>1</sup>; Brandon Hearley<sup>1</sup>; Steven Arnold<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

3:40 PM Break

4:00 PM

**Advanced Computational Techniques and Deep Learning Algorithms for the Automated Modeling and Design of Materials:** *Soheil Soghrati*<sup>1</sup>; Balavignesh Vemparala<sup>1</sup>; Pengfei Zhang<sup>1</sup>; Kartik Kashyap<sup>1</sup>; <sup>1</sup>The Ohio State University

4:20 PM

**Working Towards a Buildable and Transferable Deep Learning Model Simulating Full-Field Micromechanical Evolution of Polycrystalline Materials:** *Ashley Lenau*<sup>1</sup>; Reemu Pokharel<sup>1</sup>; Alexander Scheinker<sup>1</sup>; Stephen Niezgoda<sup>2</sup>; <sup>1</sup>Los Alamos National Lab; <sup>2</sup>The Ohio State University

4:40 PM

**Computer-Vision Based Characterization of Shock-Induced Plasticity in Atomistic Simulations:** *Andre Archer*<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Investigation and Development in Thermoelectric Materials and Applications

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

Wednesday PM | March 26, 2025  
355 | MGM Grand

**Session Chairs:** Bo-Chia Chen, National Taiwan University; I-Lun Jen, National Yang Ming Chiao Tung University

2:00 PM Invited

**Investigation of Instability Mechanism in Mg<sub>3</sub>(Sb, Bi)<sub>2</sub>-Based Materials for Thermoelectric Applications:** *Sahiba Bano*<sup>1</sup>; Takao Mori<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

2:20 PM Invited

**Thermoelectric Properties of Melt-Spun Assisted Microstructural Engineering of Higher Manganese Silicide:** *Suresh Perumal*<sup>1</sup>; Madhuvathani G S<sup>2</sup>; Ravi Renganayagalu<sup>3</sup>; Subburayalu S<sup>3</sup>; <sup>1</sup>Indian Institute of Technology Hyderabad; <sup>2</sup>SRM Institute of Science and Technology, Kattankulathur; <sup>3</sup>Indian Institute of Technology (IIT)

2:40 PM Invited

**Size-Dependent Magnon Thermal Transport in a Nanostructured Quantum Magnet:** *Xi Chen*<sup>1</sup>; <sup>1</sup>University of California, Riverside

3:00 PM

**Development of Medium and High-Entropy Diffusion Barrier for GeTe-Based Thermoelectric Module:** *Yi-Hsuan Lai*<sup>1</sup>; Yun-Han Huang Lu<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

3:20 PM Break

3:40 PM Invited

**New Angles to Thermoelectric Applications?:** *Ady Suwardi*<sup>1</sup>; <sup>1</sup>The Chinese University of Hong Kong

4:00 PM

**Advanced Inorganic-Organic Hybrid Thermoelectric Device:** *Jen-Hsun Weng*<sup>1</sup>; Wan-ting Yen<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

4:20 PM

**Enhanced Thermoelectric Performance and Joint Stability of n-Type PbTe Through Mn and Cu Codoping:** *Ming-Yu Cheng*<sup>1</sup>; Wen-Ching Wu<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Processing Innovation

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

Wednesday PM | March 26, 2025  
114 | MGM Grand

**Session Chairs:** Warren Poole, University of British Columbia; Dmitry Sediako, University of British Columbia; Xiaodong Wang, University of Chinese Academy of Sciences

2:00 PM Keynote

**Aluminum Alloy Development and Manufacturing Processes for Sustainable Transportation Applications:** *Alan Luo*<sup>1</sup>; <sup>1</sup>Ohio State University

2:25 PM

**Rapid Investment Casting of Nano-Treated Aluminum Alloy 7075 Turbines:** *Guan-Cheng Chen*<sup>1</sup>; Till Reufsteck<sup>2</sup>; Yitian Chi<sup>1</sup>; Xiaochun Li<sup>1</sup>; <sup>1</sup>University of California Los Angeles; <sup>2</sup>RWTH Aachen University

2:50 PM

**Simultaneously Improving Process Efficiency and Mechanical Properties in Aluminum Alloys with Applied Magnetic Fields:** *Michael Kesler*<sup>1</sup>; Michael Thompson<sup>1</sup>; Lisa Debeer-Schmitt<sup>1</sup>; Kangcheng Lin<sup>2</sup>; Yang Yang<sup>3</sup>; David Weiss<sup>4</sup>; Harrison Kim<sup>2</sup>; Michele Manuel<sup>3</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>UI-UC; <sup>3</sup>University of Florida; <sup>4</sup>Loukus Technologies

3:15 PM

**Banded Microstructures: Development of Novel Structures Under Directional Solidification of Aluminum-Indium:** *Jaime Perez Coronado*<sup>1</sup>; Aramanda Shanmukha Kiran<sup>1</sup>; Zach Croft<sup>1</sup>; Lingxia Shi<sup>1</sup>; Jason Landini<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Alan Taub<sup>1</sup>; <sup>1</sup>University of Michigan

3:40 PM Break

3:55 PM Keynote

**Processing of In Situ Al-TiC Nanocomposites for Improved Mechanical Properties:** *Alan Taub*<sup>1</sup>; Caleb Reese<sup>2</sup>; Aaron Gladstein<sup>3</sup>; Jonathan Goettsch<sup>1</sup>; Jaime Perez Coronado<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; Ashwin Shahani<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>General Motors; <sup>3</sup>Pratt & Whitney

4:20 PM

**Effect of Fe on Al-Mn-Fe-Si Alloys Made by Laser Additive Manufacturing:** *Qingyu Pan*<sup>1</sup>; Monica Kapoor<sup>2</sup>; Xiaoyuan Lou<sup>1</sup>; John Carsley<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Novelis Global Research and Technology Center



4:45 PM

**Applying Object Detection for In-Situ Prediction of the Internal Temperature Distribution of Inductively Heated Semi-Solid Metal Billets:** *Marco Speth*<sup>1</sup>; *Mathias Liewald*<sup>1</sup>; *Kim Rouven Riedmüller*<sup>1</sup>; <sup>1</sup>Institute For Metal Forming Technology

5:10 PM

**Development of Cold Cladding Process Technology for Aluminum Clad in Automotive Applications:** *Shreyas Khot*<sup>1</sup>; *Gautam Wagle*<sup>1</sup>; *Akshay Deshpande*<sup>1</sup>; *Dhurandas Fulzele*<sup>1</sup>; <sup>1</sup>Hindalco Industries Limited

## LIGHT METALS

**Aluminum Primary Processing - Decarbonization and Sustainability in Aluminum Primary Processing: Joint Session of Aluminum Reduction, Electrode Technology, and REWAS 2025 — Decarbonization and Sustainability in Aluminum Primary Processing: Joint Session of Aluminum Reduction, Electrode Technology, and REWAS 2025**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

**Program Organizers:** Mertol Gokelma, Izmir Institute of Technology; Stephan Broek, Kensington Technology Inc; Les Edwards, Rain Carbon Inc.; Andre-Felipe Schneider, Hatch Ltd.; Arild Hakonsen, Hycast As

Wednesday PM | March 26, 2025  
112 | MGM Grand

**Session Chairs:** Camilla Sommerseth, SINTEF Industry; Brian Zukas, Alcoa Corp

2:00 PM Introductory Comments

2:05 PM Invited

**Inert Anode Aluminum Cells – Present Status and Future Prospects:** *Halvor Kvande*<sup>1</sup>; <sup>1</sup>Retired from Norsk Hydro / Norwegian University of Science & Technology

2:30 PM

**Development of the Carbon Footprint of Primary Aluminum Production:** *Gudrun Saevarsdottir*<sup>1</sup>; *Halvor Kvande*<sup>2</sup>; <sup>1</sup>Reykjavik University; <sup>2</sup>Formerly Norwegian University of Science & Technology

2:55 PM

**Progress of Carbon Capture Efforts in Primary Aluminum Smelting:** *Stephan Broek*<sup>1</sup>; *Geert Versteeg*<sup>2</sup>; <sup>1</sup>Kensington Technology Inc; <sup>2</sup>University of Groningen

3:20 PM

**Opportunities to Reduce Calciner CO<sub>2</sub> Emissions:** *Maia Hunt*<sup>1</sup>; *Matthew Childers*<sup>1</sup>; *Les Edwards*<sup>1</sup>; <sup>1</sup>Rain Carbon Inc.

3:45 PM Break

4:00 PM

**Carbochlorination of Alumina: An Assessment Based on Single Particle Model:** *Parindra Kusriantoko*<sup>1</sup>; *Kristian Einarsrud*<sup>1</sup>; *Camilla Sommerseth*<sup>2</sup>; <sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>SINTEF Industry

4:25 PM

**On the Alloy Development of Ni - Fe - Cu Inert Anodes for Sustainable, CO<sub>2</sub>-Free Aluminum Electrolysis:** *Tom Jamieson*<sup>1</sup>; *Peer Decker*<sup>2</sup>; *Andrey Yasinitskiy*<sup>3</sup>; *Roman Düssel*<sup>2</sup>; *Gudmundur Gunnarson*<sup>4</sup>; *Jon Magnusson*<sup>5</sup>; *Bastian Adam*<sup>6</sup>; *Ralf Busch*<sup>6</sup>; *Isabella Gallino*<sup>1</sup>; <sup>1</sup>Technical University Berlin; <sup>2</sup>TRIMET; <sup>3</sup>RWTH Aachen; <sup>4</sup>IceTec Ltd; <sup>5</sup>Arctus Aluminium Ltd; <sup>6</sup>University Saarland

## LIGHT METALS

**Aluminum Reduction Technology — Sensors, Process Control and Industry 4.0 Applied to Aluminium Smelters II**

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

Wednesday PM | March 26, 2025  
113 | MGM Grand

**Session Chair:** Sebastien Guerard, Rio Tinto

2:00 PM Introductory Comments

2:05 PM

**A New Concept for Measuring Heat Fluxes from Electrolysis Cells:** *Eirik Manger*<sup>1</sup>; <sup>1</sup>Hydro Aluminium As

2:30 PM

**MHD Model Validation Through 3D Scanning and Big Data Analytics:** *Ievgen Necheporenko*<sup>1</sup>; *Alexander Arkhipov*<sup>1</sup>; *Pablo Navarro*<sup>1</sup>; *Abdalla Alzarouni*<sup>1</sup>; *Marcos Dominguez*<sup>2</sup>; *Marwan Alustad*<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

2:55 PM

**Optimizing Anode Change in Aluminum Cells – A Digital Twin Approach:** *Sebastien Guerard*<sup>1</sup>; *Pierre-Luc Voyer*<sup>1</sup>; <sup>1</sup>Rio Tinto

3:20 PM

**The Application of Anode Current in Current Efficiency Improvement in Reduction Cells:** *Qinsong Zhang*<sup>1</sup>; *Hongwu Hu*<sup>1</sup>; *Wei Liu*<sup>1</sup>; *Zhibin Zhao*<sup>1</sup>; *Yafeng Liu*<sup>1</sup>; *Michael Ren*<sup>1</sup>; <sup>1</sup>Shenyang Aluminium & Magnesium Engineering & Research Institute

3:45 PM Break

4:00 PM

**ALF3 Shots Prediction for Optimal Temperature Control and Process Efficiency in Aluminium Smelter:** *Manish Jaiswal*<sup>1</sup>; *Himan Kundu*<sup>2</sup>; *Shanmukh Rajgire*<sup>3</sup>; *Anish Das*<sup>2</sup>; *Amit Jha*<sup>4</sup>; <sup>1</sup>Hindalco Industries Ltd.-Smelter, Sambalpur; <sup>2</sup>Hindalco Industries Ltd. Aditya Aluminium; <sup>3</sup>Aditya Birla Science and Technology Company (P) Ltd, Navi Mumbai; <sup>4</sup>Aditya Birla Science & Technology Company, Ltd

4:25 PM

**Industrial Implementation of Digital Monitoring and Intelligent Control in Aluminum Reduction Cells:** *Zhibin Zhao*<sup>1</sup>; *Xi Cao*<sup>1</sup>; *Junfeng Qi*<sup>1</sup>; *Shaohu Tao*<sup>2</sup>; *Qinsong Zhang*<sup>1</sup>; *Hongwu Hu*<sup>1</sup>; *Michael Ren*<sup>3</sup>; *Wei Liu*<sup>1</sup>; <sup>1</sup>Shenyang Aluminium & Magnesium Engineering & Research Institute Co., Ltd.; <sup>2</sup>Shenyang Ligong University; <sup>3</sup>Sunlightmetal Consulting Inc.

4:50 PM

**ML-Powered Pot Performance Prediction in Aluminium Smelter:** *Manish Jaiswal*<sup>1</sup>; *Shanmukh Rajgire*<sup>2</sup>; *Atanu Maity*<sup>1</sup>; *Kishor Pattnaik*<sup>1</sup>; *Philip Hansda*<sup>1</sup>; *Pramod Shukla*<sup>1</sup>; *Kazi Arshad Ansari*<sup>1</sup>; *Pratap Sahu*<sup>1</sup>; *Debasish Mallik*<sup>1</sup>; *Amit Jha*<sup>3</sup>; <sup>1</sup>Hindalco Industries Ltd. Hirakud Smelter, Sambalpur; <sup>2</sup>Aditya Birla Science and Technology Company (P) Ltd; <sup>3</sup>Aditya Birla Science & Technology Company, Ltd

5:15 PM

**Research and Application on Big-Data Breaker Jam Identification and Intelligent Control Technology Basing on Single-Point Feeding:** *Hong Bo*<sup>1</sup>; <sup>1</sup>Guiyang Aluminium Magnesium Design & Research Institute (GAMI)

5:40 PM Concluding Comments

## Artificial Intelligence Applications in Integrated Computational Materials Engineering — Machine Learning for Materials Characterization and Process Control

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Wenwu Xu, San Diego State University; Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University; Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University; Avani Mishra, Los Alamos National Laboratory; Victoria Miller, University of Florida; Ghanshyam Pilania, General Electric (GE Aerospace Research)

**Wednesday PM | March 26, 2025**  
**351 | MGM Grand**

**Session Chairs:** Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University

### 2:00 PM Invited

**Digital Twins for Accelerated Materials Innovation:** *Surya Kalidindi*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

### 2:30 PM

**ANNA: An Open-Source Platform for Developing Artificial Neural Networks Assistant Potential Enabling High Accurate and Efficient Molecular Dynamics Simulation:** *Meng Zhang*<sup>1</sup>; Junya Inoue<sup>1</sup>; <sup>1</sup>University of Tokyo

### 2:50 PM

**Automation of the ICME Workflow Incorporating Material Digital Twins at Different Length Scales Within a Robust Information Management System:** *Brandon Hearley*<sup>1</sup>; Steven Arnold<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

### 3:10 PM

**AI in ICME: Methodologies for AI Alignment and Explainability in Self-Driving Labs:** *Kinston Acköf*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

### 3:30 PM Break

### 3:50 PM

**Rapid Microstructural Determination from Nano-indentation of High Entropy Alloys Using Machine Learning and Genetic Algorithms:** *Amit Arora*<sup>1</sup>; Abhijeet Dhal<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

### 4:10 PM

**Data and Decision Science-Driven Assessment and Selection of Mg Alloys for Fracturing Applications:** *Tanjore Jayaraman*<sup>1</sup>; <sup>1</sup>United States Air Force Academy

### 4:30 PM

**Data Modelling of Through-Life Structural Integrity Assessment of Dissimilar Metal Welds for Nuclear Application:** *Samuel Eka*<sup>1</sup>; <sup>1</sup>University of Manchester

### 4:50 PM

**High-Throughput and Robust Materials Design Hypothesis Generation via a RAG-Enhanced Large Language Model:** *Quanliang Liu*<sup>1</sup>; Maciej Polak<sup>1</sup>; So yeon Kim<sup>2</sup>; MD Al Amin Shuvo<sup>1</sup>; Hrishikesh Shridhar Deodhar<sup>1</sup>; Jeongsoo Han<sup>1</sup>; Dane Morgan<sup>1</sup>; Hyunseok Oh<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Massachusetts Institute of Technology

### 5:10 PM

**A Multiscale Simulation Framework for Incremental Deformation Processing Using a Recurrent Neural Network Surrogate Model for Crystal Plasticity:** *John Weeks*<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

## Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — Properties and Mechanical Behavior

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

**Wednesday PM | March 26, 2025**  
**370 | MGM Grand**

**Session Chair:** Frederic Sansoz, The University of Vermont

### 2:00 PM Invited

**Short-Range Order Hardening and Enhanced Tensile Ductility in Nanocrystalline Ag by Intercalation of Amorphous Ni-Rich Nanolayers:** *Frederic Sansoz*<sup>1</sup>; <sup>1</sup>University of Vermont

### 2:30 PM

**Development of Semi-Empirical Interatomic Potential to Simulate Plastic Deformation in Ni-Co-Cr-Y-O System:** *Mikhail Mendelev*<sup>1</sup>; Gabriel Plummer<sup>1</sup>; Jacob Tavenner<sup>1</sup>; Zhigang Wu<sup>1</sup>; John Lawson<sup>1</sup>; Timothy Smith<sup>1</sup>; <sup>1</sup>NASA ARC

### 2:50 PM

**Transformation-Assisted Twin Nucleation in Metals:** *Lei Cao*<sup>1</sup>; Mehrab Lotfipour<sup>1</sup>; Amir Hassan Zahiri<sup>1</sup>; Jamie Ombogo<sup>1</sup>; <sup>1</sup>University of Nevada

### 3:10 PM

**Self-Healing by Amorphous Shear-Band Recovery in Crystalline Al-Sm Materials:** *Xuanxin Hu*<sup>1</sup>; Nuohao Liu<sup>1</sup>; Izabela Szlufarska<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

### 3:30 PM Break

### 3:50 PM

**Molecular Dynamics Simulation of Fatigue Crack Propagation in Aluminum and Steel Dissimilar Joints:** *Rohit Singh*<sup>1</sup>; Jignesh Nakrani<sup>1</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

### 4:10 PM

**Simulation of Grain Growth with Molecular Dynamics Using Converted Experimental Data:** *Meizhong Lyu*<sup>1</sup>; Zipeng Xu<sup>2</sup>; Elizabeth Holm<sup>1</sup>; Gregory Rohrer<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Carnegie Mellon University

### 4:30 PM

**Finely Tunable Thermal Expansion of NiTi by Stress-Induced Martensitic Transformation and Thermomechanical Training:** *Won-Seok Ko*<sup>1</sup>; Won Seok Choi<sup>2</sup>; Edward Pang<sup>3</sup>; Yejun Park<sup>2</sup>; Jong-Hoon Park<sup>1</sup>; Hye-Hyun Ahn<sup>1</sup>; Yuji Ikeda<sup>4</sup>; Pyuck-Pa Choi<sup>2</sup>; Blazej Grabowski<sup>4</sup>; <sup>1</sup>Inha University; <sup>2</sup>Korea Advanced Institute of Science and Technology; <sup>3</sup>Massachusetts Institute of Technology; <sup>4</sup>University of Stuttgart

### 4:50 PM

**Atomistic Insights on Orientation-Dependent Deformation Mechanisms in Molybdenum: Single-Crystal Nanowires and Polycrystals:** *Afnan Mostafa*<sup>1</sup>; Linh Vu<sup>1</sup>; Feitao Li<sup>2</sup>; Aditya Dey<sup>1</sup>; Eugen Rabkin<sup>2</sup>; Hesam Askari<sup>1</sup>; Niaz Abdolrahim<sup>1</sup>; <sup>1</sup>University of Rochester; <sup>2</sup>Technion - Israel Institute of Technology

5:10 PM

**Atomistic Simulation of Dislocation-Obstacle Interactions in Al<sub>0.3</sub>CoCrFeNi Multi-Principal Element Alloys:** *Anshu Raj<sup>1</sup>; Subah Mubassira<sup>1</sup>; Peter Liaw<sup>2</sup>; Shuozi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma; <sup>2</sup>University of Tennessee*

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## LIGHT METALS

### Bauxite Residue Valorization and Best Practices — Recovery of Steel, Titania and Rare Earths

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Tobias Hertel, Ku Leuven; Christina Meskers, SINTEF; Efthymios Balomenos, Metlen Energy and Metals; Casper Van Der Eijk, SINTEF; Brajendra Mishra, Worcester Polytechnic Institute; Yiannis Pontikes, Ku Leuven R&D

**Wednesday PM | March 26, 2025**  
**111 | MGM Grand**

**Session Chair:** Yiannis Pontikes, Ku Leuven R&D

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2:00 PM

**Recovery of Alumina and Soda from High Titania Containing Bauxite Residue:** *Gautam Behera<sup>1</sup>; Chenna Borra<sup>1</sup>; Manish Kar<sup>2</sup>; Mehmet Ali Onal<sup>3</sup>; <sup>1</sup>IIT Kharagpur; <sup>2</sup>NTNU; <sup>3</sup>Genomines*

2:20 PM Question and Answer Period

2:25 PM Invited

**Recovery of Titanium from Production Residues via Physical and Chemical Processing:** *Sharon Djinigou<sup>1</sup>; Bengi Yagmurlu<sup>1</sup>; <sup>1</sup>Technical University Clausthal*

2:45 PM Question and Answer Period

2:50 PM

**Red Mud to Produce Sustainable Iron and Steel - A Thermodynamic Analysis:** *Rangasayee Kannan<sup>1</sup>; Adam Stevens<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory*

3:10 PM Question and Answer Period

3:15 PM

**Synergistic Pyrolysis with Refuse-Derived Fuel (RDF) Can Neutralize Bauxite Residue (BR):** *Roberto Seno<sup>1</sup>; Rodrigo Moreno<sup>1</sup>; Fabio Yamaji<sup>2</sup>; Maria Veloso<sup>2</sup>; <sup>1</sup>CBA; <sup>2</sup>UFSCar*

3:35 PM Question and Answer Period

3:40 PM Break

3:55 PM

**Utilizing Mining Tailings for Sustainable Steel and Rare Earth Element Recovery:** *Duhan Zhang<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology*

4:15 PM Question and Answer Period

4:20 PM Panel Discussion

4:50 PM Concluding Comments

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## BIOMATERIALS

### Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces II

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hannes Schniepp, William & Mary; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University; David Kisailus, University of California-Irvine

**Wednesday PM | March 26, 2025**  
**307 | MGM Grand**

**Session Chairs:** Terry Lowe, Colorado School of Mines; Kalpana Katti, North Dakota State University

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2:00 PM Invited

**Mechanobiology of Cellular Adhesion Proteins and Their Role in Cancer Progression:** *Dinesh Katti<sup>1</sup>; Kalpana Katti<sup>1</sup>; Hanmant Gaikwad<sup>1</sup>; Sharad Jaswandkar<sup>1</sup>; Preetham Ravi<sup>1</sup>; <sup>1</sup>North Dakota State University*

2:30 PM

**Hybrid Nanoparticles Loaded with a Combination of *Aloe Vera* and *Moringa Oleifera* Extracts for Improved Modulation of the Expression of Profibrotic and Proinflammatory Markers in Human Hepatic Stellate Cells and Hepatocytes:** *Gabriela Carballo-López<sup>1</sup>; Jhordan Ojeda-González<sup>2</sup>; Kevin Martínez-García<sup>1</sup>; Karla Cervantes-Luevano<sup>1</sup>; Aldo Moreno-Ulloa<sup>1</sup>; Ana Castro-Ceseña<sup>1</sup>; <sup>1</sup>CICESE*

2:50 PM Invited

**Facile Green Synthesis of Dual Stabilized Near-Infrared CuInSe/ZnS Quantum Dots as Fluorescent Probes for Cancer-Bacteria Imaging:** *Samuel Oluwafemi<sup>1</sup>; <sup>1</sup>University of Johannesburg*

3:20 PM

**Hierarchical Surface Restructuring of Ultra-Thin Electrodes and Microelectrode Arrays for Neural Interfacing with Peripheral and Central Nervous Systems:** *Shahram Amin<sup>1</sup>; Sina Shahbazmohamadi<sup>2</sup>; Alexander Blagojevic<sup>3</sup>; Terry Lowe<sup>4</sup>; Skyler Davis<sup>4</sup>; <sup>1</sup>Pulse Technologies Inc.; <sup>2</sup>University of Connecticut; <sup>3</sup>University of Connecticut; <sup>4</sup>Colorado School of Mines*

3:40 PM Break

3:55 PM Invited

**Analysis of Direct Electron Transfer of Glucose Oxidase on Graphene-CNT Composite Surfaces via Molecular Dynamics and Electrochemical Experiments:** *Taeyoung Yoon<sup>1</sup>; <sup>1</sup>Changwon National University*

4:25 PM

**Flavoprotein Oxidases Engineered with a Metal-Binding Peptide Tag as a Potential Diagnostic Enzyme:** *Taylor Bader<sup>1</sup>; Gabby LeDou<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas*

4:45 PM

**Carbon or Carbonate? Distinguishing Carbon Sources in Biominerals by Atom Probe Tomography:** *Jack Grimm<sup>1</sup>; Cameron Renteria<sup>1</sup>; Katherine Tang<sup>1</sup>; Sandra Taylor<sup>2</sup>; Arun Devaraj<sup>2</sup>; Dwayne Arola<sup>1</sup>; <sup>1</sup>University of Washington; <sup>2</sup>Pacific Northwest National Laboratory*

5:05 PM

**3D Printing of Multimaterial Nanocomposite Contact Lenses for Ocular Health Management:** *Haider Butt<sup>1</sup>; <sup>1</sup>Khalifa University*

## BIOMATERIALS

### Biological Materials Science — Advances in Biomimetic Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Wednesday PM | March 26, 2025**  
**306 | MGM Grand**

**Session Chair:** Steven Naleway, University of Utah

**2:00 PM**

**Biologically Inspired Mechanical Reinforcement of Plastic Bonded Explosives:** *Matthew Herman*<sup>1</sup>; John Yeager<sup>2</sup>; Erik Watkins<sup>3</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Dayton Eglin Airforce Base; <sup>3</sup>Oak Ridge National Laboratory

**2:20 PM**

**Bird Humerus Bone-Inspired 3D Voronoi Frameworks: Optimization of Compressive Mechanical Performance by Genetic Algorithms:** *Chien-Chih Lin*<sup>1</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**2:40 PM**

**Revealing the Full Brood Structure of the Stingless Bee Tetragonula Carbonaria:** *Nicole Balog*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Rosalyn Gloag<sup>2</sup>; Brock Harpur<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Sydney

**3:00 PM**

**Impact of Hyphal Differentiation on the Scattering Properties of Fungal Mycelium:** *Judith Gómez Cuyàs*<sup>1</sup>; Moritz Garger<sup>1</sup>; Markus Künzler<sup>1</sup>; Ralph Spolenak<sup>1</sup>; Henning Galinski<sup>1</sup>; <sup>1</sup>ETH Zürich

**3:20 PM Break**

**3:40 PM**

**Long and Short Carbon Nanotube Induced Cytocompatibility and Mechanical Behavior of Ultra High Molecular Weight Polyethylene:** *Pooja Rani*<sup>1</sup>; Deepak Khare<sup>1</sup>; Kantesh Balani<sup>1</sup>; <sup>1</sup>IIT Kanpur

**4:00 PM**

**Shape Memory Alloys in Medical Implants-Mechanical Properties and Application:** *Muhammad Farzik Ijaz*<sup>1</sup>; <sup>1</sup>King Saud University, KSA

**4:20 PM**

**Structural Adaptations in Nature: Investigating Functional Morphotypes and Mechanical Properties of Shark Denticles and Bone Microstructures for Advanced Structures:** *Ashish Ghimire*<sup>1</sup>; Rikke Beckmann Dahl<sup>2</sup>; Zheng-Shun Su<sup>1</sup>; Sheng-Feng Shen<sup>2</sup>; Shu-Wei Chang<sup>1</sup>; Po-Yu Chen<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Academia Sinica; <sup>3</sup>National Tsing Hua University, Taiwan

**4:40 PM**

**Challenges and Future Prospects in the Development of Biomimetic Materials for Tissue Engineering and Regenerative Medicine:** Raymond Awoyemi<sup>1</sup>; Edward Acheampong<sup>2</sup>; Awoyemi Christopher<sup>3</sup>; Peter Agyemang<sup>4</sup>; Danjuma Ibrahim<sup>5</sup>; *Sonia Edionweme*<sup>5</sup>; <sup>1</sup>Mississippi State University; <sup>2</sup>Mississippi State University; <sup>3</sup>Covenant University, Medical Centre, Canaanland; <sup>4</sup>Michigan Technological University; <sup>5</sup>Rubber Research Institute of Nigeria

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Multiscale Modeling of Complex Structures and Defects

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Wednesday PM | March 26, 2025**  
**353 | MGM Grand**

**Session Chair:** Yue Fan, University of Michigan

**2:00 PM Invited**

**Mesoscale Investigation of Dislocation-Grain Boundary Interactions in Metals and Alloys:** *Abigail Hunter*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**2:30 PM**

**Engineering the Crack-Tip Material Composition to Enhance the Microplasticity in Refractory Complex Concentrated Alloys:** *Subhendu Chakraborty*<sup>1</sup>; Liang Qi<sup>1</sup>; <sup>1</sup>University of Michigan

**2:50 PM Invited**

**The Connection Between Atomistic Defect Clusters and Geometrically Necessary Dislocations in Irradiated Nanocrystals:** Sicong He<sup>1</sup>; Emily Mang<sup>2</sup>; Osman El Atwani<sup>3</sup>; James Nathaniel<sup>4</sup>; Xinran Zhou<sup>5</sup>; Asher Leff<sup>6</sup>; Mitra Taheri<sup>2</sup>; *Jaime Marian*<sup>1</sup>; <sup>1</sup>University of California, Los Angeles; <sup>2</sup>Johns-Hopkins University; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Sandia National Laboratories; <sup>5</sup>Argonne National Laboratory; <sup>6</sup>TauMat

**3:20 PM**

**Quantifying Chemical Short-Range Order in Metallic Alloys:** *Killian Sheriiff*<sup>1</sup>; Yifan Cao<sup>1</sup>; Tess Smidt<sup>1</sup>; Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**3:40 PM Break**

**4:00 PM Invited**

**Neural Network Kinetics: Exploring Diffusion Multiplicity and Chemical Ordering in Compositionally Complex Materials:** *Penghui Cao*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**4:30 PM Invited**

**Complex Structure of Liquid and Machine-Learning:** *Takeshi Egami*<sup>1</sup>; <sup>1</sup>University of Tennessee

**5:00 PM**

**Machine Learning - Kinetic Monte Carlo Investigation on Sluggish Interstitial Diffusion in Fe-Ni-Cr-Cu-Co High Entropy Alloys:** *Wenjiang Huang*<sup>1</sup>; Xianming Bai<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute



## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Characterization of Metals

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Wednesday PM | March 26, 2025**  
**109 | MGM Grand**

**Session Chair:** Mingming Zhang, Baowu Ouyee Co. Ltd

#### 2:00 PM

**Anodization Behavior of Additive Manufactured Aluminum Alloys:** *Lydia Daum*<sup>1</sup>; Stefan Ostendorf<sup>1</sup>; Martin Peterlechner<sup>2</sup>; Gerhard Wilde<sup>1</sup>; <sup>1</sup>University of Münster; <sup>2</sup>Karlsruhe Institute of Technology

#### 2:20 PM

**Unraveling the Mystery of Helium as Environment Gas in 3D Printing of Metals:** Zhongshu Ren<sup>1</sup>; *Tao Sun*<sup>2</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Northwestern University

#### 2:40 PM

**Cu-Sn Anode Failure: Understanding the Mechanism From the Optical Approach:** *Gladys Duran Duran*<sup>1</sup>; Amy Prieto<sup>1</sup>; Rhys Otten<sup>1</sup>; <sup>1</sup>Colorado State University

#### 3:00 PM

**Development and Characterization of an Ultrastrong Single-Phase High Entropy Alloy With Enhanced Ductility:** *Emre Güneş*<sup>1</sup>; Yunus Kalay<sup>2</sup>; <sup>1</sup>Middle East Technical University / Additive Manufacturing Technology Application and Research Center (EKTAM), Gazi University; <sup>2</sup>Middle East Technical University

#### 3:20 PM

**Effect of Sulfur on the Surface Tension of Low-Sulfur Manganese-Boron Steel:** *Matheus BellÉ*<sup>1</sup>; Olena Volkova<sup>1</sup>; <sup>1</sup>Technische Universität Bergakademie Freiberg

#### 3:40 PM Break

#### 3:50 PM

**Local Electrical Characterization of Grain and Phase Boundaries in Alloys:** *Hanna Bishara*<sup>1</sup>; <sup>1</sup>Tel Aviv University

#### 4:10 PM

**Micromechanical Investigation of Defects in Single Crystal Ni-Based Superalloys:** *Felicitas Werner*<sup>1</sup>; Janine Pfitzing-Micklich<sup>1</sup>; Aleksander Kostka<sup>1</sup>; Jan Frenzel<sup>1</sup>; Gunther Eggeler<sup>1</sup>; <sup>1</sup>Ruhr-University Bochum

#### 4:30 PM

**Quantitative Analysis of Corrosion Products, Pores and Carbides on Uncoated Single Crystal RenéN5 Superalloy:** *Roger Maddalena*<sup>1</sup>; <sup>1</sup>Thermo Fisher Scientific

#### 4:50 PM

**Correlative Transmission Electron Microscopy For In Situ Grain Growth Studies in Metallic Thin Films:** *Matthew Patrick*<sup>1</sup>; Jeffrey Rickman<sup>2</sup>; Katayun Barmak<sup>1</sup>; <sup>1</sup>Columbia University; <sup>2</sup>Lehigh University

#### 5:10 PM

**Lattice Parameter Evolution During the -to- and -to- Transformations of Iron and Aluminum Modified Ti-11Cr(at.%):** *Joann Ballor*<sup>1</sup>; Jonathan Poplawsky<sup>2</sup>; Arun Devaraj<sup>3</sup>; Scott Mixture<sup>4</sup>; Carl Boehlert<sup>1</sup>; <sup>1</sup>Michigan State University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Alfred University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — AI and ML Methods for Grain Boundary Phenomena

**Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Wednesday PM | March 26, 2025**  
**304 | MGM Grand**

**Session Chairs:** Fei Zhou, Lawrence Livermore National Laboratory; Daniel Moore, Lehigh University

#### 2:00 PM Invited

**Grand Canonical Diffusion Model for Crystalline Phases and Grain Boundaries:** *Fei Zhou*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 2:30 PM

**Machine Learning Guided Prediction of Solute Segregation at Metal/Oxide**

**Interfaces:** *Yizhou Lu*<sup>1</sup>; Blas Uberuaga<sup>2</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi; <sup>2</sup>Los Alamos National Laboratory

#### 2:50 PM

**A Machine Learning Approach for Extracting Grain Boundary Mobilities From Time-Resolved Grain Maps:** *Jules Dake*<sup>1</sup>; Leonard Lauber<sup>1</sup>; Thomas Wilhelm<sup>1</sup>; Lukas Petrich<sup>1</sup>; Orkun Furat<sup>1</sup>; Volker Schmidt<sup>1</sup>; Carl Krill<sup>1</sup>; <sup>1</sup>Ulm University

#### 3:10 PM

**Examining the Interactions of Crack Tips With Disconnections in Copper Twin Boundaries:** *Ethan Cluff*<sup>1</sup>; Remi Dingreville<sup>2</sup>; Eric Homer<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Sandia National Laboratory

#### 3:30 PM Break

#### 3:50 PM

**The Influence of Lattice Distortions From Applied Stresses on Functional Properties of Shape Memory Materials:** *Eliana Feygin*<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Northwestern University

#### 4:10 PM

**Tracking the Microstructure Evolution of Ni Polycrystals:** *Yi Wang*<sup>1</sup>; Zipeng Xu<sup>1</sup>; Vivekanand Muralikrishnan<sup>1</sup>; Hao Zhu<sup>1</sup>; Gregory Rohrer<sup>1</sup>; Amanda Krause<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

4:30 PM

**Localized Corrosion of Ni-Cr-Fe-Cu Alloys Caused by Cu Segregation-Induced Cr Depletion of Grain Boundaries: Theoretical and Experimental Study:** *Karthikeyan Hariharan*<sup>1</sup>; Longsheng Feng<sup>2</sup>; Kamalnath Kadirvel<sup>3</sup>; Vignesh Karunakaran<sup>1</sup>; Koushik Kosanam<sup>1</sup>; Narasi Sridhar<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Gerald Frankel<sup>1</sup>; Eric Schindelholz<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>CompuTherm LLC

4:50 PM

**Using Bernal Hole Analysis to Understand the Experimentally Observed Grain Boundaries of Aluminum:** *Elizabeth Heon*<sup>1</sup>; Matthew Chisholm<sup>1</sup>; Gerd Duscher<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

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## NUCLEAR MATERIALS

### Composite Materials for Nuclear Applications III — Graphite, TRISO, and Novel Moderators

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Composite Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Anne Campbell, Oak Ridge National Laboratory; Dong (Lilly) Liu, University of Oxford; Rick Ubig, Boise State University; Lauren Garrison, Commonwealth Fusion Systems; Peng Xu, Idaho National Laboratory; Johann Riesch, Max Planck Institute For Plasma Physics; James Wade-Zhu, UKAEA

Wednesday PM | March 26, 2025  
164 | MGM Grand

**Session Chairs:** Rick Ubig, Boise State University; Anne Campbell, Oak Ridge National Laboratory; Dong (Lilly) Liu, University of Oxford

2:00 PM Invited

**Perspectives on Raman Spectroscopy for Carbon-Based Nuclear Materials:** *David Arregui-Mena*<sup>1</sup>; Jisue Braatz<sup>1</sup>; Takaaki Koyanagi<sup>1</sup>; Yan-Ru Lin<sup>1</sup>; Abdurahim Oguz<sup>1</sup>; Phillip Edmondson<sup>2</sup>; Yutai Katoh<sup>1</sup>; Nidia Gallego<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Manchester

2:25 PM Invited

**Understanding Fission Product Behaviour in Ion-Implanted Graphite:** *Alex Theodosiou*<sup>1</sup>; Philippe Ouzilleau<sup>2</sup>; Ben Spencer<sup>1</sup>; Abbie Jones<sup>1</sup>; <sup>1</sup>University of Manchester; <sup>2</sup>McGill University

2:50 PM

**Developing Methods to Predict Failure and Crack Growth Using Small Angle Scattering Techniques:** *Sean Fayfar*<sup>1</sup>; Boris Khaykovich<sup>1</sup>; David Sprouster<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Stony Brook University

3:10 PM

**Effects of Neutron Irradiation on the Three-Parameter Weibull Analysis of Graphite:** *Anne Campbell*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

3:30 PM Break

3:50 PM

**On the Reduced Damage Tolerance of Fine-Grained Nuclear Graphite at Elevated Temperatures Using In Situ 4D Tomographic Imaging:** Ming Jiang<sup>1</sup>; Houzheng Wu<sup>2</sup>; Robert Ritchie<sup>3</sup>; Martin Kuball<sup>4</sup>; Dong (Lilly) Liu<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>Loughborough University; <sup>3</sup>Lawrence Berkeley National Laboratory; <sup>4</sup>University of Bristol

4:10 PM

**Mechanical and Irradiation Behaviors in Low-Textured Pyrolytic Carbon:** *Raphaelle David*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>UW-Madison

4:30 PM

**TRISO Coating Layer Failure Analysis:** *Wen Jiang*<sup>1</sup>; <sup>1</sup>North Carolina State University

4:50 PM

**Irradiation Tolerance and Molten Salt Compatibility of Beryllium Carbide – A Candidate High Temperature Moderator Material:** *Diego Muzquiz*<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan Nuclear Engineering

5:10 PM

**Alloying Yttrium Hydride via Powder Metallurgy:** *Darrell Cheu*<sup>1</sup>; Aditya Shivprasad<sup>1</sup>; Caitlin Kohnert<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Thermodynamics & Kinetics of Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

Wednesday PM | March 26, 2025  
305 | MGM Grand

**Session Chairs:** Jorge Munoz, University of Texas at El Paso; Javier Llorca, IMDEA Materials Institute & Technical University of Madrid

2:00 PM Invited

**Investigations of Solute Clustering Kinetics During Quenching and Aging in Al-Zn-Mg-Based Alloys:** Zhucong Xi<sup>1</sup>; Louis Hector Jr.<sup>2</sup>; Amit Misra<sup>1</sup>; *Liang Qi*<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>General Motors Company

2:30 PM

**Computing Ternary Liquid Phase Diagrams: Fe-Cu-Ni:** *Dallas Trinkle*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

3:00 PM

**The Impact of Segregation, Ordering and Solvent Effects on the Surface Phase Diagrams of Mg-Alloys With Ca:** *Mira Todorova*<sup>1</sup>; Jing Yang<sup>1</sup>; Joerg Neugebauer<sup>1</sup>; <sup>1</sup>Max-Planck-Institute for Sustainable Material

3:20 PM

**First-Principles Prediction of the Co-Al Phase Diagram Including Configurational, Vibrational and Magnetic Contributions:** Wei Shao<sup>1</sup>; Sha Liu<sup>2</sup>; *Javier Llorca*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>Yanshan University

3:40 PM Break

4:00 PM Invited

**Lattice Dynamical Stability of the Body-Centered Cubic (BCC) Structure in Born-Von Karman (BvK) Force Constant Parameter Space:** Amir Husen<sup>1</sup>; *Jorge Munoz*<sup>1</sup>; <sup>1</sup>University of Texas at El Paso

4:30 PM

**DFTTK and PyZentropy: High-Throughput Tools for Free Energy Calculations of Individual Configurations and Systems From First-Principles:** *Nigel Hew*<sup>1</sup>; Luke Myers<sup>1</sup>; Shun-Li Shang<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Penn State University

4:50 PM

**Understanding Guinier-Preston (GP) Zones in Mg Alloys From First-Principles Thermodynamics:** Yuan-Chen Gao<sup>1</sup>; Du Cheng<sup>1</sup>; Kang Wang<sup>1</sup>; *Bi-Cheng Zhou*<sup>1</sup>; <sup>1</sup>University of Virginia

5:10 PM

**Calculation of Thermodynamic Properties of Mixed Oxides Using Modified Polyhedron Model:** Jesus Arias Hernandez<sup>1</sup>; Sun Kwon<sup>2</sup>; Elmira Moosavi-Khoonsari<sup>1</sup>; <sup>1</sup>École de Technologie Supérieure; <sup>2</sup>Oak Ridge National Laboratory

## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Processing II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

**Wednesday PM | March 26, 2025**  
**317 | MGM Grand**

**Session Chairs:** Marie Charpagne, University of Illinois; Sophie Primig, University of New South Wales

#### 2:00 PM Invited

**Opportunities for Grain Boundary Engineering via Laser Powder Bed Fusion of 316L Stainless Steel:** Sophie Primig<sup>1</sup>; Ming Luo<sup>1</sup>; Nima Haghdadi<sup>1</sup>; <sup>1</sup>University of New South Wales

#### 2:30 PM

**From Complex Geometries to Complex Microstructures: New Opportunities for Materials Design:** Matteo Seita<sup>1</sup>; <sup>1</sup>University of Cambridge

#### 2:50 PM

**A Corroborative In-Situ, Ex-Situ and 3D Study of Recrystallisation in ABD-900AM:** Yuanbo Tang<sup>1</sup>; Anh Hoang Pham<sup>2</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Shimane University

#### 3:10 PM

**Microstructure Evolution and Kinetics in Post Heat-Treatment of 316H Stainless Steel Fabricated by Laser Powder Bed Fusion:** Lin Gao<sup>1</sup>; Srinivas Mantri<sup>1</sup>; Xuan Zhang<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 3:30 PM Break

#### 3:50 PM Invited

**Pathways to Grain Boundary Engineering in Additive Manufactured Alloys:** Marie Charpagne<sup>1</sup>; Yuheng Nie<sup>1</sup>; <sup>1</sup>University of Illinois

#### 4:20 PM

**Silicon Mediated Twin Formation in Additively Manufactured 316L Stainless Steel:** Kewei Chen<sup>1</sup>; Juan Guillermo Santos Macias<sup>1</sup>; Nathalie Isac<sup>1</sup>; Maxime Vallet<sup>2</sup>; Louis Cornet<sup>2</sup>; Manas Upadhyay<sup>1</sup>; <sup>1</sup>LMS, CNRS, Ecole Polytechnique, IP Paris; <sup>2</sup>LMPS, CNRS, CentraleSupélec, ENS Paris-Saclay

#### 4:40 PM

**Remelting-Informed Grain Engineering in Laser Powder Bed Fusion:** Tianyi Lyu<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

#### 5:00 PM

**Enabling Microstructure Manipulation in Laser Powder Blown Directed Energy Deposition Through Multi-Mode Laser Beam Shaping:** Samantha Webster<sup>1</sup>; James Zuback<sup>1</sup>; Annabel Shim<sup>1</sup>; Carelyn Campbell<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

#### 5:20 PM

**Microstructural Control of Additively Manufactured Ti-6Al-4V via In-Situ Laser Annealing:** Connor Rietema<sup>1</sup>; Kaila Bertsch<sup>1</sup>; John Roehling<sup>1</sup>; William Smith<sup>1</sup>; Chase Gesteland<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>University of California, Berkeley

## SPECIAL TOPICS

### DMMM5: A Decade of Creating Inclusion and Belonging for Diversity in the Minerals, Metals, and Materials Professions — Taking Actions to Continue Progress

**Sponsored by:** TMS: Membership Diversity & Development Committee, TMS: Diversity, Equity, and Inclusion Committee

**Program Organizers:** Ben Britton, University of British Columbia; Lauren Garrison, Commonwealth Fusion Systems; Keith Bowman, University of Maryland Baltimore County; Katelyn Jones; Suveen Mathaudhu, Colorado School of Mines; Ashley Paz y Puente, University of Cincinnati; Soumya Varma, KLA Corporation; Eva Zarkadoulas; Danielle White, University of Southern California

**Wednesday PM | March 26, 2025**  
**150 | MGM Grand**

**Session Chair:** Keith Bowman, University of Maryland Baltimore County

**2:00 PM Panel Discussion – Inclusive Professional Environments**  
TMS has long worked to promote equity, diversity, and inclusion (EDI) within our profession, including through the DMMM conference series. This is a panel-based discussion to explore the journey of change and the path forward in fostering an inclusive professional environment. The panel will explore inclusive training experiences, recognizing its critical role in preparing early-career individuals for the workforce. The panel and attendees will discuss how employers can sustain an inclusive workforce, foster belonging, and address cultural competencies necessary for impactful work, particularly amid shifting social and political landscapes. We will engage the audience in a wider reflection and collaborative dialogue to develop materials that can guide our community's EDI efforts. We invite all participants at TMS and DMMM5 to join this conversation, find inspiration, and contribute to building a more inclusive professional community.

Speakers for this session include Keith Bowman, University of Maryland, Baltimore County College of Engineering and Information Technology; Olivia Graeve, University of California San Diego; Elizabeth Opila, University of Virginia; Izabela Szlufarska, University of Wisconsin Madison; and Ricardo Castro, Lehigh University.

#### 3:20 PM Discussions with the Panelists

#### 3:40 PM Break

#### 4:00 PM

**Breaking Barriers and Materials: Uncovering Constance Tipper's Impact on Metallurgy and Inclusion:** Mengying Liu<sup>1</sup>; <sup>1</sup>Washington and Lee University

**4:20 PM Panel Discussion:** Materials Engineering at Apple  
Materials have helped enable Apple products to achieve their iconic performance and industrial design. Materials engineers from a range of backgrounds have come together to form the Apple Materials team, known for their leading work in developing alloys, polymers, glass and ceramics, and engineered surfaces. In this session, Jim Yurko, a Senior Distinguished Engineer and Materials team leader, will facilitate a discussion between members of his team to learn more about their career journeys.  
Moderator: Jim Yurko; Panelists include Laura Madril, Dana Frankel, and Art Counts.

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Advanced Electronic Packaging Materials/ Process II

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**Wednesday PM | March 26, 2025**  
**360 | MGM Grand**

**Session Chairs:** Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**2:00 PM**

**Comparison Between Current Induced Joule Heat Variation on Near Eutectic and Off Eutectic Sn-Bi Solder Joint Stability:** *Tae-Kyu Lee*<sup>1</sup>; Pushkar Gothe<sup>2</sup>; Yujin Park<sup>3</sup>; Gnyaneshwar Ramakrishna<sup>1</sup>; Young-Woo Lee<sup>3</sup>; Hui-Joong Kim<sup>3</sup>; Seul-Gi Lee<sup>3</sup>; Choong-Un Kim<sup>2</sup>; <sup>1</sup>Cisco Systems; <sup>2</sup>University of Texas, Arlington; <sup>3</sup>MK Electron

**2:20 PM**

**Silver and Copper Sinter Joint Properties for 1200 V 60A Silicone Carbide MOSFET Power Modules:** *Won Sik Hong*<sup>1</sup>; So-Hee Hyun<sup>1</sup>; Mi Song Kim<sup>1</sup>; Joo Young Bae<sup>1</sup>; <sup>1</sup>Korea Electronics Technology Institute

**2:40 PM**

**Wear Behavior of Cyanide-Free Silver Nanotwin Films Co-Deposited With Graphene:** *Kuan Lin Fu*<sup>1</sup>; <sup>1</sup>National Central University

**3:00 PM**

**Microstructural Fingerprints for Secure Microelectronic Packaging:** *Min Cho*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University

**3:20 PM Break**

**3:40 PM**

**Transparent Bonding of Flexible Substrates Without an Absorber by Using Laser Heating:** *Eunhye Lee*<sup>1</sup>; Jeehoo Na<sup>2</sup>; Sang-Eun Han<sup>2</sup>; Taeyoon Im<sup>2</sup>; So Jeong Lee<sup>2</sup>; Byeong-Kwon Ju<sup>3</sup>; Tae-Ik Lee<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Korea University

**4:00 PM**

**Oxygen-Free Cu Sinter Joining in the Air on Cold-Rolled Cu Substrates:** *YehRi Kim*<sup>1</sup>; Ha-Young Yu<sup>2</sup>; Dongjin Kim<sup>2</sup>; <sup>1</sup>Korea Insititue of Industrial Technology, Korea University; <sup>2</sup>Korea Insititue of Industrial Technology

**4:20 PM**

**Blind Hole Filling With Nano-Twinned Copper in Bulid Up Pcb's:** *Jui-Sheng Chang*<sup>1</sup>; <sup>1</sup>National Central University

**4:40 PM Concluding Comments**

## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Advanced Techniques for Elucidating Radiation Effects and Corrosion in Structural Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**Wednesday PM | March 26, 2025**  
**162 | MGM Grand**

**Session Chairs:** Nathan Almirall, GE Aerospace; Farida Selim, Bowling Green State University

**2:00 PM Invited**

**Unraveling Mass Transport Mechanisms During Corrosion and Irradiation in Iron-Based Materials at the Nanoscale:** *Sandra Taylor*<sup>1</sup>; Bethany Matthews<sup>1</sup>; Aaron Kohnert<sup>2</sup>; Sten Lambeets<sup>1</sup>; Matthew Olszta<sup>1</sup>; Kayla Yano<sup>1</sup>; Daniel Schreiber<sup>1</sup>; Blas Ueberuaga<sup>2</sup>; Tiffany Kaspar<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Los Alamos National Laboratory

**2:30 PM Invited**

**Utilizing Multi-Modal Approaches to Study Metal Solutes and Corrosion in Molten Salt Environments:** *Simerjeet Gill*<sup>1</sup>; Nirmalendu Patra<sup>1</sup>; Ruchi Gakhar<sup>2</sup>; Mehmet Topsakal<sup>1</sup>; Insung Han<sup>1</sup>; Trishelle Copeland Johnson<sup>2</sup>; Alejandro Ramos Ballesteros<sup>2</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Idaho National Lab

**3:00 PM**

**Influence of Temperature and Ion Radiation on Dealloying of Fe-Ni Alloy in Liquid Lead:** *Wande Cairang*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Xing Gong<sup>2</sup>; Kevin Woller<sup>3</sup>; Michael Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Shenzhen University

**3:20 PM**

**Influence of Pre-Deformation on Grain Boundary Oxidation of a Model Fe-Cr-Ni Alloy in High-Temperature Hydrogenated Water Environments:** *Semanti Mukhopadhyay*<sup>1</sup>; Dallin Barton<sup>1</sup>; Tingkun Liu<sup>1</sup>; Pauline Simonnin<sup>1</sup>; Hyoju Park<sup>1</sup>; Cheng-Han Li<sup>1</sup>; Ziqing Zhai<sup>1</sup>; Ferdinand Colon<sup>1</sup>; Mychailo Toloczko<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:40 PM Break**

**3:55 PM**

**Correlative Microscopy of Creep Cavitation in Ferritic, Martensitic and Austenitic Steels:** *Tomas Martin*<sup>1</sup>; Eirini Galliopoulou<sup>1</sup>; Siqi He<sup>1</sup>; Michael Salvini<sup>1</sup>; Nicolo Grilli<sup>1</sup>; Alan Cocks<sup>2</sup>; Peter Flewitt<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>University of Oxford

**4:15 PM**

**Deep-Learning Driven Pt Particle Analysis for BWR Corrosion Insights:** *Txai Sibley*<sup>1</sup>; Kevin Field<sup>1</sup>; Elizabeth Holm<sup>1</sup>; <sup>1</sup>University of Michigan

**4:35 PM**

**High-Dose Evolution of Radiation-Induced Segregation in an Austenitic Fe-Ni-Cr Alloy:** *Daniele Fatto Oddiani*<sup>1</sup>; Emmanuelle Marquis<sup>1</sup>; <sup>1</sup>University of Michigan - Ann Arbor

**4:55 PM**

**High Temperature Mechanical and Irradiation Response of a Refractory Alloy With a Isostructural Eutectic Microstructure:** *Sriswaroop Dasari*<sup>1</sup>; Boopathy Kombaiah<sup>2</sup>; Philip Petersen<sup>2</sup>; Mukesh Bachhav<sup>2</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>Idaho National Laboratory



5:15 PM

**Thermomechanical Effects on Grain Structure Evolution in Ni-8Cr Alloy Using X-Ray Diffraction Contrast Tomography:** *Swapnil Morankar<sup>1</sup>; Boopathy Kombariah<sup>1</sup>; William Chuirazzi<sup>1</sup>; Idaho National Laboratory*

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Multiple Principal Component Materials — Design, Modeling, Simulation, and Machine Learning

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Wenjun Cai, Virginia Polytechnic Institute and State University; XiaoXiang Yu, Novelis Inc.; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska Lincoln; Mark Weaver, University of Alabama; Bronislava Gorz, Kit; Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Wednesday PM | March 26, 2025**  
**169 | MGM Grand**

**Session Chairs:** Yanqing Su, Utah State University; XiaoXiang Yu, Novelis Inc.

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2:00 PM

**A High Throughput CALPHAD Development Method Designing Single Phase Alloy Platform For the Exploration of Light-Weighting Elements' as Passivators in Co-Free FCC Alloys:** *Peter Connors<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia*

2:20 PM Invited

**Predicting Alloy Oxidation Resistance Using Physics Informed Machine Learning:** *Richard Oleksak<sup>1</sup>; William Trehern<sup>1</sup>; Aditya Sundar<sup>1</sup>; Leebyn Chong<sup>1</sup>; Madison Wenzlick<sup>1</sup>; Kyle Rozman<sup>1</sup>; Martin Detroit<sup>1</sup>; Paul Jablonski<sup>1</sup>; Michael Gao<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory*

2:40 PM

**Discovery of Oxidation-Resistant Refractory Complex, Concentrated Alloys Through High-Throughput Calculations and Experiments:** *Akhil Bejjurapu<sup>1</sup>; Sharmila Karumuri<sup>1</sup>; Saswat Mishra<sup>1</sup>; Joseph Flanagan<sup>1</sup>; Ilias Bilonis<sup>1</sup>; Alejandro Strachan<sup>1</sup>; Kenneth H. Sandhage<sup>1</sup>; Michael Titus<sup>1</sup>; <sup>1</sup>Purdue University*

3:00 PM

**Development of NiCoFeCrAl Based High Entropy Alloys for Hydrogen Fueled Turbine System:** *Shanshan Hu<sup>1</sup>; Xingru Tan<sup>1</sup>; Tianwei Lu<sup>1</sup>; Aditya Sundar<sup>2</sup>; Yi Wang<sup>2</sup>; Saro San<sup>2</sup>; Michael Gao<sup>2</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>National Energy Technology Laboratory*

3:20 PM

**Design and Evaluation of Multicomponent Rare Earth Disilicate Environmental Barrier Coatings:** *Richard Oleksak<sup>1</sup>; Shiqiang Hao<sup>1</sup>; Michael Gao<sup>1</sup>; Casey Carney<sup>1</sup>; Mohammad Hossain<sup>1</sup>; Ömer Doğan<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory*

3:40 PM Break

3:50 PM

**Probing Irradiation Response in CrFeMnNi Compositionally Complex Alloys Using High-Throughput Methodology:** *Nathan Curtis<sup>1</sup>; Michael Moorehead<sup>2</sup>; Mukesh Bachhav<sup>2</sup>; Benoit Queyral<sup>1</sup>; Phalgun Nelaturu<sup>1</sup>; Daniel Murray<sup>2</sup>; Bao-Phong Nguyen<sup>1</sup>; Nate Eklof<sup>1</sup>; Zack Rielley<sup>1</sup>; Dan Thoma<sup>1</sup>; Dane Morgan<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Idaho National Laboratory*

4:10 PM

**Alumina-Forming Nb-Mo-Ti-Al Bond Coat Alloys:** *Melina Endsley<sup>1</sup>; Collin Holgate<sup>1</sup>; Chiyo McMullin<sup>1</sup>; Michael Worku<sup>2</sup>; Carlos Levi<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>GE Vernova*

4:30 PM

**First-Principles Study of Oxide Formation and Stability in the Equiatomic CoCrFeNi High-Entropy Alloy:** *Dennis Boakye<sup>1</sup>; Chuang Deng<sup>1</sup>; <sup>1</sup>University of Manitoba*

4:50 PM

**Development of Novel Light Refractory Compositionally Complex Alloys for High Energy Accelerator Windows:** *Nicholas Crnkovich<sup>1</sup>; Abe Burleigh<sup>2</sup>; Kavin Ammigan<sup>2</sup>; Frederique Pellemoine<sup>2</sup>; Izabela Szlufarska<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Fermi National Accelerator Laboratory*

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## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Studies and Design Under the Process-(Micro)Structure-Properties-Performance Paradigm

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

**Wednesday PM | March 26, 2025**  
**318 | MGM Grand**

**Session Chair:** Garrett Pataky, Clemson University

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2:00 PM

**Cyclic Deformation Behavior of Laser Powder Bed Fused Stainless Steel 316L:** *Luis Avila<sup>1</sup>; Tiago Werner<sup>1</sup>; Birgit Rehmer<sup>1</sup>; Mauro Madaia<sup>1</sup>; Leonardo Agudo Jácome<sup>1</sup>; Birgit Skrotzki<sup>1</sup>; Alexander Evans<sup>1</sup>; <sup>1</sup>Federal Institute for Materials Research and Testing (BAM)*

2:20 PM

**Improved Properties of Additively Prepared Inconel 718 Alloy Post-Processed With a New Heat Treatment:** *Sumit Choudhary<sup>1</sup>; Vinit Gaur<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee*

2:40 PM

**Insights on Dwell Debit in a Ti6Al4V Alloy: A Mesoscale Correlational Study:** *Hanqing Liu<sup>1</sup>; Angus Wilkinson<sup>2</sup>; Jicheng Gong<sup>1</sup>; <sup>1</sup>King's College London; <sup>2</sup>University of Oxford*

3:00 PM

**Investigating the Effect of Deformation Twins on Fatigue Crack Growth Rate:** *Ali Asl<sup>1</sup>; Garrett Pataky<sup>1</sup>; <sup>1</sup>Clemson University*

3:20 PM

**High and Very High Cycle Fatigue Characteristics of Wire Arc Additive Manufactured and Cast Nickel Aluminum Bronze:** *Meysam Haghsheenas<sup>1</sup>; <sup>1</sup>University of Toledo*

## Friction Stir Welding and Processing XIII — Friction Stir Processing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Wednesday PM | March 26, 2025**  
**123 | MGM Grand**

**Session Chairs:** Amit Arora, Indian Institute of Technology Gandhinagar; Nilesh Kumar, University of Alabama, Tuscaloosa

**2:00 PM**

**Advanced Strengthening of Austenitic Manganese Steel via Friction Stir Processing and Subsequent Work Hardening:** *Toni Sprigode*<sup>1</sup>; Guntram Wagner<sup>1</sup>; <sup>1</sup>Chemnitz University of Technology

**2:20 PM**

**Friction Stir Processing of 316L Stainless Steel for Improvements in Biomedical Application:** *Kaleb Bates*<sup>1</sup>; Isaac Andorful<sup>1</sup>; Robert Hovanski<sup>1</sup>; Sophie Wartenta<sup>1</sup>; Quentin Allen<sup>1</sup>; <sup>1</sup>Brigham Young University

**2:40 PM**

**Heat Treatment of Multitrack Friction Stir Processing of Precipitation-Hardenable Aluminum Alloy:** *Amlan Kar*<sup>1</sup>; Hudson Wagner<sup>1</sup>; Todd Curtis<sup>1</sup>; Bharat Jasthi<sup>1</sup>; Wade Lein<sup>2</sup>; Zackery McClelland<sup>2</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology; <sup>2</sup>U.S. Army Engineer Research and Development Center (ERDC)

**3:00 PM**

**Metal Matrix Composites of Al/Al<sub>2</sub>O<sub>3</sub> Obtained via Friction Stir Processing:** *Marta Lipinska*<sup>1</sup>; Florian Pixner<sup>2</sup>; Andreas Hütter<sup>2</sup>; Norbert Enzinger<sup>2</sup>; Magorzata Lewandowska<sup>1</sup>; <sup>1</sup>Warsaw University of Technology; <sup>2</sup>Graz University of Technology

**3:20 PM Break**

**3:40 PM**

**Vibration Diagnostics Regulated Automatic Friction Stir Processing:** *Shikhar Krishn Jha*<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

**4:00 PM**

**A Discontinuous Dynamic Recrystallization Model for Predicting Grain Features During Friction Stir Processing:** *Prachi Sharma*<sup>1</sup>; Deepak Dhariwal<sup>2</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar; <sup>2</sup>Virginia Tech

**4:20 PM**

**Effect of Multiple-Pass Friction Stir Processing on Microstructural and Mechanical Properties of Stir Cast AA5083-2wt.%SiC Nanocomposite:** *Gaurav Rajan*<sup>1</sup>; Suhrit Mula<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Roorkee

**4:40 PM**

**Friction Stir Polymer Bonding of AA6061 and Beech Wood:** *Hayden Jenkins*<sup>1</sup>; Alvin Strauss<sup>1</sup>; <sup>1</sup>Vanderbilt University

## Friction Stir Welding and Processing XIII — Friction Stir Technologies

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Wednesday PM | March 26, 2025**  
**124 | MGM Grand**

**Session Chairs:** Piyush Upadhyay, Pacific Northwest National Laboratory; Troy Munro, Brigham Young University

**2:00 PM**

**Achieving Uniform Extrudate and Homogeneous Microstructure in Friction Extrusion:** *Xiao Li*<sup>1</sup>; Julian Escobar<sup>1</sup>; Lei Li<sup>1</sup>; Akash Mukhopadhyay<sup>1</sup>; Jorge Dos Santos<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**2:20 PM**

**Lightweight Bimetallic Tubular Components Via Friction Stir Backward Extrusion: Fabrication and Process Outcome Analysis:** *Rishabh Swarnkar*<sup>1</sup>; Surjya Pal<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**2:40 PM**

**Effect of Processing Parameters on the Microstructure and Mechanical Properties in Friction Stir Consolidated ODS-14YWT Powders:** *Shubhrodev Bhowmik*<sup>1</sup>; Kumar Kandasamy<sup>2</sup>; Nilesh Kumar<sup>1</sup>; <sup>1</sup>University of Alabama Tuscaloosa; <sup>2</sup>Enabled Engineering

**3:00 PM**

**Sustainable Metal Upcycling Using Solid Stir Extrusion:** *Anurag Gumaste*<sup>1</sup>; Austin Killam<sup>1</sup>; Kameron Hightower<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Sandeep Patil<sup>2</sup>; Takuro Iwata<sup>2</sup>; Nanzhu Zhao<sup>2</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Nissan Technical Center North America

**3:20 PM Break**

**3:40 PM**

**Development of Copper CoreFlow® Friction Stir Channelling for Fusion Energy Applications:** *Sam Holdsworth*<sup>1</sup>; <sup>1</sup>TWI Ltd.

**4:00 PM**

**Development of Novel Friction Surfacing Method:** *Fuyuki Ishida*<sup>1</sup>; Takayuki Yamashita<sup>1</sup>; Masayoshi Kamai<sup>1</sup>; Yoshiaki Morisada<sup>1</sup>; Hidetoshi Fujii<sup>1</sup>; <sup>1</sup>Osaka University

**4:20 PM**

**Flexible Ultrasonic-Enhanced Friction Stir Welding:** *Marat Rebrin*<sup>1</sup>; Guntram Wagner<sup>1</sup>; Martin Mädlow<sup>2</sup>; Welf-Guntram Drossel<sup>2</sup>; <sup>1</sup>Technische Universität Chemnitz; <sup>2</sup>Fraunhofer-Institut für Werkzeugmaschinen und Umformtechnik IWU

**4:40 PM**

**Hybrid Repair Techniques for Heat-Treatable Aluminum Alloys:** *Amlan Kar*<sup>1</sup>; Landon Zentz<sup>1</sup>; Todd Curtis<sup>1</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

## Functional Nanomaterials — Functional Nanomaterials III: 1D & 2D Nanostructures

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

**Wednesday PM | March 26, 2025**  
**365 | MGM Grand**

**Session Chair:** Wenzhuo Wu, Purdue University

### 2:00 PM Invited

**Precision Near-Field Electrospinning: Transforming Micro/Nano Manufacturing With Advanced Nanofiber Fabrication:** *Jiyoung Chang*<sup>1</sup>; Tae-Gon Kim<sup>2</sup>; Min Jae Seo<sup>3</sup>; Young Hun Jeong<sup>3</sup>; Seung Han Yang<sup>3</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Kyungpook National University

### 2:30 PM Keynote

**Molecular Engineering of Field-Effect Transistor Water Sensors Based on 2D Nanomaterials:** *Junhong Chen*<sup>1</sup>; <sup>1</sup>University of Chicago; Argonne National Laboratory

### 3:10 PM Invited

**Effect of Graphene Heterostructures on Electrical Performance of Ultra-Conductors:** *Keerti Kappagantula*<sup>1</sup>; Md. Reza-E-Rabby<sup>1</sup>; Aditya Nittala<sup>1</sup>; Pedro Ottoni Negro<sup>1</sup>; Tej Poudel<sup>1</sup>; Julian Escobar Atehortua<sup>1</sup>; Bharat Gwalani<sup>1</sup>; Kashi Subedi<sup>1</sup>; Kishor Nepal<sup>1</sup>; David Drabold<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

### 3:40 PM Break

### 4:00 PM Invited

**Growth Kinetics of CsPbBr<sub>3</sub> Nanocrystals Under Stirring:** *Fuqian Yang*<sup>1</sup>; <sup>1</sup>University of Kentucky

### 4:30 PM Keynote

**Medical Applications of Nanostructured Diamond Coatings:** *Roger Narayan*<sup>1</sup>; <sup>1</sup>University of North Carolina

### 5:10 PM Invited

**Ion Transport With Convective Flow in Graphene Nanochannels of Flow Cell Battery Electrodes:** *Seungha Shin*<sup>1</sup>; Yu-Kai Weng<sup>1</sup>; Md Abdullah Al Hasan<sup>1</sup>; Daniel Lee<sup>1</sup>; Kenneth Kihm<sup>1</sup>; <sup>1</sup>University of Tennessee

## Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties — Structure and Properties II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoungh Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

**Wednesday PM | March 26, 2025**  
**155 | MGM Grand**

**Session Chairs:** Mathias Goken, University Erlangen-Nurnberg; Megumi Kawasaki, Oregon State University; Rodney McCabe, Los Alamos National Laboratory; Tianlong Zhang, The Hong Kong University of Science and Technology

### 2:00 PM Invited

**Mechanical and Functional Properties of Ultrathin Heterogeneous Lamellar Metallic Composites:** *Mathias Goken*<sup>1</sup>; Moritz Kuglstatler<sup>1</sup>; Heinz Werner Höppel<sup>1</sup>; <sup>1</sup>University Erlangen-Nürnberg

### 2:25 PM

**Characterization of Heterostructure in Bulk Nanostructured Metals Processed by High-Pressure Torsion:** *Megumi Kawasaki*<sup>1</sup>; Roberto Figueiredo<sup>2</sup>; Klaus-Dieter Liss<sup>3</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Universidade Federal de Minas Gerais; <sup>3</sup>University of Tennessee – Oak Ridge Innovation Institute

### 2:45 PM

**Effects of Strong Interfaces and Intermetallic Layers on Strength Properties of ARB Processed Reactive Metals:** *Rodney McCabe*<sup>1</sup>; Yifan Zhang<sup>2</sup>; Miroslav Zecevic<sup>1</sup>; Emma Gordon<sup>1</sup>; Hi Vo<sup>1</sup>; Tom Nizolek<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Clemson University

### 3:05 PM

**Mechanical Studies of Heterogeneous Nanostructured Inconel 725:** *Ikponmwosa Iyinbor*<sup>1</sup>; Jin Wang<sup>2</sup>; Ruth Schwaiger<sup>2</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Institute of Energy and Climate Research - Microstructure and Properties of Materials (IEK-2)

### 3:25 PM Invited

**Exploring Heterostructured Materials With Synchrotron X-Ray and Neutron:** *Yang Ren*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

### 3:50 PM Break

### 4:05 PM

**High-Energy Synchrotron X-Ray Diffraction to Characterize Gradient Nanocrystalline Structure in High-Pressure Torsion Processed Inconel 718:** *Laxman Bhatta*<sup>1</sup>; Isshu Lee<sup>1</sup>; Klaus-Dieter Liss<sup>2</sup>; Megumi Kawasaki<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>University of Tennessee

### 4:25 PM

**Strong Yet Ductile Titanium Alloy Design by Concentration Modulation:** *Tianlong Zhang*<sup>1</sup>; <sup>1</sup>The Hong Kong University of Science and Technology

### 4:45 PM

**Tuning the Mechanical Behavior of Heterostructured Nanotwinned-Nanocrystalline Ni Films:** Rohit Berlia<sup>1</sup>; Jagannathan Rajagopalan<sup>1</sup>; <sup>1</sup>Arizona State University

## Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Mechanical Properties

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Wednesday PM | March 26, 2025**  
**352 | MGM Grand**

**Session Chairs:** Penghui Cao, University of California, Irvine; Srinivasan Srivilliputhur, University of North Texas

### 2:00 PM Invited

**Impacts on Microstructure and Mechanical Properties Due to Chemical Short-Range Order in CoCrNi and CrNi<sub>2</sub> Alloys:** Vinicius Bacurau<sup>1</sup>; Pedro Moreira<sup>1</sup>; Daniel Miracle<sup>2</sup>; Angelo Andreoli<sup>1</sup>; Eric Mazzer<sup>1</sup>; Michael Widom<sup>3</sup>; Michael Kaufman<sup>4</sup>; Yifan Cao<sup>5</sup>; Rodrigo Freitas<sup>5</sup>; *Francisco Coury*<sup>1</sup>; <sup>1</sup>Universidade Federal de Sao Carlos; <sup>2</sup>AF Research Laboratory, Materials and Manufacturing Directorate; <sup>3</sup>Carnegie Mellon University; <sup>4</sup>Colorado School of Mines; <sup>5</sup>Massachusetts Institute of Technology

### 2:30 PM Invited

**Role of Local Chemical Ordering on the Strengthening Properties of Structural Alloys:** *Edwin Antillon*<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

### 3:00 PM

**Abnormal Hardness in MEA and HEA After Thermomechanical Processing:** Guilherme Sato<sup>1</sup>; Guilherme Stumpf<sup>1</sup>; Caroline Gonçalves<sup>2</sup>; Vinicius Bacurau<sup>1</sup>; Francisco Coury<sup>1</sup>; *Eric Mazzer*<sup>1</sup>; <sup>1</sup>Universidade Federal de Sao Carlos (UFSCar); <sup>2</sup>Universidade Federal de Minas Gerais (UFMG)

### 3:20 PM Break

### 3:40 PM Invited

**Short Range Order and Effects on Mechanical Properties of Medium-Entropy CrCoNi:** *Easo George*<sup>1</sup>; <sup>1</sup>University of Tennessee

### 4:10 PM

**Investigation of Chemical Short-Range Order Impact on Melting Point and Generalized Stacking Fault Energy in Multi-Principal Element Alloys:** *Subah Mubassira*<sup>1</sup>; Mahshad Fani<sup>1</sup>; Anshu Raj<sup>1</sup>; Shuozhi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma

## Magnesium Technology 2025 — Microstructure Evolution and Phase Transformations

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Wednesday PM | March 26, 2025**  
**115 | MGM Grand**

**Session Chairs:** Wilhelmus Sillekens, European Space Agency; Aerial Leonard, Ohio State University

### 2:00 PM Invited

**Microstructure-Oriented Fatigue Crack Propagation in Two Cast Mg-Al-Ba-Ca Alloys:** *Petra Maier*<sup>1</sup>; Benjamin Wolfram<sup>1</sup>; Jens Roggelin<sup>1</sup>; Norbert Hort<sup>2</sup>; <sup>1</sup>University of Applied Sciences Stralsund; <sup>2</sup>Helmholtz-Zentrum Hereon

### 2:30 PM

**Effect of Erbium Addition to Magnesium on Texture, Recrystallization, and Mechanical Behaviour:** *Rashi Rajanna*<sup>1</sup>; Jayant Jain<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Delhi

### 2:50 PM

**Effect of Cooling Rate on the Solidification Behavior of AMZ211-Y/Ca Alloys:** *Jianyue Zhang*<sup>1</sup>; Jiashi Miao<sup>1</sup>; Alan Luo<sup>1</sup>; Hongyi Zhan<sup>2</sup>; Jianfeng Wang<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>General Motors

### 3:10 PM

**Considering the Possibility of Significant Strain Accommodation via Dislocation Climb Using Dislocation Density Measurements:** Michael Ritzo<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; Kristian Mathis<sup>2</sup>; *Sean Agnew*<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Charles University

### 3:30 PM Break

### 3:50 PM

**Guinier-Preston (GP) Zone Strengthening of Dilute Magnesium Alloys Comprised of Earth-Abundant Elements:** *Jishnu Bhattacharyya*<sup>1</sup>; Seth Faberman<sup>1</sup>; Aaron Sullivan<sup>1</sup>; Du Cheng<sup>1</sup>; Yuan-Chen Gao<sup>1</sup>; Bi-Cheng Zhou<sup>1</sup>; Zehao Li<sup>2</sup>; Taisuke Sasaki<sup>2</sup>; Sean Agnew<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>National Institute of Materials Science

### 4:10 PM

**Vacancy-Induced Solute Clustering in Binary Magnesium Alloys:** *Sreenivas Raguraman*<sup>1</sup>; Zehao Li<sup>2</sup>; Homero Pulido<sup>1</sup>; Michael Falk<sup>1</sup>; Arun Devaraj<sup>2</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Pacific Northwest National Laboratory

### 4:30 PM

**Precipitation Hardening in the Magnesium-Zinc-Calcium Alloy System:** *Marcel Braun*<sup>1</sup>; Mirko Schaper<sup>1</sup>; Kay-Peter Hoyer<sup>1</sup>; Olexandr Grydin<sup>1</sup>; <sup>1</sup>University Paderborn

### 4:50 PM

**Effect of Zn or Ca Addition on Microstructure and Mechanical Properties of Mg-Ti Composites Fabricated Through Liquid Metal Dealloying:** *Jee Eun Jang*<sup>1</sup>; Soo-Hyun Joo<sup>2</sup>; Ho-Sang Sohn<sup>1</sup>; Sung Hyuk Park<sup>1</sup>; <sup>1</sup>Kyungpook National University; <sup>2</sup>Dankook University



## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Impurities in Molten Salts: Measurements, Effects, and Control

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Wednesday PM | March 26, 2025**  
**165 | MGM Grand**

**Session Chairs:** Weiyue Zhou, Massachusetts Institute of Technology; Amanda Leong, Virginia Polytechnic Institute

#### 2:00 PM

**Effect of Impurities on Molten Salt Corrosion of 316H Stainless Steel in FLiNaK Medium:** *Bhagwat Ghule*<sup>1</sup>; Kailee Buttice<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

#### 2:20 PM

**Evolution of Molten Salt Chemistry During Oxygen and Moisture Ingressions:** *Nathaniel Hoyt*<sup>1</sup>; Jicheng Guo<sup>1</sup>; Nora Shaheen<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 2:40 PM

**Effects of Transition Metal Impurities on the Corrosion of Ni-Based Alloy in Molten Fluoride Salt:** *Nayoung Kim*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Michael Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

#### 3:00 PM

**Confirmation of Impurity Detection in Molten Salts:** *Logan McIlwain*<sup>1</sup>; Amanda Leong<sup>1</sup>; Jamie Bahn<sup>1</sup>; Xander Hromiak<sup>1</sup>; Trevor Bradshaw<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

#### 3:20 PM

**Impurity and Corrosion Assessment in Purified Molten Fuel NaF-BeF-UF-ZrF Salts:** *Amanda Leong*<sup>1</sup>; Matthew Si<sup>1</sup>; Jaewoo Park<sup>1</sup>; Trevor Bradshaw<sup>1</sup>; Xander Hromiak<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

#### 3:40 PM Break

#### 4:00 PM Invited

**Impact of Molten Salt Exposure on Characteristics of Metal Nanoparticles:** *Phillip Halstenberg*<sup>1</sup>; Ellie Kim<sup>1</sup>; Dmitry Maltsev<sup>1</sup>; Sheng Dai<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 4:25 PM

**Introducing and Monitoring Moisture Content in MgCl<sub>2</sub>-NaCl Salt Systems to Evaluate its Impact on Corrosion of NiCr Alloys:** *Matteo Kozlowski*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; Kumar Sridharan<sup>1</sup>; Adrien Couet<sup>1</sup>; Cody Falconer<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>TerraPower, LLC

#### 4:45 PM

**Spectroelectrochemical Detection of Moisture Related Impurities in Molten Salts:** *Thomas Selmi*<sup>1</sup>; Dev Chidambaram<sup>1</sup>; <sup>1</sup>University of Nevada

#### 5:05 PM

**Investigating the Effects of Helium-Ion Irradiation on the Corrosivity of FLiNaK Molten Salt:** *Adria Peterkin*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Mike Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Materials for Sustainable Hydrogen Energy — Hydrogen Production & Catalysts

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

**Wednesday PM | March 26, 2025**  
**359 | MGM Grand**

**Session Chairs:** Enrique Galindo-Nava, University College London; Binhan Sun, East China University of Science and Technology; Jinwoo Kim, Korea Institute Of Science And Technology (Kist); Wenwen Song, University of Kassel

#### 2:00 PM Introductory Comments

#### 2:05 PM

**Plasma-Treated Transition Metal Dichalcogenide Nanoparticles for Efficient Hydrogen Evolution Reaction:** *Alex Laikhtman*<sup>1</sup>; Arie Borenstein<sup>2</sup>; Alla Zak<sup>1</sup>; <sup>1</sup>Holon Institute of Technology (HIT); <sup>2</sup>University of Ariel

#### 2:25 PM

**Highly Durable and Efficient Anion Exchange Membrane Water Electrolyzer Using One-Step Fabrication of the Integrated Electrode by the Hot-Press Process:** *Shin-Woo Myeong*<sup>1</sup>; Sung Choi<sup>2</sup>; <sup>1</sup>Korea Institute of Materials Science (KIMS); <sup>2</sup>Korea Institute of Materials Science (KIMS); University of Science and Technology (UST)

#### 2:45 PM

**Size and Shape Dependence of Hydrogen-Induced Phase Transformation and Sorption Hysteresis in Palladium Nanoparticles:** *Xingsheng Sun*<sup>1</sup>; <sup>1</sup>University of Kentucky

#### 3:05 PM

**Non-PGM Based Binder Free Electrode for Anion Exchange Membrane Water Electrolyzer:** *Seunghun Lee*<sup>1</sup>; Yoosei Park; Yangdo Kim<sup>1</sup>; <sup>1</sup>Pusan National University

## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Thermodynamics and Rate Phenomena — Process Optimization and Material Behavior in Metallurgical Applications

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Allie Anderson, RHI Magnesita; Adrian Sabau, Oak Ridge National Laboratory; Chukwunwike Iloeje, Argonne National Laboratory; Adamantia Lazou, National Technical University of Athens; Kayla Molnar, Los Alamos National Laboratory

**Wednesday PM | March 26, 2025**  
**103 | MGM Grand**

**Session Chairs:** Adrian Sabau, Oak Ridge National Laboratory; Adamantia Lazou, National Technical University of Athens

#### 2:00 PM Introductory Comments

##### 2:05 PM

**Optimization of Rotary Kiln in Molybdenite Concentrate Oxidation for Molybdenic Trioxide Production:** *Jungho Heo*<sup>1</sup>; Seongsoo Han<sup>1</sup>; Hyunsik Park<sup>1</sup>; Joobeom Seo<sup>1</sup>; <sup>1</sup>Korea Institute of Geoscience and Mineral Resources

##### 2:25 PM

**Mold Simulator Study of Heat Transfer Behavior of Medium Carbon Steel Slag Film Inside Continuous Casting Mold:** *Zichao Wang*<sup>1</sup>; Wanlin Wang<sup>1</sup>; Haihui Zhang<sup>2</sup>; Jie Zeng<sup>1</sup>; Lejun Zhou<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>Jiangxi University of Science and Technology

##### 2:45 PM

**The Oscillating Drop's Sensitivity to Thermophysical Properties of the Melt and Flow Conditions in Electromagnetic Levitation Experiments:** *Gwendolyn Bracker*<sup>1</sup>; Robert Hyers<sup>2</sup>; <sup>1</sup>DLR Institute of Materials Physics in Space; <sup>2</sup>Worcester Polytechnic Institute

##### 3:05 PM

**Correlation of Bond Structures and Viscosity of Submerged Arc Welding Fluxes Towards Shipbuilding Steels:** *Hang Yuan*<sup>1</sup>; Yanyun Zhang<sup>1</sup>; Cong Wang<sup>1</sup>; <sup>1</sup>Northeastern University

##### 3:25 PM Break

##### 3:45 PM

**Experimental and Computational Studies on Solid-State Dewetting of Single Crystal Nickel and Copper Thin Films:** *Misong Ju*<sup>1</sup>; Maxwell L'Etoile<sup>1</sup>; Yoon Ah Shin<sup>1</sup>; Baoming Wang<sup>1</sup>; Carl Thompson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

##### 4:05 PM Concluding Comments

## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Cladding Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**Wednesday PM | March 26, 2025**  
**160 | MGM Grand**

**Session Chairs:** Benjamin Eftink, Los Alamos National Laboratory; Caleb Massey, Oak Ridge National Laboratory

#### 2:00 PM Invited

**Development of a Plasticity Model for Non-Hydrided and Hydrided Beta-Treated Zircaloy-4 Based on the Results From Notched Tensile, Torsion and Compression Testing:** *Brian Cockeram*<sup>1</sup>; James Sobotka<sup>2</sup>; <sup>1</sup>Nnl Fluor Marine Propulsion; <sup>2</sup>Southwest Research Institute

##### 2:30 PM

**Assessment of Ring and Axial Tension Tests for Determining Cladding Mechanical Properties:** *Robert Hansen*<sup>1</sup>; Philip Petersen<sup>1</sup>; Prasenjit Dewanjee<sup>2</sup>; Aaron Colldeweih<sup>1</sup>; Jake Stockwell<sup>1</sup>; David Kamerman<sup>1</sup>; Fabiola Cappia<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Utah State University

##### 2:50 PM

**Enhanced Properties of CrAl Coated ATF Cladding:** *Sung Eun Kim*<sup>1</sup>; Jong Dae Hong<sup>2</sup>; Hong Ryoul Oh<sup>2</sup>; Hyun-gil Kim<sup>2</sup>; <sup>1</sup>Inha University; <sup>2</sup>Korea Atomic Energy Research Institute

##### 3:10 PM

**Finite Element Analysis of Stress Evolution of Cr-Coated and FeCrAl-Coated Zircaloy Fuel Cladding Tubes:** *Artur Santos Paixao*<sup>1</sup>; Rijul Chauhan<sup>1</sup>; Zhihan Hu<sup>1</sup>; Frank Garner<sup>1</sup>; Michael Nastasi<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

##### 3:30 PM Break

##### 3:50 PM

**In-Situ Loading and Corrosion of Coated Zircaloy With Scratch Defects:** *Zhenyu Fei*<sup>1</sup>; Peng Wang<sup>1</sup>; Connor Shamberger<sup>1</sup>; Gary Was<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan

##### 4:10 PM

**Influence of Temperature on Slip Properties and Strain Rate Sensitivity in Zircaloy-4 by Micro-Cantilever Tests:** *Jicheng Gong*<sup>1</sup>; Ed Darnbrough<sup>2</sup>; Angus Wilkinson<sup>2</sup>; <sup>1</sup>King's College London; <sup>2</sup>Oxford University

##### 4:30 PM

**Mechanical Anisotropy of Textured Nb-Modified Zircaloy-4 Cladding Tubes:** *Mahmoud Hawary*<sup>1</sup>; K.L. Murty<sup>1</sup>; <sup>1</sup>North Carolina State University

##### 4:50 PM

**Digital Image Correlation Analysis of Modified Burst Tests to Support BISON Validation of Reactivity-Initiated Accident Separate-Effects Tests:** *Jennifer Espersen*<sup>1</sup>; Nathan Capps<sup>2</sup>; Nicholas Brown<sup>1</sup>; <sup>1</sup>University of Tennessee-Knoxville; <sup>2</sup>Oak Ridge National Laboratory

## Mechanical Behavior Related to Interface Physics IV — Fracture, Adhesion, and Nanoparticle Strengthening

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

**Wednesday PM | March 26, 2025**  
**369 | MGM Grand**

**Session Chairs:** Rebecca Gallivan, Dartmouth College; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology

**2:00 PM**

**Distinguishing Competing Mechanisms in the Deformation of Ultra-Small Nanoparticles:** *Tevis Jacobs*<sup>1</sup>; Ruikang Ding<sup>1</sup>; Amit Prasad<sup>1</sup>; Douglas Zhang<sup>1</sup>; Ting Liu<sup>1</sup>; Ashlie Martini<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**2:20 PM**

**Unveiling Size-Dependent Strength in Noble Metal Nanoparticles: A Comparative Study of Pt, Au, and Ag:** *Amit Prasad*<sup>1</sup>; Ruikang Ding<sup>1</sup>; Ashlie Martini<sup>2</sup>; Tevis Jacobs<sup>1</sup>; Douglas Zhang<sup>2</sup>; Ting Liu<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of California

**2:40 PM**

**Ductility and Brittle Fracture of Tungsten: The Role of Twin Boundaries and Pre-Existing Dislocations:** *Omar Hussein*<sup>1</sup>; Nicolas Bertin<sup>2</sup>; Tomas Oppelstrup<sup>2</sup>; Fadi Abdeljawad<sup>3</sup>; Timofey Frolov<sup>2</sup>; <sup>1</sup>George Mason University; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Lehigh University

**3:00 PM Invited**

**The Interplay Between Interfaces and Plastic Deformation in Nanoscale Materials:** *Ralph Spolenak*<sup>1</sup>; <sup>1</sup>Eth Zurich

**3:30 PM Break**

**3:50 PM**

**Analyzing Plastic Flow in Polycrystalline Alloys From Atomistic to Microscale Perspectives:** *Thanh Phan*<sup>1</sup>; Liming Xiong<sup>1</sup>; <sup>1</sup>North Carolina State University

**4:10 PM**

**Interface Design for Flexible Thin Film Systems: Electromechanical Properties and Adhesion:** *Johanna Byloff*<sup>1</sup>; Pierre-Olivier Renault<sup>2</sup>; Damien Faurie<sup>3</sup>; Soheil Husain<sup>2</sup>; Thomas Edwards<sup>1</sup>; Daniele Casari<sup>1</sup>; Claus Trost<sup>4</sup>; Megan Cordill<sup>4</sup>; Barbara Putz<sup>1</sup>; <sup>1</sup>Empa - Swiss Laboratories for Materials Science; <sup>2</sup>Universite de Poitiers; <sup>3</sup>LSPM - CNRS; <sup>4</sup>Erich Schmid Institute of Materials Science

**4:30 PM**

**Interface Modification to Tailor Adhesion of Mo-Based Alloy Thin Films to Polyimide:** *Megan Cordill*<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science

**4:50 PM Invited**

**Exploring Interface Fracture in Thin Film Structures Using Diffraction-Based Techniques:** *Alice Lassnig*<sup>1</sup>; Christoph Gammer<sup>1</sup>; Michael Meindlhumer<sup>2</sup>; Megan Cordill<sup>1</sup>; Andrew Minor<sup>3</sup>; <sup>1</sup>Erich Schmid Institut; <sup>2</sup>Montanuniversität Leoben; <sup>3</sup>University of California, Berkeley

## Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Modelling and Data-Centred Studies

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

**Wednesday PM | March 26, 2025**  
**366 | MGM Grand**

**Session Chair:** Robert Wheeler, Microtesting Solutions LLC

**2:00 PM Invited**

**Crystal Plasticity Experiments With Microstructure Clones:** *Jay Carroll*<sup>1</sup>; Kaitlynn Fitzgerald<sup>2</sup>; Tim Ruggles<sup>1</sup>; William Gilliland<sup>1</sup>; Hojun Lim<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>United States Naval Academy

**2:30 PM**

**Evaluating Phase-Field Simulations of Brittle Fracture in Polycrystalline Materials:** *Mythreyi Ramesh*<sup>1</sup>; Sara Gorske<sup>2</sup>; Blaise Bourdin<sup>3</sup>; Kaushik Bhattacharya<sup>2</sup>; Katherine Faber<sup>2</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>California Institute of Technology; <sup>3</sup>McMaster University

**2:50 PM**

**Programming the Crack Propagation and Toughness in Mechanical Metamaterials:** Hsing Lin Wu<sup>1</sup>; *Minh-Son Pham*<sup>1</sup>; <sup>1</sup>Imperial College London

**3:10 PM**

**Phase Field Microelasticity Theory and Modeling of Dislocation Dynamics in an Elastically and Structurally Inhomogeneous Solid:** *Song Ling Janel Chua*<sup>1</sup>; Brayan Murgas Portilla<sup>1</sup>; Abigail Hunter<sup>1</sup>; Nithin Mathew<sup>1</sup>; <sup>1</sup>Los Alamos National Lab

**3:30 PM Break**

**3:50 PM**

**In-Situ Tribological Analysis of UHMWPE Ski Bases and Advanced Wax Formulations for Enhanced Glide Performance:** *Jeffrey Bates*<sup>1</sup>; <sup>1</sup>University of Utah

**4:10 PM**

**Discrete Dislocation Dynamic Simulation of Shock-Induced Plasticity in Aluminum Motivated by Atomistic Data:** *Cameron Frampton*<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

**4:30 PM**

**Evaluation of the  $\Delta T$  Creep Test as a Parallelized Test Method:** *Artur Leonel Machado Ulsenheimer*<sup>1</sup>; Christo Boudreaault<sup>1</sup>; Calvin Stewart<sup>1</sup>; <sup>1</sup>MATX at The Ohio State University

**4:50 PM**

**A Mesoscale Modeling Approach to Predict Microstructural Evolution During Hypervelocity Impact of Aluminum:** *Roshan Sebastian*<sup>1</sup>; Ching Chen<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

5:10 PM

**Phase Field Modeling of Slip Transfer in Thick Biphase Interfaces in HCP/BCC Nanolaminates:** *Nicolas Fuchs-Lynch*<sup>1</sup>; Shuozi Xu<sup>2</sup>; Mauricio De Leo<sup>3</sup>; Pulkit Garg<sup>1</sup>; Nathan Mara<sup>3</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>University of Oklahoma; <sup>3</sup>University of Minnesota, Twin Cities

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## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Metallic Alloys I

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusion Engineering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

Wednesday PM | March 26, 2025  
158 | MGM Grand

**Session Chairs:** Ian Mccue, Northwestern University; Xing Wang, Pennsylvania State University

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#### 2:00 PM Keynote

**Emerging Alloy Materials for Fusion Power:** Osman El-Atwani<sup>1</sup>; Matheus Tunes<sup>2</sup>; Saryu Fensin<sup>3</sup>; Dan Thoma<sup>4</sup>; *Enrique Martinez Saez*<sup>4</sup>; Bochuan Sun<sup>4</sup>; Caleb Hatler<sup>5</sup>; Matthew Vigil<sup>5</sup>; James Haag<sup>1</sup>; Dan Schreiber<sup>1</sup>; Eda Aydogan<sup>1</sup>; Duc Nguyen<sup>6</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Montanuniversität Leoben; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Clemson University; <sup>5</sup>University of Wisconsin Madison; <sup>6</sup>UKAEA

#### 2:30 PM

**Benchmark Study of Three-Element Medium Entropy Alloy WTaV for Fusion Reactors Plasma-Facing Applications:** *Ishtiaque Karim Robin*<sup>1</sup>; Eda Aydogan<sup>1</sup>; Osman El-Atwani<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 2:50 PM

**Additive Manufacturing via Directed Energy Deposition of WTaCrV and WTaHfCrV Refractory High Entropy Alloys for Plasma Facing Components:** *Caleb Hatler*<sup>1</sup>; Matthew Vigil<sup>1</sup>; Bochuan Sun<sup>2</sup>; Enrique Martinez<sup>2</sup>; Saryu Fensin<sup>3</sup>; Osman El-Atwani<sup>4</sup>; Dan Thoma<sup>1</sup>; <sup>1</sup>University Of Wisconsin Madison; <sup>2</sup>Clemson University; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pacific Northwest National Laboratory

#### 3:10 PM

**Understanding the Role of Short-Range Order on Defect Thermodynamics in Tungsten Alloys:** *Maheshwari Meesa*<sup>1</sup>; Prashant Singh<sup>2</sup>; Nicolas Argibay<sup>2</sup>; Vijay Vasudevan<sup>1</sup>; Srinivasan Srivilliputhur<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Ames National Laboratory

#### 3:30 PM Break

#### 3:50 PM

**Refractory Alloy Processing Challenges for Next-Generation Energy Systems:** *Nicolas Argibay*<sup>1</sup>; Hailong Huang<sup>1</sup>; Ryan Ott<sup>1</sup>; Gaoyuan Ouyang<sup>1</sup>; Jordan Tiarks<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Zongyang Lyu<sup>1</sup>; Luke Gaydos<sup>1</sup>; Erik DeMeyere<sup>1</sup>; Prashant Singh<sup>1</sup>; Duane Johnson<sup>1</sup>; <sup>1</sup>Ames National Laboratory

#### 4:10 PM

**Spark Plasma Sintering of Dispersion-Strengthened Tungsten for Fusion Applications:** *Cristian Urias*<sup>1</sup>; Rameshwari Naorem<sup>2</sup>; Jonathan Rodriguez<sup>1</sup>; Hailong Huang<sup>2</sup>; Nicolas Argibay<sup>2</sup>; Vijay Vasudevan<sup>1</sup>; Thomas Scharf<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Ames National Laboratory

#### 4:30 PM

**Thermomechanical Processing of Tungsten and its Alloys for Fusion Energy Applications:** Siva Shankar Alla<sup>1</sup>; Blake Emad<sup>1</sup>; Carson Hester<sup>1</sup>; Saumyadeep Jana<sup>2</sup>; Xiao-Ying Yu<sup>3</sup>; Yutai Kato<sup>3</sup>; Vijay Vasudevan<sup>1</sup>; *Sundeeep Mukherjee*<sup>1</sup>; <sup>1</sup>University Of North Texas; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

#### 4:50 PM

**Microstructure Modification of Tungsten by Alloying, Dispersion Strengthening, and Thermomechanical Processing for Fusion Energy Applications:** *Blake Emad*<sup>1</sup>; Siva Shankar Alla<sup>1</sup>; Carson Hester<sup>1</sup>; Xiao-Ying Yu<sup>2</sup>; Yutai Kato<sup>2</sup>; Sundeeep Mukherjee<sup>1</sup>; Vijay Vasudevan<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Oak Ridge National Laboratory

#### 5:10 PM

**W-Cr Composite with Improved Fracture Toughness for Plasma-Facing Material: Fabrication and Mechanical Properties Characterization:** *Sungmin Lee*; Jeongseok Kim<sup>1</sup>; Nojun Kwak<sup>1</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University

#### 5:30 PM

**Identification of Transmutation Products in Irradiated Tungsten:** *Xiao-Ying Yu*<sup>1</sup>; Gabriel Parker<sup>1</sup>; Yan-Ru Lin<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Yutai Kato<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Microstructural Evolution and Material Properties: Session IV

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

Wednesday PM | March 26, 2025  
303 | MGM Grand

**Session Chairs:** Sukbin Lee, Ulsan National Institute Of Science And Technology; Curt Bronkhorst, University of Wisconsin-Madison

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#### 2:00 PM Invited

**Modeling Microstructure Fatigue Indicator Parameters Using Symbolic Regression with Graph Neural Networks:** *Jacob Hochhalter*<sup>1</sup>; Jonas Merrell<sup>1</sup>; Krzysztof Stopka<sup>2</sup>; Michael Sangid<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Purdue University

#### 2:30 PM Invited

**The Analysis of Grain Boundary Networks by 3D Serial Sectioning:** *David Rowenhorst*<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory

#### 3:00 PM

**Phase Transformation and Plasticity Enhanced by Electric Current or Charge:** *Heung Nam Han*<sup>1</sup>; <sup>1</sup>Seoul National University

#### 3:20 PM

**Field Fluctuations Elasto-Plastic Self-Consistent Crystal Plasticity: Applications to Predicting Texture Evolution During Rolling, Recrystallization, and Drawing Processes:** *Marko Knezevic*<sup>1</sup>; <sup>1</sup>University of New Hampshire



3:40 PM Break

4:00 PM Invited

**Advanced Coupling of an FFT-Based Mesoscale Modeling Method to a Macroscale Finite Element Method:** *Evan Lieberman*<sup>1</sup>; Miroslav Zecevic<sup>1</sup>; Caleb Yenusah<sup>2</sup>; Nathaniel Morgan<sup>1</sup>; Ricardo Lebensohn<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>SLB

4:30 PM

**Predictions of the Mechanical Behavior Scaling of Beam and Sheet Structures:** *Jonathan Lind*<sup>1</sup>; Brandon Zimmerman<sup>1</sup>; James Bellino<sup>1</sup>; Holly Carlton<sup>1</sup>; Mukul Kumar<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

4:50 PM

**Nano-Scale Analysis of Mechanically and Thermally Induced White Layers in Hard Turned AISI 52100 Bearing Steel:** *Sahith Kokkiralal*<sup>1</sup>; Seyed Hosseini<sup>2</sup>; Uta Klement<sup>1</sup>; <sup>1</sup>Chalmers University of Technology; <sup>2</sup>Research Institutes of Sweden AB

5:10 PM

**Recovery and Recrystallization of Deformed Metal Nanoparticles:** *Jonathan Zimmerman*<sup>1</sup>; Eugen Rabkin<sup>1</sup>; <sup>1</sup>Technion - Israel Institute of Technology

## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Next-Generation Fuels II: TRISO

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

Wednesday PM | March 26, 2025  
159 | MGM Grand

**Session Chairs:** Caleb Clement, Westinghouse Electric Company; Dong (Lilly) Liu, University of Oxford

2:00 PM Invited

**Assessing Thermochemical Stability and Fission Product Mobility in Advanced Nuclear Fuels:** *Elizabeth Sooby*<sup>1</sup>; Steven Cavazos<sup>1</sup>; Mira Khair<sup>1</sup>; Patrick Warren<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio

2:30 PM

**A Phase-Field Model for Studying Palladium Attack of SiC In TRISO:** Chaitanya Bhav<sup>1</sup>; Jacob Hirschhorn<sup>1</sup>; Matthew Swisher<sup>1</sup>; Larry Aagesen<sup>1</sup>; *Pierre-Clement Simon*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

2:50 PM

**3D X-Ray Micro-Tomography Imaging-Based Study of PYCASSO TRISO Fuel Particles:** Haiqi Huang<sup>1</sup>; Steven Knol<sup>2</sup>; Mark Davies<sup>3</sup>; Arjan Vreeling<sup>2</sup>; Matthew Jordan<sup>4</sup>; Nassia Tzelepi<sup>4</sup>; David Goddard<sup>4</sup>; Dong (Lilly) Liu<sup>5</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>NRG; <sup>3</sup>USNC; <sup>4</sup>UK National Nuclear Laboratory; <sup>5</sup>University of Oxford

3:10 PM

**Development of Coated Particle Fuels with New Architectures for an Expanded Service Envelope:** *Eddie Lopez Honorato*<sup>1</sup>; Ryan Heldt<sup>1</sup>; Bryan Conry<sup>1</sup>; Tyler Gerczak<sup>1</sup>; Flavio Dal Forno Chuahy<sup>1</sup>; Angel Diaz Abreu<sup>1</sup>; Katherine Montoya<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

3:30 PM Break

3:50 PM Invited

**Pebble Integrity in Action: Robust Testing for Safe Refueling:** *Assel Aitkaliyeva*<sup>1</sup>; Mitchell Mika<sup>1</sup>; Anne Campbell<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Oak Ridge National Laboratory

4:20 PM

**Kernel Composition and Variability Influence on TRISO Fuel Behavior:** *Tyler Gerczak*<sup>1</sup>; Grant Helmreich<sup>1</sup>; Will Cureton<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

4:40 PM

**In-situ Irradiation of Uranium Carbide and Zirconium Carbide:** *Rashed Almasri*<sup>1</sup>; Lingfeng He<sup>1</sup>; Jian Gan<sup>2</sup>; Adrian Wagner<sup>2</sup>; Laura Hawkins<sup>2</sup>; Wei-Ying Chen<sup>3</sup>; Yuhua Li<sup>4</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>University of Michigan

## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing — Direct Laser Writing and its Applications

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Electronic Packaging and Interconnection Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Alain Reiser, KTH Royal Institute of Technology; Wendy Gu, Stanford University; Yu Zou, University of Toronto; Mostafa Hassani, Cornell University; Ming Chen, University of Nevada, Reno

Wednesday PM | March 26, 2025  
316 | MGM Grand

**Session Chairs:** Wendy Gu, Stanford University; Yu Zou, University of Toronto

2:00 PM Introductory Comments

2:05 PM Invited

**Spatial Polymer-Free 3D Nanoprinting of Advanced Materials Using Optical Force Brush and Two-Photon Decomposition Methods:** *Gary Cheng*<sup>1</sup>; Chengqi Yi<sup>2</sup>; Yaoyu Wang<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Wuhan University

2:35 PM

**Nanoscale Additively Manufactured Oxides/Metal Nanocomposites with Composition-Dependent Microstructure and Strengths:** *Wenxin Zhang*<sup>1</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology

2:55 PM

**Femtosecond Laser Direct Writing of High Entropy Alloying Nanoparticles for Catalysis:** *Anming Hu*<sup>1</sup>; <sup>1</sup>University of Tennessee

3:15 PM

**Assessing Local Deformation, Fracture and Adhesion Properties by Multi-Photon Lithography Test Structures:** *Daniel Kiener*<sup>1</sup>; Alexander Jelinek<sup>1</sup>; Felix Ferk<sup>1</sup>; Markus Alfreider<sup>1</sup>; <sup>1</sup>University of Leoben

3:35 PM Break

3:55 PM Invited

**Ultrahigh Specific Strength by Bayesian Optimization of Lightweight Carbon Nanolattices:** Peter Serles<sup>1</sup>; Jinwook Yeo<sup>2</sup>; Michel Hache<sup>3</sup>; Pedro Guerra Demingos<sup>3</sup>; Jonathan Kong<sup>1</sup>; Pascal Kiefer<sup>3</sup>; Somayajulu Dhulipala<sup>4</sup>; Boran Kumral<sup>1</sup>; Katherine Jia<sup>1</sup>; Shuo Yang<sup>3</sup>; Tianjie Feng<sup>1</sup>; Charles Jia<sup>1</sup>; Carlos Portela<sup>4</sup>; Martin Wegener<sup>3</sup>; Pulickel Ajayan<sup>5</sup>; Jane Howe<sup>1</sup>; Chandra Veer Singh<sup>1</sup>; Yu Zou<sup>1</sup>; Seunghwa Ryu<sup>2</sup>; Tobin Filleter<sup>1</sup>; <sup>1</sup>University of Toronto; <sup>2</sup>Korea Advanced Institute of Science and Technology (KAIST); <sup>3</sup>Karlsruhe Institute of Technology; <sup>4</sup>Massachusetts Institute of Technology; <sup>5</sup>Rice University

4:25 PM

**Tuning Micro-Architected Mechanical Metamaterials by Controlling Structural Disorder:** Alexander Groetsch<sup>1</sup>; Kate Ainger<sup>2</sup>; Lorenzo Valdevit<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>University of California, Irvine

4:45 PM

**Elucidating the Structure and Energy Absorption of Holographically Produced 3D Nanoarchitected Materials:** Matias Kagias<sup>1</sup>; Thomas Tran<sup>2</sup>; Ruoqi Dang<sup>3</sup>; Zhi Li<sup>3</sup>; Nicholas Phillips<sup>4</sup>; Julia Greer<sup>2</sup>; <sup>1</sup>Lund University; <sup>2</sup>California Institute of Technology; <sup>3</sup>Institute of High Performance Computing, A\*STAR; <sup>4</sup>Paul Scherrer Institute

5:05 PM

**Cellular Fluidics: Directing Flow of Liquids and Gases Using Microarchitected Materials:** Nikola Dudukovic<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments III — Corrosive Environment

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Youxing Chen, University of North Carolina Charlotte; Haiming Wen, Missouri University of Science and Technology; Yue Fan, University of Michigan; Khalid Hattar, University of Tennessee Knoxville; Ashley Bucsek, University of Michigan; Jessica Krogstad, University of Illinois at Urbana-Champaign; Irene Beyerlein, University of California, Santa Barbara; Trevor Clark, Commonwealth Fusion Systems

Wednesday PM | March 26, 2025  
166 | MGM Grand

**Session Chair:** Trevor Clark, Commonwealth Fusion Systems

2:00 PM Invited

**Orientation-Dependent Oxidation of Fusion Plasma-Facing Tungsten:** Rajat Sainju<sup>1</sup>; Manisha De Alwis Goonatilleke<sup>1</sup>; Yuanyuan Zhu<sup>1</sup>; <sup>1</sup>University of Connecticut

2:25 PM

**Effects of Microstructure on Hydrogen Retention in Metal Hydride Moderators:** Jianqi Xi<sup>1</sup>; Nicholas Dailey<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

2:45 PM

**Electrical and Thermal Conductivity of 14YWT NFA:** Jared Justice<sup>1</sup>; Filip Ronning<sup>2</sup>; Stuart Maloy<sup>3</sup>; Osman Anderoglu<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Pacific Northwest National Lab

3:05 PM

**Improving the Oxidation Behavior of UHTCs Through Nanostructuring:** Catherine Ott<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

3:25 PM Break

3:45 PM

**Predicting Internal Oxidation in High-Temperature Ni-Cr Alloys Using a CALPHAD-Informed Phase-Field Model:** Ziming Zhong<sup>1</sup>; Peichen Wu<sup>1</sup>; Kumar Ankit<sup>1</sup>; <sup>1</sup>Arizona State University

4:05 PM

**Influence of Annealing Atmosphere on Microstructural Evolution and Variations in Mechanical Properties and Electrical Conductivity During Isochronal Annealing in a Nanocrystalline Cu-Zr Alloy:** Takahiro Kunimine<sup>1</sup>; Takeshi Inamura<sup>1</sup>; Shuhei Yamaguchi<sup>1</sup>; Naoya Nishikawa<sup>1</sup>; Reza Gholizadeh<sup>2</sup>; Nobuhiro Tsuji<sup>2</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>Kyoto University

4:25 PM

**Nanoscale Characterization of the Effect of the High Magnetic Field on a 15-5 PH Steel:** Sonia Guehairia<sup>1</sup>; <sup>1</sup>KTH

4:45 PM

**A Phonon-Unfolding Based Method for Quantitative Assessment of Thermal Conductivity of High Entropy Ceramics:** Jun Song<sup>1</sup>; Yuxuan Wong<sup>1</sup>; Guoqiang Lan<sup>1</sup>; <sup>1</sup>McGill University

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## ADVANCED CHARACTERIZATION METHODS

### Neutron and X-Ray Scattering in Materials Science and Engineering — Local Structure and Materials Properties

**Sponsored by:** TMS Functional Materials Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Michael Manley, Oak Ridge National Laboratory; Chen Li, University of California-Riverside; Hillary Smith, Swarthmore College; Jennifer Niedziela, Oak Ridge National Laboratory

Wednesday PM | March 26, 2025  
156 | MGM Grand

**Session Chair:** Puspa Upreti, Oak Ridge National Laboratory

2:00 PM Invited

**Probing Ionic Diffusion with Single Crystal Diffuse and Quasielastic Neutron Scattering:** Stephan Rosenkranz<sup>1</sup>; Jared Coles<sup>1</sup>; Raymond Osborn<sup>1</sup>; Matthew Krogstad<sup>2</sup>; Daniel Pajerowski<sup>3</sup>; <sup>1</sup>Materials Science Division, Argonne National Laboratory; <sup>2</sup>X-ray Science Division, Argonne National Laboratory; <sup>3</sup>Neutron Scattering Division, Oak Ridge National Laboratory

2:30 PM Invited

**Characterization of Radiation Effects in Ceramics with Neutron Total Scattering:** Maik Lang<sup>1</sup>; Eric O'Quinn<sup>1</sup>; Cale Overstreet<sup>1</sup>; Gianguido Baldinozzi<sup>2</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>CNRS CentraleSupélec, Université Paris-Saclay

3:00 PM

**Enhanced Magnetic-Disorder Driven Magnon Softening of TbSb via Y-Doping:** George Yumnam<sup>1</sup>; David Dahlborn<sup>1</sup>; Duncan Moseley<sup>1</sup>; Hasitha Arachige<sup>2</sup>; Barry Winn<sup>1</sup>; Allen Scheie<sup>3</sup>; Wei Tian<sup>1</sup>; Michael Manley<sup>1</sup>; David Mandrus<sup>2</sup>; Raphael Hermann<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee Knoxville; <sup>3</sup>Los Alamos National Laboratory

3:20 PM

**Planar Thermal Transport Mapping of the GaN Film with Spatial-Temporal-Resolved X-Ray Diffraction:** Thanh Nguyen<sup>1</sup>; *Chuliang Fu*<sup>1</sup>; Buxuan Li<sup>1</sup>; Tyra Espedal<sup>1</sup>; Zhantao Chen<sup>2</sup>; Haidan Wen<sup>3</sup>; Mingda Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>SLAC National Accelerator Laboratory; <sup>3</sup>Argonne National Laboratory

3:40 PM Break

3:50 PM

**Rationalization of Non-Uniform Radial Hardness Distribution in Friction Self-Piercing Riveted Al-7075 Using X-Ray Scattering and Advanced Microscopy Techniques:** *Rakesh Kamath*<sup>1</sup>; Yuan Li<sup>2</sup>; Jan Ilavsky<sup>1</sup>; Yi-Feng Su<sup>2</sup>; Yiyu Wang<sup>2</sup>; Jiheon Jun<sup>2</sup>; Yong Chae Lim<sup>2</sup>; Zhili Feng<sup>2</sup>; Dileep Singh<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Oak Ridge National Laboratory

4:10 PM

**Elucidating the Phase Evolution of a Spinodal Au-Pt-Pd Alloy Using In Situ Synchrotron X-Ray Diffraction:** *James Hogg*<sup>1</sup>; Jan Vollhüter<sup>2</sup>; Ming En Pek<sup>1</sup>; Hannah Cole<sup>1</sup>; George Wise<sup>1</sup>; Catherine Dejoie<sup>3</sup>; Nicholas Jones<sup>1</sup>; Steffen Neumeier<sup>2</sup>; David Collins<sup>1</sup>; Howard Stone<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg; <sup>3</sup>European Synchrotron Radiation Facility

4:30 PM

**In Situ X-Ray Diffraction Reveals the Early Stages of Solid Phase Alloying in the 7XXX Al Alloy System:** *Julian Escobar*<sup>1</sup>; Xiao Li<sup>1</sup>; Akash Mukhopadhyay<sup>1</sup>; Chang Chan<sup>2</sup>; Harikrishnasinh Rana<sup>3</sup>; Elizabeth Mathew<sup>2</sup>; Lars Rath<sup>2</sup>; Peter Staron<sup>2</sup>; Emad Maawad<sup>2</sup>; Uceu Suhuddin<sup>2</sup>; Lei Li<sup>2</sup>; Ayoub Soulami<sup>2</sup>; Benjamin Klusemann<sup>3</sup>; Cynthia Powell<sup>1</sup>; Jorge dos Santos<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Helmholtz-Zentrum Hereon; <sup>3</sup>Leuphana University Luneburg

## ADVANCED CHARACTERIZATION METHODS

### Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques — Materials Informatics & AI/ML Supplemented Characterization Workflows

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory; Austin McDannald, National Institute of Standards and Technology; Fan Zhang, National Institute of Standards and Technology; Sarshad Rommel, University of Connecticut

Wednesday PM | March 26, 2025  
157 | MGM Grand

**Session Chairs:** Fan Zhang, National Institute of Standards and Technology; Sriram Vijayan, Michigan Technological University

2:00 PM

**AI-Driven Microstructural Data Correlation Using In-Situ Raman Spectroscopy in Self-Driving Lab by Using Chocolate as Frugal Twin:** *Kinston Acköf*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

2:20 PM Invited

**From Chaos to Clarity: Managing the Materials Data Surge:** *Taylor Sparks*<sup>1</sup>; Ramsey Issa<sup>1</sup>; Layla Purdy<sup>1</sup>; Federico Ottomano<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Liverpool

2:45 PM Invited

**Microstructure Informatics: Automated Microstructure Characterization and Neural Network Based Modeling of Processing-Structure-Property Relations:** *Pascal Thome*<sup>1</sup>; Luis Arciniaga<sup>1</sup>; Michael Madigan<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona

3:10 PM

**A Retrieval-Augmented Generation Application in the Dental Composites Space:** *Wade Smallwood*<sup>1</sup>; Ramsey Issa<sup>1</sup>; Hasan Sayeed<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

3:30 PM Break

3:50 PM

**Accelerating Acquisition and Analysis of Nanoscale Microstructural Changes and Secondary Phases Using TEM: New Approaches for Smart Data Collection and On-the-Fly Quantification:** *Lee Casalena*<sup>1</sup>; <sup>1</sup>Thermo Fisher Scientific

4:10 PM

**Automated Real-Time 3D Stereo-Reconstructions Through Machine-Learning Based Tracking:** *Hangyu Li*<sup>1</sup>; Benjamin Eftink<sup>2</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan Ann Arbor; <sup>2</sup>Los Alamos National Laboratory

4:30 PM

**Deep Learning Conditional Diffusion Models to Recreate Scanning Electron Microscopy Using Light Optical Microscopy Priors:** *Nicholas Amano*<sup>1</sup>; Bo Lei<sup>2</sup>; Martin Müller<sup>3</sup>; Dominik Britz<sup>3</sup>; Elizabeth Holm<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Steinbeis-Forschungszentrum Material Engineering Center Saarland

4:50 PM

**Comparing Performance of U-Net Based Neural Networks for Automated Detection of Defects in TEM Images of Nuclear Materials:** *Aiden Ochoa*<sup>1</sup>; Xinyuan Xu<sup>1</sup>; Xing Wang<sup>1</sup>; <sup>1</sup>Penn State University

5:10 PM

**AI-Driven Kikuchi Pattern Enhancement for Efficient and Robust EBSD Analysis of Highly Deformed Metals:** Ayoub Dergaoui<sup>1</sup>; *Siyu Tu*<sup>2</sup>; Nouredine Barka<sup>2</sup>; <sup>1</sup>National Research Council; <sup>2</sup>University of Quebec at Rimouski

5:30 PM

**Three-Dimensional Laue-Diffraction Microscopy with a Coded Aperture: Principles and High-Performance-Computing Workflow:** *Matthew Diamond*<sup>1</sup>; Michael Prince<sup>2</sup>; Hannah Parraga<sup>1</sup>; Doga Gursoy<sup>1</sup>; Michael Wojcik<sup>1</sup>; Wenjun Liu<sup>1</sup>; Ross Harder<sup>1</sup>; Jonathan Tischler<sup>1</sup>; Dina Sheyfer<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Beyond Metals and Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

Wednesday PM | March 26, 2025  
167 | MGM Grand

**Session Chairs:** Eric Payton, University of Cincinnati; Bharat Gwalani, North Carolina State University

2:00 PM

**Domain Size Control by Spinodal Decomposition in Ferroelectrics:** *Catherine Bishop*<sup>1</sup>; <sup>1</sup>University of Canterbury

2:25 PM

**Crystal Structure Engineering of Mn/Co-Rich Spinel in Mn-Doped (Co,Cu,Mg,Ni,Zn)O:** *Jacob Norman*<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>Texas A&M; <sup>2</sup>University of Connecticut

2:45 PM

**Complex Antiphase Boundaries as a Means to Two-Phase Coexistence in Ordered Fe-Pd Alloys:** Adrian Savovici<sup>1</sup>; Yongmei Jin<sup>2</sup>; William Soffa<sup>1</sup>; *Jerrold Floro*<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Michigan Technological University

3:05 PM

**Perturbation Solutions of the Cahn-Hilliard Equations:** Rahul Basu<sup>1</sup>; *Shubhayan Mukherjee*<sup>2</sup>; <sup>1</sup>UGC, JNTU; <sup>2</sup>National Cheng Kung University

3:25 PM

**Microgravity Studies of Peritectic Coupled Growth by Using a Transparent Model Alloy Aboard the International Space Station:** *Johann Mogeritsch*<sup>1</sup>; Andreas Ludwig<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

3:45 PM Break

4:00 PM

**Phase Equilibrium and New Solid Solutions in the Sc<sub>2</sub>O<sub>3</sub>-TiO<sub>2</sub>-Fe<sub>2</sub>O<sub>3</sub> System at 1300 °C:** *Victor Emmanuel Alvarez Montano*<sup>1</sup>; Francisco Brown<sup>1</sup>; Subhash Sharma<sup>2</sup>; Miguel Olivas Martinez<sup>1</sup>; Alejandro Durán<sup>2</sup>; <sup>1</sup>Universidad de Sonora; <sup>2</sup>Universidad Nacional Autonoma de México

4:20 PM

**Pressure-Induced Amorphous-Amorphous Transitions and Crystallization in Silicon Studied by a Machine-Learned Potential:** *Zhao Fan*<sup>1</sup>; Hajime Tanaka<sup>2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>University of Tokyo

4:40 PM

**The Influence of Stoichiometry on the Reaction Behavior of Ni/Al Reactive Multilayers:** *Nensi Toncich*<sup>1</sup>; Rebecca Gallivan<sup>1</sup>; Fabian Schwarz<sup>1</sup>; Jemma Gillon<sup>1</sup>; Tina Curtins<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zürich

5:00 PM

**Pressure-Induced Phase Transformations of CdTe via Metadynamics Simulation:** *Jonathan Cappola*<sup>1</sup>; Kun Luo<sup>2</sup>; Qi An<sup>2</sup>; Lin Li<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Iowa State University

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## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Synthesis I: Powders and Particles

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

Wednesday PM | March 26, 2025  
105 | MGM Grand

**Session Chairs:** Diletta Giuntini, Eindhoven University of Technology; Chee Lip Gan, Nanyang Technological University

2:00 PM

**Tunable High-Energy Milling Toolsets for Refractory Nanocrystalline Alloys:** *Colton Gilleland*<sup>1</sup>; B. Chad Hornbuckle<sup>2</sup>; Kris Darling<sup>2</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Army Research Laboratories

2:20 PM

**Characterization of Titanium Hydride Powders: Laser-Induced Breakdown Spectroscopy (LIBS) and Quartz-Crystal Microbalance (QCM) Methods for In-Situ Hydrogen Quantification:** *Stewart Youngblood*<sup>1</sup>; Joseph Quarshie<sup>1</sup>; Doinita Neiner<sup>1</sup>; Ronald Goeke<sup>1</sup>; Russell Jarek<sup>1</sup>; Danielle Hartstein<sup>1</sup>; Daniel Bufford<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

2:40 PM Invited

**Processing of Micro/Nano-Sized Zirconia Particles with Enhanced Shape Memory and Superelastic Properties:** *Chee Lip Gan*<sup>1</sup>; Zehui Du<sup>1</sup>; Xiaomei Zeng<sup>1</sup>; <sup>1</sup>Nanyang Technological University

3:10 PM

**Microstructural Evolution of Aluminum Alloy Powders Through In-Situ TEM and DICRA Simulations:** *Kyle Tsaknopoulos*<sup>1</sup>; Matthew Gleason<sup>1</sup>; Stephen Price<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

3:30 PM

**Exploring Sintering Behavior of High-Entropy Alloy Nanoparticles (HEA-NPs):** *Daniela Fonseca*<sup>1</sup>; Ricardo Castro<sup>1</sup>; Martin Harmer<sup>1</sup>; <sup>1</sup>Lehigh University

3:50 PM Break

4:00 PM

**Fabrication of Iron Powder and Adjustment of Particle Size by Rotary Cup Atomizer-Water Curtain Process:** *Wenchao He*<sup>1</sup>; <sup>1</sup>Chongqing University of Science and Technology

4:20 PM

**Multi-Step Mechanical Milling of Metal Swarf into Additive Manufacturing Feedstock Powder:** *Andrew Neils*<sup>1</sup>; Mitchell Libby<sup>1</sup>; Jack Lesko<sup>1</sup>; Thomas Keller<sup>1</sup>; David Hayrikyan<sup>2</sup>; <sup>1</sup>The Roux Institute at Northeastern University; <sup>2</sup>bluShift Aerospace

4:40 PM

**Ultrasonic Atomization for Spherical Powder Production of Reactive Materials:** *Tomasz Choma*<sup>1</sup>; Bartosz Morończyk<sup>1</sup>; Jakub Ciftci<sup>1</sup>; ukasz rodowski<sup>1</sup>; <sup>1</sup>AMAZEMET Sp. z o.o.

5:00 PM

**PowderJet: An Agile System for High Quality Metal Powder Production via Droplet-on-Demand Metal Jetting:** *Viktor Sukhotshiy*<sup>1</sup>; Alexander Baker<sup>1</sup>; Jesse Ahlquist<sup>1</sup>; Eric Elton<sup>1</sup>; Alexandre Reikher<sup>1</sup>; Hunter Henderson<sup>1</sup>; Shahryar Mooraj<sup>1</sup>; Jesus Rivera<sup>1</sup>; Andrew Pascall<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Process Development in Mining and Metallurgy

**Sponsored by:** TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; Athanasios Karamalidis, Pennsylvania State University; Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland; Hojong Kim, Pennsylvania State University

Wednesday PM | March 26, 2025  
104 | MGM Grand

**Session Chairs:** Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan; Hong Peng, University of Queensland

2:00 PM Keynote

**Generation of Green Hydrogen from Mining Tailings and Minerals:** *Ziqi Sun*<sup>1</sup>; <sup>1</sup>Queensland University of Technology



2:20 PM

**Efficient Extraction of Vanadium from Calcification Roasted High-Calcium Vanadium Slag by Sulfuric Acid Leaching:** *Jie Cheng*<sup>1</sup>; Hong-Yi Li<sup>1</sup>; Zi-Jie Cai<sup>1</sup>; Xin-Mian Chen<sup>1</sup>; Jiang Diao<sup>1</sup>; Bing Xie<sup>1</sup>; <sup>1</sup>Chongqing University

2:40 PM

**Vaporization of Vanadium Pentoxide from Iron and Steel Making Slags:** *Lukas Neubert*<sup>1</sup>; Olena Volkova<sup>1</sup>; <sup>1</sup>Institut für Eisen- und Stahltechnologie

3:00 PM

**Molten Oxide Electrolysis for Production of Technology-Critical Metals:** *Catherine Bishop*<sup>1</sup>; Kathryn Ford<sup>1</sup>; Ashkan Takaloo<sup>1</sup>; Aaron Marshall<sup>1</sup>; Matthew Watson<sup>1</sup>; <sup>1</sup>University of Canterbury

## MATERIALS SYNTHESIS AND PROCESSING

### Recent Advances in Titanium Science and Technology: MPMD/SMD Symposium Honoring Professor Dipankar Banerjee — Fatigue and Phase Transformations

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Phase Transformations Committee, TMS: Titanium Committee

**Program Organizers:** Yufeng Zheng, University of North Texas; Abhishek Sharma, University of North Texas; Adam Pilchak, Pratt & Whitney; Rajarshi Banerjee, University of North Texas; Yunzhi Wang, Ohio State University

**Wednesday PM | March 26, 2025**  
**107 | MGM Grand**

**Session Chairs:** Samuel Hemery, Ensma - Institut Pprime; Yunzhi Wang, Ohio State University

2:00 PM Invited

**High Cycle Fatigue, Notches, R-Ratio and Macrozones in Ti-6Al-4V:** *David Dye*<sup>1</sup>; Yan Gao<sup>1</sup>; <sup>1</sup>Imperial College

2:30 PM Invited

**Microstructural Control of Prior-Beta Grain Orientation Dramatically Increases the Fatigue Resistance of DMLM Ti-6Al-4V:** Anchen Tong<sup>1</sup>; Mo-Rigen He<sup>1</sup>; Laura Dial<sup>2</sup>; Marissa Brennan<sup>2</sup>; Victor Ostroverkhov<sup>2</sup>; Christopher Immer<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>GE Aerospace Research

3:00 PM Invited

**New Insights into the Transition from Microplasticity to Fatigue Crack Nucleation in (+) Ti Alloys:** Cyril Lavogiez<sup>1</sup>; Patrick Villechaise<sup>1</sup>; Azdine Nait-Ali<sup>1</sup>; Christophe Tromas<sup>1</sup>; Florence Hamon<sup>1</sup>; Valery Valle<sup>1</sup>; Biaobiao Yang<sup>2</sup>; Miguel Monclus<sup>2</sup>; Javier Llorca<sup>2</sup>; Djafar Iabadden<sup>3</sup>; Julien Guenole<sup>3</sup>; *Samuel Hemery*<sup>4</sup>; <sup>1</sup>Institut Pprime; <sup>2</sup>IMDEA; <sup>3</sup>LEM3; <sup>4</sup>Ensma - Institute Pprime

3:30 PM Break

3:50 PM Invited

**Internal Friction of Steel: The Microstructural Origin:** Sanjay Manda<sup>1</sup>; Ajay Panwar<sup>1</sup>; *Indradev Samajdar*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology

4:20 PM Invited

**Nanoscale Shuffle Transformation in Metastable Beta Titanium Alloys:** *Yufeng Zheng*<sup>1</sup>; Deepak Pillai<sup>1</sup>; Dong Wang<sup>2</sup>; Rajarshi Banerjee<sup>1</sup>; Yunzhi Wang<sup>3</sup>; Dipankar Banerjee<sup>4</sup>; Hamish Fraser<sup>3</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Xi'an Jiaotong University; <sup>3</sup>The Ohio State University; <sup>4</sup>Indian Institute of Science

4:50 PM Invited

**Convergence of Computationally Designed Alloys and Processes:** *Rajiv Mishra*<sup>1</sup>; <sup>1</sup>University of North Texas

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2025 — Molybdenum, Tungsten, and Tantalum

**Sponsored by:** TMS Structural Materials Division, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Matthew Osborne, Global Advanced Metals; Paul Rottmann, University of Kentucky; Gianna Valentino, University of Maryland

**Wednesday PM | March 26, 2025**  
**168 | MGM Grand**

**Session Chair:** Matthew Osborne, Global Advanced Metals

2:00 PM Invited

**High-Temperature Deformation in Nb-Based Alloy C103 (Nb-10Hf-1Ti):** *Eric Taleff*<sup>1</sup>; Thomas Bennett<sup>1</sup>; <sup>1</sup>University of Texas at Austin

2:40 PM

**Heat Treatment Optimization of Laser Powder Bed Fusion Additive Manufacture C103:** Toren Hobbs<sup>1</sup>; Brandon Colon<sup>2</sup>; Chad Beamer<sup>3</sup>; Fernando Reyes<sup>1</sup>; *Carly Romnes*<sup>4</sup>; Omar Mireles<sup>5</sup>; <sup>1</sup>Nasa Marshall Space Flight Center; <sup>2</sup>University of Puerto Rico at Mayaguez; <sup>3</sup>Quintus Technologies; <sup>4</sup>NASA Marshall Space Flight Center; <sup>5</sup>Los Alamos National Laboratory

3:00 PM

**Characterizing Recrystallization in Type 2 and Type 5 Nb:** *Thomas Bennett*<sup>1</sup>; Eric Taleff<sup>1</sup>; <sup>1</sup>University of Texas at Austin

3:20 PM

**Low Temperature Oxidation Behavior of Pure Niobium and C103 Niobium Alloy:** *Ching-Chien Chen*<sup>1</sup>; Xiaoling Shen<sup>1</sup>; Dina Khattab<sup>1</sup>; Paul Mort<sup>1</sup>; Jeffrey Youngblood<sup>1</sup>; Michael Titus<sup>1</sup>; <sup>1</sup>Purdue University

3:40 PM Break

4:00 PM Invited

**Combinatorial Approaches to Design and Processing of Refractory High Entropy Alloys:** *Mitra Taheri*<sup>1</sup>; Sebastian Lech<sup>1</sup>; Anna Rawlings<sup>2</sup>; Elaf Anber<sup>1</sup>; David Beaudry<sup>1</sup>; Emily Holcombe<sup>3</sup>; Howard Joress<sup>4</sup>; Brian DeCost<sup>4</sup>; Jason Hattrick Simpers<sup>5</sup>; Tyrel McQueen<sup>1</sup>; Ben Redemann<sup>1</sup>; Loic Perriere<sup>6</sup>; Jean-Philippe Couzinie<sup>6</sup>; Debashish Sur<sup>7</sup>; John Scully<sup>7</sup>; Charlie Brandenburg<sup>7</sup>; Elizabeth Opila<sup>7</sup>; Michael Waters<sup>8</sup>; James Rondinelli<sup>8</sup>; Nathan Smith<sup>8</sup>; Christopher Wolverton<sup>8</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University; U.S. Naval Research Laboratory; <sup>3</sup>Johns Hopkins University; Naval Surface Warfare Center Carderock; <sup>4</sup>National Institute of Standards and Technology; <sup>5</sup>University of Toronto; <sup>6</sup>CNRS & Universite Paris Est Creteil; <sup>7</sup>University of Virginia; <sup>8</sup>Northwestern University

4:30 PM

**Application of High Temperature Profilometry-Based Indentation Plastometry (HT-PIP) to Refractory Metals:** *Philip McKeown*<sup>1</sup>; James Miller<sup>1</sup>; Chizhou Fang<sup>1</sup>; Bill Clyne<sup>1</sup>; <sup>1</sup>Plastometrex

4:50 PM

**Mechanical Behavior of Neutron Irradiated Ta-W Alloy:** *Zahra Ghanbari*<sup>1</sup>; Bonnie Antoun<sup>1</sup>; Micah Tillman<sup>1</sup>; Josh Sugar<sup>1</sup>; Kimberly Bassett<sup>1</sup>; Martha Gross<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

## MATERIALS SYNTHESIS AND PROCESSING

### REWAS 2025: Automation and Digitalization in Recycling Processes — Automation and Digitalization in Recycling Processes

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Process Technology and Modeling Committee

**Program Organizers:** Adamantia Lazou, National Technical University of Athens; Mertol Gokelma, Izmir Institute of Technology; Christina Meskers, SINTEF; Elsa Olivetti, Massachusetts Institute of Technology; Fabian Diaz, SMS Group

**Wednesday PM | March 26, 2025**  
**117 | MGM Grand**

**Session Chair:** Fabian Diaz, SMS Group

#### 2:00 PM Invited

**Thermodynamic-Based Process Simulation Coupled to Life Cycle Analysis: Exploring Pyrometallurgical Processes to Recycle End-of-Life Products:** Jean-Philippe Harvey<sup>1</sup>; <sup>1</sup>Polytechnique Montréal

#### 2:30 PM Invited

**Controlling Minor Element Phosphorus in Green Electric Steelmaking Using Neural Networks:** Elmira Moosavi<sup>1</sup>; Riadh Azzaz<sup>1</sup>; Valentin Hurel<sup>2</sup>; Mohammad Jahazi<sup>1</sup>; Samira Ebrahimi Kahou<sup>3</sup>; <sup>1</sup>Ecole De Technolgoie Superieure; <sup>2</sup>Finkl steel Sorel; <sup>3</sup>University of Calgary

#### 3:00 PM Invited

**Optimizing Secondary Steel Production by Copper Contaminant Removal Using Artificial Intelligence:** Nalin Kumar<sup>1</sup>; Isha Maun<sup>1</sup>; Kanishka Tyagi<sup>1</sup>; <sup>1</sup>UHV Technologies Inc

#### 3:30 PM Break

#### 3:50 PM

**Insights to Rare Earth Element Separation and Recovery Through Molecular Dynamics Modeling:** John Howarter<sup>1</sup>; Kaustubh Bawankule<sup>1</sup>; Cassidy Holdeman<sup>1</sup>; <sup>1</sup>Purdue University

#### 4:10 PM

**Metal Extraction Informatics: A Conceptual Framework for Sustainable Metals Extraction:** Avijit Khanra<sup>1</sup>; Arunabh Meshram<sup>1</sup>; Yogesh Katariya<sup>1</sup>; Siddhant Shikhar Gupta<sup>1</sup>; Kali Sanjay<sup>2</sup>; Rajiv Shekhar<sup>3</sup>; <sup>1</sup>IIT Kanpur; <sup>2</sup>CSIR - Institute of Minerals and Materials Technology, Bhubaneswar

#### 4:30 PM

**AI Assistance to Global Mineral Resource Analysis and Visualization:** Trupti Mohanty<sup>1</sup>; Hasan M Sayeed<sup>1</sup>; Chitrasen Mohanty<sup>2</sup>; Taylor D. Sparks<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Wisconsin, Madison

## LIGHT METALS

### Scandium Extraction and Use in Aluminum Alloys — Aluminum Scandium Alloys II

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Timothy Langan, Sunrise Energy Metals; Les Edwards, Rain Carbon Inc.

**Wednesday PM | March 26, 2025**  
**110 | MGM Grand**

**Session Chair:** Timothy Langan, Sunrise Energy Metals

#### 2:00 PM Introductory Comments

#### 2:05 PM Invited

**Optimizing Al-Mg-Sc-Zr Alloys for Additive Friction Stir Deposition:** Maureen Puybras<sup>1</sup>; Véronique Massardier<sup>2</sup>; Matthew Barnett<sup>3</sup>; Michel Perez<sup>2</sup>; Thomas Dorin<sup>3</sup>; <sup>1</sup>Deakin University; University Lyon; <sup>2</sup>University Lyon; <sup>3</sup>Deakin University

#### 2:55 PM

**Scandium in the Additive Manufacturing of In-Situ TiB<sub>2</sub> and TiC Particle Reinforced Aluminum Alloy Composites for Improved Mechanical Properties:** Huan Li<sup>1</sup>; Xiaoming Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; Tao Wang<sup>2</sup>; Jerome Fourmann<sup>2</sup>; Paul Rometsch<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Rio Tinto

#### 3:20 PM

**Examination of Intermetallic Phases in Al-Fe-Ni Alloys with Scandium:** Abdallah Elsayed<sup>1</sup>; Thomas Dorin<sup>2</sup>; Stephanie Kotiadis<sup>1</sup>; Lu Jiang<sup>2</sup>; <sup>1</sup>University of Guelph; <sup>2</sup>Deakin University

#### 3:45 PM Break

#### 4:00 PM Panel Discussion

## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Sciences — Spectroscopy and Microscopy

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Krzysztof Gofryk, Idaho National Laboratory; Assel Aitkaliyeva, University of Florida; Mavrik Zavarin, Lawrence Livermore National Laboratory; Rebecca Abergel, University of California Berkeley; Matthew Watrous, Idaho National Laboratory

**Wednesday PM | March 26, 2025**  
**163 | MGM Grand**

**Session Chair:** Mavrik Zavarin, Lawrence Livermore National Laboratory

#### 2:00 PM Invited

**Luminescence and Circularly Polarized Luminescence from Molecular Trans-Uranic Complexes:** Gaël Ung<sup>1</sup>; <sup>1</sup>University of Connecticut

#### 2:30 PM

**Electronic Structure Study of Uranium-Based Material Using Angle-Resolved Photoemission Spectroscopy:** Sabin Regmi<sup>1</sup>; Volodymyr Buturlim<sup>1</sup>; Alexei Fedorov<sup>2</sup>; Ladislav Havela<sup>3</sup>; Tomasz Durakiewicz<sup>1</sup>; Krzysztof Gofryk<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Lawrence Berkeley National Laboratory; <sup>3</sup>Charles University

2:50 PM

**Understanding Nanoscale Inclusions in Pu Metal Using Atom Probe Tomography:** *Dallin Barton*<sup>1</sup>; Dallas Reilly<sup>1</sup>; Daniel Perea<sup>1</sup>; Matthew Athon<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

3:10 PM Invited

**Transmission Electron Microscopy Characterization of the Chemical Interaction Between Minor Actinide Bearing Metallic Fuel and Steel Claddings:** *Tiankai Yao*<sup>1</sup>; Di Chen<sup>1</sup>; Daniele Salvato<sup>1</sup>; Luca Capriotti<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

3:40 PM Break

4:00 PM

**Optical Response of Charged Defects in Wide-Bandgap ThO<sub>2</sub> with GW Correction:** Himani Mishra<sup>1</sup>; *Shuxiang Zhou*<sup>1</sup>; Linu Malakkal<sup>1</sup>; Amey Khanolkar<sup>1</sup>; David Hurley<sup>1</sup>; Marat Khafizov<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Ohio State University

4:20 PM

**Synchrotron-Based Plutonium X-Ray Fluorescence Spectroscopy:** *Rachel Lim*<sup>1</sup>; Alexander Baker<sup>1</sup>; S. Olivia Gunther<sup>2</sup>; Alexander Ditter<sup>2</sup>; David Shuh<sup>2</sup>; Scott Donald<sup>1</sup>; Brandon Chung<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Lawrence Berkeley National Laboratory

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## NUCLEAR MATERIALS

### Special Topics in Nuclear Materials: Lessons Learned; Non-Energy Systems; and Coupled Extremes — Coupled Irradiation-Mechanical Extremes

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Charles Hirst, University of Wisconsin-Madison; Timothy Lach, Oak Ridge National Laboratory; Caleb Clement, Westinghouse Electric Company; Stephen Taller, Oak Ridge National Laboratory; Janelle Wharry, University of Illinois; Jason Trelewicz, Stony Brook University

Wednesday PM | March 26, 2025

161 | MGM Grand

**Session Chairs:** Charles Hirst, University of Wisconsin-Madison; Jason Trelewicz, Stony Brook University

2:00 PM Invited

**GIRAFFE – In Situ Material Tests Under Fusion-Relevant Conditions:** *Johann Riesch*<sup>1</sup>; Alexander Feichtmayer<sup>1</sup>; Marcel Appel<sup>1</sup>; Max Boleininger<sup>2</sup>; Sebastian Estermann<sup>1</sup>; Till Höschen<sup>1</sup>; Thomas Schwarz-Selinger<sup>1</sup>; Sergei Dudarev<sup>2</sup>; Rudolf Neu<sup>1</sup>; <sup>1</sup>Max Planck Institute for Plasma Physics; <sup>2</sup>UK Atomic Energy Authority

2:30 PM

**Effect of Applied Stress on Radiation-Induced Loop and Raft Formation in a BCC Metal:** *Hi Vo*<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; Matthew Schneider<sup>1</sup>; Aaron Kohnert<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

2:50 PM

**Effect of Tensile Stress Gradients on the Multi-Length-Scale Microstructure in Thermal and Irradiation Creep of 316L Stainless Steel:** *Mackenzie Warwick*<sup>1</sup>; Wyatt Peterson<sup>1</sup>; Ben Arms<sup>1</sup>; Charles Hirst<sup>1</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan

3:10 PM

**Atomistic Simulation of Thermal and Irradiation Creep Mechanisms in BCC-Fe and FCC-Ni using Defect Rate-Based Long-time Dynamics:** *Angel Chavira*<sup>1</sup>; Charles Hirst<sup>2</sup>; Fei Gao<sup>1</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Wisconsin - Madison

3:30 PM Question and Answer Period

3:40 PM Break

4:00 PM

**Influence of Radiation Swelling on Residual Stresses and Measurement of Micromechanical Properties:** *Alexander Leide*<sup>1</sup>; <sup>1</sup>United Kingdom Atomic Energy Authority

4:20 PM

**Phase Field Modeling of Irradiation-Induced Amorphous-to-Crystalline (A-C) Transformations in Structural Ceramics:** *Md Ali Muntaha*<sup>1</sup>; Janelle Wharry<sup>1</sup>; Claire Xiong<sup>2</sup>; Nicole Keninger<sup>1</sup>; Tristan Olsen<sup>2</sup>; Cyrus Koroni<sup>2</sup>; Sarah Pooley<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University

4:40 PM

**In-situ Electron Microscopy Characterization of Deformation Mechanisms of Inconel 718 Irradiated with Simultaneous High Energy Protons and Spallation Neutrons:** *Timothy Lach*<sup>1</sup>; Maxim Gussev<sup>1</sup>; Soyoung Kang<sup>1</sup>; Nan Li<sup>2</sup>; Joshua Kacher<sup>3</sup>; David McClintock<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Georgia Institute of Technology

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## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Glass Formation and Crystallization

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Soppa, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

Wednesday PM | March 26, 2025

367 | MGM Grand

**Session Chair:** Daniel Soppa, Erich Schmid Institute

2:00 PM

**Structure of Metallic Glasses and Their Untypical Crystallization Below the Glass-Transition Temperature:** *Dmitri Louzguine*<sup>1</sup>; <sup>1</sup>WPI-AIMR, Tohoku University

2:20 PM

**Nucleation Behavior of Primary FCC-Al in a Al86Ni10MM4 Metallic Glass:** *Wan Kim*<sup>1</sup>; John Perepezko<sup>1</sup>; Tianrui Duan<sup>1</sup>; Eun-Soo Park<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Seoul National University

2:40 PM

**Analysis of Multi-Nucleation and Growth Behavior in Fe-Co Amorphous Matrix with Varied Immiscible Elements:** *Subin An*<sup>1</sup>; Wook Ha Ryu<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Kumoh National Institute of Technology

3:00 PM

**An Analytical Approach to Understanding Glass-Formation via Different Processing Routes: Casting, Thermoplastic Forming and Additive Manufacturing:** *Owain Houghton*<sup>1</sup>; A. Lindsay Greer<sup>2</sup>; Miguel Costa<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Cambridge

## Sustainability of High Temperature Alloys — Reuse

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Mark Hardy, Rolls-Royce Plc; Caspar Schwalbe, MTU Aero Engines AG; Jeremy Rame, Naarea; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Martin Detrois, National Energy Technology Laboratory; Katerina Christofidou, University of Sheffield

**Wednesday PM | March 26, 2025**  
**102 | MGM Grand**

**Session Chairs:** Martin Detrois, National Energy Technology Laboratory; Caspar Schwalbe, MTU Aero Engines AG; Jeremy Rame, Naarea

**2:00 PM**

**Extending Service Life through Location Specific Lining of Components:** *Michael Sangid<sup>1</sup>; Saikiran Gopalakrishnan<sup>1</sup>; Ritwik Bandyopadhyay<sup>1</sup>; <sup>1</sup>Purdue University*

**2:30 PM**

**Characterising the Effect of Environment and Salt Concentration on the Fatigue Life of a Nickel Disc Alloy:** *Mark Hardy<sup>1</sup>; Yong Li<sup>1</sup>; Simon Gray<sup>1</sup>; Catherine Jackson<sup>1</sup>; Mary Taylor<sup>1</sup>; Ben Grant<sup>1</sup>; <sup>1</sup>Rolls-Royce Plc*

**3:00 PM**

**Effects of an Oxidising Environment on the Dwell Fatigue of Single Crystal Ni-Based Superalloys at Intermediate Service Temperature:** *Joseph Doyle<sup>1</sup>; Edward Saunders<sup>2</sup>; Jane Woolrich<sup>2</sup>; Nong Gao<sup>1</sup>; Philippa Reed<sup>1</sup>; <sup>1</sup>University of Southampton; <sup>2</sup>Rolls-Royce plc.*

**3:20 PM**

**Very High Cycle Fatigue Life of Ni-Based SX Superalloy Subjected to Hot Corrosion:** *Luciana Maria Bortoluci Ormastroni<sup>1</sup>; Fernando Pedraza<sup>2</sup>; Jonathan Cormier<sup>3</sup>; <sup>1</sup>Safran Aircraft Engines; <sup>2</sup>Université de La Rochelle; <sup>3</sup>Institut Pprime*

**3:40 PM Break**

**4:00 PM**

**Phase-Field-Informed Micromechanical Approach to Creep Behavior in Ni-Based Single-Crystal Superalloys at the Dendritic Scale:** *Jose Dominic<sup>1</sup>; Jean-Briac le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University*

**4:20 PM**

**Microstructural Characterization of René N4 After Rejuvenation Heat Treatment:** *Cristina Motta<sup>1</sup>; Francesco Mastromatteo<sup>2</sup>; Elisabetta Gariboldi<sup>3</sup>; Filippo Cappuccini<sup>2</sup>; <sup>1</sup>Baker Hughes, Nuovo Pignone Tecnologie S.r.l., Politecnico di Milano; <sup>2</sup>Baker Hughes, Nuovo Pignone Tecnologie S.r.l.; <sup>3</sup>Politecnico di Milano*

## Thin Films and Coatings: Properties, Processing and Applications — Thin Films and Coatings: Advances in Characterization, Processing and Applications

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougouin, CNRS, IS2m; Brandon Krick, Florida A&M University-Florida State University

**Wednesday PM | March 26, 2025**  
**101 | MGM Grand**

**Session Chairs:** Karine Mougouin, CNRS, IS2m; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Grejtak, Oak Ridge National Laboratory

**2:00 PM Invited**

**Improving the Bonding Conditions Between Metal and Polymer for Sandwich Sheet Materials:** *Heinz Palkowski<sup>1</sup>; Adele Carradò<sup>2</sup>; <sup>1</sup>Clausthal University of Technology; <sup>2</sup>University of Strasbourg, CNRS IPCMS*

**2:30 PM Invited**

**Exploring Thin Films for Promising Biomedical Applications: An Overview:** *Adele Carradò<sup>1</sup>; Heinz Palkowski<sup>2</sup>; <sup>1</sup>University of Strasbourg; <sup>2</sup>Institute of Metallurgy, Clausthal University of Technology*

**3:00 PM**

**Active Learning and Transfer Learning for Rapid Targeted Synthesis of Compositionally Complex Thin Film Alloys:** *Nathan Johnson<sup>1</sup>; Apurva Mehta<sup>2</sup>; Aashwin Mishra<sup>2</sup>; <sup>1</sup>Carl Zeiss Research Microscopy Solutions; <sup>2</sup>SLAC National Accelerator Facility*

**3:20 PM**

**Recent Progress of Antifogging Coating on Glasses/Lenses: A Short Review:** *Omotayo Sanni<sup>1</sup>; Jianwei Ren<sup>1</sup>; Tien-Chien Jen<sup>1</sup>; <sup>1</sup>University of Johannesburg*

**3:40 PM Break**

**4:00 PM Invited**

**Role of Surface Chemistry on the Growth of Plasma Polymers Thin Films:** *Paul Covin<sup>1</sup>; Aissam Airoudj<sup>1</sup>; Cuong Minh Quoc Le<sup>1</sup>; Florence Bally-Le Gall<sup>1</sup>; Vincent Roucoules<sup>1</sup>; Jamerson Carneiro De Oliveira<sup>1</sup>; <sup>1</sup>Université de Haute-Alsace, Université de Strasbourg, CNRS, IS2M*

**4:30 PM Invited**

**Laser-Induced Oxidation Phase Diagrams: Opportunities for High Throughput Thin Film Optimization:** *Nicholas Glavin<sup>1</sup>; Brian Everhart<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory*

**4:50 PM**

**Strain Effects on Adatom Diffusion, Island Nucleation and Monolayer Growth on Metal and Oxide Surfaces:** *Ahmad Ahmad<sup>1</sup>; Anter El-Azab<sup>1</sup>; <sup>1</sup>Purdue University West Lafayette*

**5:10 PM**

**Ultra-Fast Synthesis of Superhard Borides of W, Re, and WRe (20%Re) Alloys Using Electrochemical Boriding:** *Merve Uysal Komurlu<sup>1</sup>; Cafer Melik Ensar Acemi<sup>1</sup>; Bibhu Sahu<sup>1</sup>; Ali Erdemir<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University*



## Accelerated Discovery and Insertion of Next Generation Structural Materials — Accelerated Alloy Development Strategies

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Andrew Bobel, General Motors Corporation; Bharat Gwalani, North Carolina State University; Jonah Klemm-Toole, Colorado School of Mines; Antonio Ramirez, Ohio State University; Matthew Steiner, University of Cincinnati; Janelle Wharry, University of Illinois

Thursday AM | March 27, 2025  
364 | MGM Grand

**Session Chair:** Soumya Nag, Oak Ridge National Laboratory

### 8:30 AM Invited

**Boeing Baseline Delta Qualification Program:** *Mohammadreza Nematollahi*<sup>1</sup>; Paul Wilson<sup>1</sup>; <sup>1</sup>Boeing Research & Technology

### 9:00 AM Invited

**Integrating Experimental Data into Dynamic Artificial Intelligence/ Machine (AI/ML) Learning Workflows:** *Elizabeth Pogue*<sup>1</sup>; Ann Choi<sup>1</sup>; Denise Yin<sup>1</sup>; Michael Pekala<sup>1</sup>; Nam Le<sup>1</sup>; Alexander New<sup>1</sup>; Eddie Gienger<sup>1</sup>; Christian Sanjurjo-Rodriguez<sup>2</sup>; Bianca Pilosino<sup>1</sup>; Douglas Trigg<sup>1</sup>; Anna Langham<sup>1</sup>; Georgia Leigh<sup>1</sup>; Sebastian Lech<sup>1</sup>; Gregory Bassen<sup>1</sup>; Elizabeth Hedrick<sup>2</sup>; Brandon Wilfong<sup>1</sup>; Steven Storck<sup>1</sup>; Mitra Taheri<sup>1</sup>; Tyrel McQueen<sup>1</sup>; Christopher Stiles<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Princeton University

### 9:30 AM

**Characterization of Low-Cost, High-Strength, Printable Al-Alloys for Room and High-Temperature Applications:** *Benjamin Glaser*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 9:50 AM

**Tuning Chemistry for Precipitation Strengthening of Al Alloys:** *Rayna Mehta*<sup>1</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University

### 10:10 AM Break

### 10:30 AM

**Combinatorial Investigation of Amorphous/Nanocrystalline Stability in Ferritic Alloys:** *Kyle Russell*<sup>1</sup>; Andrea Hodge<sup>1</sup>; Jason Trelewicz<sup>2</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>Stony Brook University

### 10:50 AM

**High Throughput Quantification of Recrystallization Parameters for Alloy Development:** *Finn Birchall*<sup>1</sup>; *Catherine Bishop*<sup>1</sup>; <sup>1</sup>University of Canterbury

### 11:10 AM

**Analysis and Optimization of New Composition Standards for High-Strength Conductive Cu-Ni-Co-Si Alloys:** *Cunlei Zou*<sup>1</sup>; Shuang Zhang<sup>1</sup>; Wanyu Ding<sup>1</sup>; Chuang Dong<sup>1</sup>; <sup>1</sup>Dalian Jiaotong University

### 11:30 AM

**Combinatorial Synthesis and High Throughput, High Temperature Mechanical Characterization of Refractory Alloys:** *Salahudin Nimer*<sup>1</sup>; Alex Lark<sup>1</sup>; Christian Sanjurjo-Rodriguez<sup>1</sup>; Caroline Tang<sup>1</sup>; Jasmine Chin<sup>1</sup>; Kevin Lehr<sup>1</sup>; Gianna Valentino<sup>2</sup>; Li Ma<sup>1</sup>; Henry Phalen<sup>1</sup>; Victor Leon<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Maryland

## Additive Manufacturing Modeling, Simulation and Machine Learning — AM Modeling with AI/ML II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Changwon National University

Thursday AM | March 27, 2025  
311 | MGM Grand

**Session Chairs:** Charles Fisher, Naval Surface Warfare Center - Carderock; Li Ma, Johns Hopkins University Applied Physics Laboratory; Jing Zhang, Purdue University

### 8:30 AM

**Self-Supervised Vision Transformers for Anomaly Detection in 3D Printing:** *Bowen Zheng*<sup>1</sup>; Xingquan Wang<sup>1</sup>; Zeqing Jin<sup>1</sup>; Grace Gu<sup>1</sup>; <sup>1</sup>University of California Berkeley

### 8:50 AM

**Additive Manufacturing User Interface (AMUI): An Intuitive Software Suite for Part Level Process Parameter Selection:** *Peter Pak*<sup>1</sup>; Francis Ogoke<sup>1</sup>; Achuth Chandrasekhar<sup>1</sup>; Olabode Ajenifujah<sup>1</sup>; Amir Barati Farimani<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 9:10 AM

**Machine Learning Enabled Process Optimization During 3D Printing of Tablets:** *Yizhou Lu*<sup>1</sup>; Kshitij Chitnis<sup>1</sup>; Jaidev Chakka<sup>1</sup>; Samrat Choudhury<sup>1</sup>; Mo Maniruzzaman<sup>1</sup>; <sup>1</sup>University of Mississippi

### 9:30 AM

**Machine Learning-Driven Predictions of Material Printability in Laser Powder Bed Fusion:** *Sofia Sheikh*<sup>1</sup>; Brent Vela<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

### 9:50 AM

**Efficient Laser Powder Bed Fusion Microstructure and Texture Modeling:** *Gregory Wong*<sup>1</sup>; Gregory Rohrer<sup>1</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

### 10:10 AM Break

### 10:30 AM

**AIDED: Accurate Machine Learning Inference Framework for Process Parameter Optimization in Laser Directed Energy Deposition:** *Xiao Shang*<sup>1</sup>; Evelyn Li<sup>1</sup>; Ajay Talbot<sup>1</sup>; Haitao Wen<sup>1</sup>; Tianyi Lyu<sup>1</sup>; Jiahui Zhang<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

### 10:50 AM

**Effect of Interpass Temperature on the Residual Stress Evolution in a Nickel-Aluminum Bronze Wire-Arc Additive Manufacturing Build:** *Matthew Dantin*<sup>1</sup>; Charles Fisher<sup>1</sup>; <sup>1</sup>Naval Surface Warfare Center Carderock Division

### 11:10 AM

**Comprehensive Analysis of 316L Samples Fabricated via Directed Energy Deposition: Integrating Simulation With Microstructural and Mechanical Evaluations:** *Alberto Santoni*<sup>1</sup>; Marcello Cabibbo<sup>1</sup>; Maria Laura Gatto<sup>1</sup>; Gabriele Grima<sup>1</sup>; Marco Mandolini<sup>1</sup>; Eleonora Santecchia<sup>1</sup>; Anna Maria Schiavone<sup>1</sup>; Kamal Sleem<sup>1</sup>; Stefano Spigarelli<sup>1</sup>; <sup>1</sup>Università Politecnica delle Marche

### 11:30 AM

**Melt Pool Width Prediction with Machine Learning In Selective Laser Melting:** *Umut Can Gulletutan*<sup>1</sup>; Sertaç Altınok<sup>2</sup>; Irmak Sargin<sup>1</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Turkish Aerospace Industries

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Marine Materials and Structures — Marine Additive Manufacturing: Industry Perspectives / Frontiers of Marine Additive Manufacturing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Mohsen Mohammadi, University Of New Brunswick; Meysam Haghsheenas, University Of Toledo; Charles Fisher, Naval Surface Warfare Center - Carderock

**Thursday AM | March 27, 2025**  
**315 | MGM Grand**

**Session Chairs:** Charles Fisher, Naval Surface Warfare Center - Carderock; Somayeh Pasebani, Oregon State University

#### 8:30 AM Panel Discussion

**9:30 AM**

**Exploring Advanced Manufacturing Methods for Defense Applications:** *Soumya Nag*<sup>1</sup>; Jesse Heinemann<sup>1</sup>; Brian Gibson<sup>1</sup>; Lisa Smith<sup>1</sup>; John Potter<sup>1</sup>; Calen Kimmell<sup>1</sup>; Jennifer Gaies<sup>2</sup>; Jennifer Semple<sup>2</sup>; Brian Post<sup>1</sup>; Craig Blue<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>NSWC Carderock Division

**9:50 AM**

**Additive Friction Surfacing of High-Strength Low-Alloy Steel:** *Tianhao Wang*<sup>1</sup>; David Garcia<sup>1</sup>; Zehao Li<sup>1</sup>; Mayur Pole<sup>1</sup>; Tingkun Liu<sup>1</sup>; Uchechi Okeke<sup>2</sup>; Mackenzie Perry<sup>2</sup>; Christopher Smith<sup>1</sup>; Kenneth Ross<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Naval Surface Warfare Center Carderock Division

**10:10 AM Break**

**10:30 AM**

**Process and Heat Treatment Effects on the Microstructure and Mechanical Properties of Nickel Aluminum Bronze (NAB) Fabricated by W-LDED:** *Nahal Ghanadi*<sup>1</sup>; Jakub Preis<sup>1</sup>; Kwangtae Son<sup>1</sup>; Seongun Yang<sup>1</sup>; Somayeh Pasebani<sup>1</sup>; <sup>1</sup>Oregon State University

**10:50 AM**

**Study of Nb-Rich Precipitate Evolution During Post-Build Heat Treatment of Additively Manufactured Cu-30Ni and Its Influence on Mechanical Properties:** *Debasis Rath*<sup>1</sup>; Markus Chmielus<sup>1</sup>; Zachary Harris<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**11:10 AM**

**Understanding the Influence of Precipitation on Fatigue Crack Growth and Cyclic Stress Strain Behavior in an Additively Manufactured Cu-Based Alloy:** *Nathan Heniken*<sup>1</sup>; Jiashi Miao<sup>1</sup>; Veronika Mazanova<sup>2</sup>; Aerial Murphy-Leonard<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Czech Academy of Sciences

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Microstructural and Mechanical Long-Term Stability of AM Materials — Degradation: Creep and Aging

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; John Carpenter, Los Alamos National Laboratory; Eric Payton, University of Cincinnati; Emma White, DECHEMA Forschungsinstitut; Sudarsanam Babu, University of Maryland; Markus Chmielus, University of Pittsburgh

**Thursday AM | March 27, 2025**  
**302 | MGM Grand**

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Eric Payton, University of Cincinnati; John Carpenter, Los Alamos National Laboratory; Emma White, DECHEMA Forschungsinstitut

**8:30 AM**

**Enhancing Creep Resistance of AM Superalloys Through Inter-Layer Mechanical Working:** *William James*<sup>1</sup>; James German<sup>1</sup>; Supriyo Ganguly<sup>1</sup>; Goncalo Pardal<sup>1</sup>; <sup>1</sup>Cranfield University

**8:50 AM**

**Nonlinear Grading Approach for Ferritic P91 and Austenitic 347H Steels Joints Produced with Laser-Directed Energy Deposition Method:** *Selda Nayir*<sup>1</sup>; Rangasaaye Kannan<sup>1</sup>; Sebastien Dryepondt<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:10 AM**

**Evaluation of Localized Creep Deformation and Interface Characteristics of Innovative P91&304H Graded Composite Transition Joint:** *Yuying Wen*<sup>1</sup>; Ting Sun<sup>1</sup>; Youyuan Zhang<sup>1</sup>; Shanshan Hu<sup>1</sup>; Zhili Feng<sup>2</sup>; Haiyang Qian<sup>3</sup>; Xingbo Liu<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>GE Steam Power

**9:30 AM**

**Creep Behavior of Stainless Steel 316L Manufactured by Laser Powder Bed Fusion:** *Luis Avila*<sup>1</sup>; Birgit Rehmer<sup>1</sup>; Sina Schriever<sup>1</sup>; Alexander Ulbricht<sup>1</sup>; Leonardo Agudo Jácome<sup>1</sup>; Gunther Mohr<sup>1</sup>; Birgit Skrotzki<sup>1</sup>; Alexander Evans<sup>1</sup>; <sup>1</sup>Federal Institute for Materials Research and Testing (BAM)

**9:50 AM**

**Investigation of Creep Performance of Additively Manufactured Type 316 Stainless Steels:** *Olivia Denonno*<sup>1</sup>; Juan Gonzales<sup>1</sup>; Stephen Tate<sup>2</sup>; Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School Of Mines; <sup>2</sup>Electrical Power Research Institute

**10:10 AM Break**

**10:20 AM**

**The Effects of Secondary Elements on the Creep and Fracture Behavior of Additively Manufactured Nickel-Based Superalloys:** *Theophil Oros*<sup>1</sup>; Michael Kassner<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California

**10:40 AM**

**Printability and Mechanical Response of High-Strength Electrically Conductive Al-Ni-Zr Alloys Fabricated Via Laser Powder Bed Fusion:** *Nicholas Richter*<sup>1</sup>; Sumit Bahl<sup>1</sup>; Jovid Rakhmonov<sup>1</sup>; Jonathan Poplawsky<sup>1</sup>; Lawrence Allard<sup>1</sup>; Alex Plotkowski<sup>1</sup>; James Haynes<sup>1</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

11:00 AM

**Mechanical Property Retention of Additively Manufactured Al-Ce-Mo Alloy After High Temperature Exposure:** *Kevin Graydon*<sup>1</sup>; Tanner Olson<sup>2</sup>; Amberlee Haselhuhn<sup>2</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>LIFT

11:20 AM

**Enhancement of Tensile Properties and Isotropy of Wire Arc Additive Manufactured Alloy 625 via Thermomechanical Process:** *Junghoon Lee*<sup>1</sup>; Seung Hwan Lee<sup>2</sup>; Namhyun Kang<sup>3</sup>; <sup>1</sup>RIST; <sup>2</sup>Hanyang University; <sup>3</sup>Pusan National University

11:40 AM Invited

**Performance Assessment of YTiO-Enhanced 316L Stainless Steel Nanocomposites Fabricated by Laser Directed Energy Deposition:** Seongun Yang<sup>1</sup>; Kwangtae Son<sup>1</sup>; Zhengming Wang<sup>1</sup>; Nahal Ghanadi<sup>1</sup>; Donghua Xu<sup>1</sup>; Chih-hung Chang<sup>1</sup>; Marc Albert<sup>2</sup>; *Somayeh Pasebani*<sup>2</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Electric Power Research Institute

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Incorporating Breakthrough Functionalities for Building Large Scale Components — Production of Structures and Components

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Jonah Klemm-Toole, Colorado School of Mines; Soumya Nag, Oak Ridge National Laboratory; John Carpenter, Los Alamos National Laboratory; Sougata Roy, Iowa State University; Peeyush Nandwana, Oak Ridge National Laboratory; Sneha Prabha Narra, Carnegie Mellon University; Lang Yuan, University of South Carolina; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Alex Kitt, Edison Welding Institute; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC

Thursday AM | March 27, 2025  
301 | MGM Grand

**Session Chairs:** Andrzej Nycz, Oak Ridge National Laboratory; Albert To, University of Pittsburgh

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8:30 AM

**Additive Manufacturing (AM) of Supercritical CO<sub>2</sub> Heat Exchangers Using Laser Directed Energy Deposition (L-DED):** *Nathan Young*<sup>1</sup>; Jessica Garnett<sup>1</sup>; Amir Shooshtari<sup>1</sup>; Ji-Cheng Zhao<sup>2</sup>; <sup>1</sup>University of Maryland, College Park; <sup>2</sup>University of Connecticut

8:50 AM

**Wave Springs: Design, Optimization, Simulation, Additive Manufacturing, and Application:** *Aamer Nazir*<sup>1</sup>; <sup>1</sup>King Fahd University of Petroleum and Minerals

9:10 AM

**High Entropy Metamaterials: Influence of Lattice Architecture Mixing for Improved Mechanical Properties:** *Isaac Toda-Caraballo*<sup>1</sup>; Souvik Sahoo<sup>2</sup>; Dan Mordehai<sup>3</sup>; Zhi Chen<sup>3</sup>; Maria Teresa Pérez Prado<sup>2</sup>; <sup>1</sup>CENIM-CSIC; <sup>2</sup>IMDEA Materials Institute; <sup>3</sup>Technion – Israel Institute of Technology

9:30 AM

**Combining the Best of Both Wire DED and LPBF:** *Benjamin White*<sup>1</sup>; Hannah Sims<sup>1</sup>; Levi Van Bastian<sup>1</sup>; Dale Cillessen<sup>1</sup>; <sup>1</sup>Sandia National Labs

9:50 AM Break

10:10 AM

**Influencing Melt Pool Dynamics in Laser Manufacturing with Ultrasound:** *Harry Chapman*<sup>1</sup>; Xianqiang Fan<sup>1</sup>; Catherine Tonry<sup>2</sup>; Ivars Krastins<sup>2</sup>; Kai Zhang<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Martyn Jones<sup>3</sup>; Chu Lun Leung<sup>1</sup>; Andrew Kao<sup>2</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>University of Greenwich; <sup>3</sup>Rolls-Royce plc.

10:30 AM

**Thermomechanical Processing of Additive Manufactured Nickel Superalloys for Cracking Prevention and Improved Performance:** *James German*<sup>1</sup>; William James<sup>1</sup>; Supriyo Ganguly<sup>1</sup>; Goncalo Pardal<sup>1</sup>; <sup>1</sup>Cranfield University

10:50 AM

**Mechanical Behavior of AlSi10Mg Plate-Lattice Structures in Uniaxial Compression:** Joseph Berthel<sup>1</sup>; Jack Beuth<sup>1</sup>; *Rahul Panat*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## BIOMATERIALS

### Advanced Biomaterials for Biomedical Implants — Biomimetic, Bioactive, and High-Entropy Alloy Implants

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Penn State; Vinoy Thomas, University of Alabama at Birmingham

Thursday AM | March 27, 2025  
308 | MGM Grand

**Session Chair:** Vinoy Thomas, University of Alabama at Birmingham

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8:30 AM

**Unraveling Fracture Growth in 3D Printed Structures Mimicking Spicules via Computer Tomography (CT) Examination:** *Fariborz Tavangarian*<sup>1</sup>; Nillofar Fani<sup>2</sup>; Armaghan Hashemi Monfared<sup>2</sup>; <sup>1</sup>Penn State; <sup>2</sup>Penn State Harrisburg

9:00 AM

**Looking Beneath the Surface: An Ex Vivo Study of Dental Composite Resin Performance in Extracted Human Teeth:** *Wade Smallwood*<sup>1</sup>; Ramsey Issa<sup>1</sup>; Mark Juchau<sup>1</sup>; Michael Bingham<sup>1</sup>; Mary Anne Karren<sup>1</sup>; Dmitry Bedrov<sup>1</sup>; <sup>1</sup>University of Utah

9:20 AM

**Design of Bio-High Entropy Alloys with Suppressed Elemental Segregation for Laser Powder Bed Fusion Process:** *Ozkan Gokcekaya*<sup>1</sup>; Yong Seong Kim<sup>1</sup>; Takayoshi Nakano<sup>1</sup>; <sup>1</sup>Osaka University

9:40 AM

**Functionally Gradient Nitinol Structure with Pure Titanium Layers and Hydroxyapatite Over-Coating for Orthopedic Implant Applications:** Jeongwoo Lee<sup>1</sup>; S Akin<sup>1</sup>; Julia Walsh<sup>1</sup>; Martin Jun<sup>1</sup>; Hyowon Lee<sup>1</sup>; *Yung Shin*<sup>1</sup>; <sup>1</sup>Purdue University

10:00 AM Break

10:15 AM

**In-Vitro Response to Bioinspired Helically Coiled Electrospun Fibers for Cardiac Patch Application:** Alexi Switz<sup>1</sup>; Darryl Dickerson<sup>1</sup>; *Anamika Prasad*<sup>1</sup>; <sup>1</sup>Florida International University

10:35 AM

**Novel Bio-TWIP Ti and Zr Alloys for Implants: Alloy Design Strategy, Mechanical Properties and Deformation Mechanisms:** *Fan Sun*<sup>1</sup>; Bingnan Qian<sup>1</sup>; Junhui Tang<sup>1</sup>; Philippe Vermaut<sup>1</sup>; Frédéric Prima<sup>1</sup>; Sucharita Banerjee<sup>2</sup>; Rajarshi Banerjee<sup>3</sup>; Hongtao Yang<sup>4</sup>; Yufeng Zheng<sup>5</sup>; Ju Li<sup>6</sup>; <sup>1</sup>Chimie-Paristech, ENSCP, PSL Univ.; <sup>2</sup>University of Texas, Austin; <sup>3</sup>University of North Texas Denton; <sup>4</sup>Beihang University; <sup>5</sup>Pekin University; <sup>6</sup>Massachusetts Institute of Technology

10:55 AM

**Production of Tantalum Nitride by Reactive Powder Bed Fusion for Bone Tissue Engineering Applications:** *Maria Laura Gatto*<sup>1</sup>; Marcello Cabibbo<sup>1</sup>; Andrea Gatto<sup>2</sup>; Paolo Mengucci<sup>1</sup>; <sup>1</sup>Università Politecnica delle Marche; <sup>2</sup>Università di Modena e Reggio Emilia

11:15 AM

**Process Optimization and Biocompatibility of PEEK-HA-Carbon Composites:** Leila Ladani<sup>1</sup>; Amir Azimi<sup>1</sup>; David Lott<sup>2</sup>; Brent Chang<sup>2</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Mayo Clinic

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — Twinning

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Taran, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

Thursday AM | March 27, 2025  
170 | MGM Grand

**Session Chairs:** Laurent Capolungo, Los Alamos National Laboratory; Hi Vo, Los Alamos National Laboratory

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8:30 AM

**Twin Nucleation at Grain Boundaries in Mg Analyzed Through In Situ Electron Back-Scattered Diffraction and High-Resolution Digital Image Correlation:** Maral Sarebanzadeh<sup>1</sup>; Alberto Orozco-Caballero<sup>2</sup>; Eugenia Nieto-Valeiras<sup>1</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>Technical University of Madrid

8:50 AM

**Role of Slip-Twin Interactions on the Evolution of Deformation Twinning Microstructures in Hexagonal Close-Packed Metals:** *Darshan Bamney*<sup>1</sup>; Andrea Rovinelli<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:10 AM

**Deformation Mechanisms of Dual-Textured Mg-6.5Zn Alloy with Low Tension-Compression Asymmetry: Experiments and Simulations:** Biaobiao Yang<sup>1</sup>; Eugenia Nieto-Valeiras<sup>1</sup>; Meijuan Zhang<sup>1</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute; Technical University of Madrid

9:30 AM

**Nanomechanical Responses and Deformation Mechanisms of Pure Magnesium Via Nanoindentation:** *Kelvin Xie*<sup>1</sup>; Yi-Cheng Lai<sup>1</sup>; Reza Motallebi<sup>1</sup>; Jiaqi Dong<sup>1</sup>; Raj Patel<sup>1</sup>; <sup>1</sup>Texas A&M University

9:50 AM

**Transformation-Assisted Twin Nucleation in Metals:** *Lei Cao*<sup>1</sup>; Mehrab Lotfipour<sup>1</sup>; Amir Hassan Zahir<sup>1</sup>; Jamie Ombogo<sup>1</sup>; <sup>1</sup>University of Nevada

10:10 AM Break

10:30 AM

**The Role of 3D-Deformation Twin Networks on the Plastic Deformation Behaviors of Titanium:** *Hi Vo*<sup>1</sup>; Rodney McCabe<sup>1</sup>; Rose Bloom<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

10:50 AM

**Investigating and Validating the Persistence of Deformation Twinning in Haynes® 244®:** Victoria Tucker<sup>1</sup>; Thomas Mann<sup>2</sup>; Andrew Roginski<sup>1</sup>; Ignacio Escobar<sup>3</sup>; Biaobiao Yang<sup>3</sup>; Zheng Ye<sup>3</sup>; Michael Fahrman<sup>2</sup>; Ilchat Sabirov<sup>3</sup>; Javier Llorca<sup>3</sup>; *Michael Titus*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Haynes International; <sup>3</sup>IMDEA Materials

11:10 AM

**Investigating Twinability in BCC Metals Using Molecular Dynamics, Virtual Texture, and Virtual Diffraction:** *Phillip Tsurkan*<sup>1</sup>; Christian Sabatini<sup>1</sup>; Evan Byers<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

11:30 AM

**Effect of Temperature and Composition on Plastic Deformation Localization in Solid Solution-Strengthened FCC Alloys:** *Dhruv Anjaria*<sup>1</sup>; Aditya Srinivasan Tirunilai<sup>2</sup>; Guillaume Laplanche<sup>2</sup>; Jean-Charles Stinville<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign; <sup>2</sup>Institut für Werkstoffe, Ruhr-Universität Bochum

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances and Discoveries in Non-Equilibrium Driven Nanomaterials and Thin Films — High Entropy Oxide Thin Films (Part I), Multimetallc/High Entropy Alloy Nanoparticles (Part II)

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Ritesh Sachan, Oklahoma State University; Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University; Shikhar Jha, Indian Institute of Technology Kanpur

Thursday AM | March 27, 2025  
354 | MGM Grand

**Session Chairs:** Santosh Kc, San Jose State University; Ritesh Sachan, Oklahoma State University

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8:30 AM Invited

**Harnessing Compositional Complexity with Non-Equilibrium Synthesis:** *Zac Ward*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

8:50 AM Invited

**Exsolution-Self-Assembly in Entropy Designed Oxide Thin Films:** *William Bowman*<sup>1</sup>; <sup>1</sup>University of California, Irvine

9:10 AM Invited

**Macro-Equimolar High Entropy Spinel Thin Films by Pulsed Laser Deposition:** Anu Mohan<sup>1</sup>; Adityanarayan Pandey<sup>1</sup>; *Ashutosh Gandhi*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

9:30 AM

**Enthalpy-Driven Self-Healing in Thin Metallic Films on Flexible Substrates:** *Claus Trost*<sup>1</sup>; Alice Lassnig<sup>1</sup>; Patrice Kreiml<sup>1</sup>; Christian Mitterer<sup>2</sup>; Megan Cordill<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science of the Austrian Academy of Sciences; <sup>2</sup>Montanuniversität Leoben

9:50 AM Break

10:10 AM Invited

**Hyperdoping: Doping TiO<sub>2</sub> Beyond Thermodynamic Limits Using Flash Sintering:** Anupam Raj<sup>1</sup>; *Shikhar Krishn Jha*<sup>1</sup>; <sup>1</sup>IIT Kanpur



10:30 AM Invited

**Creation of Multi-Principal Element Alloy Nanoparticles Via Nanosecond Laser-Induced Dewetting:** *Ritesh Sachan*<sup>1</sup>; Soumya Mandal<sup>1</sup>; Ashish Gupta<sup>2</sup>; Jordan Hachtel<sup>2</sup>; Nozomi Shirato<sup>3</sup>; <sup>1</sup>Oklahoma State University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Argonne National Laboratory

10:50 AM Invited

**Exploring Multi Element Nanoparticles for Sustainable Catalysts:** *Nozomi Shirato*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

11:10 AM

**Functional Trimethylsilane Plasma Nanocoatings for Surface Modification of Cardiovascular Stents and Silver Nanowires:** *ThiThuHa Phan*<sup>1</sup>; Yixuan Liao<sup>1</sup>; *Qingsong Yu*<sup>1</sup>; <sup>1</sup>University of Missouri

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## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Structures and Modeling

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Thursday AM | March 27, 2025  
368 | MGM Grand

**Session Chairs:** Chelsey Hargather, Los Alamos National Laboratory; Shuozhi Xu, University of Oklahoma

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8:30 AM Invited

**Factors Affecting Calculated Properties of High-Entropy Alloys (HEAs) Using Density Functional Theory:** *Chelsey Hargather*<sup>1</sup>; Danielson Moreno<sup>2</sup>; Christopher Lafferty<sup>2</sup>; Joshua Strother<sup>2</sup>; Peter Liaw<sup>3</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>New Mexico Institute of Mining and Technology; <sup>3</sup>University of Tennessee, Knoxville

8:50 AM Invited

**Ubiquitous Short-Range Order in Multi-Principal Element Alloys and Its Impact on the Mechanical Behaviors:** *Yang Yang*<sup>1</sup>; Penghui Cao<sup>2</sup>; Andrew Minor<sup>3</sup>; Mark Asta<sup>3</sup>; Wen Chen<sup>4</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of California, Irvine; <sup>3</sup>University of California, Berkeley; <sup>4</sup>University of Massachusetts, Amherst

9:10 AM

**Electronic Descriptors for Dislocation Deformation Behavior and Intrinsic Ductility in bcc High-Entropy Alloys:** *Pedro Borges*<sup>1</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley

9:30 AM Invited

**High-Throughput Multiscale Modeling of Solidification of Refractory High Entropy Alloys:** *Victoria Tucker*<sup>1</sup>; Shardul Kamat<sup>2</sup>; Gregory Wagner<sup>2</sup>; *Michael Titus*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Northwestern University

9:50 AM Invited

**Investigation of Short-Range Order and Its Impact on Mechanical Properties of AlCoCrFeNi High-Entropy Alloys Using Atomistic Simulations and Data Analytics:** *Seungha Shin*<sup>1</sup>; Md Abdullah Al Hasan<sup>1</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee

10:10 AM Break

10:30 AM Invited

**A Molecular Dynamics Multi-Particle Model for Modeling Hot-Press Sintering Process of HEAs Combined with Phase-Field Simulation:** *Yuhong Zhao*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing, North University of China

10:50 AM

**Bidirectional Transformation in a Low Energy Interface Engineered Metastable High Entropy Alloy Under Dynamic Loading:** *Shreya Mukherjee*<sup>1</sup>; Ravi Haridas<sup>1</sup>; Priyanka Agrawal<sup>1</sup>; Aishani Sharma<sup>1</sup>; Prithvi Awasthi<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

11:10 AM

**Investigating the Exceptional Creep Behavior of Al<sub>0.3</sub>CoCrFeNi Multi-Principal Element Alloys Through Crystal Plasticity Finite Element Method:** *Anshu Raj*<sup>1</sup>; Namit Pai<sup>2</sup>; Anirban Patra<sup>2</sup>; Peter Liaw<sup>3</sup>; Shuozhi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma; <sup>2</sup>Indian Institute of Technology Bombay; <sup>3</sup>University of Tennessee

11:30 AM

**Temperature Dependent Screw Dislocation Dynamics in MoNbTi and TaNbTi Multi-Principal Element Alloys:** *Pulkit Garg*<sup>1</sup>; Daniel Magnuson<sup>2</sup>; Kevin Hemker<sup>2</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>Johns Hopkins University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Methods I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

Thursday AM | March 27, 2025  
320 | MGM Grand

**Session Chair:** Christopher Stiles, Johns Hopkins University Applied Physics Laboratory

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8:30 AM

**Enhancing Materials Discovery in Complex Composition Spaces: FUSE Meets Generative ML:** *Hasan Muhammad Sayeed*<sup>1</sup>; Christopher Collins<sup>2</sup>; Taylor Sparks<sup>1</sup>; Matthew Rosseinsky<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Liverpool

8:50 AM

**Navigating High-Dimensional Formulation Spaces with GP-Latent Variable Models for Dental Composites:** *Ramsey Issa*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

9:10 AM

**Closed-Loop Discovery of Lunar In Situ Resource Utilization (ISRU) Constrained Manufacturable Materials:** *Christopher Stiles*<sup>1</sup>; Michael Pekala<sup>1</sup>; Nam Le<sup>1</sup>; Alexander New<sup>1</sup>; Greg Canal<sup>1</sup>; Karun Kumar Rao<sup>1</sup>; Milena Graziano<sup>1</sup>; Eddie Gienger<sup>1</sup>; Christian Sanjurjo-Rodriguez<sup>1</sup>; Steven Storck<sup>1</sup>; Elizabeth Pogue<sup>1</sup>; Mary Daffron<sup>1</sup>; Bobby Mueller<sup>1</sup>; Gregory Bassen<sup>2</sup>; Ann Choi<sup>1</sup>; Aaron Baumgarten<sup>2</sup>; Brandon Wilfong<sup>2</sup>; Denise Yin<sup>2</sup>; Samuel Barham<sup>1</sup>; Mark Foster<sup>2</sup>; Wyatt Bunstine<sup>2</sup>; Tyrel McQueen<sup>2</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>Johns Hopkins University

9:30 AM

**Verification, Validation, and Uncertainty Quantification for Self-Driving Labs - Proof of Concept with Chocolate as Frugal Twin:** *Kinston Acköf*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

9:50 AM Break

10:00 AM

**Student's T Process for Optimizing Material Properties:** *Stanley Wessman*<sup>1</sup>; Taylor Sparks<sup>1</sup>; Andrew Falkowski<sup>1</sup>; <sup>1</sup>University of Utah

10:20 AM

**Developing an Oxidation Materials Ontology for Data-Driven Materials Design:** *Madison Wenzlick*<sup>1</sup>; William Trehern<sup>1</sup>; Leebyn Chong<sup>2</sup>; Michael Gao<sup>1</sup>; Richard Oleksak<sup>1</sup>; Wissam Saidi<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>National Energy Technology Laboratory/NETL Support Contractor

10:40 AM

**Deep Gaussian Process Based Bayesian Optimization for Materials Discovery in High Entropy Alloy Space:** *Sk Md Ahnaf Akif Alvi*<sup>1</sup>; Jan Janssen<sup>2</sup>; Danial Khatamsaz<sup>1</sup>; Douglas Allaire<sup>1</sup>; Danny Perez<sup>3</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>MPiE; <sup>3</sup>Los Alamos National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Machine Learning Application for Materials Characterization and Materials Discovery

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

Thursday AM | March 27, 2025  
319 | MGM Grand

**Session Chairs:** Saaketh Desai, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory

8:30 AM

**Deep Learning for Quantitative Dynamic Fragmentation Analysis:** *Erwin Cazares*<sup>1</sup>; Brian Schuster<sup>1</sup>; <sup>1</sup>University of Texas at El Paso

8:50 AM

**DiSCoVeR 2.0: Incorporating Structural Similarity as a Search Criteria for New Materials:** *Taylor Sparks*<sup>1</sup>; Andrew Falkowski<sup>1</sup>; Sterling Baird<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Toronto

9:10 AM

**Discovering High-Performance High Entropy Alloys: A Combined Genetic Algorithm and Machine Learning Approach:** *Caroline Binde Stoco*<sup>1</sup>; Guillaume Deffrennes<sup>2</sup>; Yannick Champion<sup>2</sup>; Francisco Gil Coury<sup>1</sup>; <sup>1</sup>PPGCEM/DEMA-UFSCar; <sup>2</sup>Université Grenoble Alpes, CNRS, Grenoble INP, SIMaP

9:30 AM

**Efficient Non-Recyclable Plastics Sorting Through Advanced Sensor Fusion and Artificial Intelligence:** *Kanishka Tyagi*<sup>1</sup>; Isha Maun<sup>1</sup>; Lorenzo Vega-Montoto<sup>2</sup>; Nalin Kumar<sup>1</sup>; <sup>1</sup>UHV Technologies; <sup>2</sup>Idaho National Lab

9:50 AM

**An Edgeworth Cross Mutual Information Function for Multimodal Pattern Matching:** *Zachary Varley*<sup>1</sup>; Megna Shah<sup>1</sup>; Jeff Simmons<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

10:10 AM Break

10:30 AM

**Explainable Deep Learning Model for Defect Detection During Autoclave Composite Manufacturing:** Deepak Kumar<sup>1</sup>; Pragathi Agraharam Chan<sup>1</sup>; Yongxin Liu<sup>1</sup>; *Sirish Namila*<sup>1</sup>; <sup>1</sup>Embry Riddle Aeronautical University

10:50 AM

**Machine Learning Based Classification of Optical Materials:** *Sheldon Ferreira*<sup>1</sup>; Nuggehalli Ravindra<sup>2</sup>; <sup>1</sup>New Jersey Institute of Technology; Materium Technologies; <sup>2</sup>New Jersey Institute of Technology

11:10 AM

**Machine Learning, Simulation and Constraint Algorithms for Interpreting 2D X-Ray Diffraction Patterns of Dynamic Compression Experiments:** Nathan Brown<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Samantha Brozak<sup>1</sup>; Brendan Donohoe<sup>1</sup>; Tommy Ao<sup>1</sup>; Mark A Rodriguez<sup>1</sup>; Marcus Knudson<sup>1</sup>; *J. Matthew Lane*<sup>1</sup>; <sup>1</sup>Sandia National Labs

11:30 AM

**Material Characterization for Sheet Metal Forming Processes Using Deep Learning Methods for Time Series Processing:** *Papdo Tchasse*<sup>1</sup>; Kim Riedmüller<sup>1</sup>; Mathias Liewald<sup>1</sup>; <sup>1</sup>University of Stuttgart

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Microstructure Evolution and Characterization

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

Thursday AM | March 27, 2025  
114 | MGM Grand

**Session Chairs:** Mohsen Mohammadi, University of New Brunswick; Alan Taub, University of Michigan

8:30 AM Keynote

**Challenging the Hydrogen Embrittlement in Powertrain Aluminum Alloys:** *Dimitry Sediako*<sup>1</sup>; Rashiga Walallawita<sup>1</sup>; Jordan Kozakevich<sup>1</sup>; Matthew Hinchliff<sup>1</sup>; Anna Paradowska<sup>2</sup>; Mark Reid<sup>3</sup>; <sup>1</sup>University of British Columbia; <sup>2</sup>The University of Sydney; <sup>3</sup>Australia's Nuclear Science and Technology Organisation

8:55 AM

**Mischmetal Composition Effects on Microstructural and Mechanical Properties of Al-(Ce, La, Nd) Eutectic Alloys:** *Jie Qi*<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

9:20 AM

**Solidification Processing by Low-Power Electric Current: Towards Phase Control in Aluminum Alloys:** *Jonathan Goettsch*<sup>1</sup>; Pulkit Gupta<sup>1</sup>; Shanmukha Aramanda<sup>1</sup>; David Weiss<sup>2</sup>; Xianghui Xiao<sup>3</sup>; Katsuyo Thornton<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Alan Taub<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Vision Materials; <sup>3</sup>Brookhaven National Laboratory

9:45 AM

**In Situ DSC Investigation of Homogenization Conditions in EN AW-7075 Aluminum Alloy:** Aleya Gumussoy<sup>1</sup>; Isik Kaya<sup>1</sup>; *Aybars Guven*<sup>1</sup>; Emrah Ozdogru<sup>1</sup>; <sup>1</sup>TRI Metalurji A.S.

10:10 AM Break

10:25 AM Keynote

**In Situ Thermite Reactions: A Pathway to Enhanced Alumina Wettability in Aluminum Composites:** *David Weiss*<sup>1</sup>; Jordan Kozakevich<sup>2</sup>; Dimitry Sediako<sup>2</sup>; <sup>1</sup>Loukus Technologies, Inc.; <sup>2</sup>University of British Columbia

10:50 AM

**Influence of Thermal-Rate Treatment on Precipitation Evolution and Mechanical Properties of Al-10Si-0.35Mg Alloy:** Sang-Ik Lee<sup>1</sup>; Saif Kayani<sup>1</sup>; Yun-Ho Lee<sup>1</sup>; Je-In Lee<sup>2</sup>; Kwangjun Euh<sup>1</sup>; *Young-Hee Cho*<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science; <sup>2</sup>Pusan National University

11:15 AM

**Microstructure and Texture Evolution of Continuous Casting 8021 Aluminum Alloy Sheets:** *Jiacheng Zhang*<sup>1</sup>; Chao Wu<sup>1</sup>; Dongwei Wei<sup>1</sup>; Hongpo Wang<sup>1</sup>; Zizong Zhu<sup>1</sup>; <sup>1</sup>Chongqing University

11:40 AM

**Effect of Mg Content in a Flat-Rolled EN AW-ALSiMg(A) Aluminum Alloy Cast via Twin Roll Casting:** *Cemil Isiksacan*<sup>1</sup>; Mert Gülver<sup>1</sup>; Hikmet Kayaçetin<sup>1</sup>; Pelin Bölükbaşı<sup>1</sup>; Sertu Bahat<sup>1</sup>; <sup>1</sup>Assan Aluminium

## LIGHT METALS

### Aluminum Reduction Technology — Productivity Increase and Modernization of Aluminium Smelters

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

Thursday AM | March 27, 2025  
113 | MGM Grand

**Session Chair:** Maria Daviou, Aluar Aluminio Argentino Saic

8:30 AM Introductory Comments

8:35 AM

**Advancements of INAFed Tech for Enhanced Efficiency and Reliability in Reduction Cell Operations at INALUM:** *Aghnia Pangeran Siregar*<sup>1</sup>; Ivan Ermisyam<sup>1</sup>; Ismadi Jenal<sup>1</sup>; Ade Buandra<sup>1</sup>; Ari Purwanto<sup>1</sup>; Zulfiqar Baihaqi<sup>1</sup>; Yan Hasibuan<sup>1</sup>; Rahmadhana Andri<sup>1</sup>; <sup>1</sup>PT INALUM

9:00 AM

**INALUM Pilot Pots Upgrade – Successful Completion of the Performance Test:** Sajid Hussain<sup>1</sup>; *Nadia Ahl*<sup>1</sup>; Abdalla Alzarooni<sup>1</sup>; Abdulaziz Sarhan<sup>1</sup>; Maitha Faraj<sup>1</sup>; Hassan Alhayas<sup>1</sup>; Ade Buandra<sup>2</sup>; Ferdy Rahadian<sup>2</sup>; Recky Suharmon<sup>2</sup>; Fathur Rahman<sup>2</sup>; <sup>1</sup>Emirates Global Aluminium; <sup>2</sup>PT Indonesia Asahan Aluminium

9:25 AM

**Anode Clamp Reliability Improvements in EGA DX Reduction Potlines:** Mohamed Aldhanhani<sup>1</sup>; *Balakrishnan Palanisamy*<sup>1</sup>; Satish Rajput<sup>1</sup>; Ravindra Shinde<sup>1</sup>; Arogyanathan Sigamani<sup>1</sup>; Mohammed Al Jaziri<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

9:50 AM

**Cell Superstructure Tap Door Improvements for EGA DX Technology:** Mohamed Aldhanhani<sup>1</sup>; *Balakrishnan Palanisamy*<sup>1</sup>; Satish Rajput<sup>1</sup>; Ravindra Shinde<sup>1</sup>; Arogyanathan Sigamani<sup>1</sup>; Talal Albalushi<sup>1</sup>; Nasser Hussein<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

10:15 AM Break

10:30 AM

**Pot Shell Demolition Facility Reliability Improvement For EGA Smelter:** Mohamed Aldhanhani<sup>1</sup>; Balakrishnan Palanisamy<sup>1</sup>; Amit Dubey<sup>1</sup>; Syam Sudabattula<sup>1</sup>; *Hashim Alhammadi*<sup>1</sup>; Velmurugan Sankaranarayanan<sup>1</sup>; Mohammad Shahid<sup>1</sup>; Vishnu Sankar<sup>1</sup>; Basavaraj Basavanagowda<sup>1</sup>; Seikh Sikander<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

10:55 AM Concluding Comments

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Artificial Intelligence Applications in Integrated Computational Materials Engineering — Computational Modeling and Simulation in Materials Engineering

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Wenwu Xu, San Diego State University; Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University; Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University; Avnish Mishra, Los Alamos National Laboratory; Victoria Miller, University of Florida; Ghanshyam Pilania, General Electric (GE Aerospace Research)

Thursday AM | March 27, 2025  
351 | MGM Grand

**Session Chairs:** Victoria Miller, University of Florida; Wenwu Xu, San Diego State University

8:30 AM Invited

**Machine Learning Potentials and Other Tools in LAMMPS for Materials Engineering:** *James Goff*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

9:00 AM

**Developing a Foundational Inter-Atomic Potential for Transitional Metal Alloys Using Active Learning:** *Brenden Hamilton*<sup>1</sup>; Benjamin Nebgen<sup>1</sup>; Avnish Mishra<sup>1</sup>; Mashroor Nitol<sup>1</sup>; Nithin Mathew<sup>1</sup>; Saryu Fensin<sup>1</sup>; Timothy Germann<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:20 AM

**Developing Reduced Order Models for Phase Field Modeling of Irradiation Damage Using Koopman Operator Theory:** *John Eggemeyer*<sup>1</sup>; Umesh Vaidya<sup>1</sup>; Cheng Sun<sup>1</sup>; <sup>1</sup>Clemson University

9:40 AM

**Magnetic RANN Interatomic Potential for Iron:** *Hala Ben Messaoud*<sup>1</sup>; Mashroor Nitol<sup>2</sup>; Doyle Dickel<sup>1</sup>; <sup>1</sup>Mississippi State University; <sup>2</sup>Los Alamos National Laboratory

10:00 AM Break

10:20 AM

**Prediction of Fatigue Indicator Parameter by Graph Neural Network:** *Gyu-Jang Sim*<sup>1</sup>; Myoung-Gyu Lee<sup>1</sup>; Marat Latypov<sup>2</sup>; <sup>1</sup>Seoul National University Materials Mechanics Laboratory; <sup>2</sup>University of Arizona

10:40 AM

**Effect of the Microstructure on Intergranular Fracture in FCC and HCP Polycrystals: A Machine Learning Approach:** *Javier Llorca*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid

11:00 AM

**Pushing the Limits of Fine Feature Detection in Deep-Learning Assisted 3D X-Ray Microscopy: Characterization of Hierarchical Microstructures in TiC Reinforced Nickel Matrix Composites:** *Kaushik Yanamandra<sup>1</sup>; Hrishikesh Bale<sup>1</sup>; Nathan Johnson<sup>1</sup>; Raj Banerjee<sup>2</sup>; <sup>1</sup>Carl Zeiss Microscopy; <sup>2</sup>University of North Texas*

11:20 AM

**A Machine Learning Informed Phase Field Damage Model to Simulate Void Nucleation and Growth in Metal Microstructures:** *Abhijith Thoopul Anantharanga<sup>1</sup>; Jackson Plummer<sup>1</sup>; Saryu Fensin<sup>2</sup>; Brandon Runnels<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Los Alamos National Laboratory*

11:40 AM

**Combined THz-TDS and Raman Spectroscopy for In-Situ Material Identification via a Machine Learning Algorithm:** *Marco Herbsommer<sup>1</sup>; Sushrut Karmarkar<sup>1</sup>; Mahavir Singh<sup>1</sup>; Meghana Sudarshan<sup>1</sup>; Vikas Tomar<sup>1</sup>; <sup>1</sup>Purdue University*

## MECHANICS OF MATERIALS

**Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior: A MPMD Symposium in Honor of Professor Diana Farkas — From Foams to Graphene**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Andrea Hodge, University of Southern California; Arun Nair, University of Arkansas; Alejandro Strachan, Purdue University; Chelsey Hargather, Los Alamos National Laboratory; Christopher Schuh, Northwestern University

Thursday AM | March 27, 2025  
370 | MGM Grand

**Session Chair:** Andrea Hodge, University of Southern California

8:30 AM Introductory Comments

8:40 AM

**A Combined Experimental-Computational Study of the Compression of Nanoporous Gold Nanoparticles:** *Ben Engelman<sup>1</sup>; Santhosh Mathesan<sup>1</sup>; Tatyana Fedyaev<sup>1</sup>; Eugen Rabkin<sup>1</sup>; Dan Mordehai<sup>1</sup>; <sup>1</sup>Israel Institute of Technology*

9:00 AM

**Molecular Dynamics Simulation Study on the Phase Transformation Behaviors of Additively Manufactured Shape-Memory Alloys:** *Jong-Hoon Park<sup>1</sup>; Won-Seok Ko<sup>1</sup>; <sup>1</sup>Inha University*

9:20 AM

**Role of Rippllocations and Rippllocation Boundaries on the Deformation of Graphite:** *Kaustubh Sudhakar<sup>1</sup>; <sup>1</sup>Drexel University*

9:40 AM

**Influence of Single- and Multiphase Zinc-Blende and Wurtzite Structures on Thermal Properties of Semiconductors During Ultrafast Melt-Quenching and Deformation:** *Mehrab Lotfpour<sup>1</sup>; Lei Cao<sup>1</sup>; <sup>1</sup>University of Nevada, Reno*

## BIOMATERIALS

**Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces III**

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hannes Schniepp, William & Mary; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University; David Kisailus, University of California-Irvine

Thursday AM | March 27, 2025  
307 | MGM Grand

**Session Chairs:** David Kisailus, University of California-Irvine; Hannes Schniepp, William & Mary

8:30 AM Keynote

**Alloy Design via Additive Manufacturing of Metallic Implants:** *Amit Bandyopadhyay<sup>1</sup>; <sup>1</sup>Washington State University*

9:10 AM

**Fluid Flow Enabled Metastasis Testbed of Breast and Prostate Cancer Metastasis to Bone:** *Kalpana Katti<sup>1</sup>; Sharad Jaswandkar<sup>1</sup>; Preetham Ravi<sup>1</sup>; Shrinwanti Ghosh<sup>1</sup>; Jiha Kim<sup>1</sup>; Dinesh Katti<sup>1</sup>; <sup>1</sup>North Dakota State University*

9:40 AM Break

9:55 AM Invited

**A Durable, High Strength Enzymatic Structural Material:** *Nima Rahbar<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute*

10:25 AM

**Iron Acquisition and Mineral Transformation by Cyanobacteria Living in Extreme Environments:** *David Kisailus<sup>1</sup>; <sup>1</sup>University of California-Irvine*

10:50 AM

**Machine Learning Guided Biomimetic Peptide Design for Heterogenous Interfaces:** *Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas*



## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Characterization of Polymers, Composites, Coatings, and Ceramics

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyeeel Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Thursday AM | March 27, 2025**  
**109 | MGM Grand**

**Session Chairs:** Zhiwei Peng, Central South University; Rajiv Soman, AnalytiChem Group, USA

**8:30 AM**

**A Comprehensive Review on Dynamic Mechanical Thermal Analysis of Polyester Reinforced Composites:** *Kator Jomboh*<sup>1</sup>; <sup>1</sup>University of Maiduguri, Borno State

**8:50 AM**

**Recent Progress in Microwave-Assisted Synthesis of Composites Based on Titanium Alloy and Hydroxyapatite at Central South University:** Shangyong Zuo<sup>1</sup>; *Qian Peng*<sup>1</sup>; Tong Zhang<sup>1</sup>; Yihong Chen<sup>1</sup>; Hengrong Xiong<sup>1</sup>; Zhiwei Peng<sup>1</sup>; <sup>1</sup>Central South University

**9:10 AM**

**Characterization of Polymer Resin Composite With Fiberglass and Polycarbonate Microfibers for Applications in Small-Scale Boat Models:** Clarissa Dias<sup>1</sup>; Bruno da Cunha<sup>1</sup>; *Sergio Monteiro*<sup>1</sup>; Ricardo Weber<sup>1</sup>; <sup>1</sup>Military Institute of Engineering

**9:30 AM**

**Preparation of Glass-Ceramics From Ferronickel Slag and Iron Ore Tailings: Effects of Crystallization Temperature and Time:** Zhiwei Peng<sup>1</sup>; *Chaojun Xiang*<sup>1</sup>; Huimin Tang<sup>1</sup>; Xin Zhang<sup>1</sup>; Qiang Zhong<sup>1</sup>; Mingjun Rao<sup>1</sup>; <sup>1</sup>Central South University

**9:50 AM**

**Multiscale Characterization and Experimentation to Analyze the Role of Ceramic Inoculants in the Failure Behavior of Aluminum Metal Matrix Composites:** *Alex Butler*<sup>1</sup>; Jamila Khanfri<sup>1</sup>; Aaron Stebner<sup>1</sup>; Josh Kacher<sup>1</sup>; Brad Boyce<sup>2</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Sandia National Laboratories

**10:10 AM Break**

**10:20 AM**

**Structural Characterization of TiO<sub>2</sub>, WO<sub>3</sub>, ZnO and SnO<sub>2</sub> for Modified Zinc - Titanium Dioxide Nanocomposites Smart Coatings:** *Ayodele Daniyan*<sup>1</sup>; <sup>1</sup>Obafemi Awolowo University

**10:40 AM**

**Modeling the Thermal Frequency Response of Printed Silver on Glass, Alumina, and Polyamide Substrates for Modulated Photothermal Radiometry:** *Javier Corona*<sup>1</sup>; Nirmala Kandadai<sup>1</sup>; <sup>1</sup>Oregon State University

## NUCLEAR MATERIALS

### Composite Materials for Nuclear Applications III — SiC Composites for Fission and Fusion

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Composite Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Anne Campbell, Oak Ridge National Laboratory; Dong (Lilly) Liu, University of Oxford; Rick Ubic, Boise State University; Lauren Garrison, Commonwealth Fusion Systems; Peng Xu, Idaho National Laboratory; Johann Riesch, Max Planck Insitute For Plasma Physics; James Wade-Zhu, UKAEA

**Thursday AM | March 27, 2025**  
**164 | MGM Grand**

**Session Chairs:** Peng Xu, Idaho National Laboratory; James Wade-Zhu, UKAEA

**8:30 AM Invited**

**Advancing SiC-SiC Cladding Technology to Support Nuclear Power Generation:** *David Frazer*<sup>1</sup>; Sean Gonderman<sup>1</sup>; Lucas Borowski<sup>1</sup>; Rolf Haefelfinger<sup>1</sup>; Mohammad Alavi<sup>1</sup>; Christian Deck<sup>1</sup>; Jack Gazza<sup>1</sup>; <sup>1</sup>General Atomics

**8:55 AM Invited**

**Developing and Testing Silicon Carbide Composites for Fusion-Relevant Conditions:** *Alexander Leide*<sup>1</sup>; Douglas Andrews<sup>1</sup>; James Wade-Zhu<sup>1</sup>; <sup>1</sup>United Kingdom Atomic Energy Authority

**9:20 AM Invited**

**Silicon Carbide Composites for Fusion Applications:** Paul Barron<sup>1</sup>; Colin Baus<sup>1</sup>; Tatsuya Hinoki<sup>2</sup>; Reuben Holmes<sup>1</sup>; Satoshi Ogawa<sup>1</sup>; *Taishi Sugiyama*<sup>1</sup>; Satoshi Konishi<sup>1</sup>; <sup>1</sup>Kyoto Fusioneering; <sup>2</sup>Kyoto University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Additive Manufacturing & Synthesis

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Labratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Thursday AM | March 27, 2025**  
**305 | MGM Grand**

**Session Chairs:** Nicolas Argibay, Ames National Laboratory; Jacob Jeffries, Clemson University

**8:30 AM Invited**

**Network Formation in Dual-Cure Resins for Direct Ink Write Carbon Fiber Composites:** *Michael Chandross*<sup>1</sup>; Eric Rothchild<sup>1</sup>; Phillip Taylor<sup>1</sup>; Joel Clemmer<sup>1</sup>; EJ Broker<sup>2</sup>; James Batteas<sup>2</sup>; Hsu-Ming Lien<sup>3</sup>; Filippo Mangolini<sup>3</sup>; Kyle Nogales<sup>1</sup>; Nekoda van de Werken<sup>1</sup>; Gary Grest<sup>1</sup>; Adam Cook<sup>1</sup>; Leah Appelhans<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Texas A&M University; <sup>3</sup>University of Texas at Austin

9:00 AM

**Phase Diagrams and Crystallization of Molten Salts Studied by Machine-Learned Potentials:** *Zhao Fan*<sup>1</sup>; Michael Whittaker<sup>1</sup>; Piotr Zarzycki<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

9:20 AM Invited

**Atomistic Modeling Insights in Low Energy Implantation for High Quality Synthesis:** *Eva Zarkadoulas*<sup>1</sup>; Sumner Harris<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:50 AM

**Prediction of Defect Properties in Concentrated Solid Solutions Using a Langmuir-Like Model:** *Jacob Jeffries*<sup>1</sup>; Enrique Martinez<sup>1</sup>; <sup>1</sup>Clemson University

10:10 AM Break

10:30 AM Invited

**Computational Simulations of Rapid Solidification During Additive Manufacturing of a Magnesium Alloy:** *Damien Tournet*<sup>1</sup>; Rouhollah Tavakoli<sup>1</sup>; Adrian Boccardo<sup>1</sup>; Ahmed Boukellal<sup>2</sup>; Muzi Li<sup>1</sup>; Jon Molina<sup>3</sup>; Javier LLorca<sup>3</sup>; <sup>1</sup>IMDEA Materials Institute; <sup>2</sup>IMDEA Materials & Université de Lorraine; <sup>3</sup>IMDEA Materials & Universidad Politécnica de Madrid

11:00 AM

**CALPHAD-Enabled Design of a Compact Morphology Cobalt-Based Superalloy for Additive Manufacturing:** *Krista Biggs*<sup>1</sup>; Brandon Snow<sup>1</sup>; Julio Cesar Pereira dos Santos<sup>2</sup>; Gregory Olson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>National Institute of Standards and Technology

11:20 AM

**Atomistic Simulations of Active Brazing:** *Eric Rothchild*<sup>1</sup>; Ian Winter<sup>1</sup>; Michael Chandross<sup>1</sup>; Jeffrey Horner<sup>1</sup>; Jaideep Ray<sup>1</sup>; Edward Arata<sup>1</sup>; Ping Lu<sup>2</sup>; Scott Roberts<sup>1</sup>; David Kemmenoe<sup>1</sup>; Anthony McMaster<sup>1</sup>; Anne Grillet<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

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## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Design

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

Thursday AM | March 27, 2025  
317 | MGM Grand

**Session Chairs:** Yuntian Zhu, City University of Hong Kong; Hyoungh Seop Kim, Pohang University of Science and Technology

8:30 AM Invited

**Additive Manufacturing of High-Strength Al-Ti Composites:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto

9:00 AM

**Direct Design of Microstructures for Ti-Nb-Ta Biomedical Alloys by Additive Manufacturing:** *Thomas Niendorf*<sup>1</sup>; Christian Lauhoff<sup>1</sup>; Jan Johannsen<sup>2</sup>; Melanie Stenzel<sup>3</sup>; Markus Weinmann<sup>3</sup>; <sup>1</sup>Universitaet Kassel; <sup>2</sup>Fraunhofer Research Institution for Additive Manufacturing Technologies IAPT; <sup>3</sup>TANIOBIS GmbH

9:20 AM

**Understanding Chemical Homogeneity and Elemental Mixing in Al-Zn Multi-Material Systems Through Process Parameter Control of Laser Powder Bed Fusion:** *Fanyue Kong*<sup>1</sup>; Ji Ma<sup>1</sup>; James Burns<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

9:40 AM

**Design of Graded Microstructures Between Vanadium and Stainless Steel:** *Bernard Gaskey*<sup>1</sup>; Cheryl Hawk<sup>1</sup>; John Carpenter<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

10:00 AM Break

10:20 AM

**Integrated Computational-Experimental Framework for Production of Additively Manufactured Functionally Graded Materials From Structural to Refractory Alloys:** *Kaila Bertsch*<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Jennifer Glerum<sup>1</sup>; Michael Juhasz<sup>1</sup>; Scott Peters<sup>1</sup>; Raiyan Seede<sup>1</sup>; Nicholas Ury<sup>1</sup>; Aurelien Perron<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

10:40 AM

**Laser Powder Bed Fusion of CuCrZr - In625 Multi-Materials:** *Andaç Özsoy*<sup>1</sup>; Steve Gaudet<sup>2</sup>; Antonios Baganis<sup>2</sup>; William Hearn<sup>1</sup>; Zoltán Hegedüs<sup>3</sup>; Yunhui Chen<sup>4</sup>; Alexander Rack<sup>5</sup>; *Steven Van Petegem*<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>EMPA; <sup>3</sup>DESY; <sup>4</sup>RMIT; <sup>5</sup>ESRF

11:00 AM

**Characterizing a Functionally Graded Ti-6Al-4V - Ti-6Al-4V-xW System Using Directed Energy Deposition AM:** *Matthew Dolde*<sup>1</sup>; Fatih Sikan<sup>1</sup>; Maria Quintana<sup>1</sup>; Peter Collins<sup>1</sup>; <sup>1</sup>Iowa State University

11:20 AM

**Parameter Selection and Micro/Meso-Material Response: Understanding the Cause-Effect Relationship:** *Alexander Sloane*<sup>1</sup>; Minh Phan<sup>1</sup>; Henry Saunders<sup>1</sup>; Alex Leung<sup>2</sup>; David McArthur<sup>2</sup>; Partha Paul<sup>3</sup>; Joseph Brunet<sup>3</sup>; Iain Todd<sup>1</sup>; Katerina Christofidou<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>University College London; <sup>3</sup>European Synchrotron Radiation Facility

11:40 AM

**Additive Manufacturing Based Design Approach For Biomedical Implant Applications:** *Sarang Sajji*<sup>1</sup>; Tirthesh Ingale<sup>1</sup>; Adebowale Odumuwagun<sup>2</sup>; Allison Beese<sup>2</sup>; Peter Collins<sup>3</sup>; Narendra Dahotre<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Pennsylvania State University; <sup>3</sup>Iowa State University

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## SPECIAL TOPICS

### DMMM5: A Decade of Creating Inclusion and Belonging for Diversity in the Minerals, Metals, and Materials Professions — Personal & Professional Development

**Sponsored by:** TMS: Membership Diversity & Development Committee, TMS: Diversity, Equity, and Inclusion Committee

**Program Organizers:** Ben Britton, University of British Columbia; Lauren Garrison, Commonwealth Fusion Systems; Keith Bowman, University of Maryland Baltimore County; Katelyn Jones; Suveen Mathaudhu, Colorado School of Mines; Ashley Paz y Puente, University of Cincinnati; Soumya Varma, KLA Corporation; Eva Zarkadoulas; Danielle White, University of Southern California

Thursday AM | March 27, 2025  
150 | MGM Grand

**Session Chair:** Lauren Garrison, Commonwealth Fusion Systems

**8:30 AM Introductory Comments:** Career Development and Transitions: Discover how identity and cultural influences impact career choices and decision making. In this panel session, we will discuss how the dynamics of diversity contribute to personal and career growth and leadership roles. Our speakers will first take turns to share their experiences in career changes from R&D to government management, how to make the switch from national lab to academia or industry, and how diversity evolves in leadership roles. This session will conclude with a panel of speakers for an engaging Q&A with the audience.

8:35 AM

**Going International:** *Megan Cordill*<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science

8:45 AM

**Professional Development as a Structural Materials Researcher:** *Amit Misra*<sup>1</sup>; <sup>1</sup>University of Michigan

8:55 AM

**Materials Research in Industry:** *Trevor Clark*<sup>1</sup>; <sup>1</sup>Commonwealth Fusion Systems

9:05 AM Panel Discussion; Q & A with Audience

10:10 AM Break

10:30 AM

**Black Sheep—The Choice is Yours (Revisited):** *Suveen Mathaudhu*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

11:00 AM

**Best Practices for Resume Review and Hiring Panels—Hands on Activity:** *Lauren Garrison*<sup>1</sup>; <sup>1</sup>Commonwealth Fusion Systems

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## LIGHT METALS

### Electrode Technology for Aluminum Production — Anode Performance, Anode Baking Furnaces, SPL

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Egil Skybakmoen, SINTEF Industry; Les Edwards, Rain Carbon Inc.

Thursday AM | March 27, 2025  
112 | MGM Grand

**Session Chair:** Ketil Rye, Alcoa

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8:30 AM Introductory Comments

8:35 AM

**Experimental Study of the Green Anode Cooling:** *Mohammadhossein Dabaghi*<sup>1</sup>; *Duygu Kocaefe*<sup>1</sup>; *Yasar Kocaefe*<sup>1</sup>; <sup>1</sup>University of Quebec at Chicoutimi

9:00 AM

**Impact of Increasing the Height of Carbon Anodes for Aluminum Production:** *Emmily Fonseca*<sup>1</sup>; *Marcus Brasiense*<sup>2</sup>; *Paulo Nogueira*<sup>3</sup>; *Felipe Biolchini*<sup>1</sup>; *Nayary Monteiro*<sup>3</sup>; *Camila da Silva*<sup>1</sup>; *Benigno Junior*<sup>1</sup>; <sup>1</sup>Albras

9:25 AM

**Mitigating Fire Risk at EGA Paste Plants by Improving the Performance and Reliability of Regenerative Thermal Oxidizer (RTO) and Heat Transfer Medium (HTM) Systems:** *Bienvenu Ndjom*<sup>1</sup>; *Abdalla Saeed Al Sharji*<sup>1</sup>; *Sunith Warriar*<sup>1</sup>; *Rizwan Waghui*<sup>1</sup>; *Mohammed Ali*<sup>1</sup>; *Abdulla Alshaikh*<sup>1</sup>; *Amer Almarzooqi*<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

9:50 AM

**Managing Bake Furnace Relines to Optimize Fire Startup:** *Daniel Reichelson*<sup>1</sup>; *Jonathan Reichelson*<sup>1</sup>; <sup>1</sup>Hatch

10:15 AM Break

10:30 AM

**End-of-Life Treatment of Spent Potlining by Low Pressure and Heat:** *Camilla Sommerseth*<sup>1</sup>; *Pål Tettlie*<sup>1</sup>; *Samuel Senanu*<sup>1</sup>; *Egil Skybakmoen*<sup>1</sup>; *Per Anders Eidem*<sup>2</sup>; *Pavel Stransky*<sup>2</sup>; *Heiko Gaertner*<sup>1</sup>; *Ellen Myrvold*<sup>3</sup>; *Eirik Hagen*<sup>4</sup>; *Lorentz Petter Lossius*<sup>4</sup>; *Anders Sørhuus*<sup>5</sup>; <sup>1</sup>SINTEF Industry; <sup>2</sup>SINTEF Helgeland; <sup>3</sup>Alcoa Norway; <sup>4</sup>Hydro Aluminium AS; <sup>5</sup>REEL Norway AS

10:55 AM

**Separation and Recovery of Fluoride, Carbon, Alkali Metal Oxides and Refractories With Vacuum Distillation Process From Aluminum Electrolytic Cell Spent Pot Lining:** *Naixiang Feng*<sup>1</sup>; *Yuezhong Di*<sup>1</sup>; *Yaowu Wang*<sup>1</sup>; *Jianping Peng*<sup>1</sup>; *Wenxiong Dong*<sup>2</sup>; *Buju Guo*<sup>1</sup>; *Jianbin Huang*<sup>2</sup>; *Zhibiao Hu*<sup>2</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>GuangXi LaiBin GIG YinHai Aluminum CO.,LTD.

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## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Advanced Techniques for Elucidating Radiation Effects in Structural Materials III

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** *Mukesh Bachhav*, Idaho National Laboratory; *Boopathy Kombaiah*, Idaho National Laboratory; *Janelle Wharry*, University of Illinois; *Assel Aitkaliyeva*, University of Florida; *Miaomiao Jin*, Pennsylvania State University; *Farida Selim*, Arizona State University; *Nathan Almirall*, GE Aerospace

Thursday AM | March 27, 2025  
162 | MGM Grand

**Session Chairs:** *Mukesh Bachhav*, Idaho National Laboratory; *Boopathy Kombaiah*, Idaho National Laboratory

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8:30 AM

**Methods for Characterization of Voids and Bubbles in S/TEM:** *Witold Chmurny*<sup>1</sup>; *Mikhail Zibrov*<sup>2</sup>; *Piotr Bazarnik*<sup>1</sup>; *Lukasz Ciupinski*<sup>1</sup>; <sup>1</sup>Warsaw University of Technology; <sup>2</sup>Max Planck Institute for Plasma Physics

8:50 AM

**Defect Evolution in Nanocrystalline SiC at High Irradiation Temperature:** *Nabil Daghbouj*<sup>1</sup>; *Tomas Polcar*<sup>1</sup>; <sup>1</sup>Czech Technical University in Prague

9:10 AM

**Effect of Mn and Co on Radiation-Induced Segregation in Austenitic Fe-Ni-Cr Alloys:** *Daniele Fatto*<sup>1</sup>; *Offidani*<sup>1</sup>; *Emmanuelle Marquis*<sup>1</sup>; <sup>1</sup>University of Michigan - Ann Arbor

9:30 AM

**Microstructural Evolution of Ion Irradiated Commercially Pure Titanium:** *Aida Amroussia*<sup>1</sup>; *Carl Boehlert*<sup>2</sup>; *F. Pellemeine*<sup>3</sup>; *W. Mittig*<sup>4</sup>; *M. Li*<sup>5</sup>; *W.-Y. Chen*<sup>5</sup>; <sup>1</sup>Saint-Gobain Research Paris; <sup>2</sup>Michigan State University; <sup>3</sup>Michigan State University; <sup>4</sup>Fermilab; <sup>5</sup>National Superconducting Cyclotron Laboratory; <sup>6</sup>Argonne National Laboratory

9:50 AM

**Effects of Grain Size on Microstructural Evolution of a FeCrAl System After Neutron Irradiation:** *Joshua Rittenhouse*<sup>1</sup>; *Mukesh Bachhav*<sup>1</sup>; *Laura Hawkins*<sup>1</sup>; *Sohail Shah*<sup>1</sup>; *Cameron Howard*<sup>1</sup>; *David Frazer*<sup>2</sup>; *Nedim Cinbiz*<sup>3</sup>; *Haiming Wen*<sup>4</sup>; *Tiankai Yao*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>General Atomics; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Missouri University of Science and Technology

10:10 AM Break

10:30 AM

**Irradiation Damage in Compositionally Complex Carbide Ceramics:** *Bai Cui*<sup>1</sup>; *Lanh Trinh*<sup>1</sup>; *Fei Wang*<sup>1</sup>; *Luke Wadle*<sup>1</sup>; *Yongfeng Lu*<sup>1</sup>; *Kaustubh Bawane*<sup>2</sup>; *Khalid Hattar*<sup>3</sup>; *Zilong Hua*<sup>2</sup>; *Linu Malakkal*<sup>2</sup>; *Lingfeng He*<sup>4</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of Tennessee, Knoxville; <sup>4</sup>North Carolina State University

10:50 AM

**X-Ray Evaluation of Ion Irradiation-Induced Defects in Austenitic Steels: Comparison With an Analytical Model Based on TEM Observations:** *Raphaelle Guillou*<sup>1</sup>; Thomas Jourdan<sup>2</sup>; Marie Loyer Prost<sup>2</sup>; Dominique Thiaudière<sup>3</sup>; Joël Malaplate<sup>1</sup>; <sup>1</sup>Université Paris-Saclay, CEA, Service de Recherche en Matériaux et procédés Avancés; <sup>2</sup>Université Paris-Saclay, CEA, Service de recherche en Corrosion et du Comportement des Matériaux, SRMP; <sup>3</sup>Synchrotron SOLEIL

11:10 AM

**Influence of Composition and Ion Species on Radiation Damage Evolution in Refractory High Entropy Alloys:** *Emily Mang*<sup>1</sup>; Annie Barnett<sup>1</sup>; Daniel Foley<sup>1</sup>; Wei-Ying Chen<sup>2</sup>; Michael Falk<sup>1</sup>; Jaime Marian<sup>3</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>University of California - Los Angeles

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Multiple Principal Component Materials — High Temperature Corrosion

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Wenjun Cai, Virginia Polytechnic Institute and State University; XiaoXiang Yu, Novelis Inc.; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Kit; Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

Thursday AM | March 27, 2025  
169 | MGM Grand

**Session Chairs:** Elizabeth Opila, University of Virginia; Bronislava Gorr, Kit

8:30 AM

**Cyclic Oxidation of NiCoCr Alloys in Air and Air-Steam Environments:** *Elmer Prenzlow*<sup>1</sup>; Benjamin Church<sup>1</sup>; William Musinski<sup>1</sup>; Timothy Smith<sup>2</sup>; Christopher Kantzos<sup>2</sup>; <sup>1</sup>University of Wisconsin Milwaukee; <sup>2</sup>NASA Glenn Research Center

8:50 AM Invited

**Phase Stability and Magnetic Thermodynamics in Rocksalt High-Entropy Oxides:** *Raphael Hermann*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:10 AM

**Hot Corrosion Behavior of Nickel-Based Superalloys in Molten Na<sub>2</sub>SO<sub>4</sub>-MgSO<sub>4</sub> Salts:** *Yuyuan Zhang*<sup>1</sup>; Shanshan Hu<sup>1</sup>; Yuying Wen<sup>1</sup>; Ting Sun<sup>1</sup>; Xingru Tan<sup>1</sup>; Xingbo Liu<sup>1</sup>; Michael Teka<sup>2</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>Pratt & Whitney

9:30 AM

**Improvement of Complex Oxide Properties by Doping:** *Bronislava Gorr*<sup>1</sup>; Bjoern Schaefer<sup>1</sup>; Steven Schellert<sup>2</sup>; Hans Christ<sup>2</sup>; Alexander Kauffmann<sup>1</sup>; Martin Heilmair<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology (KIT); <sup>2</sup>University of Siegen

9:50 AM

**Influence of the Presence of Ti or Ta on the Oxidation Behavior at 1200°C of Cast MPEAs Derived From an Equimolar CoNiFeCr Basis:** *Siouare Hammi*<sup>1</sup>; Yasmima El Hadad<sup>1</sup>; Lyna Amrouche<sup>1</sup>; Romin Chevalme<sup>1</sup>; Lionel Aranda<sup>2</sup>; *Patrice Berthod*<sup>1</sup>; <sup>1</sup>University of Lorraine

10:10 AM Break

10:20 AM

**Oxidation Behavior of High Entropy Materials:** *Rahul Agrawal*<sup>1</sup>; Sean O'Brien<sup>1</sup>; Rajeev Gupta<sup>1</sup>; <sup>1</sup>North Carolina State University

10:40 AM

**Oxidation Mechanisms and Kinetics of As-Cast Versus Homogenized Refractory-Based High Entropy Alloys:** *Kavin Ram*<sup>1</sup>; Jibril Shittu<sup>1</sup>; Connor Rietema<sup>1</sup>; Joseph Mckeown<sup>1</sup>; Peter Hosemann<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>University of California, Berkeley

11:00 AM Invited

**Cyclic Oxidation of Oxide Dispersion Strengthened Multi-Principal Element Alloys:** *Timothy Smith*<sup>1</sup>; Bryan Harder<sup>1</sup>; Christopher Kantzos<sup>1</sup>; Paul Gradl<sup>1</sup>; Aaron Thompson<sup>1</sup>; Austin Whitt<sup>1</sup>; Timothy Gabb<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

11:20 AM

**Investigation of Protective Potential of Al & Cr in Intermediate Temperature Oxidation of MoNbTaW Thin Film:** *Md Imran Noor*<sup>1</sup>; Zahidur Rahman<sup>1</sup>; Paul F. Rottmann<sup>1</sup>; <sup>1</sup>University of Kentucky

11:40 AM Invited

**Strategies for Improved Oxidation Resistance of Refractory Multiple Principal Element Alloys:** *Elizabeth Opila*<sup>1</sup>; Charlie Brandenburg<sup>1</sup>; Mitra Taheri<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Johns Hopkins University

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## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Deformation and Detection

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

Thursday AM | March 27, 2025  
318 | MGM Grand

**Session Chairs:** J.C. Stinville, University of Illinois Urbana-Champaign; Orion Kafka, National Institute of Standards and Technology

8:30 AM

**Beyond Crack Detection: Non-Destructive Methods for Early-Stage Fatigue Damage Detection:** *Maryam Izadi Najafabadi*<sup>1</sup>; Ebad Bagherpour<sup>1</sup>; <sup>1</sup>Brunel University

8:50 AM

**Finding a Fatigue Crack in a Swiss Watch: Fatigue Cracking Kinetics, Detectability, and Defect Criticality in Miniaturized PH13-8Mo Shafts:** *Christopher Finfrack*<sup>1</sup>; Donald Susan<sup>1</sup>; Jeffrey Rodelas<sup>1</sup>; Brian Choragwicki<sup>1</sup>; Hannah Sims<sup>1</sup>; John Laing<sup>1</sup>; <sup>1</sup>Sandia National Laboratories



9:10 AM

**High-Throughput Characterization of Small Crack Growth Behavior in Ti-6-4:** *Michelle Harr<sup>1</sup>; Bradley Rucker<sup>1</sup>; Devin Blankenship<sup>1</sup>; Nathan Levkulich<sup>2</sup>; Glenn Balbus<sup>1</sup>; Ayman Salem<sup>1</sup>; Adam Pilchak<sup>3</sup>; Thomas Broderick<sup>4</sup>; Samuel Kuhr<sup>2</sup>; <sup>1</sup>Materials Resources LLC; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>Pratt & Whitney; <sup>4</sup>Federal Aviation Administration*

9:30 AM Invited

**The Temperature Sensitivity of Titanium Dwell Fatigue: In-Situ Characterisation, Crystal Plasticity Modelling and Mechanistic Analysis:** *Fionn Dunne<sup>1</sup>; Yu Cao<sup>1</sup>; Yilun Xu<sup>2</sup>; Yang Liu<sup>3</sup>; Zebang Zheng<sup>4</sup>; <sup>1</sup>Imperial College; <sup>2</sup>A\*STAR; <sup>3</sup>Leicester University; <sup>4</sup>Northwestern Polytechnical University*

9:50 AM Break

10:10 AM

**Very High Cycle Fatigue Behavior of BCC Refractory Alloy C103:** *Madeline Vailhe<sup>1</sup>; Leah Mills<sup>1</sup>; Jean-Charles Stinville<sup>2</sup>; Chris Torbet<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>University of Illinois, Urbana-Champaign*

10:30 AM

**Transformation Induced Fatigue in Shape Memory Alloys:** *Nicole Stoetzel<sup>1</sup>; Jan Frenzel<sup>1</sup>; Marcus Young<sup>2</sup>; Tamas Ungar<sup>3</sup>; Gunther Eggeler<sup>1</sup>; <sup>1</sup>Ruhr-University Bochum; <sup>2</sup>University of North Texas; <sup>3</sup>Eötvös Loránd University*

10:50 AM

**Cyclic Plastic Deformation and Hardening in Additively Manufactured Ti6Al4V Materials:** *Venkateshwaran Ravi Narayanan<sup>1</sup>; Leila Ladani<sup>1</sup>; <sup>1</sup>Arizona State University*

11:10 AM

**The Impact of Microstructure on Slip Band Intensification:** *Rembert White<sup>1</sup>; Behnam Ahmadikia<sup>1</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara*

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## MATERIALS SYNTHESIS AND PROCESSING

### Friction Stir Welding and Processing XIII — Additive Friction Stir Deposition I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Thursday AM | March 27, 2025**  
**123 | MGM Grand**

**Session Chair:** Paul Allison, Baylor University

8:30 AM

**Developing AFSD Processes for Critical Aviation and Defense Applications:** *Noah Barnhill<sup>1</sup>; <sup>1</sup>ASTRO America, Contractor under Army GVSC*

8:50 AM

**Force Feedback and Bonding Characteristics of Graphite Free Aluminum 7075 Using Additive Friction Stir Deposition:** *Jacob Hansen<sup>1</sup>; Luk Dean<sup>1</sup>; Yuri Hovanski<sup>1</sup>; Michael Merrell<sup>1</sup>; <sup>1</sup>Brigham Young University*

9:10 AM

**Assessing the Effects of Heat Input on Bonding Strength of Lubricant Free Twin Rod Additive Friction Stir Deposition Repair of Aluminum Alloy 7050:** *Victor Rojas<sup>1</sup>; Brian Jordon<sup>1</sup>; Rachel Swinney<sup>1</sup>; Paul Allison<sup>1</sup>; <sup>1</sup>Baylor University*

9:30 AM

**Designing Tools for Graphite Free Additive Friction Stir Deposition of 7xxx Aluminum:** *Jacob Hansen<sup>1</sup>; Lukas Dean<sup>1</sup>; Scott Rose<sup>2</sup>; Max Hossfeld<sup>3</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>BOEING; <sup>3</sup>University of Stuttgart*

9:50 AM

**Advancements in Lubrication-Free Additive Friction Stir Deposition and Post-Processing Heat Treatments for Aluminum Alloys:** *J. Brian Jordon<sup>1</sup>; Paul Jordon<sup>1</sup>; <sup>1</sup>Baylor University*

10:10 AM Break

10:30 AM

**Improving Build Direction Heat Treated Tensile Properties of Additive Friction Stir Deposition AA7050:** *Isaac Liu<sup>1</sup>; Jacob Hoarston<sup>1</sup>; Paul Allison<sup>1</sup>; Brian Jordon<sup>1</sup>; <sup>1</sup>Baylor University*

10:50 AM

**Simulation of the Additive Friction Stir Deposition Process Using a Directs Energy Deposition Approach:** *Joseph Broadhead<sup>1</sup>; Michael Miles<sup>1</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University*

11:10 AM

**Effect of Layer Thickness on Resulting Microstructures and Mechanical Properties of Aluminum Alloys Using Additive Friction Stir Deposition:** *Rachel Swinney<sup>1</sup>; Cole Ritter<sup>1</sup>; John Cary<sup>1</sup>; Caleb Miller<sup>1</sup>; James Jordon<sup>1</sup>; Paul Allison<sup>1</sup>; <sup>1</sup>Baylor University*

11:30 AM

**Deposition Parameters & Property Correlations in Novel Al-Ce Alloys:** *Roberto Menchaca<sup>1</sup>; Nagaraja Naveen Kumar<sup>1</sup>; Vishal Soni<sup>1</sup>; Adam Loukus<sup>2</sup>; David Weiss<sup>2</sup>; Rajiv Mishra<sup>1</sup>; Vijay Vasudevan<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Loukus Technologies*

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## MATERIALS SYNTHESIS AND PROCESSING

### Friction Stir Welding and Processing XIII — Advanced Controls

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Thursday AM | March 27, 2025**  
**124 | MGM Grand**

**Session Chairs:** Kevin Colligan, Concurrent Technologies Corporation; Lars Cederqvist, SKB

8:30 AM

**A New Method of Tool Depth Control in Friction Stir Welding:** *Arnold Wright<sup>1</sup>; John Bosker<sup>1</sup>; <sup>1</sup>Bond Technologies*

8:50 AM

**Temperature Control in Aluminum Friction Stir Applications:** *Joel Gibb<sup>1</sup>; Jared Jackson<sup>1</sup>; Scott Yadon<sup>1</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University*

9:10 AM

**A Review of Friction Stir Welding Focused Path Planning:** *Joshua Sheffield<sup>1</sup>; <sup>1</sup>CFSP Brigham Young University*

9:30 AM

**Production of 5 cm Thick Copper Canisters Containing Sweden's Nuclear Waste Using Friction Stir Welding:** *Lars Cederqvist<sup>1</sup>; <sup>1</sup>Swedish Nuclear Fuel and Waste Management Company (SKB)*

9:50 AM Break

10:10 AM

**Optimizing Hardness in the Heat Affected Zone of AA7075-T6 Aluminum Alloy via Machine Learning-Guided Friction Stir Welding:** *Yizhou Lu*<sup>1</sup>; Shubhrodev Bhowmik<sup>2</sup>; Nilesh Kumar<sup>2</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi; <sup>2</sup>University of Alabama

10:30 AM

**Machine Learning Implementations for Predicting Weld Strengths on Aluminum 7075:** *Danny Langan*<sup>1</sup>; Michael Hall<sup>1</sup>; Sasha Schrandt<sup>1</sup>; Jason Grafft<sup>1</sup>; Ryan Schuette<sup>1</sup>; Ryan Tedjasukmana<sup>1</sup>; <sup>1</sup>PAR Systems

10:50 AM

**Visual Temperature Estimation and Flash Detection of Aluminum 7075 Welds Using Neural Networks:** *Danny Langan*<sup>1</sup>; Michael Hall<sup>1</sup>; Sasha Schrandt<sup>1</sup>; Jason Grafft<sup>1</sup>; Ryan Schuette<sup>1</sup>; Ryan Tedjasukmana<sup>1</sup>; <sup>1</sup>PAR Systems

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials — Functional Nanomaterials IV: Energy and Medical Applications

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

Thursday AM | March 27, 2025  
365 | MGM Grand

**Session Chair:** Aditya Nittala, Pacific Northwest National Laboratory

8:30 AM Keynote

**Unlocking the Potential of Metamaterials: Advancing Terahertz Communication, Noise Reduction, and MRI Imaging:** *Xin Zhang*<sup>1</sup>; <sup>1</sup>Boston University

9:10 AM Invited

**High-Endurance Zinc Ion Supercapacitors With Wide Temperature Tolerance:** *Tse Nga Ng*<sup>1</sup>; <sup>1</sup>University of California San Diego

9:40 AM Invited

**Vapor-Phase Infiltration (VPI) for Advanced Patterning, Device, and Microelectronics Applications:** *Chang-Yong Nam*<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory

10:10 AM Break

10:30 AM Invited

**Heterogeneous Nanostructure Array Integration for Sustainable CO<sub>2</sub> Conversion and H<sub>2</sub> Production:** *Pu-Xian Gao*<sup>1</sup>; <sup>1</sup>University of Connecticut

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Characterization and Modeling II

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

Thursday AM | March 27, 2025  
352 | MGM Grand

**Session Chairs:** Sriswaroop Dasari, University of Texas at El Paso; Rajarshi Banerjee, University of North Texas

8:30 AM Invited

**Recent Advances in Short-Range Ordering in Multicomponent Materials:** *Peter Liaw*<sup>1</sup>; Jian-Min Zuo<sup>2</sup>; Lia Amalia<sup>1</sup>; Rui Feng<sup>3</sup>; Ke An<sup>4</sup>; Jonathan Poplawsky<sup>4</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>National Energy Technology Laboratory; <sup>4</sup>Oak Ridge National Laboratory

9:00 AM Invited

**Predicting Short-Range Order in Complex Concentrated Alloys - A Tale of DFT and Data-Driven Approaches:** *Prashant Singh*<sup>1</sup>; Duane D. Johnson<sup>2</sup>; Hailong Huang<sup>1</sup>; Gaoyuan Ouyang<sup>1</sup>; Nicolas Argibay<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Ryan Ott<sup>1</sup>; Rajarshi Banerjee<sup>3</sup>; Soni Vishal<sup>3</sup>; Pratik Ray<sup>4</sup>; Dishant Beniwal<sup>4</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University; <sup>3</sup>University of North Texas; <sup>4</sup>Indian Institute of Technology Ropar

9:30 AM

**Predicting Diffusion Kinetics and its Resulting Local Chemical Ordering in Compositionally Complex Materials:** *Bin Xing*<sup>1</sup>; Timothy Rupert<sup>1</sup>; Xiaoqing Pan<sup>1</sup>; Penghui Cao<sup>1</sup>; <sup>1</sup>University of California, Irvine

9:50 AM Break

10:10 AM Invited

**Developing Super Plastic Bulk Metallic Glasses via Manipulation of Icosahedral Ordering:** Geun Hee Yoo<sup>1</sup>; Wook Ha Ryu<sup>1</sup>; Chae Woo Ryu<sup>2</sup>; Byeong Chan Lee<sup>3</sup>; Jia-Lun Gu<sup>4</sup>; Ke-Fu Yao<sup>4</sup>; *Eun Soo Park*<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Hongik University; <sup>3</sup>Kyung Hee University; <sup>4</sup>Tsinghua University

10:40 AM

**First-Principles Investigation of Short-Range Order in Binary Alloys and Its Effect on Percolation and Passivation:** *Abhinav Roy*<sup>1</sup>; Karl Sieradzki<sup>1</sup>; James Rondinelli<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

11:00 AM

**Role of Locally Ordered Noble Metallic Inclusions on Charged Species Transport and Oxide Growth:** *Adrien Couet*<sup>1</sup>; Junliang Liu<sup>1</sup>; Ximeng Wang<sup>1</sup>; Alex Kvit<sup>1</sup>; Andrew Tong<sup>1</sup>; Maryam Zahedian<sup>1</sup>; Ricardo Vidrio<sup>1</sup>; Jennifer Choy<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

## Magnesium Technology 2025 — Advanced Processing

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Thursday AM | March 27, 2025**  
**115 | MGM Grand**

**Session Chairs:** Jitka Straska, Charles University; Tracy Berman, University of Michigan

**8:30 AM Invited**

**Development of Magnesium Flat Products:** *Dietmar Letzig*<sup>1</sup>; Jose Victoria Hernandez<sup>2</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon

**9:00 AM**

**Microstructure and Alloy Design to Achieve Excellent Formability, Strength and Mechanical Anisotropy in Bake-Hardenable Magnesium Alloy Sheets:** Xuan Luo<sup>1</sup>; Isao Nakatsugawa<sup>2</sup>; *Taisuke Sasaki*<sup>1</sup>; Zehao Li<sup>3</sup>; Taiki Nakata<sup>3</sup>; Ming-Zhe Bian<sup>2</sup>; Yasumasa Chino<sup>2</sup>; Shigeharu Kamado<sup>3</sup>; Kazuhiro Hono<sup>1</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>National Institute of Advanced Industrial Science and Technology; <sup>3</sup>Nagaoka University of Technology

**9:20 AM**

**Improvement of Room Temperature Formability in Mg-Zn-Zr Alloy Sheet by Thermo-Mechanical Treatment:** Seoungyoun Yu<sup>1</sup>; Ying Ma<sup>1</sup>; *Young Min Kim*<sup>1</sup>; Sung Hyuk Park<sup>2</sup>; Byeong-Chan Suh<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science; <sup>2</sup>Kyungpook National University

**9:40 AM Break**

**10:00 AM Invited**

**Feasibility of a Circular Process to Manufacture High-Performance Mg Alloy Profiles by Extruding Recycled Chips From Machining Processes:** *Judit Medina*<sup>1</sup>; Gerardo Garces<sup>1</sup>; Pablo Pérez<sup>1</sup>; Paloma Adeva<sup>1</sup>; <sup>1</sup>CENIM-CSIC

**10:30 AM**

**Precipitate Strengthening Design Strategy for Mg-RE Alloy Manufactured by LPBF:** *Chengwei Zang*<sup>1</sup>; Dikai Guan<sup>1</sup>; <sup>1</sup>University of Southampton

**10:50 AM**

**WE43 Surface Composite With Oxide Particles by Friction Stir Processing:** Hamza Faisal Ghauri<sup>1</sup>; Vasanth Shunmugasamy<sup>2</sup>; *Bilal Mansoor*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Texas A&M University at Qatar

**11:10 AM**

**Spark Plasma Sintering of Mg and Mg Alloy Powders:** *Steven Johnson*<sup>1</sup>; Anita Ghodsi<sup>1</sup>; <sup>1</sup>Central Connecticut State University

**11:30 AM Concluding Comments**

## Materials and Chemistry for Molten Salt Systems — Molten Salt Chemistry and Advanced Structural/Chemical Measurement

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Thursday AM | March 27, 2025**  
**165 | MGM Grand**

**Session Chairs:** Weiyue Zhou, Massachusetts Institute of Technology; Stephen Raiman, University of Michigan

**8:30 AM**

**Methods for Online Quantification of U and Ln Fission Product Species Using UV-Vis-NIR Optical Spectroscopy:** Thomas Selmi<sup>1</sup>; Dev Chidambaram<sup>1</sup>; *Jeremy Moon*<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**8:50 AM**

**Optical Basicity Determination in Molten Chloride Salts:** *Kailee Buttice*<sup>1</sup>; Qiufeng Yang<sup>2</sup>; Ruchi Gakhar<sup>2</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison; <sup>2</sup>Idaho National Laboratory

**9:10 AM**

**Thermal Decomposition of Hydroxide Salts:** *Logan McIlwain*<sup>1</sup>; Amanda Leong<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

**9:30 AM**

**Tracking Chemical Evolution of Cr Ions in Molten LiCl-KCl Salts via In Situ X-Ray Absorption Spectroscopy:** *Yuxiang Peng*<sup>1</sup>; Ankita Mohanty<sup>1</sup>; Kaifeng Zheng<sup>1</sup>; Denis Leshchev<sup>2</sup>; Bobby Layne<sup>2</sup>; Ellie Kim<sup>3</sup>; Phillip Halstenberg<sup>3</sup>; Sheng Dai<sup>4</sup>; James F. Wishart<sup>2</sup>; Anatoly Frenkel<sup>1</sup>; Yu-Chen Karen Chen-Wiegart<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>University of Tennessee Knoxville; <sup>4</sup>Oak Ridge National Laboratory

**9:50 AM**

**Uranium Chlorination/Fluorination Using Exchange Reactions:** *Adam Burak*<sup>1</sup>; Mohammad Umar Farooq Khan<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan

**10:10 AM Break**

**10:30 AM**

**Structural and Thermochemical Investigations of Intermediate Compounds in the CsCl-UCl<sub>3</sub> and NaCl-CsCl-UCl<sub>3</sub> Systems:** *Aiswarya Padinhare Manissery*<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Hunter B Tisdale<sup>1</sup>; Hans-Conrad zur Loye<sup>2</sup>; Theodore M Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

**10:50 AM**

**Deposition of Surrogate Fuel in Static and Pumped Fluoride Salt Systems:** *Diego Macias*<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan

**11:10 AM**

**Separation of Fission Product Cesium From an Alkali Fluoride Matrix (CsF-LiF-KF-NaF) via Melt-Crystallization Technique:** *Maria Del Rocio Rodriguez Laguna*<sup>1</sup>; Kevin Tolman<sup>1</sup>; Jacob Yingling<sup>1</sup>; Tae-Sic Yoo<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

11:30 AM

**Understanding the Speciation of Molten Iodide Salts via Spectro-Electrochemistry:** *Stephanie Castro Baldovino*<sup>1</sup>; Alejandro Ramos Ballesteros<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; Gregory Holmbeck<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Materials for Sustainable Hydrogen Energy — Materials for Hydrogen Storage

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

**Thursday AM | March 27, 2025**  
**359 | MGM Grand**

**Session Chairs:** Jinwoo Kim, Korea Institute Of Science And Technology (Kist); Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Binhan Sun, East China University of Science and Technology

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#### 8:30 AM Introductory Comments

##### 8:35 AM Invited

**Assessing the Hydrogen Storage Performance of a Novel (Miniaturized) Metal-Hydride Bed System:** *Antonios Banos*<sup>1</sup>; Jacek Wasik<sup>1</sup>; Tom Scott<sup>1</sup>; <sup>1</sup>University of Bristol

##### 9:05 AM

**Ti-Fe-O Duplex Hydrogen Storage Alloys for Activation-Free Hydrogenation:** *Jinwoo Kim*<sup>1</sup>; Young-Chul Yoon<sup>1</sup>; Jaedong Kang<sup>1</sup>; Krishnamohan Thekkepat<sup>1</sup>; Seung-Cheol Lee<sup>1</sup>; Young-Su Lee<sup>1</sup>; Eun Soo Park<sup>2</sup>; <sup>1</sup>Korea Institute of Science and Technology (KIST); <sup>2</sup>Seoul National University

##### 9:25 AM

**Effect of MgH<sub>2</sub> on High Entropy Alloys for Energy Application:** *Modupeola Dada*<sup>1</sup>; Patricia Popoola<sup>1</sup>; *Philips Gbenedor*<sup>1</sup>; Lindokuhle Ntanz<sup>1</sup>; Rudolf Kayane<sup>1</sup>; <sup>1</sup>Tshwane University of Technology

##### 9:45 AM

**Decomposition and Decelerated Grain Growth of the Nanostructured High Entropy Alloy TiVZrNbHf Under Hydrogen:** *Lukas Schweiger*<sup>1</sup>; Felix Roemer<sup>1</sup>; Goekhan Gizer<sup>2</sup>; Michael Burtscher<sup>1</sup>; Daniel Kiener<sup>1</sup>; Claudio Pistidda<sup>2</sup>; Alexander Schoekel<sup>3</sup>; Florian Spieckermann<sup>1</sup>; Juergen Eckert<sup>4</sup>; <sup>1</sup>Montanuniversität Leoben; <sup>2</sup>Helmholtz-Zentrum Hereon GmbH; <sup>3</sup>Deutsches Elektronen-Synchrotron DESY; <sup>4</sup>Montanuniversität Leoben / Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

##### 10:05 AM Break

##### 10:20 AM

**Hydrogen Release Mechanism of MgH<sub>2</sub> Doped With Fe-Rich Additives:** *Oluwashina Gbenedor*<sup>1</sup>; Abimbola Popoola<sup>1</sup>; <sup>1</sup>Tshwane University of Technology

##### 10:40 AM

**Microstructure Impacts on H Uptake Kinetics in Polycrystalline Microstructures for Solid-State H Storage Materials:** *Younggil Song*<sup>1</sup>; Kyoung E. Kwon<sup>1</sup>; Nathan Keilbart<sup>1</sup>; Brandon Wood<sup>1</sup>; Tae Wook Heo<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

##### 11:00 AM

**Fe-W Foams as Energy Storage Materials:** *Ming Chen*<sup>1</sup>; Samuel Pennell<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

11:20 AM

**Density Functional Theory Study on the Influence of Solute Elements on the Efficiency of Mg<sub>2</sub>Ni Hydrogen Storage Alloys:** *Min-Seok Yoon*<sup>1</sup>; Won-Seok Ko<sup>1</sup>; <sup>1</sup>Inha University

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Thermodynamics and Rate Phenomena — Computational Modeling and Simulation of Materials Manufacturing

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Allie Anderson, RHI Magnesita; Adrian Sabau, Oak Ridge National Laboratory; Chukwunwike Iloeje, Argonne National Laboratory; Adamantia Lazou, National Technical University of Athens; Kayla Molnar, Los Alamos National Laboratory

**Thursday AM | March 27, 2025**  
**103 | MGM Grand**

**Session Chairs:** Allie Anderson, RHI Magnesita; Kayla Molnar, Los Alamos National Laboratory

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#### 8:30 AM Introductory Comments

##### 8:35 AM

**Predicting Blast Furnace Raceway Dynamics Using Coupled Computational Fluid Dynamics-Discrete Element Method:** *Ying-Hsuan Ko*<sup>1</sup>; Hernan Felipe Puentes Cantor<sup>1</sup>; Jian-Shiang Chen<sup>1</sup>; Wei-Jie Chen<sup>1</sup>; Hao-Chuan Huang<sup>1</sup>; Tsung-Yen Huang<sup>2</sup>; Chien-Hsiung Tsai<sup>3</sup>; *Te-Cheng Su*<sup>1</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>China Steel Corporation; <sup>3</sup>National Pingtung University of Science and Technology

##### 8:55 AM

**Modeling Dynamic Burden Behavior in a Secondary Lead Reverberatory Furnace Using Computational Fluid Dynamics:** *Nicholas Walla*<sup>1</sup>; Zachary Holmes<sup>1</sup>; Misbahuddin Syed<sup>1</sup>; Armin Silaen<sup>1</sup>; Jason Schirck<sup>2</sup>; Alexandra Anderson<sup>3</sup>; Joseph Trouba<sup>2</sup>; Joseph Grogan<sup>2</sup>; *Chenn Zhou*<sup>1</sup>; <sup>1</sup>Purdue University Northwest; <sup>2</sup>Gopher Resource; <sup>3</sup>RHI Magnesita

##### 9:15 AM

**Effect of Arc Transients on Flow in Vacuum Arc Remelting:** *Caleb Schrad*<sup>1</sup>; Matthew Krane<sup>1</sup>; <sup>1</sup>Purdue University

##### 9:35 AM

**Comparative Analysis of Commercial and Open-Source Software for Multiphase Flow Simulation in a Ladle Furnace Model:** *Mario Herrera-Ortega*<sup>1</sup>; *José Ángel Ramos-Banderas*<sup>1</sup>; Constantin Alberto Hernández-Bocanegra<sup>1</sup>; Alberto Beltrán<sup>2</sup>; Nancy Margarita López-Granados<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Nacional Autónoma de México

##### 9:55 AM Break

##### 10:15 AM

**Study of Transient Thermo-Fluid Model of Meniscus Behavior in Continuous Casting Mold by Navier-Stokes-Cahn-Hilliard Equation:** *Haihui Zhang*<sup>1</sup>; Chaobin Lai<sup>1</sup>; Zichao Wang<sup>2</sup>; <sup>1</sup>Jiangxi University of Science and Technology; <sup>2</sup>Central South University

##### 10:35 AM

**Role of Entropy and Langevin Friction in Dislocation Glide Mechanisms:** *Mohammad Nahavandian*<sup>1</sup>; Liam Myhill<sup>1</sup>; Enrique Martinez<sup>1</sup>; <sup>1</sup>Clemson University



10:55 AM

**Three Dimensional Effects in the Dendritic Growth Competition of Bi-Crystals:** *Peter Soar*<sup>1</sup>; Ivars Krastins<sup>1</sup>; Paul Brown<sup>2</sup>; Owen Draper<sup>2</sup>; Nick Green<sup>3</sup>; Andrew Kao<sup>1</sup>; <sup>1</sup>University of Greenwich; <sup>2</sup>Rolls Royce Plc; <sup>3</sup>High Temperature Research Centre, University of Birmingham

11:15 AM Concluding Comments

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## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Properties of Nanostructured Materials

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

Thursday AM | March 27, 2025  
160 | MGM Grand

**Session Chairs:** Eda Aydogan, Pacific Northwest National Laboratory; Kayla Yano, Pacific Northwest National Laboratory

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8:30 AM Invited

**Mechanical Behavior of Structural Materials With Radiation Resistant Microstructures:** *Thak Sang Byun*<sup>1</sup>; Maxim Gussev<sup>1</sup>; Timothy Lach<sup>1</sup>; Yan-Ru Lin<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:00 AM

**Anisotropic Mechanical Properties of a 14YWT Nanostructured Ferritic Alloy:** *Md Ershadul Alam*<sup>1</sup>; Stuart Maloy<sup>1</sup>; G Odette<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>University of California Santa Barbara

9:20 AM

**Effect of Neutron Irradiation on Microstructure and Mechanical Properties of Microcrystalline and Nanocrystalline Nickel:** *Ramprasad Prabhakaran*<sup>1</sup>; Kayla Yano<sup>1</sup>; Stuart Maloy<sup>1</sup>; Indrajit Charit<sup>2</sup>; KL Murty<sup>3</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>University of Idaho; <sup>3</sup>North Carolina State University

9:40 AM

**High Temperature Creep Behavior of Castable and Sintered Nanostructured Alloys Using the Nanoindentation Technique:** *Abhinav Sharma*<sup>1</sup>; Mingxi Ouyang<sup>1</sup>; Jason Trelewicz<sup>2</sup>; David Sprouster<sup>1</sup>; Lance Snead<sup>1</sup>; <sup>1</sup>Stony Brook University

10:00 AM

**Mesoscale Simulation of Mn-Ni Rich Precipitate Pinning of Dislocations in Reactor Pressure Vessel Steels:** *Ashley Foster*<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

10:20 AM Break

10:40 AM

**Enhancing Deformability of W-Based Refractory Multi-Principal Element Alloys Through Titanium Alloying:** *Ali Ozaip*<sup>1</sup>; Yunus Eren Kalay<sup>1</sup>; Osman El-Atwani<sup>2</sup>; Eda Aydogan<sup>2</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Pacific Northwest National Laboratory

11:00 AM

**Mechanical Performance of Thin Multilayer Coating Designs Developed for Various Advanced Reactors Applications:** *Sumit Bhattacharya*<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; Shipeng Shu<sup>1</sup>; Abdellatif Yacout<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

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## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Multilayers and Interfaces Engineered on Nano-Scale

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

Thursday AM | March 27, 2025  
369 | MGM Grand

**Session Chairs:** Alice Lassnig, Montanuniversitaet Leoben; Youxing Chen, University of North Carolina Charlotte

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8:30 AM

**Aperiodic Interface Spacing and Its Role in Multifunctional Ceramic Nanomultilayers:** *Danielle White*<sup>1</sup>; Koushik Jagadish<sup>1</sup>; Yu-Tsun Shao<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California

8:50 AM

**Micromechanics of Hybrid Ceramic-Organic Nanocomposites:** *Diletta Giuntini*<sup>1</sup>; <sup>1</sup>Eindhoven University of Technology

9:10 AM

**High Strength and Ductility in Metal Nanolaminates With Ultra-Thin Amorphous Ceramic Interfaces:** *Xavier Maeder*<sup>1</sup>; Amit Sharma<sup>1</sup>; Simon Tsianikas<sup>2</sup>; Tijmen Vermeij<sup>1</sup>; Vivek Devulapalli<sup>1</sup>; Chunhua Tian<sup>1</sup>; Johann Michler<sup>1</sup>; <sup>1</sup>Empa; <sup>2</sup>University of British Columbia

9:30 AM Invited

**Plasticity at the Crystalline Metal/Amorphous Oxide Interface in Al/Al<sub>2</sub>O<sub>3</sub> Nanolaminates:** *Thomas Edwards*<sup>1</sup>; <sup>1</sup>NIMS

10:00 AM Break

10:20 AM

**Combinatorial ALD/PVD Deposition of Ti/Ti<sub>2</sub>AlC Metal/MAX Multilayered Nanolaminates and Investigating Their Mechanical Properties and Deformation Mechanisms:** *Skye Supakul*<sup>1</sup>; *Sid Pathak*<sup>2</sup>; Garritt Tucker<sup>2</sup>; Kevin Jacob<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Baylor University

10:40 AM

**Confined Layer Slip Process in Ag/Cu Nanolaminates: An Atomistic Study:** *Mahshad Fani*<sup>1</sup>; Luis Cervantes<sup>1</sup>; Anshu Raj<sup>1</sup>; Shuozi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma

11:00 AM Invited

**Atomistic Analysis of the Effect of Thick Interfaces on the Deformation in Metallic Nanolayered Composites:** *Caizhi Zhou*<sup>1</sup>; Shujing Dong<sup>1</sup>; Youxing Chen<sup>2</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>University of North Carolina at Charlotte

## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Plastic Deformation and Fracture

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

**Thursday AM | March 27, 2025**  
**366 | MGM Grand**

**Session Chairs:** Minh-Son Pham, Imperial College London; Dongchan Jang, Korea Advanced Institute of Science and Technology

#### 8:30 AM Invited

**Per-Grain Behaviour in a Duplex-Steel During Stress Induced Phase Transformations:** James Ball<sup>1</sup>; *David Collins*<sup>2</sup>; <sup>1</sup>European Synchrotron Radiation Facility (ESRF); <sup>2</sup>University of Cambridge

#### 9:00 AM

**A Virtual Framework to Model the Microstructural Evolution in Laser-Direct-Drive Experiments:** *Andrew Shortridge*<sup>1</sup>; Ching Chen<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

#### 9:20 AM

**Automated DIC-Based Local Identification of Various Nanoscale Plastic Deformation Mechanisms in HCP:** *Tijmen Vermeij*<sup>1</sup>; Gert-Jan Slockers<sup>2</sup>; Casper Mornout<sup>2</sup>; Dennis König<sup>2</sup>; Johan Hoefnagels<sup>2</sup>; <sup>1</sup>EMPA; <sup>2</sup>Eindhoven University of Technology

#### 9:40 AM

**Examination of Deformation Rate Effects Using Profilometry-Based Indentation Plastometry:** *Shiraz Mujahid*<sup>1</sup>; Dawn Van Iderstine<sup>1</sup>; Hongjoo Rhee<sup>1</sup>; <sup>1</sup>Mississippi State University

#### 10:00 AM Break

#### 10:20 AM Invited

**In-Situ TEM Study on Toughening Mechanisms in Metal-Graphene Nanolayered Composites:** *Seung Min Han*<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

#### 10:50 AM

**Real-Time Sub-Microscopic Observation and Atomic Simulation of Deformation-Induced Martensitic Transformation at Grain Boundaries:** *Jesada Punyafu*<sup>1</sup>; Tomotsugu Shimokawa<sup>2</sup>; Myeong-Heom Park<sup>3</sup>; Nobuhiro Tsuji<sup>3</sup>; Mitsuhiro Murayama<sup>4</sup>; <sup>1</sup>Kyushu University; <sup>2</sup>Kanazawa University; <sup>3</sup>Kyoto University; <sup>4</sup>Virginia Tech

## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Metallic Alloys II

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusioneering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

**Thursday AM | March 27, 2025**  
**158 | MGM Grand**

**Session Chairs:** Sneha Prabha Narra, Carnegie Mellon University; Kun Wang, Alfred University

#### 8:30 AM Keynote

**Shrinking Pains — Materials Challenges in a More Compact Fusion Device:** *Emre Yildirim*<sup>1</sup>; Sandeep Irukuvarghula<sup>1</sup>; Samara Levine<sup>1</sup>; Chris Moore<sup>2</sup>; Arunodaya Bhattacharya<sup>3</sup>; Jim Pickles<sup>1</sup>; Chris Wilson; Jonathan Naish; Gurdeep Kamal; <sup>1</sup>Tokamak Energy; <sup>2</sup>Bangor University; <sup>3</sup>University of Birmingham

#### 9:00 AM Invited

**Progress and Issues of R&D on Fusion DEMO Structural Materials in Japan:** *Takashi Nozawa*<sup>1</sup>; Motoki Nakajima<sup>2</sup>; Dai Hamaguchi<sup>1</sup>; Taichiro Kato<sup>4</sup>; Yasuhiro Aoki<sup>2</sup>; Hidetoshi Fujii<sup>2</sup>; Yoshiyuki Watanabe<sup>1</sup>; Masami Ando<sup>1</sup>; Hiroyasu Tanigawa<sup>1</sup>; <sup>1</sup>National Institutes for Quantum Science and Technology; <sup>2</sup>Osaka University

#### 9:30 AM

**Design Strategy of PWHT-Free Reduced-Activation Bainitic Steel for Vacuum Vessel Components in Fusion Reactors:** *Yukinori Yamamoto*<sup>1</sup>; Tim Graening Seibert<sup>1</sup>; Roger Miller<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 9:50 AM

**Exploration of Ferrous Alloys as Radiation Damage Resistant Materials for Fusion:** *Sophie Barwick*<sup>1</sup>; Jack Haley<sup>2</sup>; Amy Gandy<sup>2</sup>; Christopher Race<sup>1</sup>; Katerina Christofidou<sup>1</sup>; Russell Goodall<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>United Kingdom Atomic Energy Authority

#### 10:10 AM Break

#### 10:30 AM

**Modeling of Dislocation Loop Evolution in Iron Through Kinetic Monte Carlo:** *Anthony Tom*<sup>1</sup>; Dwaipayan Dasgupta<sup>1</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

#### 10:50 AM

**Fracture Toughness of F82H Steel After Neutron Irradiation to ~70 dpa at 400°C and 500°C:** *Xiang (Frank) Chen*<sup>1</sup>; Mikhail Sokolov<sup>1</sup>; Takashi Nozawa<sup>2</sup>; Masami Ando<sup>2</sup>; Dai Hamaguchi<sup>2</sup>; Josina Geringer<sup>1</sup>; Hiroyasu Tanigawa<sup>2</sup>; Yutai Katoh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>National Institutes for Quantum Science and Technology

#### 11:10 AM

**Enhanced Radiation Resistance of W-Based HEA Under Helium-Ion Irradiation Conditions:** *Kun Wang*<sup>1</sup>; Shijun Zhao<sup>2</sup>; Di Chen<sup>3</sup>; Kevin Woller<sup>4</sup>; <sup>1</sup>Alfred University; <sup>2</sup>City University of Hong Kong; <sup>3</sup>Idaho National Lab; <sup>4</sup>MIT

#### 11:30 AM

**Tungsten-Based WTaVCr Refractory High Entropy Alloys for Fusion Energy Applications:** *Bai Cui*<sup>1</sup>; Yongchul Yoo<sup>1</sup>; Xiang Zhang<sup>1</sup>; Fei Wang<sup>1</sup>; Xin Chen<sup>1</sup>; Xing-Zhong Li<sup>1</sup>; Michael Nastasi<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>Texas A&M University

## NUCLEAR MATERIALS

### Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Next-Generation Fuels III: Metallic Fuels

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Thursday AM | March 27, 2025**  
**159 | MGM Grand**

**Session Chair:** Yi Xie, Peking University

#### 8:30 AM Invited

**Multiscale Fuel Performance Modeling of U-Mo Fuel for Research Reactors:** *Benjamin Beeler*<sup>1</sup>; Bei Ye<sup>2</sup>; Shenyang Hu<sup>3</sup>; Yongfeng Zhang<sup>4</sup>; Maria Okuniewski<sup>5</sup>; ATM Jahid Hasan<sup>1</sup>; Shipeng Shu<sup>2</sup>; Gyuchul Park<sup>2</sup>; Zhi-Gang Mei<sup>2</sup>; Sourabh Kadambi<sup>6</sup>; Linu Malakkal<sup>6</sup>; Larry Aagesen<sup>6</sup>; Ziang Yu<sup>4</sup>; Ziri Mao<sup>3</sup>; Sukanya Majumder<sup>5</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>University of Wisconsin; <sup>5</sup>Purdue University; <sup>6</sup>Idaho National Laboratory

#### 9:00 AM

**Computational Studies of Radiation Induced Segregation in Metallic Alloys:** *Yitao Wang*<sup>1</sup>; Jacob Jeffries<sup>2</sup>; Marie Thomas<sup>3</sup>; Daniele Offidani<sup>4</sup>; Suveen Mathaudhu<sup>3</sup>; Emmanuelle Marquis<sup>4</sup>; Enrique Martinez<sup>2</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University; <sup>2</sup>Clemson University; <sup>3</sup>Colorado School of Mines; <sup>4</sup>University of Michigan

#### 9:20 AM

**Examining Constituent Redistribution in U-19Pu-10Zr Fuel as it Evolves with Local Burnup:** *Allison Probert*<sup>1</sup>; Jason Schulthess<sup>2</sup>; Luca Capriotti<sup>2</sup>; Tiankai Yao<sup>2</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

#### 9:40 AM

**Impact of Short-Range Order on Thermodynamic Properties of Point Defects in UMo Fuels:** *Ziang Yu*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; Benjamin Beeler<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>North Carolina State University

#### 10:00 AM Break

#### 10:20 AM

**Phase Evolution of Neutron-Irradiated U-Mo Alloys at Low Temperature in the Low-Fluence Regime:** *Sukanya Majumder*<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Mehmet Topsakal<sup>2</sup>; Gyuchul Park<sup>3</sup>; Benjamin Beeler<sup>4</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>North Carolina State University

#### 10:40 AM

**Correlation of Thermal Properties with Local Microstructure of Irradiated Sodium-Bonded U-Zr Metallic Fuel:** *Cynthia Adkins*<sup>1</sup>; Ethan Hisle<sup>1</sup>; Narayan Poudel<sup>1</sup>; Tsvetoslav Pavlov<sup>1</sup>; Luca Capriotti<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

#### 11:00 AM

**Nanostructured U-Mo Based Metallic Fuels for Fast Reactors – Electronic Structure Calculations and Machine Learning:** *Yizhou Lu*<sup>1</sup>; *Samrat Choudhury*<sup>1</sup>; <sup>1</sup>University of Mississippi

## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing — Inorganic Materials: Mechanical and Functional Properties

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Electronic Packaging and Interconnection Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Alain Reiser, KTH Royal Institute of Technology; Wendy Gu, Stanford University; Yu Zou, University of Toronto; Mostafa Hassani, Cornell University; Ming Chen, University of Nevada, Reno

**Thursday AM | March 27, 2025**  
**316 | MGM Grand**

**Session Chairs:** Ming Chen, Northwestern University; Alain Reiser, KTH Royal Institute of Technology

#### 8:30 AM Introductory Comments

#### 8:35 AM Invited

**Nanoscale Focused Electron and Ion Beam Induced Processing: Extending 3d Printing to the Nanoscale:** *Philip Rack*<sup>1</sup>; <sup>1</sup>University of Tennessee

#### 9:05 AM

**Advancing Meniscus-Confined Electrodeposition Towards Higher Speed, Resolution, and Complexity in Small Scale Additive Manufacturing of Metals:** *Simon Sprengel*<sup>1</sup>; Dmitry Momotenko<sup>1</sup>; <sup>1</sup>Carl von Ossietzky University

#### 9:25 AM

**The Curious Case of Ni-P-O: Insights for Unusual Materials Printing at the Nanoscale:** *Rebecca Gallivan*<sup>1</sup>; Tingyi Wang<sup>1</sup>; Yuan Gao<sup>1</sup>; Arthur Barras<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

#### 9:45 AM

**Mechanical and Microstructural Analysis of Aerosol Jet 3D Printed Gold Micropillars and Their Application in Brain Computer Interface:** *Sanjida Jahan*<sup>1</sup>; Chunshan Hu<sup>1</sup>; Bin Yuan<sup>1</sup>; *Rahul Panat*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 10:05 AM Break

#### 10:25 AM Invited

**From 2D to 3D Electrochemical Microfabrication of Copper and Nickel Based Materials: Synthesis, Microstructure and Mechanical Properties Under Extreme Loading:** *Killang Pratama*<sup>1</sup>; Patrik Schürch<sup>2</sup>; Jakob Schwiedrzik<sup>1</sup>; Manish Jain<sup>1</sup>; Chunhua Tian<sup>1</sup>; Rajaprakash Ramachandramoorthy<sup>1</sup>; Wabe W. Koelmans<sup>2</sup>; Johann Michler<sup>1</sup>; *Xavier Maeder*<sup>1</sup>; <sup>1</sup>Empa; <sup>2</sup>Exaddon

#### 10:55 AM

**Electrochemical 3D Printing of Sn Microstructures as Future Anodes for High-Power Lithium Ion Batteries:** *Weishan Wu*<sup>1</sup>; Dmitry Momotenko<sup>1</sup>; <sup>1</sup>Carl von Ossietzky Universität Oldenburg

#### 11:15 AM

**Mechanics of Cracking and Delamination of 3D-Printed Metallic Films for Printed Microelectronics:** *Chunshan Hu*<sup>1</sup>; Sanjida Jahan<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

#### 11:35 AM

**Mechanical Properties of Nanoporous Silver: Electrohydrodynamic-Redox Printing vs. PVD Sputtering:** *Nikolaus Porenta*<sup>1</sup>; Rebecca Gallivan<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

## ADVANCED CHARACTERIZATION METHODS

### Neutron and X-Ray Scattering in Materials Science and Engineering — Characterization of Manufactured Materials

**Sponsored by:** TMS Functional Materials Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Michael Manley, Oak Ridge National Laboratory; Chen Li, University of California-Riverside; Hillary Smith, Swarthmore College; Jennifer Niedziela, Oak Ridge National Laboratory

**Thursday AM | March 27, 2025**  
**156 | MGM Grand**

**Session Chair:** Chen Li, University of California-Riverside

**8:30 AM Invited**

**In-Situ Characterization of Phase Transformation Dynamics in Fusion-Based Metal Additive Manufacturing Processes by High-Speed X-Ray Diffraction:** *Lianyi Chen*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**9:00 AM**

**The Use of Neutron Diffraction for the Understanding of Additive Manufacturing Process of Magnesium Alloys:** *Borja Pillado*<sup>1</sup>; *Gerardo Garces*<sup>2</sup>; *Sandra Cabeza*<sup>3</sup>; *Inés Puente-Orench*<sup>3</sup>; <sup>1</sup>ILL; <sup>2</sup>Cenim-Csic; <sup>3</sup>CSIC-Universidad de Zaragoza

**9:20 AM**

**Operando X-Ray and Neutron Diffraction and Imaging During Laser Powder Bed Fusion:** *Steven Van Petegem*<sup>1</sup>; <sup>1</sup>Paul Scherrer Institut

**9:40 AM**

**Measurement of Residual Stress in Additively Manufactured Ti-6Al-4V & Ti-6Al-2Sn-4Zr-6Mo Walls Using Neutron Diffraction:** *Rajib Halder*<sup>1</sup>; *Samuel Lim*<sup>2</sup>; *Louis Chiu*<sup>2</sup>; *Aijun Huang*<sup>2</sup>; *Ke An*<sup>3</sup>; *Anthony Rollett*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Monash University; <sup>3</sup>Oak Ridge National Laboratory

**10:00 AM Break**

**10:10 AM Invited**

**HIPPO Meets ERNI & BERT – Upgrading a Neutron Diffractometer with an Energy-Resolved Neutron Imaging Detector:** *Sven Vogel*<sup>1</sup>; *Alexander M. Long*<sup>1</sup>; *Adrian S. Losko*<sup>2</sup>; *Tsviki Y. Hirsh*<sup>3</sup>; *Andrew F.T. Leong*<sup>1</sup>; *Daniel J. Savage*<sup>1</sup>; *John Rakovan*<sup>4</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Technical University Munich/FRM-2; <sup>3</sup>Soreq NRC; <sup>4</sup>New Mexico Bureau of Geology & Mineral Resources

**10:40 AM**

**Mapping of the Local Residual Stress in 316L Stainless Steel Processed by Laser Powder Bed Fusion:** *Tianyi Lyu*<sup>1</sup>; *Renfei Feng*<sup>2</sup>; *Changjun Cheng*<sup>1</sup>; *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto; <sup>2</sup>Canadian Light Source

**11:00 AM**

**Effects of Cooling Rates on Residual Stress Evolution Quantified via Neutron Diffraction in Lubricant-Free, Solid-State Repaired AA7075:** *Ning Zhu*<sup>1</sup>; *Ryan Kinser*<sup>1</sup>; *Jacob Strain*<sup>2</sup>; *Luke Brewer*<sup>2</sup>; *Paul Allison*<sup>1</sup>; *Brian Jordon*<sup>1</sup>; <sup>1</sup>Baylor University; <sup>2</sup>The University of Alabama

## ADVANCED CHARACTERIZATION METHODS

### Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques — High Throughput Testing & Materials Discovery Workflows

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory; Austin McDannald, National Institute of Standards and Technology; Fan Zhang, National Institute of Standards and Technology; Sarshad Rommel, University of Connecticut

**Thursday AM | March 27, 2025**  
**157 | MGM Grand**

**Session Chairs:** Rakesh Kamath, Argonne National Laboratory; Sarshad Rommel, University of Connecticut

**8:30 AM**

**Optimizing Nanoindentation Methods for the High Throughput Study of Combinatorial Thin Film Libraries:** *Andre Bohn*<sup>1</sup>; *Adie Alwen*<sup>1</sup>; *Andrea Hodge*<sup>1</sup>; <sup>1</sup>University of Southern California

**8:50 AM Invited**

**Rapid Synthesis, Characterization and Mechanical Testing of Novel Printable Alloys Via Functional Grading in Additive Manufacturing:** *Marie Charpagne*<sup>1</sup>; *Jean-Charles Stinville*<sup>1</sup>; <sup>1</sup>University of Illinois

**9:15 AM**

**High-Throughput Synthesis and Rapid Characterization of Cu and Cu-Ti Alloys:** *Rohit Berlia*<sup>1</sup>; *Piyush Wanchoo*<sup>1</sup>; *Michael Wall*<sup>1</sup>; *Todd Hufnagel*<sup>1</sup>; *K T. Ramesh*<sup>1</sup>; *Timothy Weihs*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**9:35 AM**

**Towards Accelerated Material Characterization: Uncertainty Quantification in Elemental Analysis:** *Jarred Fountain*<sup>1</sup>; *Aaron Stebner*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**9:55 AM Break**

**10:15 AM**

**Overview of Machine Learning in Low-Latency Automated Data Analysis for In-Situ Synchrotron X-Ray Diffraction in Metals and Alloys:** *Tingkun Liu*<sup>1</sup>; *Vinay Amatya*<sup>1</sup>; *Venkata B Vukkum*<sup>1</sup>; *Arun Devaraj*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:35 AM**

**Challenges and Opportunities for Rapid EXAFS Analysis of Short-Range Order in HEAs:** *Howard Joress*<sup>1</sup>; *Elaf Anber*<sup>2</sup>; *Emily Holcombe*<sup>2</sup>; *Jonathan Hollenbach*<sup>2</sup>; *Austin McDannald*<sup>1</sup>; *Georgia Leigh*<sup>2</sup>; *Jason Hattrick-Simpers*<sup>3</sup>; *Bruce Ravel*<sup>1</sup>; *Mitra Taheri*<sup>2</sup>; *Brian DeCost*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Johns Hopkins University; <sup>3</sup>University of Toronto

**10:55 AM**

**Accelerated Discovery of Nanostructured High-Entropy Alloys With Superior Thermal Stability:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto

**11:15 AM**

**High-Throughput Quantitative Texture Imaging Using Wide-Field Laser Polarized-Light Microscope:** *Brian Hoover*<sup>1</sup>; *Cesar Ornelas-Rascon*<sup>1</sup>; <sup>1</sup>Advanced Optical Technologies, Inc.



## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Deformation and Heat Treatments

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

**Thursday AM | March 27, 2025**  
**167 | MGM Grand**

**Session Chairs:** Klaus-Dieter Liss, University of Tennessee, Knoxville; Sriram Vijayan, Michigan Technological University

**8:30 AM**

**Synchrotron X-Ray Diffraction Monitoring of the Microstructural Evolution of a Zirconium Alloy During Complex Thermal Cycles:** *Thibault Chommaux*<sup>1</sup>; Romain Borrossi<sup>2</sup>; Raphaëlle Guillou<sup>1</sup>; <sup>1</sup>Université Paris-Saclay, CEA; <sup>2</sup>Framatome

**8:50 AM**

**The Role of Mechanical Loading in bcc-hcp Phase Transition Tension-Compression Asymmetry and Twin Formation:** *Mehrab Lotfpoor*<sup>1</sup>; Lei Cao<sup>1</sup>; Amir Hassan Zahiri<sup>1</sup>; Jamie Ombogo<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**9:10 AM**

**Phase Transformations in Ultrafine-Grained Ti15Mo Alloy Prepared by Severe Plastic Deformation:** *Milos Janecek*<sup>1</sup>; Kristina Bartha<sup>1</sup>; Anna Veverková<sup>1</sup>; Jozef Vesely<sup>1</sup>; Pere Barriobero-Vila<sup>2</sup>; <sup>1</sup>Charles University; <sup>2</sup>University of Catalonia · BarcelonaTech

**9:30 AM**

**Semi In-Situ Observations on Stress-Induced Martensite in Metastable Beta Titanium Alloy:** *Ying-Chun Chao*<sup>1</sup>; Hung-Wei Yen<sup>1</sup>; <sup>1</sup>National Taiwan University

**9:50 AM Break**

**10:05 AM**

**Recent Applications of PRISMS-PF for Phase-Field Simulations of Microstructure Evolution:** *David Montiel*<sup>1</sup>; Supriyo Chakraborty<sup>1</sup>; Jason Landini<sup>1</sup>; William Andrews<sup>1</sup>; Alexander Mensah<sup>1</sup>; Tracy Berman<sup>1</sup>; Brian Puchala<sup>1</sup>; Anton Van der Ven<sup>2</sup>; John Allison<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

**10:25 AM**

**In-Situ Study of Bulk Hetero-Nanostructured Copper During Heating Using Mono- and Polychromatic Synchrotron X-Ray Diffraction:** *Isshu Lee*<sup>1</sup>; Laxman Bhatta<sup>1</sup>; Jae-Kyung Han<sup>1</sup>; Nobumichi Tamura<sup>2</sup>; Malte Blankenburg<sup>3</sup>; Klaus-Dieter Liss<sup>4</sup>; Megumi Kawasaki<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Lawrence Berkeley National Laboratory; <sup>3</sup>Deutsches Elektronen-Synchrotron; <sup>4</sup>University of Tennessee

**10:45 AM**

**Evaluation of Austenite Conditioning and Decomposition in Steels with Laser Ultrasonics:** *Minghui Lin*<sup>1</sup>; Matthias Militzer<sup>1</sup>; <sup>1</sup>University of British Columbia

**11:05 AM**

**Effects of Current-Assisted Treatment on the Microstructure, Mechanical Property, and Corrosion Behavior of Cu-8 wt% Sn Alloys in a Chloride Environment:** *Chih-An Wu*<sup>1</sup>; Meng-Chun Chiu<sup>1</sup>; Jau-Chi Chen<sup>1</sup>; Yung-Hua Chen<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**11:25 AM**

**Influence of Ni on the Austenitic Deformation Mechanism of Model Fe-Cr-Ni Alloys Studied Using in Situ Synchrotron X-Ray Diffraction, Electron Microscopy, Density Functional Theory and Thermodynamic Linear-Response Theory:** *Tingkun Liu*<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Cheng-Han Li<sup>1</sup>; Tianyi Li<sup>2</sup>; Yang Ren<sup>2</sup>; Prashant Singh<sup>3</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Ames National Laboratory

## BIOMATERIALS

### Porous Materials for Biomedical Applications — Porous Materials for Biomedical Applications I

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Usman Liaqat, National University of Sciences and Technology; Waheed Miran, National University of Sciences and Technology; Khurram Yaqoob, National University of Sciences and Technology; Xizi Long, University of South China

**Thursday AM | March 27, 2025**  
**306 | MGM Grand**

**Session Chair:** Adele Carradò, University of Strasbourg, CNRS IPCMS

**8:30 AM Introductory Comments**

**8:40 AM Invited**

**Scalable Functionalization of Liposomes via a Membrane Lipid Exchange Process:** *Xizi Long*<sup>1</sup>; Chiho Kataoka-Hamai<sup>1</sup>; Chialun Ho<sup>1</sup>; Wei-Lun Huang<sup>1</sup>; Yi-Ho Kuo<sup>1</sup>; Li-Ting Yang<sup>1</sup>; Wei-Peng Li<sup>1</sup>; Akihiro Okamoto<sup>1</sup>; <sup>1</sup>University of South China

**9:05 AM**

**Synthesis of Graphene Oxide GO@Au Nanosheets for Efficient Proliferation and Differentiation of Adipose-Derived Mesenchymal Stem Cells:** *Ali Mohsin*<sup>1</sup>; <sup>1</sup>East China University of Science and Technology State Key Laboratory of Bioreactor Engineering

**9:30 AM**

**Gravity and Centrifugal Casting and Characterization of Composed As-Cast Foam From Biodegradable ZnMg1.5 Alloy and NaCl Salt:** *Primoz Mrvar*<sup>1</sup>; Heinz Palkowski<sup>2</sup>; Mitja Petrič<sup>2</sup>; Adele Carradò<sup>3</sup>; Sebastijan Kastelic<sup>1</sup>; <sup>1</sup>University of Ljubljana; <sup>2</sup>Institute of Metallurgy, Clausthal University of Technology; <sup>3</sup>University of Ljubljana; <sup>4</sup>University of Strasbourg, IPCMS CNRS

**9:55 AM Break**

**10:15 AM**

**Forming of Open-Structured Zn1.5Mg Alloys to be Filled with Polymers for Absorbable Tissues:** *Heinz Palkowski*<sup>1</sup>; Mitja Petrič<sup>2</sup>; Matteo Caranchini<sup>3</sup>; Valeria Vistoso<sup>4</sup>; Primoz Mrvar<sup>2</sup>; Adele Carradò<sup>4</sup>; <sup>1</sup>Clausthal University of Technology; <sup>2</sup>University of Ljubljana; <sup>3</sup>Polimi; <sup>4</sup>University of Strasbourg, CNRS IPCMS

**10:40 AM**

**Plasma Electrolytic Oxidation Coated Porous Zinc-Magnesium Alloys for Biodegradable Implants:** *Jessica Salinas*<sup>1</sup>; Nafiseh Mollae<sup>2</sup>; Mónica Echeverry-Rendón<sup>2</sup>; *Carl Boehlert*<sup>1</sup>; <sup>1</sup>Michigan State University; <sup>2</sup>IMDEA Materials Institute

**11:05 AM Concluding Comments**

## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Synthesis II: New Material Developments

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

**Thursday AM | March 27, 2025**  
**105 | MGM Grand**

**Session Chair:** Jose Torralba, Universidad Carlos III Madrid

**8:30 AM**

**Development of Functionally Graded Al Metal Matrix Layered Hybrid Composite Reinforced with CNT, Y<sub>2</sub>O<sub>3</sub> & SiC Through PM Route:** *Rajat Gupta*<sup>1</sup>; Kausik Chattopadhyay<sup>1</sup>; Nilay Krishna Mukhopadhyay<sup>1</sup>; <sup>1</sup>India Institute of Technology BHU

**8:50 AM**

**Influence of Manufacturing Processes on the Microstructure and Properties of High-Entropy Alloys for Advanced Applications:** *Paula Alvaredo*<sup>1</sup>; R Carbajales<sup>1</sup>; D Guerrero<sup>1</sup>; Jose Torralba<sup>2</sup>; Monica Campos<sup>1</sup>; <sup>1</sup>Universidad Carlos III de Madrid; <sup>2</sup>Universidad Carlos III de Madrid and IMDEA Materials Institute

**9:10 AM Invited**

**Developing PM High Entropy Alloys to be Used in Extreme Conditions: High Temperature, Corrosion and Hydrogen Embrittlement:** *Jose Torralba*<sup>1</sup>; Monica Campos<sup>1</sup>; Paula Alvaredo<sup>1</sup>; Alberto Meza<sup>1</sup>; Lucia Garcia de la Cruz<sup>1</sup>; Maria de Nicolas-Morillas<sup>1</sup>; S. Venkatesh Kumaran<sup>1</sup>; Rita Carbajales<sup>1</sup>; Daniel Guerrero<sup>1</sup>; <sup>1</sup>Universidad Carlos III Madrid

**9:40 AM**

**Analysis of Defects and Testing of Tungsten Heavy Alloys:** *Jessica Buckner*<sup>1</sup>; John Laing<sup>1</sup>; Mark Reece<sup>1</sup>; Zahra Ghanbari<sup>1</sup>; Don Susan<sup>1</sup>; Juan Duran<sup>1</sup>; David Weiss<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:00 AM**

**Boosting Mechanical and Tribological Properties in Multi-Walled Carbon Nanotube Reinforced Inconel 718 Fabricated by High-Energy Ball Milling and Spark Plasma Sintering:** *Sanoj Karki*<sup>1</sup>; Satyavan Digole<sup>1</sup>; Manoj Mugale<sup>1</sup>; Amit Choudhari<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

**10:20 AM Break**

**10:30 AM Invited**

**Self-Assembled Silica Colloids as Lightweight and Tough Composites:** *Florian Bouville*<sup>1</sup>; <sup>1</sup>Imperial College London

**11:00 AM**

**Understanding Powder Consolidation Processes with Compaction Experiments and Coordinated Modeling:** *Daniel Bufford*<sup>1</sup>; Joseph Monti<sup>1</sup>; Stewart Youngblood<sup>1</sup>; Marlene Barela<sup>1</sup>; William Erikson<sup>1</sup>; Dan Bolintineanu<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**11:20 AM**

**Metallurgical Evaluation of Near-Canister Degradation of Charpy Toughness Observed in Low Alloy Steel Billets Produced by PM-HIP:** *Bryan Miller*<sup>1</sup>; Eric Sload<sup>1</sup>; Terrance Nolan<sup>1</sup>; Colin Ridgeway<sup>1</sup>; <sup>1</sup>Naval Nuclear Laboratory

**11:40 AM**

**Influence of Heat Treatments on Ni-Based Superalloy Densified by Spark Plasma Sintering : Evolution of PPBs and Grain Boundaries Overlap:** *Remi Lebot*<sup>1</sup>; Emmanuel Saly<sup>1</sup>; Gautier Huser<sup>1</sup>; Pierre Sallot<sup>1</sup>; Patrick Villechaise<sup>2</sup>; Jonathan Cormier<sup>2</sup>; <sup>1</sup>Safran Tech; <sup>2</sup>Institut Pprime

## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Recycling

**Sponsored by:** TMS Extraction and Processing Division, TMS: Hydrometallurgy and Electrometallurgy Committee

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; Athanasios Karamalidis, Pennsylvania State University; Takanari Ouchi, University of Tokyo; Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong Peng, University of Queensland; Hojong Kim, Pennsylvania State University

**Thursday AM | March 27, 2025**  
**104 | MGM Grand**

**Session Chairs:** Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hojong Kim, Pennsylvania State University

**8:30 AM**

**Recovery of Manganese Sulfate from Acidic Solutions Using Eutectic Freeze Crystallization:** *Mohammadreza Akbarkermani*<sup>1</sup>; Michael Svärd<sup>1</sup>; Kerstin Forsberg<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**8:50 AM**

**Assessment of Metallic Elements as Reductants in the Processing of Licoo<sub>2</sub> (LCO): Comparison Between Aqueous Leaching Using H<sub>2</sub>SO<sub>4</sub> and Solvleaching Using Acidic Organic Extractants:** *Kurniawan Kurniawan*<sup>1</sup>; Mooki Bae<sup>2</sup>; Sookyung Kim<sup>2</sup>; <sup>1</sup>Korea University of Science and Technology; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources (KIGAM)

**9:10 AM**

**Recovery of Rhenium from Superalloy Swarf, Grindings, Turnings, and Scrap:** *Morgan Simco*<sup>1</sup>; Richard Bradshaw<sup>1</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**9:30 AM**

**Recycling of Strategic Metals from Spent Hydro-Desulphurization Catalysts Using Microbial Activities:** *Sadia Ilyas*<sup>1</sup>; Rajiv Srivastava<sup>2</sup>; <sup>1</sup>Luleå University of Technology; <sup>2</sup>Duy Tan University

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## MATERIALS SYNTHESIS AND PROCESSING

### Recent Advances in Titanium Science and Technology: MPMD/SMD Symposium Honoring Professor Dipankar Banerjee — Microstructure Design in Structural Materials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Phase Transformations Committee, TMS: Titanium Committee

**Program Organizers:** Yufeng Zheng, University of North Texas; Abhishek Sharma, University of North Texas; Adam Pilchak, Pratt & Whitney; Rajarshi Banerjee, University of North Texas; Yunzhi Wang, Ohio State University

**Thursday AM | March 27, 2025**  
**107 | MGM Grand**

**Session Chairs:** Hamish Fraser, Ohio State University; Rajarshi Banerjee, University of North Texas

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#### 8:30 AM Invited

**Titanium Alloys Modified with Boron:** *Daniel Miracle*<sup>1</sup>; Sesh Tamirisakandala<sup>2</sup>; Stéphane Gorsse<sup>3</sup>; <sup>1</sup>Air Force Research Laboratory; <sup>2</sup>MRL Materials Resources LLC; <sup>3</sup>University of Bordeaux, CNRS

#### 9:00 AM Invited

**An Approach to Developing High Strength Eutectic Alloys by Ternary Additions:** *Kamano Chattopadhyay*<sup>1</sup>; <sup>1</sup>Indian Institute of Science

#### 9:30 AM Invited

**Eutectics to Single Crystals: Fundamentals to Applications:** Swapnil Bhure<sup>1</sup>; Divya Nalajala<sup>1</sup>; Aramanda Shanmukha Kiran<sup>1</sup>; Sumeet Rajesh Khanna<sup>1</sup>; *Abhik Choudhury*<sup>1</sup>; <sup>1</sup>Indian Institute of Science, Bangalore

#### 10:00 AM Break

#### 10:20 AM Invited

**Determination of Deformation Mechanisms in Refractory Compositionally Complex Alloys:** Gopal Viswanathan<sup>1</sup>; Zachary Kloenne<sup>2</sup>; Brian Welk<sup>1</sup>; Jean-Philippe Couzinié<sup>3</sup>; *Hamish Fraser*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Imperial College; <sup>3</sup>University Paris-Est Creteil (UPEC)

#### 10:50 AM Invited

**Unraveling the Complexities of Room Temperature Creep in Titanium Alloys Through Cantilever Bending: Anisotropy, Tension-Compression Asymmetry and Microtextured Regions:** *Vikram Jayaram*<sup>1</sup>; <sup>1</sup>Indian Institute of Science

#### 11:20 AM Invited

**Structure and Mobility of Deformation Twin Boundaries in Ferroelastic Crystals:** Yuchi Wang<sup>1</sup>; Hao Tang<sup>2</sup>; Ju Li<sup>2</sup>; *Yunzhi Wang*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>MIT

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## LIGHT METALS

### Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2025 — Sustainable Melting and Casting Technology

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

**Program Organizers:** Mertol Gokelma, Izmir Institute of Technology; Anne Kvithyld, SINTEF; Les Edwards, Rain Carbon Inc.; Andre-Felipe Schneider, Hatch Ltd.; Arild Hakonsen, Hycast As

**Thursday AM | March 27, 2025**  
**116 | MGM Grand**

**Session Chair:** Mertol Gokelma, Izmir Institute of Technology

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#### 8:30 AM Introductory Comments

#### 8:35 AM

**A Risk-Based Approach to Qualification of Hydrogen as Fuel in Aluminum Casthouses:** Martin Strande<sup>1</sup>; Thea Marstrander<sup>1</sup>; Agathe Bjelland Eriksen<sup>1</sup>; Oskar Altzar<sup>1</sup>; Simon Jones<sup>1</sup>; Mark Hannum<sup>2</sup>; Mark Fischer<sup>2</sup>; *Are Bergin*<sup>3</sup>; <sup>1</sup>Hydro Havrand; <sup>2</sup>Fives; <sup>3</sup>Hydro Aluminium AS

#### 9:00 AM

**Energy Efficiency and Clean Energy Usage in Cast House Furnaces:** Terri-Ann Bethell<sup>1</sup>; Lee Allen<sup>1</sup>; *Tim Hordley*<sup>2</sup>; <sup>1</sup>Mechatherm International Limited

#### 9:25 AM

**Environmental Impact Lifecycle Assessment of Green Sand Moulding in Foundries:** Georgios Karadimas<sup>1</sup>; *Emanuele Pagone*<sup>1</sup>; Tim Birch<sup>2</sup>; <sup>1</sup>Cranfield University; <sup>2</sup>Foseco International

#### 9:50 AM Break

#### 10:05 AM

**Multifrequency Ultrasonic Treatment of Aluminum Alloys for Microstructural Modification:** *Raquel Jaime*<sup>1</sup>; Hélder Puga<sup>2</sup>; Miodrag Prokic<sup>3</sup>; Martijn Vos<sup>4</sup>; Diran Apelian<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>University of Minho; <sup>3</sup>MPI Interconsulting; <sup>4</sup>Aluminium Rheinfelden

#### 10:30 AM

**Oxy-Fuel Combustion: Impact of Hydrogen Combustion on Aluminum Melt Quality in Secondary Melting Processes:** Pooyan Kheirkhah<sup>1</sup>; *Anandkumar Makwana*<sup>1</sup>; Valmiro Sa<sup>1</sup>; <sup>1</sup>Air Products & Chemicals Inc

#### 10:55 AM

**A Modeling Methodology of New Combustion Technologies for Aluminum Remelting Furnaces:** *Louis Piquard*<sup>1</sup>; Emilien Clement<sup>1</sup>; Pierre-Yves Menet<sup>1</sup>; <sup>1</sup>Constellium

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2025 — Tantalum and Tungsten

**Sponsored by:** TMS Structural Materials Division, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Matthew Osborne, Global Advanced Metals; Paul Rottmann, University of Kentucky; Gianna Valentino, University of Maryland

**Thursday AM | March 27, 2025**  
**168 | MGM Grand**

**Session Chair:** Gianna Valentino, University of Maryland

#### 8:30 AM Invited

**Refractory Metals, A Nanocrystalline Approach:** *Michael Spencer<sup>1</sup>*; <sup>1</sup>Touchstone Research Laboratory

#### 9:10 AM

**Designing Refractory Alloy Bond Coats That Develop Thermally-Grown Complex Oxides: An Investigation of the Cr-Ta System:** *Matthew Foong<sup>1</sup>*; Daniel Mumm<sup>1</sup>; <sup>1</sup>University of California Irvine

#### 9:30 AM

**Observations on Surface Deformation of Tungsten Materials in Laser Focus in Air:** *Minsuk Seo<sup>1</sup>*; Dazhong Ding<sup>2</sup>; A. Leigh Winfrey<sup>3</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Johns Hopkins University School of Medicine; <sup>3</sup>State University of New York Maritime College

#### 9:50 AM

**Fatigue Crack Propagation in Semi-Brittle Materials: A Case Study on Tungsten:** *Anton Hohenwarter<sup>1</sup>*; Michael Pegritz<sup>2</sup>; Stefan Wurster<sup>2</sup>; Reinhard Pippan<sup>2</sup>; <sup>1</sup>University of Leoben; <sup>2</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

#### 10:10 AM Break

#### 10:30 AM Invited

**Oxidation of Refractory Metals in Molecular and Dissociated Oxygen:** *Elizabeth Opila<sup>1</sup>*; Connor Stephens<sup>1</sup>; <sup>1</sup>University of Virginia

#### 11:10 AM

**Effect of Microstructure on Machining Pure Tungsten:** *Thomas Skinner<sup>1</sup>*; Gary Rozak<sup>1</sup>; <sup>1</sup>Elmet Technologies LLC

#### 11:30 AM

**Assessment of State of the Art in Refractory Niobium Alloys:** *Noah Philips<sup>1</sup>*; Carolina Frey<sup>1</sup>; Joseph Jankowski<sup>2</sup>; Kaitlyn Mullin<sup>3</sup>; Leah Mills<sup>3</sup>; Tresa Pollock<sup>3</sup>; <sup>1</sup>ATI Metals; <sup>2</sup>ATI; <sup>3</sup>University of California-Santa Barbara

## NUCLEAR MATERIALS

### Special Topics in Nuclear Materials: Lessons Learned; Non-Energy Systems; and Coupled Extremes — Radiation Effects in Non-Energy Systems

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Charles Hirst, University of Wisconsin-Madison; Timothy Lach, Oak Ridge National Laboratory; Caleb Clement, Westinghouse Electric Company; Stephen Taller, Oak Ridge National Laboratory; Janelle Wharry, University of Illinois; Jason Trelewicz, Stony Brook University

**Thursday AM | March 27, 2025**  
**161 | MGM Grand**

**Session Chairs:** Caleb Clement, Westinghouse Electric Company; Timothy Lach, Oak Ridge National Laboratory

#### 8:30 AM Invited

**Advancing Radioisotope Heat Sources: Enhancing RPS for Extreme Environments:** *Jacob Matthews<sup>1</sup>*; Alexander Gilbert<sup>1</sup>; Harsh Desai<sup>1</sup>; <sup>1</sup>Zeno Power Systems

#### 9:00 AM Invited

**Materials Research for High-Power Accelerator Beam-Intercepting Devices:** *Kavin Ammigan<sup>1</sup>*; Gaurav Arora<sup>1</sup>; Sujit Bidhar<sup>1</sup>; Abraham Burleigh<sup>1</sup>; Frederique Pellemoine<sup>1</sup>; Adrien Couet<sup>2</sup>; Nicholas Crnkovich<sup>2</sup>; Izabela Szlufarska<sup>2</sup>; <sup>1</sup>Fermilab; <sup>2</sup>University of Wisconsin - Madison

#### 9:30 AM

**Post Irradiation Examination and Administrative Lifetime Limits of Highly Irradiated Components at The Spallation Neutron Source:** *David McClintock<sup>1</sup>*; <sup>1</sup>Oak Ridge National Laboratory

#### 9:50 AM

**Cavity Formation Induced by Swift Heavy Ion Irradiation in AlN/GaN:** *Mahjabin Mahfuz<sup>1</sup>*; Farshid Reza<sup>1</sup>; Xingyu Liu<sup>1</sup>; Rongming Chu<sup>1</sup>; Maik Lang<sup>2</sup>; Michael Snure<sup>3</sup>; Xing Wang<sup>1</sup>; Miaomiao Jin<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of Tennessee; <sup>3</sup>Air Force Research Laboratory

#### 10:10 AM Break

#### 10:30 AM

**Fabrication of Titanium-Containing Tri-Carbide Ultra-High Temperature Ceramics:** *Ethan Payne<sup>1</sup>*; Luke Hansen<sup>1</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

#### 10:50 AM

**Modeling Galvanic Drawdown Separations Technique:** *Garrett Kemmerly<sup>1</sup>*; <sup>1</sup>Virginia Polytechnic Institute



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## NUCLEAR MATERIALS

### Spectroscopic Methods and Analysis for Nuclear Energy Related Materials — Imaging and Spectroscopy of Materials for Nuclear Energy

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Scarlett Widgeon Paisner, Los Alamos National Laboratory; Arjen van Veen, Los Alamos National Laboratory; Xiaofeng Guo, Washington State University; Farida Selim, Arizona State University; Maik Lang, University of Tennessee; Dong (Lilly) Liu, University of Oxford

Thursday AM | March 27, 2025  
163 | MGM Grand

**Session Chairs:** Maik Lang, University of Tennessee; Scarlett Widgeon Paisner, Los Alamos National Laboratory

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8:30 AM Invited

**Correlative Investigation of Hydride Phase Formation and Transformation in Zircaloy-4 Using In Operando XRD and Feature Relocation EBSD-SEM:** *Joshua Silverstein*<sup>1</sup>; Quin Miller<sup>1</sup>; Dushyant Barpaga<sup>1</sup>; Katarzyna Grubel<sup>1</sup>; Jose Marcial<sup>1</sup>; Jarrod Crum<sup>1</sup>; Walter Luscher<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

8:55 AM

**Nano-Scale Orientation Mapping Using Electron Backscatter Diffraction:** *Junliang Liu*<sup>1</sup>; Longfei Liu<sup>1</sup>; Hyunseok Oh<sup>1</sup>; Haiming Wen<sup>2</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin- Madison; <sup>2</sup>Missouri University of Science and Technology

9:15 AM Invited

**The Use of Spatially Resolved EELS Spectroscopy to Elucidate Irradiation Induced Phase Transformation in Fe2O3 and Cr2O3 Irradiated with Ions and its Impact on Irradiation Induced-Loop Formation:** *Djamel Kaoum*<sup>1</sup>; Angelica Lopez Morales<sup>1</sup>; Yujun Xie<sup>2</sup>; Christopher Winkler<sup>1</sup>; Benjamin Derby<sup>3</sup>; Tiffany Kaspar<sup>4</sup>; Daniel Schreiber<sup>4</sup>; Peter Hosemann<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>University of California Berkeley; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Pacific Northwest National Laboratory

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## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Simulation and Machine Learning

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Soper, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

Thursday AM | March 27, 2025  
367 | MGM Grand

**Session Chair:** Katharine Flores, Washington University in St. Louis

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8:30 AM

**Spatial Heterogeneities in Metallic Glass: Identifying the Origins Beyond the 100 nm Length Scale:** *Reza Rashidi*<sup>1</sup>; Birte Riechers<sup>1</sup>; Robert Maass<sup>1</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM)

8:50 AM

**Interrogating the Local Yield Surface of a Model Metallic Glass:** *Spencer Fajardo*<sup>1</sup>; Michael Falk<sup>1</sup>; Sylvain Patinet<sup>2</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>ESPCI

9:10 AM

**Insight Beyond Short-Range Order in Metallic Glasses Revealed by Machine Learning:** *Yue Fan*<sup>1</sup>; <sup>1</sup>University of Michigan

9:30 AM

**The Role of Structural Motifs in Deformation Behavior of Simulated Metallic Glasses:** *Suzanne LoTempio*<sup>1</sup>; W. Porter Weeks<sup>1</sup>; Katharine Flores<sup>1</sup>; <sup>1</sup>IMSE - Washington University in St. Louis

9:50 AM

**Predicting Orientation-Dependent Plastic Susceptibility from Static Structure in Amorphous Solids via Convolutional Neural Networks:** *Zhao Fan*<sup>1</sup>; Evan Ma<sup>2</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>Johns Hopkins University

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## MATERIALS SYNTHESIS AND PROCESSING

### Sustainability of High Temperature Alloys — Repair, Recycle & Panel Discussion

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Mark Hardy, Rolls-Royce Plc; Caspar Schwalbe, MTU Aero Engines AG; Jeremy Rame, Naarea; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Martin Detrois, National Energy Technology Laboratory; Katerina Christofidou, University of Sheffield

Thursday AM | March 27, 2025  
102 | MGM Grand

**Session Chairs:** Benjamin Adam, Oregon State University; Katerina Christofidou, University of Sheffield

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8:30 AM

**Remanufacturing and Repair of Superalloys: A Focus on Alloy 718:** *Joel Andersson*<sup>1</sup>; <sup>1</sup>University West

9:00 AM

**Development of Direct Recycling Technique for Advanced Ni-Base Single Crystal Superalloys:** *Kyoko Kawagishi*<sup>1</sup>; Chihiro Tabata<sup>2</sup>; Satoshi Utada<sup>1</sup>; Tadaharu Yokokawa<sup>1</sup>; Shinsuke Suzuki<sup>2</sup>; Hiroshi Harada<sup>1</sup>; <sup>1</sup>National Institute For Materials Science; <sup>2</sup>Waseda University

9:30 AM

**Effects of Residual Ca Content on the Mechanical Response of a New Polycrystalline Ni-Base Superalloy:** *George Wise*<sup>1</sup>; Hon Tong Pang<sup>1</sup>; Mark Hardy<sup>2</sup>; Nicholas Jones<sup>1</sup>; Howard Stone<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Rolls-Royce plc.

9:50 AM Break

10:10 AM Panel Discussion

## MATERIALS SYNTHESIS AND PROCESSING

### Thin Films and Coatings: Properties, Processing and Applications — Thin Films for Nanotechnology and Electronics II

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougou, CNRS, Is2m; Brandon Krick, Florida A&M University-Florida State University

**Thursday AM | March 27, 2025**  
**101 | MGM Grand**

**Session Chairs:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Karine Mougou, CNRS, Is2m; Tomas Grejtak, Oak Ridge National Laboratory

**8:30 AM Invited**

**Material and Device Engineering for Multi Kilo Volt Class Vertical Ga2O3 Devices:** *Nidhin Kurian Kalarickal<sup>1</sup>; Advait Gilankar<sup>1</sup>; Nabasindhu Das<sup>1</sup>; Abishek Katta<sup>1</sup>; Fikadu Alema<sup>2</sup>; William Brandt<sup>2</sup>; Andrei Osinsky<sup>2</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Agnitron Technologies*

**9:00 AM**

**Doping/Alloying Enabled Tunable Optical Properties of Epitaxial -Ga2O3 Thin Films:** *Debabrata Das<sup>1</sup>; Francelia Escobar<sup>1</sup>; Nathan Episcopo<sup>1</sup>; C.V. Ramana<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso*

**9:20 AM**

**Thermal Measurements at the Nano-Scale: Theory, Reality, and Examples:** *Ron Fisher<sup>1</sup>; John Gaskins<sup>1</sup>; <sup>1</sup>Laser Thermal Analysis*

**9:40 AM**

**Electro-Mechanical Behavior of Indium Tin Oxide Thin Films Deposited on Flexible Substrates:** *Thibault Chommaux<sup>1</sup>; Pierre-Olivier Renault<sup>1</sup>; Pierre Godard<sup>1</sup>; Philippe Goudeau<sup>1</sup>; Dominique Thiaudière<sup>2</sup>; <sup>1</sup>Université de Poitiers; <sup>2</sup>Synchrotron SOLEIL*

**10:00 AM Break**

**10:20 AM**

**Magnetic Nanocomposites for Flexible Magneto-Electronics:** *Barbara Putz<sup>1</sup>; Dominik Gutnik<sup>2</sup>; Laszlo Pethö<sup>1</sup>; Pierre-Olivier Renault<sup>3</sup>; Damien Faurie<sup>4</sup>; <sup>1</sup>Empa Thun; <sup>2</sup>Montanuniversität Leoben; <sup>3</sup>Prime Poitiers; <sup>4</sup>LSPM-CNRS*

## MECHANICS OF MATERIALS

### Accelerated Discovery and Insertion of Next Generation Structural Materials — Accelerated Structure-Property Assessment

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Andrew Bobel, General Motors Corporation; Bharat Gwalani, North Carolina State University; Jonah Klemm-Toole, Colorado School of Mines; Antonio Ramirez, Ohio State University; Matthew Steiner, University of Cincinnati; Janelle Wharry, University of Illinois

**Thursday PM | March 27, 2025**  
**364 | MGM Grand**

**Session Chairs:** Bharat Gwalani, North Carolina State University; Matthew Steiner, University of Cincinnati

**1:00 PM Invited**

**High Throughput Mechanical Testing with Multi-Gage and Topology Optimized Specimens:** *Syed Idrees Afzal Jalali<sup>1</sup>; Yakov Zelickman<sup>1</sup>; Anchen Tong<sup>1</sup>; John Sharon<sup>2</sup>; Jamie Guest<sup>1</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Raytheon Technologies Research Center*

**1:30 PM Invited**

**Precision and Efficiency in Nanoindentation: Automated Contact Area Measurement Techniques:** *Daniel Lewis<sup>1</sup>; Nicole Person<sup>1</sup>; Braden Miller<sup>1</sup>; Joshua Cline<sup>1</sup>; Michael Hurst<sup>2</sup>; Jacob Hempel<sup>1</sup>; James Paramore<sup>1</sup>; George Pharr<sup>1</sup>; *Brady Butler<sup>3</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>George H.W. Bush Combat Development Complex; <sup>3</sup>DEVCOM - Army Research Laboratory**

**2:00 PM**

**High Velocity (HiVe) Joining: A Novel Process to Join Similar/Dissimilar Alloys:** *Mayur Pole<sup>1</sup>; Benjamin Schuessler<sup>1</sup>; Lei Li<sup>1</sup>; Krishna Chaitanya Pitike<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Darrell Herling<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory*

**2:20 PM Break**

**2:40 PM**

**Accelerated Testing to Understand the Long-Term Performance of High Temperature Materials:** *Victoria Tucker<sup>1</sup>; Thomas Mann<sup>1</sup>; Michael Titus<sup>1</sup>; <sup>1</sup>Purdue University*

**3:00 PM**

**Predicting Chemistry-Dependent Mechanical Behavior in High-Entropy Alloys: Iterative Design Insights from the BIRDSHOT Center Using Data-Driven and Generative Models:** *Nicolas Flores<sup>1</sup>; Trevor Hastings<sup>1</sup>; Mrinalini Mulukutla<sup>1</sup>; Wenle Xu<sup>1</sup>; Daniel Lewis<sup>1</sup>; Bibhu Sahu<sup>1</sup>; Daniel Salas Mula<sup>1</sup>; Danial Khatamsaz<sup>1</sup>; Jacob Hempel<sup>1</sup>; Douglass Allaire<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; James Paramore<sup>1</sup>; Brady Butler<sup>1</sup>; George Pharr<sup>1</sup>; Vahid Attari<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M*

**3:20 PM**

**Streamlined Correlation of Microstructure-Mechanical Property Relationships in Laser Clad Steels:** *Kevin Schmalbach<sup>1</sup>; Eric Hintsala<sup>1</sup>; Douglas Stauffer<sup>1</sup>; Sanjit Bhowmick<sup>1</sup>; <sup>1</sup>Bruker Nano*

**3:40 PM**

**Microstructure and Mechanical Properties of ECAP Processed High Mn Steel Testing at 298 K and 77 K:** *Young Hoon Jung<sup>1</sup>; Beom Joon Kim<sup>1</sup>; Hyeonseok Kwon<sup>2</sup>; Marina Abramova<sup>3</sup>; Hyoung Seop Kim<sup>4</sup>; Nariman Enikeev<sup>5</sup>; Ailreza Zagraran<sup>2</sup>; Jung Gi Kim<sup>1</sup>; <sup>1</sup>Gyeongsang National University; <sup>2</sup>Pohang University of Science and Technology; <sup>3</sup>Ufa University of Science and Technology; <sup>4</sup>Tohoku University; <sup>5</sup>Saint Petersburg State University*

## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning — Modeling of AM Properties and Microstructures II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Changwon National University

Thursday PM | March 27, 2025  
311 | MGM Grand

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Jing Zhang, Purdue University

#### 1:00 PM

**AMMap Library of Additive Manufacturing Design, Alloy Discovery, and Path Planning:** *Alexander Richter*<sup>1</sup>; Adam Krajewski<sup>1</sup>; Zhening Yang<sup>1</sup>; Allison Beese<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Penn State University

#### 1:20 PM

**Digital Shadow Model Reference Control for Directed Energy Deposition:** *James Haley*<sup>1</sup>; Bruno Turcksin<sup>1</sup>; Callan Herberger<sup>1</sup>; Ashley Gannon<sup>1</sup>; Steve Dewitt<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 1:40 PM

**Implementation of Alloy-Specific Thermo-Fluid Modelling for Designing Mg Alloys Suitable for Laser Powder-Bed Fusion:** *Seyed Mohammad Mehdi Hoseini Athar*<sup>1</sup>; Mikael Ersson<sup>1</sup>; Peter Hedström<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

#### 2:00 PM

**High-Fidelity Numerical Simulation of Droplet-Powder Bed Interactions in Binder Jet Additive Manufacturing:** *Mohan Sai Ramalingam*<sup>1</sup>; Shashank Sharma<sup>1</sup>; Chaithanya Kumar K N<sup>1</sup>; Sameehan S Joshi<sup>1</sup>; Narendra B Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

#### 2:20 PM Break

#### 2:40 PM

**High Fidelity Modeling of Laser Absorptivity and Molten Pool Geometry During Powderbed Fusion Processes of Ti64Al4V with the Stationary and Moving Laser Beam Sources:** *Akash Aggarwal*<sup>1</sup>; *Yung Shin*<sup>1</sup>; <sup>1</sup>Purdue University

#### 3:00 PM

**Full-Field Crystal Plasticity Surrogate Modeling for Rapid Defect Assessment in AM Materials:** *Jason Mayeur*<sup>1</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Tasnim M.T. Oishib<sup>2</sup>; Michael Kirka<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of New Hampshire

#### 3:20 PM Invited

**Micromechanical Modeling Exploration of Microstructure-Properties of Additively Manufactured Pure Tantalum:** *Li Ma*<sup>1</sup>; Gianna Valentino<sup>2</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>University of Maryland

#### 3:40 PM

**Mechanical Behavior of Additively Manufactured Metamaterials Under Dynamic Load:** *Meir Shachar*<sup>1</sup>; William Schill<sup>1</sup>; Brandon Zimmerman<sup>1</sup>; Mukul Kumar<sup>1</sup>; Mike Homel<sup>1</sup>; Jonathan Belof<sup>1</sup>; Jonathan Lind<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## ADDITIVE MANUFACTURING

### Additive Manufacturing: Microstructural and Mechanical Long-Term Stability of AM Materials — Microstructure-Property Relationships

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; John Carpenter, Los Alamos National Laboratory; Eric Payton, University of Cincinnati; Emma White, DECHEMA Forschungsinstitut; Sudarsanam Babu, University of Maryland; Markus Chmielus, University of Pittsburgh

Thursday PM | March 27, 2025  
302 | MGM Grand

**Session Chairs:** Sneha Prabha Narra, Carnegie Mellon University; Sudarsanam Babu, University of Maryland; Benjamin Adam, Oregon State University; Eric Payton, University of Cincinnati

#### 1:00 PM Invited

**In Situ Laser TEM and SEM Study of Austenitic Steel Solidification:** *Kinga Unocic*<sup>1</sup>; John Lasseter<sup>2</sup>; Kevin Roccapriore<sup>2</sup>; Debangshu Mukherjee<sup>2</sup>; Yousub Lee<sup>2</sup>; Rangasayee Kannan<sup>2</sup>; Philip Rack<sup>3</sup>; Stephen Jessee<sup>2</sup>; Lawrence Allard<sup>2</sup>; Sebastien Dryepondt<sup>2</sup>; Steven Randolph<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Tennessee

#### 1:20 PM

**In Situ Synchrotron Diffraction Study of Ultra-Fine Microstructure Formation During Directed Energy Deposition Additive Manufacturing of a High-Performance Al Alloy:** *Da Guo*<sup>1</sup>; Chengbo Zhu<sup>2</sup>; Kai Zhang<sup>1</sup>; Harry E. Chapman<sup>1</sup>; Imogen Cowley<sup>1</sup>; Ravi Shivaraman<sup>1</sup>; Amanpreet Kaur<sup>3</sup>; Dmitry Eskin<sup>2</sup>; Iakovos Tzanakis<sup>3</sup>; Robert Atwood<sup>4</sup>; Stefan Michalik<sup>4</sup>; Chu Lun Alex Leung<sup>1</sup>; Peter D. Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Brunel University London; <sup>3</sup>Oxford Brookes University; <sup>4</sup>Diamond Light Source

#### 1:40 PM

**Ni-Based Superalloy MAR-M247 Fabricated by Electron-Beam Powder-Bed Fusion (E-PBF): Effect of Pre-Heating on Printability and Microstructure-Property Relationship:** *Minsoo Jin*<sup>1</sup>; Taehyuk Kang<sup>1</sup>; Hyeonbin Noh<sup>1</sup>; Pyuck-Pa Choi<sup>1</sup>; <sup>1</sup>KAIST

#### 2:00 PM

**The Influence of Part Temperature on Defects and In Situ Phase Precipitation during LPBF Fabrication of Alloy 718:** *William Frieden Templeton*<sup>1</sup>; Shawn Hinnebusch<sup>2</sup>; Seth Strayer<sup>2</sup>; Albert To<sup>2</sup>; P. Chris Pistorius<sup>1</sup>; Sneha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>University of Pittsburgh

#### 2:20 PM Break

#### 2:30 PM Invited

**Location-Specific Microstructures and Properties of Haynes 282 Alloy With Laser-Wire Direct Energy Deposition Processing:** *Rui Feng*<sup>1</sup>; Kristin Tippey<sup>1</sup>; Jonathan Poplawsky<sup>2</sup>; Dunji Yu<sup>2</sup>; Ke An<sup>2</sup>; Chantal Sudbrack<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Oak Ridge National Laboratory

#### 2:50 PM

**Microstructure Evolution and Mechanical Properties of Ti6Al4V Processed Below -Transus Temperature Using Additive Friction Stir Deposition:** *Meet Gor*<sup>1</sup>; Daniel Fabijanic<sup>2</sup>; Pinaki Prasad Bhattacharjee<sup>3</sup>; <sup>1</sup>IIT Hyderabad and Deakin University; <sup>2</sup>Deakin University; <sup>3</sup>IIT Hyderabad

3:10 PM

**Phase Evolution and Mechanical Performance of Additively Manufactured HT9 Ferritic-Martensitic Steel:** *Madhavan Radhakrishnan*<sup>1</sup>; Selvamurugan Palaniappan<sup>1</sup>; Shashank Sharma<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

3:30 PM

**Microstructural Features of Additively Manufactured 420 Stainless Steel After Isothermal Deformation Below the Ae1 Temperature:** *Harveen Bongao*<sup>1</sup>; Jubert Pasco<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; Kudakwashe Nyamuchiwa<sup>1</sup>; <sup>1</sup>University of New Brunswick

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances and Discoveries in Non-Equilibrium Driven Nanomaterials and Thin Films — 2D Materials (Part I), Metallic Systems (Part II)

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Ritesh Sachan, Oklahoma State University; Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University; Shikhar Jha, Indian Institute of Technology Kanpur

Thursday PM | March 27, 2025  
354 | MGM Grand

**Session Chairs:** Shikhar Jha, Indian Institute of Technology Kanpur; Ashutosh Tiwari, University of Utah

1:00 PM Invited

**Graphene Infused Copper with Ultrahigh Electrical Conductivity Prepared by the Flash Method:** *Suprabha Das*<sup>1</sup>; Rishi Raj<sup>2</sup>; <sup>1</sup>University of Colorado Boulder; <sup>2</sup>University of Colorado

1:20 PM Invited

**Decoupling Irradiation-Induced Heterogeneities in Two-Dimensional Semiconductors Through Atomic Scale Mapping of Optical Modes and Infrared Excitations:** *Kory Burns*<sup>1</sup>; Christopher Smyth<sup>2</sup>; Eric Lang<sup>3</sup>; Tinsae Alem<sup>1</sup>; Elaina Truhart<sup>1</sup>; Stephen McDonnell<sup>1</sup>; Jordan Hachtel<sup>4</sup>; <sup>1</sup>University Of Virginia; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>University of New Mexico; <sup>4</sup>Oak Ridge National Laboratory

1:40 PM Invited

**Emerging 2D Hybrid Organic-Inorganic Thin Films for Next-Generation Optoelectronic Devices:** *Surendra Anantharaman*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Madras

2:00 PM Invited

**Structural, Electronic, and Optical Properties of 2D Metal Chalcogenophosphates for Electronic and Optoelectronic Devices:** *Santosh Kc*<sup>1</sup>; Hung Chiu<sup>1</sup>; <sup>1</sup>San Jose State University

2:20 PM

**Photophysics of Quantum Defects in Layered Materials:** *Sanjay Behura*<sup>1</sup>; <sup>1</sup>San Diego State University

2:40 PM Break

3:00 PM

**Mechanisms of Defect Formation in Physical Vapor Deposited Phase-Separating Alloy Films: A Phase Field Study:** *Kumar Ankit*<sup>1</sup>; <sup>1</sup>Arizona State University

3:20 PM

**Self-Assembly of Plasmonic Networks Via Far from Equilibrium Chemical Dealloying:** *Marcello Pozzi*<sup>1</sup>; Camillo Sirvinski<sup>1</sup>; Anastacia De Gorostiza<sup>1</sup>; Arnold Müller<sup>1</sup>; Ralph Spolenak<sup>1</sup>; Henning Galinski<sup>1</sup>; <sup>1</sup>ETH Zürich

3:40 PM

**Controlled Kirkendall Voiding in Al-Au and Cu-Au Thin Films by Adjusting Sputtering Parameters:** *Oliver Wipf*<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Alloy Synthesis and Mechanical Behavior

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Thursday PM | March 27, 2025  
368 | MGM Grand

**Session Chairs:** T.S. Srivatsan, University of Akron; Wen Chen, University of Massachusetts-Amherst

1:00 PM Invited

**Additive Manufacturing of Emerging Complex Alloys:** *Wen Chen*<sup>1</sup>; <sup>1</sup>University of Massachusetts-Amherst

1:20 PM Invited

**Light Single-Phase Al-Based Complex Concentrated Alloy with High Specific Strength:** *Qiaoshi Zeng*<sup>1</sup>; <sup>1</sup>Hpstar

1:40 PM

**Measuring the Entropy of High Entropy Alloys:** *Kyle Hunady*<sup>1</sup>; Elena Priesen Reis<sup>1</sup>; Brent Fultz<sup>1</sup>; <sup>1</sup>Caltech

2:00 PM Invited

**Sheet Formability of CoCrFeMnNi High-Entropy Alloy:** *Hyoung Seop Kim*<sup>1</sup>; Yeon Taek Choi<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology

2:20 PM Break

2:40 PM Invited

**Thin Film Combinatorial Sputtering of Multiple-Principal Element Alloys for Rapid Materials Discovery:** *Philip Rack*<sup>1</sup>; <sup>1</sup>University of Tennessee

3:00 PM

**Investigating Composition-Structure-Property Relationships in Nb-V-Zr-X Alloys Using a High-Throughput Synthesis Approach:** *Katharine Padilla*<sup>1</sup>; Aziz Octovian<sup>1</sup>; Rohan Mishra<sup>1</sup>; Katharine Flores<sup>1</sup>; <sup>1</sup>Washington University in St. Louis

3:20 PM

**Competition Between Faulting Plasticity and Transformation-Induced Plasticity at Cryogenic Temperatures:** *Hrishikesh Deodhar*<sup>1</sup>; Je In Lee<sup>2</sup>; Hyunseok Oh<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison; <sup>2</sup>Pusan National University

3:40 PM

**Alloy Design, Microstructure, and Mechanical Properties of CoFeNi Medium Entropy Alloy with Vanadium and Carbon Addition:** *Hamshini Rajendran*<sup>1</sup>; Reza Gholizadeh<sup>1</sup>; Yoshida Shuhei<sup>1</sup>; Tsuji Nobuhiro<sup>1</sup>; <sup>1</sup>Kyoto University



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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Methods II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

**Thursday PM | March 27, 2025**  
**320 | MGM Grand**

**Session Chair:** Anh Tran, Sandia National Laboratories

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#### 1:00 PM

**Data Assimilation for Columnar Dendrite Growth Coupled with Large-Scale Phase-Field Simulations:** *Tomohiro Takaki*<sup>1</sup>; Ayano Yamamura<sup>1</sup>; Shunsuke Kanki<sup>1</sup>; Shinji Sakane<sup>1</sup>; Hideyuki Yasuda<sup>2</sup>; <sup>1</sup>Kyoto Institute of Technology; <sup>2</sup>Kyoto University

#### 1:20 PM

**Discovery of Quaternary Structural Materials Using Constrained Generative Models:** *Karun Kumar Rao*<sup>1</sup>; Alexander New<sup>1</sup>; Nina Borodin<sup>1</sup>; Nam Le<sup>1</sup>; Christopher Stiles<sup>1</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory

#### 1:40 PM

**Generative Priors for Regularizing Ill-Posed Problems: Applications to 3D Polycrystalline RVE's:** *Michael Buzzy*<sup>1</sup>; Andreas Robertson<sup>2</sup>; Surya Kalidindi<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Sandia National Labs

#### 2:00 PM

**The Unsaturation Effect: Balanced Data Aggregation for Materials Informatics via Acquisition Functions:** *Layla Purdy*<sup>1</sup>; Taylor Sparks<sup>1</sup>; Ramsey Issa<sup>1</sup>; Federico Ottomano<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Liverpool

#### 2:20 PM

**KnowMat: Transforming Unstructured Material Science Literature into Structured Knowledge:** *Hasan Muhammad Sayeed*<sup>1</sup>; Ramsey Issa<sup>1</sup>; Trupti Mohanty<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Manufacturing and Process Control

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

**Thursday PM | March 27, 2025**  
**114 | MGM Grand**

**Session Chairs:** X-Grant Chen, Quebec University of Chicoutimi; David Weiss, Loukus Technologies, Inc.; Mihaela Isac, McGill Metals Processing Centre

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#### 1:00 PM

**Hypoeutectic Al-Ce-Ni Composite Alloy: The Interplay Between Varying Zr and Sub-Micron Alumina Reinforcement Particulates:** *Jordan Kozakevich*<sup>1</sup>; Dimitry Sediako<sup>1</sup>; David Weiss<sup>2</sup>; <sup>1</sup>University of British Columbia; <sup>2</sup>Loukus Technologies

#### 1:25 PM

**Characterization of the Mechanical Behavior of AA5052 Alloy:** *Nicholas Hopkins*<sup>1</sup>; Benoit Revil-Baudard<sup>2</sup>; Oana Cazacu<sup>2</sup>; <sup>1</sup>University of Florida/REEF; <sup>2</sup>University of Arizona

#### 1:50 PM

**Experimental Characterization and Modeling of an AA6061 Al Alloy:** *Luigi Ciccia*<sup>1</sup>; Benoit Revil-Baudard<sup>1</sup>; Oana Cazacu<sup>1</sup>; <sup>1</sup>University of Arizona

#### 2:15 PM

**Influence of Contamination and Passivation on the Ultrasonic Welding Performance of Aluminum Stranded Wires:** *Dmitrii Ozherelkov*<sup>1</sup>; Andreas Holländer<sup>2</sup>; Guntram Wagner<sup>1</sup>; <sup>1</sup>Chemnitz University of Technology; <sup>2</sup>Fraunhofer Institute for Applied Polymer Research IAP

#### 2:40 PM Break

#### 2:55 PM

**Mechanical and Corrosion Testing of High Recycled Content Aluminum Automotive Body Sheet Alloys:** *Alissa Tsai*<sup>1</sup>; Minju Kang<sup>2</sup>; Evan Huang<sup>2</sup>; Chal Park<sup>2</sup>; John Allison<sup>1</sup>; Daniel Cooper<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Novelis

#### 3:20 PM

**Processing and Mechanical Properties of High-Entropy-Alloy Reinforced Al-Alloy:** *Esra Dokumaci Alkan*<sup>1</sup>; Murat Alkan<sup>1</sup>; Ugur Aybarc<sup>2</sup>; <sup>1</sup>Dokuz Eylül University; <sup>2</sup>CMS Jant ve Mak. San. A.S.

#### 3:45 PM Concluding Comments

## LIGHT METALS

### Aluminum Reduction Technology — Process Fundamentals and Metal Purity

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Andre-Felipe Schneider, Hatch Ltd.; Les Edwards, Rain Carbon Inc.

**Thursday PM | March 27, 2025**  
**113 | MGM Grand**

**Session Chair:** Samuel Senanu, SINTEF

#### 1:00 PM Introductory Comments

##### 1:05 PM

**Enthalpies for Dissolution of Alumina in Hall-Héroult Bath: Towards More Accurate Modelling of Energy Balances:** *Asbjorn Solheim*<sup>1</sup>; Kristian Etienne Einarsrud<sup>2</sup>; <sup>1</sup>SINTEF Industry; <sup>2</sup>NTNU

##### 1:30 PM

**Strategy to Increase the Number of High Purity Metal (HPM) Pots at INALUM:** *Fathur Rahman*<sup>1</sup>; Ade Buandra<sup>1</sup>; Ferdy Rahadian<sup>1</sup>; Ismadi Jenal<sup>1</sup>; Ivan Ermisyam<sup>1</sup>; <sup>1</sup>Inalum

##### 1:55 PM

**Theoretical Basis for Future Control of Impurity Elements in Hall-Héroult Cells:** *Asbjorn Solheim*<sup>1</sup>; Ole Kjos<sup>1</sup>; Sverre Rolseth<sup>1</sup>; Egil Skybakmoen<sup>1</sup>; <sup>1</sup>SINTEF Industry

##### 2:20 PM

**Qualitative and Quantitative Analysis of Multi-Bubble Motion Using a Physical Laboratory Model of the Hall-Héroult Cell: From Sliding Under the Anode to Rising Up in the Side Channel:** *Ali Amiri Gheisvandi*<sup>1</sup>; Simon Laliberté-Riverin<sup>1</sup>; Ryan Soncini<sup>2</sup>; Patrice Doiron<sup>2</sup>; Gelareh Momen<sup>3</sup>; Houshang Darvishi Alamdari<sup>1</sup>; Seyed Mohammad Taghavi<sup>1</sup>; <sup>1</sup>Université Laval; <sup>2</sup>Alcoa – Operational Excellence Center of Excellence; <sup>3</sup>Université du Québec à Chicoutimi (UQAC)

##### 2:45 PM Break

##### 3:00 PM

**The Influence of Calcium Fluoride on Entrainment of Electrolyte During Metal Siphoning:** *Curtis Landon*<sup>1</sup>; Stephen Lindsay<sup>2</sup>; Brian Zukas<sup>1</sup>; <sup>1</sup>Alcoa; <sup>2</sup>Hatch

##### 3:25 PM

**Pilot Scale Regeneration of Aluminum Fluoride from Pure Bath:** *Brian Zukas*<sup>1</sup>; Driss Mrabet<sup>2</sup>; Keven Turgeon<sup>2</sup>; Charles-Olivier Fournier<sup>3</sup>; <sup>1</sup>Alcoa Corp; <sup>2</sup>Corem; <sup>3</sup>Hatch

##### 3:50 PM Concluding Comments

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Artificial Intelligence Applications in Integrated Computational Materials Engineering — Emerging Applications of AI in Materials Science

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Wenwu Xu, San Diego State University; Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University; Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University; Avani Mishra, Los Alamos National Laboratory; Victoria Miller, University of Florida; Ghanshyam Pilania, General Electric (GE Aerospace Research)

**Thursday PM | March 27, 2025**  
**351 | MGM Grand**

**Session Chairs:** Ghanshyam Pilania, GE Aerospace Research; Avani Mishra, Los Alamos National Laboratory

#### 1:00 PM Invited

**Machine Learning-Enhanced Wearable System for Respiratory and Heartbeat Co-Monitoring with Multi-Source Fusion Recognition:** *Yang Yang*<sup>1</sup>; <sup>1</sup>San Diego State University

##### 1:30 PM

**Enhancing Extrusion Efficiency: Development of a Digital Twin for Glass Reinforced Polymer Processes Using Machine Learning and Real-Time Data Integration:** *Gulshan Noorumar*<sup>1</sup>; Sayan Adhikari<sup>1</sup>; Hallvard Fjær<sup>1</sup>; Øyvind Jensen<sup>1</sup>; Michaela Meir<sup>2</sup>; <sup>1</sup>IFE Institute for Energy Technology; <sup>2</sup>Inaventa Solar

##### 1:50 PM

**Machine Learning-Driven Multiscale Analysis of Mechanical Properties in Metal-Matrix Nanocomposites:** Md. Shahrier Hasan<sup>1</sup>; *Wenwu Xu*<sup>1</sup>; <sup>1</sup>San Diego State University

##### 2:10 PM

**Accelerating Crystal Plasticity Simulations with Graph Neural Networks:** *Kyle Farmer*<sup>1</sup>; Elizabeth Holm<sup>1</sup>; <sup>1</sup>University of Michigan

##### 2:30 PM Break

##### 2:50 PM

**Machine Learning Facilitated Integration of Characterization Data and Simulations to Generate Residual Stress Distributions:** *Kranthi Balusu*<sup>1</sup>; Shadab Anwar Shaikh<sup>1</sup>; Lei Li<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab

##### 3:10 PM

**Enhancing Medical Waste Recycling Through Computer Vision and Near-Infrared Spectroscopy:** *Babak Namazi*<sup>1</sup>; Kanishka Tyagi<sup>1</sup>; Nalin Kumar<sup>1</sup>; <sup>1</sup>UHV technologies

##### 3:30 PM

**Generative Adversarial Network (GAN)-Based Microstructure Mapping from Surface Profile For Laser Powder Bed Fusion (LPBF):** *Jingwen Gao*<sup>1</sup>; Chenyang Zhu<sup>1</sup>; Shubo Gao<sup>1</sup>; Ming Xue<sup>2</sup>; Kun Zhou<sup>1</sup>; <sup>1</sup>Nanyang Technological University; <sup>2</sup>Infineon Technologies Asia Pacific Pte. Ltd.

## BIOMATERIALS

### Bio-Nano Interfaces and Engineering Applications — Bio-Nano Interfaces IV

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hannes Schniepp, William & Mary; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University; David Kisailus, University of California-Irvine

**Thursday PM | March 27, 2025**  
**307 | MGM Grand**

**Session Chairs:** Candan Tamerler, University of Kansas; Terry Lowe, Colorado School of Mines

#### 1:00 PM Invited

**Engineering Tissue-Biomaterial Interfaces: From Nanostructure Modification to Pathological Tissue Integration:** *Indranath Mitra*<sup>1</sup>; <sup>1</sup>College of William and Mary

#### 1:30 PM

**The Influence of Buffer Composition and Surface Topography on the Antimicrobial Properties of Copper:** *Rebecca Reiss*<sup>1</sup>; William Kluck<sup>2</sup>; Kaitlyn Betz<sup>2</sup>; Daniela Hirsch<sup>2</sup>; Terry Lowe<sup>2</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology; <sup>2</sup>Colorado School of Mines

#### 1:55 PM

**Advancement of Targeted Antimicrobial Peptides Through Machine Learning: Toward Microbial Balance and Species Specificity:** *Kalea Chu*<sup>1</sup>; Aya Cloyd<sup>1</sup>; Kyle Boone<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas

#### 2:15 PM

**Surface Modification of Plasmonic Nanoparticles by Aryl Diazonium Salts for Raman Bioimaging and Biosensing:** *Da Li*<sup>1</sup>; Yang Zhang<sup>1</sup>; Fan Sun<sup>2</sup>; Nordin Felidji<sup>1</sup>; Nathalie Gagey-Eilstein<sup>1</sup>; Aazdine Lamouri<sup>1</sup>; Philippe Nizard<sup>1</sup>; Jean Pinson<sup>1</sup>; Kelly Aubertin<sup>1</sup>; Florence Gazeau<sup>1</sup>; Claire Mangeney<sup>1</sup>; *Yun Luo*<sup>1</sup>; <sup>1</sup>Paris Cité University; <sup>2</sup>Chimie Paris Tech - PSL University

#### 2:35 PM Break

#### 2:50 PM

**A Durable, High Strength Carbon-Negative Enzymatic Structural Materials:** *Shuai Wang*<sup>1</sup>; Nima Rahbar<sup>2</sup>; Suzanne Scarlate<sup>2</sup>; <sup>1</sup>Enzymatic, Inc; <sup>2</sup>Worcester Polytechnic Institute

#### 3:10 PM

**Multi-Stage Biomineralization of Iron Oxide and Calcium Phosphate Phases in the Abrasion Resistant Teeth of Chiton Articulatus:** *Ezra Sarmiento*<sup>1</sup>; David Kisailus<sup>1</sup>; <sup>1</sup>University of California Irvine

#### 3:30 PM

**Identification of SARS-CoV-2 Virus Variants Through a Label-Free SERS Technique:** *Han Lee*<sup>1</sup>; Jiunn-Der Liao<sup>1</sup>; Wei-Chia Hsu<sup>1</sup>; <sup>1</sup>National Cheng Kung University

## NUCLEAR MATERIALS

### Composite Materials for Nuclear Applications III — Fuels & MSR Applications

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Composite Materials Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Anne Campbell, Oak Ridge National Laboratory; Dong (Lilly) Liu, University of Oxford; Rick Ubic, Boise State University; Lauren Garrison, Commonwealth Fusion Systems; Peng Xu, Idaho National Laboratory; Johann Riesch, Max Planck Institute For Plasma Physics; James Wade-Zhu, UKAEA

**Thursday PM | March 27, 2025**  
**164 | MGM Grand**

**Session Chairs:** Denise Adorno Lopes, Oak Ridge National Laboratory; Thaneshwor Kaloni, Canadian Nuclear Laboratories

#### 1:00 PM

**A Machine Learning Approach for Predicting Nuclear Fuel Performance With Solid Fission Products:** *Denise Adorno Lopes*<sup>1</sup>; Rinkle Juneja<sup>1</sup>; Matthew Kurley<sup>1</sup>; Will Cureton<sup>1</sup>; Christian Petrie<sup>1</sup>; Andrew Nelson<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 1:20 PM

**Development of High-Temperature-Steam Resistant UN via the Addition of UB<sub>2</sub>:** *Megan Pritchard*<sup>1</sup>; Tim Abram<sup>1</sup>; Joel Turner<sup>1</sup>; <sup>1</sup>University of Manchester

#### 1:40 PM

**Densification of 3D Printed Composite Ceramics via Spark Plasma Sintering:** *Nathaniel Cavanaugh*<sup>1</sup>; Dong Zhao<sup>1</sup>; Shuting Lei<sup>2</sup>; Dong Lin<sup>3</sup>; Guang Yang<sup>2</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute; <sup>2</sup>Kansas State University; <sup>3</sup>Oregon State University

#### 2:00 PM

**Material Bonding Layered Metallic and Ceramic Composites Using Continuous Electric-Field Assisted Sintering:** *Andrew Gorman*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

#### 2:20 PM Break

#### 2:40 PM

**Impact of (U,Zr)C Carbon Stoichiometry on Thermal Properties:** *Joseph Schaeperkoetter*<sup>1</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Kenneth McClellan<sup>1</sup>; Joshua White<sup>1</sup>; Brian Taylor<sup>2</sup>; Jhonathan Rosales<sup>2</sup>; Erofil Kardoouaki<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Marshall Space Flight Center

#### 3:00 PM

**Computational Simulation on Irradiation Damage in GaAs-Based Betavoltaic Batteries:** *Thaneshwor Kaloni*<sup>1</sup>; J Patel<sup>1</sup>; E Brian<sup>1</sup>; Edmanuel Torres<sup>1</sup>; <sup>1</sup>Canadian Nuclear Laboratories

#### 3:20 PM

**Corrosion Resistance of Amorphous Fe- and Ni-Based Thermal Spray Coatings Exposed to Molten FLiNaK Salt Nuclear Reactor Coolant at 700 °C:** *Enrique Maya-Visuet*<sup>1</sup>; <sup>1</sup>Liquidmetal Coatings

#### 3:40 PM

**Equivariant Neural Network Force Fields for 11-Cation Chloride Molten Salts System:** *Chen Shen*<sup>1</sup>; Siamak Attarian<sup>1</sup>; Mark Asta<sup>2</sup>; Izabela Szlufarska<sup>1</sup>; Dane Morgan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of California, Berkeley

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Solidification - A Phase-Field Modelling

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

**Thursday PM | March 27, 2025**  
**305 | MGM Grand**

**Session Chairs:** Prashant Singh, Ames National Laboratory; Shiddhartha Ramprakash, The Ohio State University

#### 1:00 PM Invited

**Investigating the Origin of Melting Entropy and the Latent Heat of Metallic Elements and Alloys:** *Anne Lin*<sup>1</sup>; Camille Bernal-Choban<sup>1</sup>; Vladimir Ladygin<sup>1</sup>; Brent Fultz<sup>1</sup>; <sup>1</sup>California Institute of Technology

#### 1:30 PM

**Determination of Mobility for Antiphase Domain Growth in Fe3Al: An Integration of Experiments and Phase-Field Simulations:** *Yuheng Liu*<sup>1</sup>; Masayuki Okugawa<sup>1</sup>; Tsubasa Sato<sup>1</sup>; Yuichiro Koizumi<sup>1</sup>; <sup>1</sup>Osaka University

#### 1:50 PM

**An Efficient Phase Field Model of Stoichiometric Compounds and Limited Soluble Phases:** *Dong-Uk Kim*<sup>1</sup>; Seong Gyeon Kim<sup>1</sup>; Pil-Ryung Cha<sup>1</sup>; <sup>1</sup>Kookmin University

#### 2:10 PM

**Anisotropic Phase Field Modeling of Tricrystal Grain Growth Using a Spherical-Gaussian-Based 5-D Computational Approach:** *Lenissongui Yeo*<sup>1</sup>; Jacob Bair<sup>1</sup>; <sup>1</sup>Oklahoma State University

#### 2:30 PM Break

#### 2:50 PM Invited

**Designing Recycled Al-Alloys With High-Throughput Scheil Solidification:** *Sunyoung Kwon*<sup>1</sup>; Gerald Knapp<sup>1</sup>; Ying Yang<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:10 PM

**A Computational Fluid Dynamics Investigation of Running System Approaches for Reactive Alloy Castings:** Christopher Jones<sup>1</sup>; *James Lennard*<sup>2</sup>; <sup>1</sup>AWE

#### 3:30 PM

**Microstructural Design of Multi-Principal Element Alloys:** *Shiddhartha Ramprakash*<sup>1</sup>; Shalini Roy Koneru<sup>2</sup>; Christopher Tandoc<sup>3</sup>; Yong-Jie Hu<sup>3</sup>; Hamish Fraser<sup>1</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>TCS Research, Tata Consultancy Services; <sup>3</sup>Drexel University

#### 3:50 PM

**Design of a New Al-Mg-Si Based Alloy for Higher Strength Using CALPHAD Simulations:** *Sagar Kumar Deb*<sup>1</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar

## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Mechanics

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

**Thursday PM | March 27, 2025**  
**317 | MGM Grand**

**Session Chairs:** Ahmed Alade Tiamiyu, University of Calgary, Canada; Hang Yu, Virginia Polytechnic Institute and State University

#### 1:00 PM Invited

**Cellular Engineering of Additive Manufactured Metallic Materials:** *Hyoung Seop Kim*<sup>1</sup>; Jihye Kwon<sup>1</sup>; Jeong Min Park<sup>2</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>Korean Institute for Materials Science

#### 1:30 PM

**Some Design Issues on Heterostructures Through Additive Manufacturing:** *Yuntian Zhu*<sup>1</sup>; <sup>1</sup>Citi University of Hong Kong

#### 1:50 PM

**Exceptional Strength and Ductility in Heterogeneous Multi-Gradient TiAl Alloys Through Additive Manufacturing:** *Xingdong Dan*<sup>1</sup>; Yuntian Zhu<sup>2</sup>; Zibin Chen<sup>1</sup>; <sup>1</sup>The Hong Kong Polytechnic University; <sup>2</sup>City University of Hong Kong

#### 2:10 PM

**Microstructure and Heterogeneous Deformation of Functionally Integrated Materials Fabricated by Directed Energy Deposition Additive Manufacturing:** *Xin Wang*<sup>1</sup>; Baolong Zheng<sup>2</sup>; Brandon Fields<sup>2</sup>; Jacob Norman<sup>3</sup>; Benjamin MacDonald<sup>2</sup>; Lorenzo Valdevit<sup>2</sup>; Enrique Lavernia<sup>3</sup>; Julie Schoenung<sup>3</sup>; <sup>1</sup>University of Alabama / University of California, Irvine; <sup>2</sup>University of California, Irvine; <sup>3</sup>University of California, Irvine / Texas A&M University

#### 2:30 PM Break

#### 2:50 PM Invited

**A Site-Specific Study of Complex Heterogeneous Microstructure Evolution During High-Velocity Metallic Microparticle Impact:** *Ahmed Alade Tiamiyu*<sup>1</sup>; <sup>1</sup>University of Calgary, Canada

#### 3:20 PM

**Towards Tailored Microstructure Design in Drop-on-Demand Molten Metal Jetting:** *Negar Gilani*<sup>1</sup>; Xiangyun Gao<sup>1</sup>; Marco Simonelli<sup>1</sup>; Mark East<sup>1</sup>; Richard Hague<sup>1</sup>; <sup>1</sup>University of Nottingham

#### 3:40 PM

**Processing and Microstructure: Localized Control of an Al-Ce-Cu-Zr Alloy:** *Kevin Sisco*<sup>1</sup>; Simon Ringer<sup>1</sup>; <sup>1</sup>The University of Sydney

#### 4:00 PM

**Influence of Phase Constitution on the Corrosion Behavior of Al-Added Steels Produced by Laser-Based Powder Bed Fusion Processes:** *Julia Richter*<sup>1</sup>; Johanna Frenck<sup>1</sup>; Gert Bartzsch<sup>2</sup>; Steffen Scherbring<sup>3</sup>; Olena Volkova<sup>2</sup>; Javad Mola<sup>3</sup>; Thomas Niendorf<sup>1</sup>; <sup>1</sup>University of Kassel; <sup>2</sup>TU Bergakademie Freiberg; <sup>3</sup>Osnaabrueck University of Applied Sciences



## Friction Stir Welding and Processing XIII — Additive Friction Stir Deposition II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Niles Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

Thursday PM | March 27, 2025  
123 | MGM Grand

**Session Chair:** Scott Rose, The Boeing Company

### 1:00 PM

**Towards Achieving Sustainability in Additive Friction Stir Deposition:** *Sweta Baruah*<sup>1</sup>; Joshua Hoekstra<sup>1</sup>; Madelyn Carter<sup>1</sup>; Rob Patterson<sup>1</sup>; Brett Compton<sup>1</sup>; Tony Schmitz<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

### 1:20 PM

**Integrating MegaStir Liquid-Cooled Tool Holder With MELD L3 Machine: Purpose and Process:** *Lukas Dean*<sup>1</sup>; Russell Steel<sup>2</sup>; Chase Cox<sup>3</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>MAZAK MegaStir; <sup>3</sup>MELD Manufacturing

### 1:40 PM

**Evaluation of Additive Friction Stir Deposited A206:** *Benjamin Pollard*<sup>1</sup>; Eric Lass<sup>1</sup>; Benjamin Wing<sup>1</sup>; <sup>1</sup>University of Tennessee

### 2:00 PM

**Additive Friction Stir Deposition of Carbon Steel:** Selami Emanet<sup>1</sup>; Saeid Zavari<sup>1</sup>; Huan Ding<sup>1</sup>; *Shengmin Guo*<sup>1</sup>; <sup>1</sup>Louisiana State University

### 2:20 PM Break

### 2:40 PM

**Fabrication of Laminated Metal Composites Using Additive Friction Stir Deposition:** *Ravi Sankar Haridas*<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Supreeth Gaddam<sup>1</sup>; Eric Kusterer<sup>1</sup>; Brandon McWilliams<sup>2</sup>; Kyu Cho<sup>2</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>DEVCOM Army Research Laboratory

### 3:00 PM

**Characterization of an Alternative Solid-State Additive Manufacturing Process:** *Eloise Cluff*<sup>1</sup>; Joel Gibb<sup>1</sup>; Josef Cobb<sup>2</sup>; Zachary Courtright<sup>2</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>National Aeronautics and Space Administration

### 3:20 PM

**On the Flexibility of Feedstock, Process, and Microstructure Control in Solid-Phase Metal Deposition via SolidStir®-AM:** *Kumar Kandasamy*<sup>1</sup>; Pankaj Kulkarni<sup>1</sup>; Devin Davis<sup>1</sup>; Anurag Gumaste<sup>2</sup>; Ravi Sankar Haridas<sup>2</sup>; Rajiv Mishra<sup>2</sup>; <sup>1</sup>Enabled Engineering; <sup>2</sup>University of North Texas

### 3:40 PM

**A Solid-State Additive Manufacturing Approach for the Fabrication of SiC-Reinforced Metal Matrix Composite in Automotive Components of Light Metal:** *Souvik Karmakar*<sup>1</sup>; Surjya Pal<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

## Friction Stir Welding and Processing XIII — Simulation & Spot Technologies

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Niles Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

Thursday PM | March 27, 2025  
124 | MGM Grand

**Session Chairs:** Ayoub Soulami, Pacific Northwest National Laboratory; Yong Chae Lim, Oak Ridge National Laboratory

### 1:00 PM

**Advances in Meshfree Simulations of Friction Stir Welding and Processing:** *Ayoub Soulami*<sup>1</sup>; Lei Li<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

### 1:20 PM

**Analysis of FSW Macro-Sections in Aluminum Relative to Unit-Area Data Features:** *Kevin Colligan*<sup>1</sup>; <sup>1</sup>Concurrent Technologies Corporation

### 1:40 PM

**Computational Framework for the Accurate and Efficient Simulation of FSW Processes:** *Michele Chiumenti*<sup>1</sup>; Henning Venghaus<sup>1</sup>; Narges Dialami<sup>1</sup>; Joan Baiges<sup>1</sup>; Daniel Juhre<sup>2</sup>; <sup>1</sup>CIMNE; <sup>2</sup>Otto von Guericke University Magdeburg

### 2:00 PM

**Measurement of Heat Transfer Coefficient Between a Friction Stir Welding Tool and Workpiece During Plunge Using a 3-Omega Sensor:** Matthew Goodson<sup>1</sup>; Isaac Culter<sup>1</sup>; Michael Miles<sup>1</sup>; Troy Munro<sup>1</sup>; <sup>1</sup>Brigham Young University

### 2:20 PM Break

### 2:40 PM

**Phase-Field Modeling of Grain Evolution and Recrystallization in Friction Stir Processing:** *Zhengtao Gan*<sup>1</sup>; <sup>1</sup>Arizona State University

### 3:00 PM

**Friction Self-Piercing Riveting Process for 3T Configuration of AA7075-AA7075-AA6022:** *Tianzhao Wang*<sup>1</sup>; Sammy Ojo<sup>1</sup>; Yong Chae Lim<sup>1</sup>; Zhili Feng<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 3:20 PM

**Refill Friction Stir Spot Welding in AA6061-T4 Automotive Sheets:** *Taylor Smith*<sup>1</sup>; Damon Gale<sup>1</sup>; Jeremy Coyne<sup>2</sup>; Kate Namola<sup>2</sup>; Yuri Hovanski<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Toyota Motor North America

### 3:40 PM

**Scale-Up of Friction Self-Piercing Riveting Process for Multi-Material Joints:** *Yong Chae Lim*<sup>1</sup>; Tianzhao Wang<sup>1</sup>; Yiyu Wang<sup>1</sup>; Jeremy Slade<sup>1</sup>; Sammy Ojo<sup>1</sup>; Zhili Feng<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

## Functional Nanomaterials — Functional Nanomaterials V: Structure-Property Relationships

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

**Thursday PM | March 27, 2025**  
**365 | MGM Grand**

**Session Chairs:** Chang-Yong Nam, Brookhaven National Laboratory; Jiyoung Chang, University of Utah

**1:00 PM**

**Metal-Schiff Base Covalently Grafted to the Iron-Based Metal-Organic Framework as an Effective Heterogeneous Catalyst for Ciprofloxacin Degradation:** *Harinder Kaur*<sup>1</sup>; <sup>1</sup>Punjab Engineering College

**1:20 PM**

**Functional Nanoglues for Heterogeneous Catalysis:** *Jingyue Liu*<sup>1</sup>; Ying Zheng<sup>1</sup>; Yiwei Yu<sup>1</sup>; Bailey Holmes<sup>1</sup>; <sup>1</sup>Arizona State University

**1:40 PM**

**Effect of Metal Modification on the Laminating Structure and Dielectric Performance of Graphene Oxide Membranes:** *Yijing Stehle*<sup>1</sup>; Timothy Barnum<sup>1</sup>; Ellen Robertson<sup>1</sup>; Maren Friday<sup>1</sup>; Veronah Najiuko<sup>1</sup>; Qin Zou<sup>2</sup>; Ryan Russel<sup>1</sup>; <sup>1</sup>Union College; <sup>2</sup>Sichuan University

**2:00 PM**

**Extreme Environment Soft Magnetic Nanocomposite Alloys:** Paul Ohodnicki<sup>1</sup>; *Yuankang Wang*<sup>1</sup>; Lauren Wewer<sup>1</sup>; Tyler Paplham<sup>1</sup>; Alex Leary<sup>2</sup>; Ronald Noebe<sup>2</sup>; Samuel Kernion<sup>3</sup>; Kevin Byerly<sup>3</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>CorePower Magnetics

**2:20 PM Break**

**2:40 PM**

**Energy-Efficient Synthesis of Organic-Inorganic Hybrids Through Polymer Complexation:** *Shaghayegh Abtahi*<sup>1</sup>; Jiashan Mi<sup>1</sup>; Kaitlyn Hillery<sup>1</sup>; Nayanathara Hendeniya<sup>1</sup>; Caden Chittick<sup>1</sup>; Gabriel Mogbojuri<sup>1</sup>; Aaron Rossini<sup>1</sup>; Boyce Chang<sup>1</sup>; <sup>1</sup>Iowa State University

**3:00 PM**

**Nanodiamond Patterning of Direct Laser Written Structures by Pulsed Laser Annealing:** *Sumeer Khanna*<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>NC State University

**3:20 PM**

**Regioselective Self-Assembly of Biomolecules Guided by Moire-Patterned 2D Homo/Heterostructures:** *Daiyue Wei*<sup>1</sup>; Yi Yang<sup>1</sup>; Ossie Douglas<sup>1</sup>; Zhewen Yin<sup>1</sup>; Muhammad Rafique<sup>1</sup>; Keegan Suero<sup>1</sup>; Sofia Morales Ferreira<sup>1</sup>; Nathan Gallant<sup>1</sup>; Michael Cai Wang<sup>1</sup>; <sup>1</sup>University of South Florida

## Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Corrosion and Radiation Damage

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Thursday PM | March 27, 2025**  
**352 | MGM Grand**

**Session Chairs:** Yang Yang, Pennsylvania State University; Sriswaroop Dasari, University of Texas at El Paso

**1:00 PM Invited**

**Atomic Scale Investigation of Surface Segregation and Local Ordering During Alloy Oxidation:** *Meng Li*<sup>1</sup>; Wissam Saidi<sup>2</sup>; Judith Yang<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>National Energy Technology Laboratory

**1:30 PM Invited**

**Effects of Short Range Order on Primary Passivation in Binary Alloys on:** Abhinav Roy<sup>1</sup>; Karl Sieradzki<sup>2</sup>; James Rondinelli<sup>1</sup>; *Ian Mccue*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Arizona State University

**2:00 PM**

**Revealing Short-Range Order in Refractory Multiprincipal Element Alloy: Implications for Oxidation Resistance:** *Elaf Anber*<sup>1</sup>; Brian DeCost<sup>2</sup>; Yevgeny Rakita<sup>1</sup>; Nathan Smith<sup>3</sup>; David Beaudry<sup>1</sup>; Georgia Leigh<sup>1</sup>; Howie Jorress<sup>2</sup>; Michael Waters<sup>3</sup>; Ben Redemann<sup>1</sup>; Loic Perriere<sup>4</sup>; James Rondinelli<sup>3</sup>; Simon J.L. Billinge<sup>5</sup>; Tyrel McQueen<sup>1</sup>; Chris Wolverton<sup>3</sup>; Jean Phillippe Couzinie<sup>4</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>National Institute of Standard and Technology; <sup>3</sup>Northwestern University; <sup>4</sup>University Paris-Est Créteil (UPEC) - IUT; <sup>5</sup>Columbia University

**2:20 PM Break**

**2:40 PM Invited**

**The Interplay Between Short-Range Order and Radiation Damage in Multi-Principal Element Alloys:** *Miaomiao Jin*<sup>1</sup>; Hyeonwoo Kim<sup>2</sup>; Hamdy Arkoub<sup>1</sup>; Sangtae Kim<sup>2</sup>; Yang Yang<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Hanyang University

**3:10 PM**

**Neutron Irradiation Induced Local Chemical Ordering in CrFeMnNi and CrFeMnNiTiAl Compositionally Complex Alloys:** *Nathan Curtis*<sup>1</sup>; Sohail Shah<sup>2</sup>; Kaustubh Bawane<sup>2</sup>; Fei Teng<sup>2</sup>; Tiankai Yao<sup>2</sup>; Mukesh Bachhav<sup>2</sup>; Haiming Wen<sup>3</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Missouri University of Science and Technology

**3:30 PM**

**Effect of Local Chemical Order on Vacancy Diffusion in NiCoCr Medium Entropy Alloys:** *Eryang Lu*<sup>1</sup>; Xiaoyu Gui<sup>1</sup>; Xudong An<sup>1</sup>; Filip Tuomisto<sup>1</sup>; <sup>1</sup>University of Helsinki

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Mechanical Degradation and Material Development in Molten Salts

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

Thursday PM | March 27, 2025  
165 | MGM Grand

**Session Chairs:** Stephen Raiman, University of Michigan; Weiyue Zhou, Massachusetts Institute of Technology

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1:00 PM

**Effect of Stress on Corrosion of 316H in Molten FLiNaK:** *Kyle Williams*<sup>1</sup>; Nathaniel Thomas<sup>1</sup>; Yinyin Hong<sup>1</sup>; Rijul Chauhan<sup>1</sup>; SeungSu Kim<sup>1</sup>; Lin Shao<sup>1</sup>; <sup>1</sup>Texas A&M University

1:20 PM

**Towards Understanding Embrittlement of Ni and Fe Based Alloys in Te- Containing FLiNaK Salt:** *Mohammad Umar Farooq Khan*<sup>1</sup>; Lesley Frame<sup>2</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Connecticut

1:40 PM

**Advanced Corrosion Barrier Design for Molten Salt Reactors:** *Sumit Bhattacharya*<sup>1</sup>; Yinbin Miao<sup>1</sup>; Abdellatif Yacout<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

2:00 PM

**Thermal Aging Behavior and Microstructure Evolution in AL/Ti Modified Ni-Cr-W-Mo Alloys:** Naveen Kumar N<sup>1</sup>; *Sonali Ravikumar*<sup>1</sup>; Boateng Twum Donkor<sup>2</sup>; Vishal Soni<sup>2</sup>; Abhishek Sharma<sup>1</sup>; Govindarajan Muralidharan<sup>3</sup>; Rajarshi Banerjee<sup>1</sup>; J Song<sup>4</sup>; M. A. Steiner<sup>2</sup>; Ravi Vilupanur<sup>5</sup>; Steven J. Zinkle<sup>6</sup>; Vijay K Vasudevan<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>University of Cincinnati; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Virginia Polytechnic Institute and State University; <sup>5</sup>California State Polytechnic University; <sup>6</sup>The University of Tennessee

2:20 PM Break

2:40 PM

**Development of Surveillance Test Articles for Materials Degradation Management in MSR Environments:** *Xinchang Zhang*<sup>1</sup>; Heramb Mahajan<sup>1</sup>; Michael McMurtrey<sup>1</sup>; Mark Messner<sup>2</sup>; Ruchi Gakhar<sup>1</sup>; Qiufeng Yang<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Argonne National Laboratory

3:00 PM

**Development of Corrosion-Resistant High Entropy Alloy for Nuclear Application:** *Priyanshi Agrawal*<sup>1</sup>; Michael Moorehead<sup>1</sup>; Arin Preston<sup>1</sup>; Qiufeng Yang<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; Michael McMurtrey<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

3:20 PM

**Corrosion of Ni-Cr-Fe Model Alloy in Molten NaCl-MgCl<sub>2</sub> Salt:** *Robert Gentile*<sup>1</sup>; Lingfeng He<sup>1</sup>; Ruchi Gakhar<sup>2</sup>; Laura Hawkins<sup>2</sup>; Michael Woods<sup>2</sup>; Wylie Simpson<sup>3</sup>; James Earthman<sup>3</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of California, Irvine

3:40 PM

**Molten Salt Corrosion and Irradiation Tolerance of Electric Field Assisted Sintered AlMoNbTiZr High Entropy Alloy:** *Crewse Petersen*<sup>1</sup>; Michael McMurtrey<sup>2</sup>; Priyanshi Agrawal<sup>2</sup>; Michael Moorehead<sup>2</sup>; Qiufeng Yang<sup>2</sup>; Ruchi Gakhar<sup>2</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Idaho National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Materials for Sustainable Hydrogen Energy — Hydrogen Combustion, Energy Conversion and Storage

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

Thursday PM | March 27, 2025  
359 | MGM Grand

**Session Chairs:** Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute Of Science And Technology (Kist); Binhan Sun, East China University of Science and Technology; Wenwen Song, University of Kassel

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1:00 PM Introductory Comments

1:05 PM Keynote

**Environmental Degradation of Ni-Based Superalloys in Hydrogen-Based Combustion Systems:** Dominik Dzedzic<sup>1</sup>; Philipp Schulz<sup>1</sup>; Ramanarayanan Balachandran<sup>1</sup>; Midhat Talibi<sup>1</sup>; *Enrique Galindo-Nava*<sup>1</sup>; <sup>1</sup>University College London

1:35 PM

**Numerical Modeling of Cavity Growth Resulting From Rapid Gas Decompression:** *Azdine Nait-Ali*<sup>1</sup>; Sylvie Castagnet<sup>1</sup>; Jérôme Colin<sup>2</sup>; <sup>1</sup>Isae-Ensma; <sup>2</sup>Université Poitiers/Pprime

1:55 PM

**Attempt to Synthesize Aluminum Hydride Using Hydrogen Plasma:** *Goroh Itoh*<sup>1</sup>; Hiroto Yuda<sup>1</sup>; Naoyuki Sato<sup>1</sup>; Shigeru Kuramoto<sup>1</sup>; Junya Kobayashi<sup>1</sup>; <sup>1</sup>Ibaraki University

2:15 PM Break

2:35 PM Panel Discussion

3:55 PM Concluding Comments

## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Ferritic Alloys

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**Thursday PM | March 27, 2025**  
**160 | MGM Grand**

**Session Chairs:** Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**1:00 PM Invited**

**Mechanical Properties of Tempered Martensitic Steels After High Dose Fast Reactor Irradiations:** *Stuart Maloy*<sup>1</sup>; Nathan Bailey<sup>1</sup>; Ramprasad Prabhakaran<sup>1</sup>; Eda Aydogan<sup>1</sup>; Md Alam<sup>1</sup>; Mychailo Toloczko<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**1:30 PM**

**Probing the Plastic Strength of Fe-Cr Alloys by Composition-Aware Dislocation Dynamic:** *Riccardo Civierto*<sup>1</sup>; *Anter El-Azab*<sup>1</sup>; <sup>1</sup>Purdue University

**1:50 PM**

**Chloride-Induced Stress Corrosion Crack Propagation Mechanisms in Austenitic Stainless Steel are Mechanically Driven:** *Saqib Bin Habib*<sup>1</sup>; *Yu Lu*<sup>2</sup>; *Yaqiao Wu*<sup>2</sup>; *Donna Guillen*<sup>3</sup>; *David Gandy*<sup>4</sup>; *Janelle Wharry*<sup>1</sup>; *Ronit Roy*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University, Center for Advanced Energy Studies; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Electric Power Research Institute

**2:10 PM**

**Towards a Multiscale Approach for Understanding Irradiation Induced Swelling and Creep in 316 Stainless Steels - A Coupled Cluster Dynamics and Crystal Plasticity Approach:** *Stephanie Pitts*<sup>1</sup>; *Sanjoy Mazumder*<sup>1</sup>; *Michael Moorehead*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**2:30 PM**

**Effect of Dynamic Strain Aging on High-Temperature Mechanical Properties of FeCrAl APMT Alloys:** *Mahmoud Hawary*<sup>1</sup>; *Abdullah Alomari*<sup>1</sup>; *K.L. Murty*<sup>1</sup>; <sup>1</sup>North Carolina State University

**2:50 PM Break**

**3:10 PM**

**Evaluation of Irradiation-Induced Hardening in Ferritic/Martensitic Steels and Hardness Correction Using Pile-Up Measurements:** *Kook Noh Yoon*<sup>1</sup>; *Christopher Reis*<sup>1</sup>; *Mehdi Balooch*<sup>1</sup>; *Takuya Yamamoto*<sup>2</sup>; *George Odette*<sup>2</sup>; *Peter Hosemann*<sup>1</sup>; <sup>1</sup>UC Berkeley; <sup>2</sup>UC Santa Barbara

**3:30 PM**

**Deformation Behaviour of Self-Irradiated Model Fe-9Cr and Fe-9Cr-NiSiP Alloys at Room Temperature and 300C: A Nanoindentation Case Study:** *Katarzyna Mulewska*<sup>1</sup>; *Damian Kalita*<sup>1</sup>; *Magdalena Wilczopolska*<sup>1</sup>; *Witold Chrominski*<sup>1</sup>; *Lukasz Kurpaska*<sup>1</sup>; <sup>1</sup>National Centre for Nuclear Research

**3:50 PM**

**Neutron Irradiation-Induced Pseudoelasticity in 316L Austenitic Stainless Steel:** *Arya Chatterjee*<sup>1</sup>; *Soumita Mondal*<sup>1</sup>; *Yu Lu*<sup>2</sup>; *Donna Guillen*<sup>3</sup>; *Benjamin Sutton*<sup>4</sup>; *David Gandy*<sup>4</sup>; *Janelle Wharry*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Electric Power Research Institute

**4:10 PM**

**Dislocation-Precipitate Interactions in Neutron-Irradiated RPV Steel:** *Brandon Bohanon*<sup>1</sup>; *Salil Bavdekar*<sup>2</sup>; *Ghatu Subhash*<sup>1</sup>; *Douglas Spearot*<sup>1</sup>; *Assel Aitkaliyeva*<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Illinois State University

## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Materials for Special/Extreme Application/Modelling of Interfaces

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

**Thursday PM | March 27, 2025**  
**369 | MGM Grand**

**Session Chairs:** Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Stanislav Zak, Austrian Academy of Sciences

**1:00 PM**

**Atomic-Scale Elucidation of the Chemo-Mechanical Coupling Effects in Garnet-Type Solid-Electrolyte Materials:** *Liwen Wan*<sup>1</sup>; *Suyue Yuan*<sup>1</sup>; *Kwangnam Kim*<sup>1</sup>; *Bo Wang*<sup>1</sup>; *Longsheng Feng*<sup>1</sup>; *Tae Wook Heo*<sup>1</sup>; *Brandon Wood*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**1:20 PM**

**A Large Hysteresis Behavior in CaFe<sub>2</sub>As<sub>2</sub> Single Crystal via the Bauschinger Effect Associated With Buckling-Induced Formation of Nanocrystalline Structure:** *Alexander Horvath*<sup>1</sup>; *Juan Schmidt*<sup>2</sup>; *Daniel Saccone*<sup>1</sup>; *Christopher Weinberger*<sup>3</sup>; *Paul Canfield*<sup>2</sup>; *Seok-Woo Lee*<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Iowa State University; <sup>3</sup>Colorado State University

**1:40 PM Invited**

**Nanolayered Metallic Alloys for Extreme Applications:** *Tomas Polcar*<sup>1</sup>; <sup>1</sup>Czech Technical University

**2:10 PM Break**

**2:30 PM Invited**

**The Effect of Interface Curvature on the Distribution of Radiation-Induced Voids:** *Griffin Turner*<sup>1</sup>; *Digvijay Yadav*<sup>1</sup>; *Emmeline Sheu*<sup>1</sup>; *Yongqiang Wang*<sup>2</sup>; *Jon Baldwin*<sup>2</sup>; *Michael Demkowicz*<sup>1</sup>; *Kelvin Xie*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Los Alamos National Laboratory

**3:00 PM**

**Disconnection-Mediated Twinning in Magnesium: A Combined Atomistic and Phase Field Approach:** *Yang Hu*<sup>1</sup>; *Dennis Kochmann*<sup>2</sup>; *Brandon Runnels*<sup>3</sup>; <sup>1</sup>Empa; <sup>2</sup>ETH Zurich; <sup>3</sup>Iowa State University



## Meeting Materials Challenges for the Future of Fusion Energy — Metallic Alloys III

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusion Engineering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

**Thursday PM | March 27, 2025**  
**158 | MGM Grand**

**Session Chairs:** Amy Gandy, UK Atomic Energy Authority; Dalong Zhang, Baylor University

### 1:00 PM Keynote

**Development of Industrially Scalable High-Temperature Steels for Fusion Applications:** *David Bowden*<sup>1</sup>; Viacheslav Kuksenko<sup>1</sup>; Jack Haley<sup>1</sup>; Jim Johnson<sup>1</sup>; Stephen Jones<sup>2</sup>; Nicholas Lavery<sup>2</sup>; Marcus Crabbe<sup>3</sup>; Peter Barnard<sup>4</sup>; <sup>1</sup>United Kingdom Atomic Energy Authority; <sup>2</sup>Swansea University; <sup>3</sup>Sheffield Forgemasters; <sup>4</sup>Materials Processing Institute

### 1:30 PM

**Investigation Of Microstructure and Mechanical Properties in Cost-Effective Thermomechanically Processed Nanostructured Ferritic Alloys:** *Yan-Ru Lin*<sup>1</sup>; Yajie Zhao<sup>2</sup>; Yi-Feng Su<sup>1</sup>; Thak Sang Byun<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee, Knoxville

### 1:50 PM

**The Role of AI in Advancing Materials Development and Testing for Fusion Energy Deployment:** *Ross Allen*<sup>1</sup>; <sup>1</sup>digiLab

### 2:10 PM Invited

**Advancing the Scalable Fabrication of Oxide Dispersion Strengthened (ODS) Steel Plates:** *Dalong Zhang*<sup>1</sup>; Xiang Wang<sup>2</sup>; Jens Darsell<sup>2</sup>; Kenneth Ross<sup>2</sup>; Tingkun Liu<sup>2</sup>; Zehao Li<sup>2</sup>; Benjamin Schuessler<sup>2</sup>; Kayla Yano<sup>2</sup>; Iver Anderson<sup>3</sup>; Thak Sang Byun<sup>4</sup>; Stuart Maloy<sup>2</sup>; Wahyu Setyawan<sup>2</sup>; <sup>1</sup>Baylor University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Ames Laboratory; <sup>4</sup>Oak Ridge National Laboratory

### 2:40 PM Break

### 3:00 PM

**Laser Additive Manufacturing of PFCs for Nuclear Fusion: Studying the Influence of Tungsten Deposition on RAFM Steel Using Multimodal Synchrotron Imaging:** *Natan Garrivier*<sup>1</sup>; Malgorzata Makowska<sup>1</sup>; Manuel Pouchon<sup>1</sup>; *Steven Van Petegem*<sup>1</sup>; Markus Strobl<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute

### 3:20 PM

**Assessment of Additive Manufacturing Techniques for Obtaining Ferritic/Martensitic ODS:** *Emma Kruck*<sup>1</sup>; Lucas Autones<sup>1</sup>; Olivier Tache<sup>2</sup>; Pascal Aubry<sup>1</sup>; Manuel Francois<sup>3</sup>; *Yann De Carlan*<sup>1</sup>; <sup>1</sup>Cea; <sup>2</sup>CEA-CNRS; <sup>3</sup>UTT

### 3:40 PM

**Characterisation of Oxide Dispersion Strengthened Steels for Nuclear Fusion Application:** *Viacheslav Kuksenko*<sup>1</sup>; <sup>1</sup>UK Atomic Energy Authority

## Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Next-Generation Fuels IV: Cladding and Fuel-Cladding Interactions

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Thursday PM | March 27, 2025**  
**159 | MGM Grand**

**Session Chairs:** Xing Wang, Pennsylvania State University; Caleb Clement, Westinghouse Electric Company

### 1:00 PM Invited

**Development of Elemental Technologies for Application of SiC Fuel Cladding to BWR:** *Ryo Ishibashi*<sup>1</sup>; Masana Sasaki<sup>2</sup>; Masatoshi Shibata<sup>2</sup>; Kenichi Yasuda<sup>2</sup>; Yoshiyuki Nemoto<sup>3</sup>; Tatsuya Hinoki<sup>4</sup>; <sup>1</sup>Hitachi, Ltd.; <sup>2</sup>Hitachi-GE Nuclear Energy, Ltd.; <sup>3</sup>Japan Atomic Energy Agency; <sup>4</sup>Kyoto University

### 1:30 PM

**Multimodal Investigation of the Neutron Induced Defect of SiC/SiC Composites:** *David Arregui-Mena*<sup>1</sup>; Takaaki Koyanagi<sup>1</sup>; Weicheng Zhong<sup>1</sup>; Yutai Katoh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 1:50 PM

**Recent Progress on Ceramic Coating Development for Advanced Cladding:** *Jian Gan*<sup>1</sup>; Chao Jiang<sup>1</sup>; Yuhang Li<sup>1</sup>; Tiankai Yao<sup>1</sup>; Laura Hawkins<sup>1</sup>; Mukesh Bachhav<sup>1</sup>; Yizhi Zhang<sup>2</sup>; Yifan Zhang<sup>2</sup>; Jiawei Song<sup>2</sup>; Haiyan Wang<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Purdue University

### 2:10 PM

**Material Characterization and Pellet Cladding Interaction Performance of Optimized ZIRLO™ with Liner:** *Caleb Clement*<sup>1</sup>; Guirong Pan<sup>1</sup>; Magnus Limback<sup>2</sup>; Antoine Ambard<sup>3</sup>; Zaheen Shah<sup>2</sup>; Nermine Chaari-Schule<sup>3</sup>; Kenneth Gorannsson<sup>2</sup>; Britta Helmersson<sup>2</sup>; Jonna Partezana<sup>1</sup>; Julian Soulacroix<sup>3</sup>; <sup>1</sup>Westinghouse Electric Company; <sup>2</sup>Westinghouse Electric Sweden; <sup>3</sup>Electricite de France

### 2:30 PM Break

### 2:50 PM

**Thermal Response and Mechanical Integrity of High Temperature Cr-Coated Zr Cladding Under Multiple Quench Tests:** *WooHyun Jung*<sup>1</sup>; Cole Dunbar<sup>1</sup>; Jun Yeong Jo<sup>2</sup>; Kumar Sridharan<sup>1</sup>; *Hwasung Yeom*<sup>2</sup>; <sup>1</sup>University of Wisconsin, Madison; <sup>2</sup>Pohang University of Science and Technology

### 3:10 PM

**Fission Product Distribution Analysis in Zr Lined U-Mo Fuels Using Transmission Electron Microscopy and Atom Probe Tomography:** *Nicole Rodriguez Perez*<sup>1</sup>; Sobhan Patnaik<sup>2</sup>; Shehab Shousha<sup>3</sup>; Mukesh Bachhav<sup>2</sup>; Luca Capriotti<sup>2</sup>; Geoffrey Beausoleil<sup>2</sup>; Benjamin Beeler<sup>3</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>North Carolina State University

3:30 PM

**Characterization and Modeling of Joint Oxide-Gain and Inner Cladding Corrosion in Fast Reactor Fuels:** *Aurelien Hoel-Bacle*<sup>1</sup>; Jean-Christophe Dumas<sup>1</sup>; Philippe Bienvenu<sup>1</sup>; Karine Hanifi<sup>1</sup>; Isabelle Zacharie-Aubrun<sup>1</sup>; Thierry Blay<sup>1</sup>; Ingrid Roure<sup>1</sup>; Catherine Sabathier<sup>1</sup>; Doris Drouan<sup>1</sup>; Laurent Fayette<sup>1</sup>; Nicolas Robert<sup>1</sup>; Pierre Benigni<sup>2</sup>; Charlotte Becquart<sup>3</sup>; <sup>1</sup>CEA, DES, IRESNE, DEC; <sup>2</sup>Aix Marseille Univ, Université de Toulon, CNRS; <sup>3</sup>University Lille, CNRS

3:50 PM

**Density Functional Theory Study of Helium Diffusion in Ni-M Alloys (M= Cr, Mo):** *Ximeng Wang*<sup>1</sup>; Yachun Wang<sup>2</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Idaho National Laboratory

## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing — From Multi-Materials to Advanced Inorganic Materials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Electronic Packaging and Interconnection Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Alain Reiser, KTH Royal Institute of Technology; Wendy Gu, Stanford University; Yu Zou, University of Toronto; Mostafa Hassani, Cornell University; Ming Chen, University of Nevada, Reno

Thursday PM | March 27, 2025  
316 | MGM Grand

**Session Chairs:** Alain Reiser, KTH Royal Institute of Technology; Mostafa Hassani, Cornell University

#### 1:00 PM Introductory Comments

1:05 PM Invited

**Advances in High-Throughput, Multimaterial, Micro and Nano Additive Manufacturing:** *Christopher Spadaccini*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

1:35 PM

**3D-AJP: Fabrication of Advanced Microarchitected Multi-Material Ceramic Structures via Binder-Free and Auxiliary-Free Aerosol Jet 3D Nanoprinting:** *Chunshan Hu*<sup>1</sup>; Sanjida Jahan<sup>1</sup>; Bin Yuan<sup>1</sup>; Caitlyn Santiago<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

1:55 PM

**Single-Melt Pool Methods to Print the Unprintable:** *Marcus Hansen*<sup>1</sup>; Wuxian Yang<sup>2</sup>; Wen Chen<sup>2</sup>; Kelvin Xie<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of Massachusetts

2:15 PM

**Direct 3D Printing of Multi-Metal Components Via Drop-On-Demand Molten Metal Jetting:** *Negar Gilani*<sup>1</sup>; Xiangyun Gao<sup>1</sup>; Marco Simonelli<sup>1</sup>; Mark East<sup>1</sup>; Richard Hague<sup>1</sup>; <sup>1</sup>University of Nottingham

2:35 PM Break

2:55 PM Invited

**Additive Manufacturing of Large-Scale Bulk and Architected Materials with Micro/Nano-Structural Control:** *Lorenzo Valdevit*<sup>1</sup>; <sup>1</sup>University of California, Irvine

3:25 PM

**Agglomerate Formation and Flowability Analysis of Hybrid Feedstocks Containing Micron-Sized Nanoporous Copper Powders and Nanoparticles for Laser Powder Bed Fusion Printing:** *Laura Duenas Gonzalez*<sup>1</sup>; Natalya Kublik<sup>1</sup>; Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University

3:45 PM

**Process Development and Microstructure Evaluation of Additive Manufacturing of Silicon Components:** *Austin Tiley*<sup>1</sup>; Chia-Yu Chang<sup>1</sup>; Emily Holt<sup>1</sup>; Yi Song<sup>2</sup>; John Chen<sup>2</sup>; Ben DiMarco<sup>1</sup>; John Middendorf<sup>1</sup>; Alan Luo<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Silfex, Inc.

4:05 PM

**3-Dimensional Electrocatalytic On-Site Oxygenation Using Aerosol Jet Printing for Implanted Cell Therapies:** *Aaditya Nandakumar*<sup>1</sup>; Rahul Panat<sup>1</sup>; Itzhaq Cohen-Karni<sup>1</sup>; Chunshan Hu<sup>1</sup>; Inkyu Lee<sup>1</sup>; Seonghan Jo<sup>1</sup>; Suyeon Kim<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

## ADVANCED CHARACTERIZATION METHODS

### Neutron and X-Ray Scattering in Materials Science and Engineering — Technique Development

**Sponsored by:** TMS Functional Materials Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Michael Manley, Oak Ridge National Laboratory; Chen Li, University of California-Riverside; Hillary Smith, Swarthmore College; Jennifer Niedziela, Oak Ridge National Laboratory

Thursday PM | March 27, 2025  
156 | MGM Grand

**Session Chair:** Michael Manley, Oak Ridge National Laboratory

1:00 PM Invited

**Unveiling Multiscale Structure and Dynamics with Neutron Imaging:** *James Torres*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

1:30 PM

**Feasibility of a Focusing Small-Angle Neutron Scattering (SANS) Instrument at the MIT Nuclear Reactor Laboratory:** *Boris Khaykovich*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

1:50 PM

**Application of Energy-Dispersive X-Ray Diffraction for Engineering Alloys:** *Chihpin Chuang*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

2:10 PM

**From Angstroms to Micrometers: Across-Length-Scale Structural Characterization of Hard Materials via X-Ray Scattering:** *Fan Zhang*<sup>1</sup>; Jan Ilavsky<sup>2</sup>; Andrew Allen<sup>1</sup>; Lyle Levine<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Argonne National Laboratory

2:30 PM Break

2:40 PM

**The Development of a Stress-Strain Diffractometer at the MIT Reactor Using a Polychromatic Beam:** *Sean Fayfar*<sup>1</sup>; Jay Cremer<sup>2</sup>; Boris Khaykovich<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Adelphi Technology

3:00 PM

**Back-Grinding for Improved X-Ray Diffraction:** *Braden Miller*<sup>1</sup>; Joshua Cline<sup>1</sup>; Michael Hurst<sup>1</sup>; James Paramore<sup>2</sup>; Anup Bandyopadhyay<sup>1</sup>; Eli Norris<sup>1</sup>; Brady Butler<sup>3</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>George H.W. Bush Combat Development Complex at the Texas A&M Rellis Campus; <sup>3</sup>DEVCOM Army Research Laboratory South at Texas A&M University

3:20 PM

**The Influence of Grain Size on the Deformation-Induced Martensitic Transformation in Austenitic Steels: From Grain-Average to Single-Grain Behavior Studied by In-Situ High-Energy Synchrotron X-Ray Diffraction:** *Chen Cai*<sup>1</sup>; Benjamin Neding<sup>2</sup>; Gaoming Zhu<sup>3</sup>; Peter Hedström<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>University of Applied Sciences Lübeck; <sup>3</sup>Helmholtz-Zentrum Hereon

### 3:40 PM Invited

**The Role of Annealing and Grain Boundary Controls on the Mechanical Properties of Limestones, Marbles and Novaculite:** *Lawrence Anovitz<sup>1</sup>; Rui Zhang<sup>1</sup>; Paul Bosomworth<sup>2</sup>; Juliane Weber<sup>1</sup>; Jan Ilavsky<sup>3</sup>; Si Chen<sup>1</sup>; Elliot Gilbert<sup>4</sup>; Jitendra Mata<sup>4</sup>; Mark Rivers<sup>5</sup>; Peter Eng<sup>5</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>BuzzMac International LLC; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>Australian Centre for Neutron Scattering, Australian Nuclear Science and Technology Organisation; <sup>5</sup>University of Chicago*

## ADVANCED CHARACTERIZATION METHODS

### Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques — Microstructure Characterization Workflows

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory; Austin McDannald, National Institute of Standards and Technology; Fan Zhang, National Institute of Standards and Technology; Sarshad Rommel, University of Connecticut

Thursday PM | March 27, 2025  
157 | MGM Grand

**Session Chairs:** Rakesh Kamath, Argonne National Laboratory; Sarshad Rommel, University of Connecticut

### 1:00 PM

**Efficient SEM Imaging Strategies for Microstructure Analysis in Metal Additive Manufacturing:** *Christina Koenig<sup>1</sup>; Andrei Tudor Durnescu<sup>1</sup>; Sotero Romero<sup>1</sup>; Laura Andrea Paz Salas<sup>1</sup>; Joerg Jinschek<sup>1</sup>; <sup>1</sup>Technical University of Denmark - DTU Nanolab*

### 1:20 PM

**Optimization of Automated Sample Polishing Enabled by the Characterization of Surface Roughness Evolution:** *Styler Goring<sup>1</sup>; Michael Pagan<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

### 1:40 PM

**High Throughput Characterization of 316L Stainless Steel Fabricated Using Laser Powder Bed Fusion:** *Justin Warner<sup>1</sup>; Sriram Vijayan<sup>1</sup>; <sup>1</sup>Michigan Tech*

### 2:00 PM

**Rapid Data-Driven Non-Destructive Inspection of Additively Manufactured IN718 Using the Side-Band Peak Counting (SPC) Non-Linear Ultrasonics Method:** *I-Ting Ho<sup>1</sup>; Krishna Muralidharan<sup>1</sup>; Sammy Tin<sup>1</sup>; Devin Bayly<sup>1</sup>; Pierre Deymier<sup>1</sup>; Tribikram Kundu<sup>1</sup>; <sup>1</sup>University of Arizona*

### 2:20 PM Break

### 2:40 PM

**Application of The Polyhedral Template Matching Method for Characterization of 2D Atomic Resolution Electron Microscopy Images:** *Darcey Britton<sup>1</sup>; Douglas Medlin<sup>2</sup>; Alejandro Hinojos<sup>2</sup>; Michelle Hummel<sup>2</sup>; David Adams<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Sandia National Laboratories*

### 3:00 PM

**Correlative Microscopy and AI for Rapid Analysis of Complex Material Structures:** *Hugues Francois-Saint-Cyr<sup>1</sup>; Alice Scarpellini<sup>1</sup>; Bartlomej Winiarski<sup>1</sup>; Rengarajan Pelapur<sup>1</sup>; <sup>1</sup>Thermo Fisher Scientific*

### 3:20 PM

**Deep Learning-Assisted Study of 3D Damage Evolution in Semiconductor Packages Under Thermal Cycling Using X-ray Microcomputed Tomography:** *Eshan Ganju<sup>1</sup>; Yaw Obeng<sup>2</sup>; William Harris<sup>3</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>NIST; <sup>3</sup>Zeiss*

### 3:40 PM

**Interrogating 3D Grain Morphology and Crystallographic Texture via Automated Polarized Light Microscopy:** *Paul Chao<sup>1</sup>; Rhianna Oakley<sup>2</sup>; Andrew Polonsky<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of New Mexico*

## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Additive Manufacturing

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

Thursday PM | March 27, 2025  
167 | MGM Grand

**Session Chairs:** Le Zhou, Marquette University; Kevin Sisco, University of Sydney

### 1:00 PM

**Microstructure Design in Duplex Stainless Steels Via Additive Manufacturing:** *Nima Haghdadi<sup>1</sup>; Cindy He<sup>2</sup>; Sophie Primig<sup>2</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>UNSW Sydney*

### 1:25 PM Invited

**Phase Transformations in Metal Additive Manufacturing:** *Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory*

### 1:50 PM

**Microstructure and Texture Formation in Inconel 718 Deposited by Induction-Heating-Assisted Laser-Directed Energy Deposition:** *Junmyoung Jang<sup>1</sup>; Yeongcheol Shin<sup>1</sup>; Jaeheon Lee<sup>1</sup>; Seung Hwan Lee<sup>1</sup>; <sup>1</sup>Hanyang University*

### 2:10 PM

**Investigating Appropriate Heat Treatments for Laser Powder Bed Fusion Nickel Alloy 718:** *James Zuback<sup>1</sup>; Andrew Iams<sup>1</sup>; Saadi Habib<sup>1</sup>; Mark Stoudt<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology*

### 2:30 PM Break

### 2:45 PM

**Directed Energy Deposition of CoCrFeMnNi High Entropy Alloy: Influence of Process Parameters on Thermal Cycles and Microstructural Evolution:** *Nishkarsh Srivastava<sup>1</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Advanced Materials Processing Research Group, Materials Engineering, Indian Institute of Technology Gandhinagar*

### 3:05 PM

**Phase Transformations and Microstructure Evolution in Additive Laser Powder Bed Fusion Processed and Heat-Treated Co-Cr-Mo Alloy:** *Boateng Twum Donkor<sup>1</sup>; Sonali Ravikumar<sup>2</sup>; Naveen Kumar Nagaraja<sup>2</sup>; Jie Song<sup>3</sup>; Matthew Steiner<sup>1</sup>; Vijay Vasudevan<sup>2</sup>; <sup>1</sup>University of Cincinnati; <sup>2</sup>University of North Texas; <sup>3</sup>Virginia Polytechnic Institute and State University*

3:25 PM

**Discovery of New Nano-Scale Metastable Intermetallic Phases in Laser Rapid Solidified Aluminum-Germanium Eutectic:** *Arkajit Ghosh*<sup>1</sup>; Wenqian Wu<sup>2</sup>; Tao Ma<sup>1</sup>; Jian Wang<sup>2</sup>; Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Nebraska – Lincoln

3:45 PM

**Microstructural Stability and Phase Transformations in 17-4PH Stainless Steel Builds Fabricated Via Laser Powder Bed Fusion:** *Gowri Shankar Bollu*<sup>1</sup>; Sriram Vijayan<sup>1</sup>; <sup>1</sup>Michigan Technological University

4:05 PM

**Development of a Novel Processing Technique for Cold-Rolled 2014 Aluminum Alloys via Athermally-Enhanced Electrical Annealing:** *Yao-Lun Cheng*; Jen-Ting Wang<sup>1</sup>; Meng-Chun Chiu<sup>1</sup>; Yung-Hua Chen<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>NTUST

## BIOMATERIALS

### Porous Materials for Biomedical Applications – Porous Materials for Biomedical Applications II

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Usman Liaqat, National University of Sciences and Technology; Waheed Miran, National University of Sciences and Technology; Khurram Yaqoob, National University of Sciences and Technology; Xizi Long, University of South China

Thursday PM | March 27, 2025  
306 | MGM Grand

**Session Chair:** Heinz Palkowski, Clausthal University of Technology

1:00 PM Introductory Comments

1:10 PM Invited

**Magnetically Enhanced Nanotherapy for Targeted Cancer Treatment:** *Waqas Qamar Zaman*<sup>1</sup>; <sup>1</sup>INL

1:35 PM

**Non-Thermal Plasma Modification of 3D-Printed Starch-Based Bio-Composites: Advancing Soft Robotics and Biocompatible Materials Through In-Situ Corona Discharge Treatment:** *Alexis Gasca*<sup>1</sup>; Rajvardhan Patil<sup>1</sup>; Derek Xiong<sup>1</sup>; Kaiyu Vang<sup>1</sup>; Sankha Banerjee<sup>1</sup>; <sup>1</sup>California State University, Fresno

2:00 PM

**Polymers Covering Open ZnMg Structures for Controlled Corrosion in Absorbable Implants:** *Matteo Caranchini*<sup>1</sup>; Valeria Vistoso<sup>1</sup>; Mitja Petrič<sup>2</sup>; Primoz Mrvar<sup>2</sup>; Stephane Mery<sup>3</sup>; Lydie Ploux<sup>4</sup>; Tiphaine Schott<sup>5</sup>; Karine Mougin<sup>6</sup>; Françoise Liautaud<sup>5</sup>; Heinz Palkowski<sup>7</sup>; *Adele Carradò*<sup>8</sup>; <sup>1</sup>University of Strasbourg, IPCMS CNRS; <sup>2</sup>University of Ljubljana; <sup>3</sup>IPCMS CNRS - UMR 7504; <sup>4</sup>INSERM / Université de Strasbourg, UMR\_S 1121; <sup>5</sup>CETIM, Matériaux Métalliques et Surface, Mulhouse; <sup>6</sup>Institut de Science des Matériaux de Mulhouse IS2M; <sup>7</sup>Clausthal University of Technology; <sup>8</sup>University of Strasbourg, CNRS IPCMS

## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding – Sustainability

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

Thursday PM | March 27, 2025  
105 | MGM Grand

**Session Chairs:** Catherine Elissalde, Cnrs/University Bordeaux; Claude Estournes, Cirimat - Cnrs

1:00 PM

**Enabling the Manufacturing of Hierarchical and Layered Materials:** *Diletta Giuntini*<sup>1</sup>; <sup>1</sup>Eindhoven University of Technology

1:20 PM

**A Sustainable Approach to Manufacturing Carbon Steels from Oxide Powder Feedstocks:** *Elias Winterscheidt*<sup>1</sup>; Apurva Nayak<sup>1</sup>; Josh Kacher<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

1:40 PM Invited

**Moving Towards the Eco-Design of Flexible Piezoelectric Energy Harvester: Some Issues and Prospects:** *Catherine Elissalde*<sup>1</sup>; U-Chan Chung<sup>1</sup>; Christopher Castro Chavarria<sup>1</sup>; Nadia Bencharef<sup>1</sup>; Rabie Aloui<sup>2</sup>; Michaël Josse<sup>1</sup>; Barbara Lafarge<sup>2</sup>; Mario Maglione<sup>1</sup>; Hélène Debéda<sup>3</sup>; <sup>1</sup>ICMCB/CNRS/Université Bordeaux; <sup>2</sup>Université de Technologie de Compiègne; <sup>3</sup>IMS/ Bordeaux University

2:10 PM Invited

**Engineering of Ceramic Oxides Microstructures using Low Temperature Sintering Processes:** *Claude Estournes*<sup>1</sup>; Julien De Landtsheer<sup>1</sup>; Nicolas Albar<sup>1</sup>; Melanie Rousselle<sup>1</sup>; Geoffroy Chevallier<sup>1</sup>; Alicia Weibel<sup>1</sup>; Florence Ansart<sup>1</sup>; Guillaume Fradet<sup>1</sup>; Catherine Elissalde<sup>2</sup>; Thomas Herisson de Beauvoir<sup>2</sup>; <sup>1</sup>CIRIMAT - CNRS; <sup>2</sup>ICMCB CNRS

2:40 PM Break

2:50 PM Invited

**Low Energy Densification Processes for Ceramic Powders: Processing to Properties:** *Claire Dancer*<sup>1</sup>; <sup>1</sup>University of Warwick

3:20 PM Invited

**Processing of Barium Zirconate-Based Protonic Conductors by Suitable Combination of Cold Sintering and Post Thermal Treatment:** *Martin Bram*<sup>1</sup>; Moritz Kindelmann<sup>1</sup>; Joachim Mayer<sup>2</sup>; Olivier Guillon<sup>1</sup>; <sup>1</sup>Forschungszentrum Jülich; <sup>2</sup>RWTH Aachen

3:50 PM

**Progress on Thermal Sprayed Ultrahard Coatings for Preventing Adhesive Wear of Stamping Die Surfaces:** Iver Anderson<sup>1</sup>; Jordan Tiarks<sup>1</sup>; Rameshwari Naorem<sup>1</sup>; Andrew Kustas<sup>2</sup>; Yun Bai<sup>3</sup>; Bill Lenling<sup>4</sup>; Emma White<sup>5</sup>; Nicolas Argibay<sup>1</sup>; <sup>1</sup>Iowa State University Ames Laboratory; <sup>2</sup>Sandia National Lab; <sup>3</sup>Ford Motor Company; <sup>4</sup>TST Fisher Barton; <sup>5</sup>DECHEMA



## MATERIALS SYNTHESIS AND PROCESSING

### Recent Advances in Titanium Science and Technology: MPMD/SMD Symposium Honoring Professor Dipankar Banerjee — Alloy Design of High Temperature Materials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Phase Transformations Committee, TMS: Titanium Committee

**Program Organizers:** Yufeng Zheng, University of North Texas; Abhishek Sharma, University of North Texas; Adam Pilchak, Pratt & Whitney; Rajarshi Banerjee, University of North Texas; Yunzhi Wang, Ohio State University

**Thursday PM | March 27, 2025**  
**107 | MGM Grand**

**Session Chairs:** Yufeng Zheng, University of North Texas; Abhishek Sharma, University of North Texas

#### 1:00 PM Invited

**Oxide Dispersion Strengthening: An Old Topic with New Developments:** *Michael Mills*<sup>1</sup>; Milan Heczko<sup>2</sup>; Jiashi Miao<sup>1</sup>; Andreas Bezold<sup>1</sup>; Stephen Niezgoda<sup>1</sup>; Calvin Stewart<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Emmanuelle Marquis<sup>3</sup>; Timothy Smith<sup>4</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Czech Academy of Sciences; <sup>3</sup>University of Michigan; <sup>4</sup>NASA Glenn Research Center

#### 1:30 PM Invited

**High-Temperature Deformation and Damage Behavior a -Lean Ni-Based Superalloy: A Case Study of IN740H:** Chandan Kumar<sup>1</sup>; Praveen Kumar<sup>1</sup>; <sup>1</sup>Indian Institute of Science

#### 2:00 PM Invited

**High Creep Stress Exponents and Elementary Deformation Mechanisms:** *Gunther Eggeler*<sup>1</sup>; <sup>1</sup>Ruhr-Universität Bochum

#### 2:30 PM Break

#### 2:50 PM Invited

**An Integrated Framework to Accelerate the Design of Alloys and Processes for Texture Dominated Properties in HCP Alloys:** *John Allison*<sup>1</sup>; <sup>1</sup>University of Michigan

#### 3:20 PM Concluding Comments

## LIGHT METALS

### Recycling and Sustainability in Cast Shop Technology: Joint Session with REWAS 2025 — Purification and Alloys for Recycling

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee, TMS: Aluminum Committee

**Program Organizers:** Mertol Gokelma, Izmir Institute of Technology; Anne Kvithyld, SINTEF; Les Edwards, Rain Carbon Inc.; Andre-Felipe Schneider, Hatch Ltd.; Arild Hakonsen, Hycast As

**Thursday PM | March 27, 2025**  
**116 | MGM Grand**

**Session Chair:** Anne Kvithyld, SINTEF

#### 1:00 PM Introductory Comments

#### 1:05 PM

**Classification of Automotive Aluminum Scrap Into Cast and Wrought Alloys:** *Shri Shankar*<sup>1</sup>; Carl Soderhjelm<sup>1</sup>; Diran Apelian<sup>1</sup>; Stuart Wiesner<sup>2</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>Rheinfelden Alloys

#### 1:30 PM

**Development of Aluminum Chips Recycling Process for Recovery Rates and Corrosion Resistance of A380 Alloy:** *Hongfa Hu*<sup>1</sup>; <sup>1</sup>Mame, University of Windsor

#### 1:55 PM Keynote

**Electrolytic Purification of Aluminum Scrap in NaCl-KCl-Na<sub>3</sub>AlF<sub>6</sub> Molten Salt System:** *Buju Guo*<sup>1</sup>; Yaowu Wang<sup>1</sup>; Wenxiong Dong<sup>1</sup>; Jinbo Qiao<sup>1</sup>; <sup>1</sup>Northeastern University

#### 2:20 PM Break

#### 2:35 PM

**Enhancing Secondary Aluminum Supply: Optimizing Urban Mining Through a Systems Thinking Approach:** *Milan Liu*<sup>1</sup>; Kilian Schneider<sup>2</sup>; Lampros Litos<sup>1</sup>; Konstantinos Salonitis<sup>1</sup>; <sup>1</sup>Cranfield University; <sup>2</sup>Constellium

#### 3:00 PM

**Microstructure-Based Investigation of Bonding Mechanisms of Solid-State-Recycled Aluminum Chips for Sustainable Semi-Finished Products:** *Alexander Koch*<sup>1</sup>; Frank Walther<sup>1</sup>; <sup>1</sup>TU Dortmund University

#### 3:25 PM

**Achieving High Impurity Tolerance in Recycled Aluminum Alloy Through Solid Phase Processing:** *Tianhao Wang*<sup>1</sup>; Xiao Li<sup>1</sup>; Akash Mukhopadhyay<sup>1</sup>; Shivakant Shukla<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

## Refractory Metals 2025 — Student Presentations

**Sponsored by:** TMS Structural Materials Division, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Matthew Osborne, Global Advanced Metals; Paul Rottmann, University of Kentucky; Gianna Valentino, University of Maryland

**Thursday PM | March 27, 2025**  
**168 | MGM Grand**

**Session Chair:** Paul Rottmann, University of Kentucky

**1:00 PM**

**Flow Stress and Microstructural Evolution of TZM and Mo-La Alloys at Temperatures From 1400 to 1700 °C:** *Monica Martinez Henriquez*<sup>1</sup>; Gary Rozak<sup>2</sup>; Eric Taleff<sup>1</sup>; <sup>1</sup>University of Texas Austin; <sup>2</sup>Elmet Technologies LLC

**1:20 PM**

**Effect of Geometric Features on Liquid Metal Dealloying of Additively Manufactured Niobium-Titanium:** *Catherine Barrie*<sup>1</sup>; Kourtney Porsch<sup>2</sup>; Michael Brupbacher<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory

**1:40 PM**

**Microstructural Evolution of Nb-Alloys Produced via High-Pressure Torsion:** *Miranda Bell*<sup>1</sup>; Leticia Calderon<sup>2</sup>; Kaitlyn Mullin<sup>3</sup>; Tresa Pollock<sup>3</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Fort Lewis College; <sup>3</sup>University of California, Santa Barbara

**2:00 PM**

**Preparation of Homogeneous W-Re Alloys by Coating Tungsten Powder With Perhenic Acid:** *Davis Conklin*<sup>1</sup>; Michael Zaza<sup>1</sup>; Hailey Loehde-Woolard<sup>1</sup>; Hermann Barrientos<sup>1</sup>; Arne Croell<sup>2</sup>; Jhonathan Rosales<sup>3</sup>; Alan Weimer<sup>1</sup>; <sup>1</sup>University of Colorado Boulder; <sup>2</sup>University of Alabama in Huntsville; <sup>3</sup>NASA Marshall Space Flight Center

**2:20 PM**

**The High Temperature Performance of Mechanically Processed Equiatomic NbTaV Refractory Alloy:** *Eli Norris*<sup>1</sup>; Cafer Acemi<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Austin Whitt<sup>2</sup>; Ronald Noebe<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>NASA Glenn Research Center

**2:40 PM Break**

**3:00 PM**

**Temperature Dependent Deformation in Single Crystalline MoNbTi:** *Daniel Magnuson*<sup>1</sup>; Benjamin Redemann<sup>1</sup>; Tyrel McQueen<sup>1</sup>; Pulkit Garg<sup>2</sup>; Irene Beyerlein<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California, Santa Barbara

**3:20 PM**

**Evaluating Microstructure and Strength Properties of Tungsten Based Refractory Multi-Principal Element Alloy Fabricated by Laser Based Directed Energy Deposition:** *Amaranth Karra*<sup>1</sup>; Bryan Webler<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**3:40 PM**

**Understanding the Microstructural Evolution and Mechanical Property in As-Cast and Annealed Refractory High Entropy Alloys:** *Merbin John*<sup>1</sup>; Deepak Pillai<sup>1</sup>; Sydney Fields<sup>1</sup>; Lin Li<sup>2</sup>; Feng Yan<sup>2</sup>; Liang Qi<sup>3</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Arizona State University; <sup>3</sup>University of Michigan

## Structure and Dynamics of Metallic Glasses — Alloy Development

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Sopa, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Thursday PM | March 27, 2025**  
**367 | MGM Grand**

**Session Chair:** A. Lindsay Greer, University of Cambridge

**1:00 PM Invited**

**Development of Al-Based Complex Confused Metallic Glasses Overcoming Glass-Forming Ability and Fragility Trade-Off:** Wan Kim<sup>1</sup>; Ji Young Kim<sup>2</sup>; Min Kyung Kwak<sup>2</sup>; Eun Soo Park<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Seoul National University

**1:25 PM**

**Design and Characterization of Novel Zr-Based Metallic Glasses with Nanoscale Phase Separation:** Devinder Singh<sup>1</sup>; Parthiban Ramasamy<sup>2</sup>; Anna Sophie Jelinek<sup>3</sup>; Rahul Bhattacharya<sup>1</sup>; Zhuo Chen<sup>1</sup>; Simon Fellner<sup>1</sup>; Christoph Gammer<sup>1</sup>; Zaoli Zhang<sup>1</sup>; Jürgen Eckert<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences; <sup>2</sup>Erich Schmid Institute of Materials Science; <sup>3</sup>Montanuniversität Leoben

**1:45 PM**

**Oxygen Effects on Processability of Zr-Based Bulk Metallic Glasses:** *Nelson Delfino De Campos Neto*<sup>1</sup>; Felipe Santa Maria<sup>2</sup>; Michael Kaufman<sup>3</sup>; Marcelo de Oliveira<sup>4</sup>; <sup>1</sup>University of North Florida, Colorado School of Mines; <sup>2</sup>Federal University of Lavras, University of São Paulo; <sup>3</sup>Colorado School of Mines; <sup>4</sup>University of São Paulo

**2:05 PM**

**Manipulating Atomic Topology and Chemical Affinity for Tailored Pure-Solvent Clusters in Ti-Based Metallic Glasses:** *Wook Ha Ryu*<sup>1</sup>; Won-Seok Ko<sup>2</sup>; Ji Young Kim<sup>3</sup>; Min Kyung Kwak<sup>3</sup>; Eun Soo Park<sup>3</sup>; <sup>1</sup>Kumoh National Institute of Technology & RIAM, Seoul National University; <sup>2</sup>Inha University; <sup>3</sup>Seoul National University

**2:25 PM Break**

**2:45 PM**

**Structure-Processing-Property Relationships in Refractory Metallic Glass Powders for Additive Manufacturing:** *Jerry Howard*<sup>1</sup>; Forest Thompson<sup>2</sup>; Dev Chidambaram<sup>1</sup>; Grant Crawford<sup>2</sup>; Krista Carlson<sup>1</sup>; <sup>1</sup>University of Nevada, Reno; <sup>2</sup>South Dakota School of Mines & Technology

**3:05 PM**

**Tungsten-Based Thin Film Metallic Glass as Diffusion Barrier Between Copper and Silicon:** *Pei-Yu Chen*<sup>1</sup>; Jhen-De You<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University

## Thin Films and Coatings: Properties, Processing and Applications — Metallic Thin Films and Coatings: Processing, Properties and Environmental Impacts

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougine, CNRS, Is2m; Brandon Krick, Florida A&M University-Florida State University

**Thursday PM | March 27, 2025**  
**101 | MGM Grand**

**Session Chairs:** Tomas Grejtak, Oak Ridge National Laboratory; Tomas Babuska, Sandia National Laboratories

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### 1:00 PM Invited

**A Review of Coating Processes for Engineering Surfaces in Harsh Environments:** *David Mitchell*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

### 1:30 PM

**Design of Interpenetrating Composite Coatings for Extreme Environments:** *Zachary Cordero*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

### 1:50 PM

**Plasma-Assisted Surface Treatment and Coating Deposition on AZ91D and AM60 Mg Alloys for Corrosion Protection:** *Jiheon Jun*<sup>1</sup>; Yong Chae Lim<sup>1</sup>; Yi-Feng Su<sup>1</sup>; Gyoung Gug Jang<sup>1</sup>; Ryan Robinson<sup>2</sup>; Daphne Pappas<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Plasmatreteat USA

### 2:10 PM Break

### 2:30 PM

**Thermal Stability and Mechanical Properties of -Phase Composition W-Fe-Ni-Mo Multi-Principal Element Alloy Film:** *Zahidur Rahman*<sup>1</sup>; Michael J. Detisch<sup>1</sup>; Thomas Balk<sup>1</sup>; <sup>1</sup>University of Kentucky

### 2:50 PM

**Transition Metal Dependency on the Hardness of Sputter Deposited Metal Carbide Thin Films:** *Gregory Thompson*<sup>1</sup>; Corinne Blacksher<sup>1</sup>; Alyssa Stubbers<sup>1</sup>; Chris Weinberger<sup>2</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Colorado State University

### 3:10 PM

**Systematic Control of Crystallization Temperature of Amorphous NiTi Films Using Seed Crystals:** *Amirhossein Shafieizad*<sup>1</sup>; Paul Rasmussen<sup>1</sup>; Jagannathan Rajagopalan<sup>1</sup>; <sup>1</sup>Arizona State University

# GUIDE TO THE TMS2025 POSTER SESSION

View a changing display of posters in the Marquee Ballroom. Please join us for two separate poster presentation sessions, grouped by topic areas, on Monday and Tuesday evening. Presenters will be on hand during these sessions to discuss their work.

## POSTER SESSION SCHEDULE (for Poster Presenters)

The poster sessions, which are coupled with networking activities in the exhibit hall, are typically well-attended events. Poster presenters are encouraged to take advantage of this opportunity to discuss their work one-on-one with fellow attendees.

If you are presenting a poster, please note the following information for your assigned poster session.

### Schedule for Poster Session I: Monday, March 24

*Held in conjunction with the Exhibit Opening Reception*

- **Noon to 2:00 p.m.** Poster Installation
- **2:00 p.m. to 5:30 p.m.** Gallery Viewing (Posters will be on display for visitors to browse; presenters do *not* need to be present.)
- **5:30 p.m. to 6:30 p.m.** Poster Presentations (Please stand by your poster at this time to discuss your research with attendees)
- **6:30 p.m.** Poster Removal (Presenters should remove posters immediately following the conclusion of the poster session. TMS Student Poster Contest entries, however, should remain up until Tuesday evening.)

### Schedule for Poster Session II: Tuesday, March 25

*Held in conjunction with the Exhibit Hall Happy Hour*

- **Noon to 2:00 p.m.** Poster Installation
- **2:00 p.m. to 5:30 p.m.** Gallery Viewing (Posters will be on display for visitors to browse; presenters do *not* need to be present.)
- **5:30 p.m. to 6:30 p.m.** Poster Presentations (Please stand by your poster at this time to discuss your research with attendees)
- **6:30 p.m.** Poster Removal (All posters should be removed following the conclusion of this poster session.)

## NAVIGATING THE POSTER SESSIONS (for Attendees)

Two poster sessions will be held in the TMS2025 Exhibit Hall:

- **Poster Session I** (held in conjunction with the Exhibit Opening Reception)  
Monday, March 24 | 5:30 p.m. to 6:30 p.m.
- **Poster Session II** (held in conjunction with the Exhibit Hall Happy Hour)  
Tuesday, March 25 | 5:30 p.m. to 6:30 p.m.

Confirmed posters are grouped by topic according to the listing on this page.

- Each topic area is assigned a letter code
- Each poster within that topic is assigned a number
- You can search in the mobile app and mobile-friendly PDF for specific posters and poster numbers.
- Posters that were not confirmed will be in the Open Poster Area and are not numbered.

### Poster Session I

**Monday, March 24** | 5:30 p.m. to 6:30 p.m.

#### Featuring Posters on:

Biomaterials (A)
Electronic, Magnetic, and Energy Materials (B)
Materials Degradation and Degradation by Design (C)
Materials Synthesis and Processing (D)
Mechanics of Materials (E)
Nuclear Materials (F)

### Poster Session II

**Tuesday, March 25** | 5:30 p.m. to 6:30 p.m.

#### Featuring Posters on:

Additive Manufacturing (G)
Advanced Characterization Methods (H)
Data-Driven and Computational Materials Design (J)
Light Metals (K)



## SPECIAL TOPICS

**2025 Technical Division Student Poster Contest  
— EPD 2025 Technical Division Graduate Student  
Poster Contest**

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPG-1: A Study on Optimizing Characteristics for High-Efficiency Nickel Recovery From the Nickel Intermediates and Nickel Sludge Resources:** *Myungsuk Kim*<sup>1</sup>; Namhun Kwon<sup>1</sup>; Seoung Uk Bae<sup>1</sup>; Dong Hyun Kim<sup>1</sup>; Jae Hong Shin<sup>1</sup>; Kyoung-Tae Park<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**Design of Porous High Entropy Alloy Materials and Study on Water Electrolysis Performance:** *Mengyu Hong*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Stress Corrosion Cracking of Commercial Purity Titanium Using Constant Load Method:** *Osama Alyousif*<sup>1</sup>; <sup>1</sup>Kuwait University

**SPG-6: Study of Thermodynamic for Effective Ni Extraction From Nickel Pig Iron (NPI) via Carbonyl Process:** *Seoung Uk Bae*<sup>1</sup>; Namhun Kwon<sup>1</sup>; Dong Hyun Kim<sup>1</sup>; JaeJin Sim<sup>1</sup>; Kyoung-Tae Park<sup>1</sup>; Jae Hong Shin<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**SPG-7: Study on the Kinetics of Magnetizing Roasting of Niobium Mineral Tailings Containing Rare Earth Elements:** *Vitoria Garcia Alvarez*<sup>2</sup>; Flavio Beneduce<sup>2</sup>; <sup>1</sup>CBMM; University of Sao Paulo; <sup>2</sup>University of Sao Paulo

## SPECIAL TOPICS

**2025 Technical Division Student Poster Contest —  
EPD 2025 Technical Division Undergraduate Student  
Poster Contest**

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPU-1: Combined X-Ray Fluorescence and X-Ray Diffraction Method Validation and Standardization:** *Jakob Scroggins*<sup>1</sup>; Sikhumbuzo Masina<sup>2</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>SLAC National Accelerator Laboratory

## SPECIAL TOPICS

**2025 Technical Division Student Poster Contest  
— FMD 2025 Technical Division Graduate Student  
Poster Contest**

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPG-8: Advanced X-Ray and Electron Based Techniques for Material and Cell-Level Battery Analysis:** *Zijun Wang*<sup>1</sup>; <sup>1</sup>University of Colorado-Boulder; Rigaku Americas

**SPG-9: Analysis of Mechanical Properties and Microstructural Changes in Al-6Cu Alloy with Combined Additions of Transition Elements Cr, Mn, and Zr After High-Temperature Exposure:** *Hyuncheul Lee*<sup>1</sup>; Jaehui Bang<sup>1</sup>; Nawon Kwak<sup>1</sup>; Eunkyung Lee<sup>1</sup>; <sup>1</sup>National Korea Maritime And Ocean University

**SPG-10: Atomistic Insights Into the Passivation Mechanisms of Carbon Steel, ReaxFF-MD Study:** *Matin Alsadat Mostaan*<sup>1</sup>; Burkan Isgor<sup>1</sup>; Lıney Árnadóttir<sup>1</sup>; <sup>1</sup>Oregon State University

**SPG-11: Comparison of Superconducting Properties of Three HEAs with the Same Valence Electron Concentration:** *Wojciech Nowak*<sup>1</sup>; Micha Babij<sup>2</sup>; Daniel Gnida<sup>2</sup>; Robert Konieczny<sup>1</sup>; Monika K. Krawczyk<sup>1</sup>; Dorota Podsiadła<sup>1</sup>; Adam Pikul<sup>2</sup>; Rafa Idczak<sup>1</sup>; <sup>1</sup>Institute of Experimental Physics, University of Wrocław; <sup>2</sup>Institute of Low Temperature and Structure Research, Polish Academy of Sciences

**SPG-12: Effect of Plasma Environment Oscillations on Carbon Nanotube Field Emission Cathode Performance:** *Arega Margousian*<sup>1</sup>; Mitchell Walker<sup>1</sup>; Jud Ready<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**SPG-13: Electride-Driven Surface Electron Layers for Oxidation Resistance of Metals:** *Ja Kyoung Gu*<sup>1</sup>; <sup>1</sup>Sungkyunkwan University

**SPG-14: Electron-Rich Pt/C Catalysts for High Performance Hydrogen Evolution Reaction:** *Hye-Ji Sim*<sup>1</sup>; <sup>1</sup>Sungkyunkwan University

**SPG-16: Green Abundant Carbon Nanoparticles for High Voltage Insulation Materials:** *Anton Bjurström*<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**SPG-17: HEA Design Agent: AI-Powered Tools for Predicting and Optimizing High-Entropy Alloy Properties:** *You-Xun Chang*<sup>1</sup>; Kuan-Hung Chao<sup>1</sup>; Yi-Hsiang Chen<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; Shun-Chi Wu<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**SPG-18: High-Reliability Cu-to-Cu Interconnections: IMC-Free TLP Bonding via Gallium Electroplating:** *Tzu-Hsuan Huang*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**SPG-19: High Cycle Shape Memory Performance Evaluation of GNP- Reinforced Polyurethane Electrospun Membranes Based on a Novel Constrained Shape Recovery Approach:** *Rony Thomas Murickan*<sup>1</sup>; Lihua Lou<sup>2</sup>; Luiza Benedetti<sup>1</sup>; Abhijith Kunneparambil Sukumaran<sup>1</sup>; Denny John<sup>1</sup>; Anil Lama<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>Clemson University

**SPG-20: Interrelationship of Stress-Induced Martensitic Transformation and Pitting Corrosion in Iron-Based Shape Memory Alloys:** *Johanna Frenck*<sup>1</sup>; Georg Frenck<sup>2</sup>; Sebastian Degener<sup>3</sup>; Malte Vollmer<sup>4</sup>; Thomas Niendorf<sup>1</sup>; <sup>1</sup>University of Kassel; <sup>2</sup>University of Augsburg; <sup>3</sup>Bundesanstalt für Materialforschung und -prüfung; <sup>4</sup>Volkswagen AG Baunatal

**SPG-21: Nanocellulose via Soil Immersion to Modify Flax Growth and Mechanical Properties:** *Louise Batta*<sup>1</sup>; Alan Taub<sup>1</sup>; <sup>1</sup>University of Michigan-MSE

**SPG-22: Optimizing Near Infrared Sintering for Pad-Printed Silver Microparticle Traces:** *Jonah Brooks*<sup>1</sup>; *Maija Pearson*<sup>1</sup>; Philippe Passeraub<sup>1</sup>; <sup>1</sup>Brigham Young University

**SPG-23: Pumice Stone, Refractory Brick and Cork Wood on the Facade of Buildings to Mitigate Noise Pollution in Urban Street Canyons:** *Jeiser Rendón Giraldo*<sup>1</sup>; Henry A. Colorado L.<sup>1</sup>; <sup>1</sup>Universidad de Antioquia

**SPG-24: Quaternary MAB Semi-Hard Magnets MxMn5-xSiB2 (M = Cr, Mo): Experimental and Computational Studies:** *Shola Adeniji*<sup>1</sup>; Alexei Belik<sup>2</sup>; Takao Mori<sup>2</sup>; Boniface Fokwa<sup>1</sup>; <sup>1</sup>University of California, Riverside; <sup>2</sup>National Institute for Materials Science (NIMS)

**SPG-25: Structural Constraint Integration in Generative Model for Discovery of Quantum Material Candidates:** *Ryotaro Okabe*<sup>1</sup>; Mouyang Cheng<sup>1</sup>; Abhijatmedhi Chottrattanapituk<sup>1</sup>; Mingda Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**SPG-26: Superconductivity in Additively Manufactured High-Entropy Alloys: Nb<sub>34</sub>Ti<sub>33</sub>Zr<sub>14</sub>Ta<sub>11</sub>Hf<sub>8</sub> and Ti<sub>0.5</sub>(ZrNbTaHf)<sub>0.5</sub>:** *Bartosz Rusin*<sup>1</sup>; Piotr Sobota<sup>1</sup>; Wojciech Nowak<sup>1</sup>; Jakub Ciftci<sup>2</sup>; ukasz rodowski<sup>2</sup>; Rafa Idczak<sup>1</sup>; <sup>1</sup>University of Wrocław; <sup>2</sup>AMAZEMET

**SPG-27: Synchrotron Radiation Based Observation of and Phases of CuSn Under Electric Current:** *Shubhayan Mukherjee*<sup>1</sup>; Yu-chen Liu<sup>2</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**SPG-28: The Phase Equilibria of the Cu-Sn-Ti Ternary System:** *Ssu-Chi Huang*<sup>1</sup>; Hao-Wei Lee<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**SPG-29: Towards Low-Temperature Additive Manufacturing Process for Miniaturized Disposable Antibody-Type Biosensor:** *Elizabeth Clark*<sup>1</sup>; Enrico Condeci<sup>2</sup>; Philippe Passeraub<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>aeChem Sarl

**SPG-30: Tuning Microstructure and Material Properties of Laser-Based Directed Energy Deposition (L-DED) Duplex Stainless Steel via In-Situ Alloying:** *Prayag Burad*<sup>1</sup>; Vishal Mahey<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

**SPG-31: Vanadium-Stabilized MoB Nanoparticles for Enhanced Hydrogen Evolution at High Current Densities:** *Sang Bum Kim*<sup>1</sup>; Johan Yapo<sup>1</sup>; Akira Yasuhara<sup>2</sup>; Kunio Yubuta<sup>3</sup>; Boniface Fokwa<sup>1</sup>; <sup>1</sup>University of California Riverside; <sup>2</sup>JEOL Ltd.; <sup>3</sup>Shinshu University

## SPECIAL TOPICS

### 2025 Technical Division Student Poster Contest — FMD 2025 Technical Division Undergraduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPU-2: Carbon Nanotube Field Emission Arrays: A Comparative Study of Polysilicon and Chromium Gate Materials:** *Gabriel Feng*<sup>1</sup>; Jud Ready<sup>1</sup>; Arega Margousian<sup>1</sup>; <sup>1</sup>Georgia Tech Research Institute

**SPU-3: Copper Metallizations via Micro-Vacuum Cold Spray:** *Thomas Hands*<sup>1</sup>; Paul Fuierer<sup>1</sup>; <sup>1</sup>New Mexico Tech

**SPU-4: Demonstrating the Reprocessability of Liquid Crystalline Epoxy Networks (LCENs):** *Mohammad Husein*<sup>1</sup>; Cotton Pekol<sup>1</sup>; David Harper<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**SPU-5: Exploring Tetrahedral Nitrogen Formation in Electronically-Doped GaAsN Alloys:** *Matteo Carcassi*<sup>1</sup>; Joshua Cooper<sup>1</sup>; Dasha Womack<sup>1</sup>; Rachel Goldman<sup>1</sup>; <sup>1</sup>University of Michigan

**SPU-6: Exploring the Self-Assembly of Sensory Recombinant Proteins Governed by the Phase Transition of ELP:** *Adriana LaVopa*<sup>1</sup>; Bornita Deb<sup>1</sup>; Emma McDougall<sup>1</sup>; Yeongseon Jang<sup>1</sup>; <sup>1</sup>University of Florida

**SPU-7: Investigation of Sintering Conditions for Optimization of High Entropy Garnet Ceramics:** *Marlena Alexander*<sup>1</sup>; Kaden Anderson<sup>1</sup>; Chuck Melcher<sup>1</sup>; Luis Stand<sup>1</sup>; Mariya Zhuravleva<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**SPU-8: Nanocrystalline Thermoelectric Materials Synthesis:** *Metri Zughbi*<sup>1</sup>; Kevin Anderson<sup>2</sup>; Boris Feygelson<sup>2</sup>; James Wollmershauser<sup>2</sup>; Benjamin Greenberg<sup>2</sup>; <sup>1</sup>Lehigh University; <sup>2</sup>U.S. Naval Research Lab

**SPU-9: Optimization of Laser-Induced Graphene Oxide Sensors for Flexible Energy Storage Applications:** *Ryan Russell*<sup>1</sup>; Yijing Stehle<sup>1</sup>; <sup>1</sup>Union College

**SPU-10: Size Evolution of CeOx Nanoglue Islands and Their Catalytic Performance for CO Oxidation:** *Bailey Holmes*<sup>1</sup>; Ying Zheng<sup>1</sup>; Asuka Firdaus<sup>1</sup>; Jingyue Liu<sup>1</sup>; <sup>1</sup>Arizona State University

**SPU-11: Synthesis of Skyrmions in Fe<sub>1-x</sub>Co<sub>x</sub>Si:** *Madeline Maben*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**SPU-12: Tuning Graphene Functionalization via Diazonium Chemistry:** *Cole Rabe*<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison

**SPU-13: ZnO Nanorod Growth for Electron Transport Layer in Perovskite Solar Cells:** *Brianna Sebastian-Olazabal*<sup>1</sup>; Wendifer Reyes Ramos<sup>1</sup>; Bipin Rijal<sup>1</sup>; Tara Dhakal<sup>1</sup>; <sup>1</sup>Binghamton University

## SPECIAL TOPICS

### 2025 Technical Division Student Poster Contest — LMD 2025 Technical Division Graduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPG-33: Decarbonizing Aluminum Recycling: Evaluating Hydrogen in a Lab-Scale Tilting Rotary Furnace:** *Stefan Tichy*<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

**SPG-34: Development of Stable Nanocrystalline Al-Si and Al-La Alloys for High-Strength Lightweight Applications:** *Sridhar Lanka*<sup>1</sup>; Amanendra K. Kushwaha<sup>1</sup>; Manoranjan Misra<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**SPG-36: Effects of Al Content on the Tensile and Fatigue Properties of SEN Magnesium Alloy Extrusions:** *Jee Eun Jang*<sup>1</sup>; Ji-Yoon Lee<sup>1</sup>; Gun Woong An<sup>1</sup>; Sung Hyuk Park<sup>1</sup>; <sup>1</sup>Kyungpook National University

**SPG-37: Fabrication of Aluminum Welding Fillers Reinforced with Niobium Diboride Nanoparticles for Aerospace Applications:** *Norman Burgos*<sup>1</sup>; Oscar Marcelo Suárez<sup>1</sup>; <sup>1</sup>University of Puerto Rico at Mayagüez

**SPG-38: Investigating the Process-Microstructure-Property Relationships of Large-Scale Deposition with Nano-Treated Al6061 Alloy via Wire Arc Additive Manufacturing:** *Pial Das*<sup>1</sup>; Roman Savinov<sup>2</sup>; Yashwant Bandari<sup>3</sup>; Shuvodeep De<sup>4</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Cincinnati; <sup>3</sup>Fastech LLC; <sup>4</sup>Texas State University

**SPG-39: Multi-Scale Characterization of Al-1100 and Al-6061 Alloys Processed by a Cold Angular Rolling Process:** *Yun-Hsuan Wu*<sup>1</sup>; Melissa Santala<sup>1</sup>; <sup>1</sup>Oregon State University

**SPG-40: Relationship Between Grain Boundary Precipitation and Hydrogen Embrittlement in an Al-4%Cu-1.5%Mg Alloy:** *Atsumi Ito*<sup>1</sup>; Taiki Kimura<sup>1</sup>; Ryu Minobe<sup>1</sup>; Goroh Itoh<sup>1</sup>; Shigeru Kuramoto<sup>1</sup>; Junya Kobayashi<sup>1</sup>; <sup>1</sup>Ibaraki University

**SPG-41: The Role of Interfaces and Crystallographic Grain Orientation on Cyclic Stress Strain Behavior of Magnesium Alloys:** *Arianna Mena*<sup>1</sup>; Justin Smith<sup>1</sup>; Aerial Murphy-Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University

**SPG-42: Understanding the Deformation Behavior in Cold Rolled Ti-12Mo Binary Alloy System Using Advanced Characterization Techniques:** *Deepak Pillai*<sup>1</sup>; Merbin John<sup>1</sup>; Fan Sun<sup>2</sup>; Liang Qi<sup>3</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Institut de Recherche de Chimie Paris; <sup>3</sup>University of Michigan

**SPG-43: Understanding the Microstructure and Texture Evolution of Mg-Ca-Zn Alloys During Recrystallization:** *Rogine Gomez*<sup>1</sup>; Aerial Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University

**SPG-44: Understanding the Role of Alloying on Low Cycle Fatigue Behavior in Mg Alloys:** *Justin Smith*<sup>1</sup>; Aerial Murphy-Leonard<sup>1</sup>; <sup>1</sup>Ohio State University

## SPECIAL TOPICS

## 2025 Technical Division Student Poster Contest — LMD 2025 Technical Division Undergraduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPU-14: Effect of Annealing on the Microstructure and Mechanical Properties of Quaternary High-Entropy Alloys at Different Treatment Durations:** *Rakhmatjon Gaipov*<sup>1</sup>; Elyorjon Jumaev<sup>1</sup>; Omon Sultonov<sup>1</sup>; Amir Abidov<sup>2</sup>; Farkhod Abdullaev<sup>2</sup>; Orifjon Mikhlijev<sup>3</sup>; <sup>1</sup>University of Business and Science; <sup>2</sup>Uzbekistan Technological Metals Complex JSC; <sup>3</sup>FIE UzLITI Engineering LLC

**SPU-15: Increasing Strength, Hardness and Corrosion Resistance of A356.1 Through Heat Treatments and Addition of Magnesium:** *Tomas Peralta*<sup>1</sup>; <sup>1</sup>University of Michigan

## SPECIAL TOPICS

## 2025 Technical Division Student Poster Contest — MPMD 2025 Technical Division Graduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPG-48: Additively Processed Maraging Steel M789 and Its Heat Treatment, Homogenized Microstructure and Precipitation Hardening:** *Andrea Malkova*<sup>1</sup>; Ludmila Kučerová<sup>1</sup>; Karolína Burdová<sup>1</sup>; <sup>1</sup>Západočeská Univerzita v Plzni

**SPG-49: Artificial Intelligence Enabled Microstructural Feature Detection:** Hariharan Saravanan<sup>1</sup>; *Pooja Maurya*<sup>1</sup>; Alex Gaudio<sup>2</sup>; Asim Smailagic<sup>1</sup>; P. Chris Pistorius<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Johns Hopkins University

**SPG-51: Characterization of Nitinol Powders for Cold Spray Welding:** *Matthew Gleason*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-52: Comparative Analysis of Mechanical Properties and Microstructures in Hot and Cold Wire Laser-Directed Energy Deposition of Stainless Steel 316:** *Nahal Ghanadi*<sup>1</sup>; Somayeh Pasebani<sup>1</sup>; <sup>1</sup>Oregon State University

**SPG-54: Development of Functionally Graded Materials via AM: A Combined Experimental and Computational Approach:** *Jorge Valilla*<sup>1</sup>; Damien Turret<sup>1</sup>; Ilchat Sabirov<sup>1</sup>; <sup>1</sup>Imdea Materials

**SPG-55: Development of Lightweight, Ballistic Shock-Resistant Materials by Friction Stir Processing:** *Varun Pushpa*<sup>1</sup>; Amlan Kar<sup>1</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

**SPG-56: Effect of Lunar Dust on Microstructural and Mechanical Properties of 3D Printed Stainless Steel:** *Aye Thiri Khaing*<sup>1</sup>; Mohsen Eshraghi<sup>1</sup>; Chris Bachman<sup>1</sup>; Raffi Shirinian<sup>1</sup>; <sup>1</sup>California State University Los Angeles

**SPG-57: Effect of Wire Feed Rate on Microstructure and Mechanical Properties in Multi-Wire GTAW-Based WAAM Steel Alloys:** *Ganesan Gunasekaran*<sup>1</sup>; Neel Gupta<sup>1</sup>; Siddhartha<sup>1</sup>; Shahu Karade<sup>1</sup>; Narasimhan K<sup>1</sup>; Karunakaran K.P.<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**SPG-58: Effects of Inclusions on Fatigue Behavior of High Strength Bar Steel:** *Natalie Compton*<sup>1</sup>; Kip Findley<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**SPG-59: Electrochemical Corrosion Properties and Fatigue Life of Al 7075 Parts Prepared by Additive Friction Stir Deposition:** *Ehsan Bagheri*<sup>1</sup>; Noushin Adibi<sup>1</sup>; Peyton Wilson<sup>1</sup>; Michael Khonsari<sup>1</sup>; Shengmin Guo<sup>1</sup>; <sup>1</sup>Louisiana State University

**SPG-60: Energy Density and Infill Angles In Tailoring Laser-Wire Directed Energy Deposition Microstructure:** *Matthew Engquist*<sup>1</sup>; Amir Shakibi<sup>1</sup>; Mohsen Eshraghi<sup>1</sup>; <sup>1</sup>California State University, Los Angeles

**Enhancing WAAM of Aluminum 2219 Walls Through Thermal Imaging for Improved Process Control and Material Quality:** *Oguzcan Dedec*<sup>1</sup>; <sup>1</sup>Roketsan Missiles Inc.

**Fabrication and Laser-Assisted Machining (LAM) of Fused Silica-Based Ceramic Composites Reinforced with Nanoparticles:** *Rajat Jain*<sup>1</sup>; <sup>1</sup>National Institute of Technology Warangal

**SPG-63: Formable Ordered Microcomposite Energetics (FOMEs) as Structural Energetics:** *Nare Cho*<sup>1</sup>; Bryan Llumiquinga<sup>1</sup>; Iris You<sup>1</sup>; Shane Esola<sup>2</sup>; Jonathan Singer<sup>1</sup>; <sup>1</sup>Rutgers University; <sup>2</sup>US Army DEVCOM Armaments Center

**SPG-64: Foundational Computer Vision Models for Automated Powder Morphology Characterization:** *Stephen Price*<sup>1</sup>; Kiran Judd<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Elke Rundensteiner<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-68: Enhancing Investment Casting Through Direct 3D Printing of Silica Molds: A Comparative Study of Thermal Debinding and Sintering Processes:** *Aabha Chandra*<sup>1</sup>; Holly Martin<sup>1</sup>; Pedro Cortes<sup>2</sup>; <sup>1</sup>Youngstown State University; <sup>2</sup>The University of Texas at El Paso

**SPG-69: Investigating the Potential of Large Scale Wire Arc Additive Manufacturing to Deposit Duplex Stainless Steel for Structural Applications:** *Vishal Mahey*<sup>1</sup>; Prayag Burad<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

**SPG-70: Ionic Liquid (IL) Compatibilization of Macropore-Infused Nanocomposite Thermosets (MINETs) for Structural Ion Transport:** *Bryan Llumiquinga*<sup>1</sup>; Iris You<sup>1</sup>; Nare Cho<sup>1</sup>; Kevin Miller<sup>2</sup>; Jonathan Singer<sup>1</sup>; <sup>1</sup>Rutgers University; <sup>2</sup>Murray State University

**SPG-72: Mechanical Properties of 3D Printed High Performance Ceramics and Multi-Material Ceramics Fabricated via Vat Photopolymerization:** *Taslima Akter*<sup>1</sup>; Holly Martin<sup>1</sup>; Pedro Cortes<sup>2</sup>; <sup>1</sup>Youngstown State University; <sup>2</sup>The University of Texas at El Paso

**SPG-73: Mesoscale Modeling of Hydrogen Embrittlement in Iron-Hydrogen Alloys:** *Daniel Coelho*<sup>1</sup>; Nikolas Provatas<sup>1</sup>; <sup>1</sup>McGill University

**SPG-74: Microstructural Evolution and Mechanical Properties of Cu-30Ni Fabricated via Wire-DED: From As-Built to Heat-Treated States:** *Debasis Rath*<sup>1</sup>; Debjit Misra<sup>1</sup>; Markus Chmielus<sup>1</sup>; Zachary Harris<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**SPG-75: Microstructures of a Ti-6Al-4V Alloy Additively Manufactured by the Powder Bed Fusion with Blue Diode Laser:** *Naoya Nishikawa*<sup>1</sup>; Koki Maeda<sup>2</sup>; Takahiro Kunimine<sup>1</sup>; Yuji Sato<sup>3</sup>; Masahiro Tsukamoto<sup>3</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>Kindai University; <sup>3</sup>Osaka University

**SPG-76: Molten Salts for Lithium-Ion Batteries Recycling:** *Jennifer Navarro Naranjo*<sup>1</sup>; <sup>1</sup>University of Nevada Reno

**SPG-77: Nanostructures in the Direct Energy Deposited Metastable Beta Ti-5Al-5Mo-5V-3Cr Alloy:** *Sydney Fields*<sup>1</sup>; Deepak Pillai<sup>1</sup>; Dian Li<sup>1</sup>; Tirthesh Ingale<sup>1</sup>; Vishal Soni<sup>1</sup>; Mohammad Merajul Haque<sup>2</sup>; Yiliang Liao<sup>2</sup>; Rajarshi Banerjee<sup>1</sup>; Yufeng Zheng<sup>1</sup>; Yao Li<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Iowa State University

**SPG-78: Optimization on Yield Production of Nanoporous Copper Powders via Chemical Dealloying:** *Aishwarya Thotta Jayachandran*<sup>1</sup>; Laura Duenas Gonzalez<sup>1</sup>; Natalya Kublik<sup>1</sup>; Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University



**SPG-79: Parametric Study of Beam Deflection to Reduce Residual Stresses in Electron Beam Welded Thin Plates:** *Rebecca Bauman*<sup>1</sup>; Alistair Smith<sup>2</sup>; Howard Stone<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Rolls-Royce

**SPG-80: Performance Evaluation of Wire Arc Additive Manufacturing (WAAM) Repairs of H13 Tool Steel Forging Die:** *Akash Belure*<sup>1</sup>; Mayank Garg<sup>1</sup>; David Schwam<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

**SPG-82: Predicting the Effects of a Lunar Environment on a Wire-Laser Directed Energy Deposition Process via Numerical Modeling:** *Nathan Stotzel*<sup>1</sup>; Mohsen Eshraghi<sup>1</sup>; <sup>1</sup>California State University, Los Angeles

**SPG-83: Recovering and Processing Metal Feedstock Powders for Re-Use in Cold Spray Additive Manufacturing:** *Ashton Lyon*<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-84: Reversing Conventional Wisdom: Discovery of Welded Joints with Superior Cryogenic Strength-Ductility Over Base Metals:** *Yoona Lee*<sup>1</sup>; Jeong Min Park<sup>2</sup>; Dongwon Shin<sup>3</sup>; Wei Xiong<sup>4</sup>; Marcia Myung Hye Ahn<sup>4</sup>; Namhyun Kang<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Korea Institute of Materials Science; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>University of Pittsburgh

**SPG-85: Self-Limiting Electro Spray with High-Flow Rate Emitters and Defect Elimination Using Secondary Bias:** *Rahman Pejman*<sup>1</sup>; Ayman Roufi<sup>1</sup>; Shubin Xie<sup>1</sup>; Jonathon Singer<sup>1</sup>; <sup>1</sup>Rutgers University

**SPG-86: Strategies for Vat Photopolymerisation of Dense and Porous Silicon Carbide Ceramics with Enhanced Properties:** *Terence Ho*<sup>1</sup>; Zehui Du<sup>1</sup>; Chee Lip Gan<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**SPG-88: Ultrasonic Vibration-Assisted Direct Energy Deposition 3D Printing of High-Strength Aluminum Alloys:** *Lovejoy Mutswatiwa*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**SPG-89: Understanding the High Temperature Oxidation and Interdiffusion Behaviour of Tantalum Alloyed - Based Titanium Aluminide:** *Shivansh Mehrotra*<sup>1</sup>; Kushal Samanta<sup>1</sup>; Dibyajyoti Ghosh<sup>1</sup>; Sangeeta Santra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi

**SPG-90: Unravelling the Powder-Microstructure-Property Relationship in Cu-10Sn Alloy Manufactured by Laser Beam Powder Bed Fusion:** *Kangwei Chen*<sup>1</sup>; Simon Ringer<sup>1</sup>; Keita Nomoto<sup>1</sup>; <sup>1</sup>University of Sydney

**SPG-92: Validation and Implementation of Thermal Conductivity Measurements in Non-Contact Modulation Calorimetry:** *Regan Krizan*<sup>1</sup>; Lydia Tonani-Penha<sup>1</sup>; Gwendolyn Bracker<sup>1</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

## SPECIAL TOPICS

### 2025 Technical Division Student Poster Contest — MPMD 2025 Technical Division Undergraduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPU-16: Additive Manufacturing with Spherical UO<sub>2</sub> Powder:** *Tanvir Hassan*<sup>1</sup>; Anil Prasad R<sup>2</sup>; Ghaouti Bentoumi<sup>2</sup>; Nikolaos Kotsios<sup>2</sup>; James Crigger<sup>2</sup>; <sup>1</sup>Canadian Nuclear Laboratories; Toronto Metropolitan University; <sup>2</sup>Canadian Nuclear Laboratories

**SPU-17: Bio-Insulation Decreases VOCs and Improves Human Health:** *Joshua Carlson*<sup>1</sup>; Daniel Casey<sup>1</sup>; Erin Clingerman<sup>1</sup>; *Naszir Mantilla*<sup>1</sup>; Molly Rodgers<sup>1</sup>; <sup>1</sup>University of Michigan

**SPU-18: Computational Method to Predict Volumetric Contraction of Alloys During the Liquid-to-Solid Phase Transition:** *Audrey Thiessen*<sup>1</sup>; Aurora Pribram-Jones<sup>2</sup>; Jonas Kaufman<sup>3</sup>; Lori Bassman<sup>1</sup>; Kevin Laws<sup>4</sup>; <sup>1</sup>Harvey Mudd College; <sup>2</sup>University of California, Merced; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>University of New South Wales

**SPU-19: Controlling Porosity of Electrospayed Polyimide Films Through Co-Solvent Blending:** *Emily Li*<sup>1</sup>; Robert Green-Warren<sup>1</sup>; Isha Shah<sup>1</sup>; Jonathan Singer<sup>1</sup>; <sup>1</sup>Rutgers University

**SPU-20: Electroplating for Surface Modification of Powders for Additive Manufacturing:** *Sarah Fenton*<sup>1</sup>; Eric Klein<sup>1</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPU-21: Exploring a "Universal Dip" for Electro Spray Applications:** *Hannah Mow*<sup>1</sup>; Jonathan Singer<sup>1</sup>; <sup>1</sup>Rutgers University

**SPU-22: Exploring Effects of Additives on the Thermal Stability and Processability of Paper Fiber Reinforced Polypropylene for Automotive Applications:** *Jocelyn Hess*<sup>1</sup>; Cecile Grubb<sup>1</sup>; David Harper<sup>1</sup>; David Keffer<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

**SPU-24: How Powder Morphology and Surface Energies Affect Ambient Moisture Adsorption:** *Sajjad Jaffer*<sup>1</sup>; <sup>1</sup>Purdue University

**SPU-25: Material Processing Development for the Fabrication of Melt Wires for Monitoring Nuclear Reactor Temperatures:** *Shanae Bracht*<sup>1</sup>; *Adam Storms*<sup>1</sup>; Rene Rodriguez<sup>1</sup>; <sup>1</sup>Idaho State University

**SPU-27: Reduction of Absorbed Interstitial Elements in Metallic Feedstock Powder During Heat Treatment:** *Audrey Johnson*<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

## SPECIAL TOPICS

### 2025 Technical Division Student Poster Contest — SMD 2025 Technical Division Graduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPG-93: A First-Principles Study of Self, Dilute, and Non-Dilute Solute Diffusion Properties of BCC Transition Metals:** *Tanvir Rahman*<sup>1</sup>; Chelsey Hargather<sup>2</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology; <sup>2</sup>Los Alamos National Laboratory

**SPG-94: A Quasi-Brittle Fracture Mechanics Model for Assessing Treatment Effects in Human Cortical Bone:** *Glynn Gallaway*<sup>1</sup>; Thomas Siegmund<sup>1</sup>; <sup>1</sup>Purdue University

**SPG-95: AI-Driven Multiscale Computational Framework for Corrosion-Induced Degradation of High Temperature Alloys:** *Praneeth Bachu*<sup>1</sup>; Radhakrishnan Balasubramaniam<sup>2</sup>; Tracie Lowe<sup>2</sup>; Celine Hin<sup>1</sup>; Rishi Pillai<sup>2</sup>; <sup>1</sup>Virginia Tech; <sup>2</sup>Oak Ridge National Laboratory

**SPG-97: Comparison of Microstructure and Mechanical Properties of Automotive Press Hardened Beams Manufactured by Different Processing Routes:** *Micah Gendich*<sup>1</sup>; <sup>1</sup>University of Michigan

**SPG-98: Correlating 3D Stress Distributions with Twin Nucleation and Growth Using PRISMS-Plasticity:** *Michael Pilipchuk*<sup>1</sup>; Sangwon Lee<sup>1</sup>; Chaitali Patil<sup>1</sup>; John Allison<sup>1</sup>; Ashley Bucsek<sup>1</sup>; Veera Sundararaghavan<sup>1</sup>; <sup>1</sup>University of Michigan

**SPG-99: Effect of Aging on High Entropy NiTiHfZrCu Shape Memory Alloys:** *Hatim Raji*<sup>1</sup>; Mehmet Kelestemur<sup>2</sup>; Tolga Ensari<sup>2</sup>; Soheil Saedi<sup>1</sup>; <sup>1</sup>Florida Institute of Technology; <sup>2</sup>Arkansas Tech



**SPG-101: Effect of Local Lattice Distortion on Dislocation Based Plastic Deformation Characteristics of NbMoTaW-Ti Alloys:** *Ali Ozalp<sup>1</sup>; Eda Aydogan<sup>2</sup>; Yunus Eren Kalay<sup>1</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Pacific Northwest National Laboratory*

**SPG-102: Electrochemical and Mechanical Characterization of Hydrogen Embrittlement in PH Nickel Alloys:** *Yousif Al Rabie<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

**SPG-103: Enabling Gen-IV Fission and Gen-I Fusion Reactors via Ductile Refractory Alloys:** *Luke Gaydos<sup>1</sup>; Hailong Huang<sup>2</sup>; Zongyang Lyu<sup>2</sup>; Prashant Singh<sup>2</sup>; Duane Johnson<sup>2</sup>; Ryan Ott<sup>2</sup>; Nicolas Argibay<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Ames National Laboratory*

**SPG-104: Exploration of Process-Microstructure-Property Relationships in Laser-DED Manufactured High-Temperature FeCrAl Alloy for Nuclear ATF:** *Salikh Omarov<sup>1</sup>; Prayag Burad<sup>1</sup>; Christopher Silligman<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University*

**SPG-105: Fabrication and Characterization of CeO<sub>2</sub> + (C, Eu<sub>2</sub>O<sub>3</sub>) Pellets:** *Julian Valdez<sup>1</sup>; Robert Frost<sup>2</sup>; Denise Lopes<sup>3</sup>; Kyle Johnson<sup>4</sup>; Elizabeth Sooby<sup>1</sup>; Jacob Flowers<sup>1</sup>; Dzempl Adrovic<sup>2</sup>; Anthony Horsman<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio; <sup>2</sup>Uppsala University; <sup>3</sup>ORNL; <sup>4</sup>Westinghouse Sweden AB*

**SPG-106: Film Characterization and Repassivation Kinetics of Carbon & Austenitic Stainless Steel in Thiosulfate-Containing Environments:** *Abdullah Alzubail<sup>1</sup>; Preet Singh<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

**Flow Stress Behavior, Deformation Micro-Mechanisms and Microstructural Evolution of Heat-Treated Alloy 625 Using SASH Model:** *Sonika Chahar<sup>1</sup>; Suhrit Mula<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee*

**SPG-108: Gecko-Inspired Dry Adhesive Micropillar Arrays: Impact of Geometry and Contact Shape on Performance:** *Isabel Lopez<sup>2</sup>; <sup>1</sup>California State University, Los Angeles*

**SPG-109: Grain Interface Functional Design to Create Damage Resistance in Polycrystalline Tantalum**  
: *Olajesu Olanrewaju<sup>1</sup>; Kevin Jacob<sup>1</sup>; Curt Bronkhorst<sup>2</sup>; Nan Chen<sup>2</sup>; Marko Knezevic<sup>3</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Wisconsin; <sup>3</sup>University of New Hampshire*

**SPG-110: High-Cycle Fatigue of a Nickel Superalloy Pre-Exposed to Type II Hot Corrosion: Simulating Service Damage:** *Jordan Buckley<sup>1</sup>; Louis Scott<sup>1</sup>; Yong Li<sup>1</sup>; Helen Davies<sup>1</sup>; Mark Hardy<sup>2</sup>; <sup>1</sup>Swansea University; <sup>2</sup>Rolls-Royce*

**SPG-111: Influence of Microstructure on Fatigue Behavior of Additively Manufactured Nickel Aluminum Bronze:** *Nathan Heniken<sup>1</sup>; Jiashi Miao<sup>1</sup>; Veronika Mazanova<sup>2</sup>; Aerial Murphy-Leonard<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Czech Academy of Sciences*

**SPG-112: Investigating the Microstructures of As-Cast Advanced High Strength Steels:** *Nhu Ngo<sup>1</sup>; Bryan Webler<sup>1</sup>; Petrus Pistorius<sup>1</sup>; <sup>1</sup>Carnegie Mellon University*

**SPG-113: Investigation into Hot Corrosion Induced Pit Morphology of a Novel Nickel-Based Superalloy:** *Louis Scott<sup>1</sup>; Jordan Buckley<sup>1</sup>; Helen Davies<sup>1</sup>; Mark Hardy<sup>2</sup>; Yong Li<sup>1</sup>; <sup>1</sup>Swansea University; <sup>2</sup>Rolls-Royce*

**SPG-114: Ionic Liquid Mediated Extraction of Cellulose from Fruit Wastes:** *Erin Clingerman<sup>1</sup>; Brian Love<sup>1</sup>; Tolulope Lawal<sup>1</sup>; <sup>1</sup>University of Michigan - Ann Arbor*

**SPG-115: Kink Band Boundary Structure and Evolution in NbTaTiHF MEA:** *Xiaoyu Chen<sup>1</sup>; David Cook<sup>1</sup>; Madelyn Payne<sup>1</sup>; Andrew Minor<sup>1</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley*

**SPG-117: Microstructural and Mechanical Evaluation of Wire-Arc DED Fabricated High Strength Steels:** *Jason Langevin<sup>1</sup>; Danielle Cote<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute*

**SPG-118: Microstructure and Mechanical Properties Uniformity Analysis Across Different Locations of Forging Preform Fabricated by SLM:** *Sambhaji Kusekar<sup>1</sup>; Tushar Borkar<sup>1</sup>; Jay Desai<sup>1</sup>; David Schwam<sup>1</sup>; Amit Choudhary<sup>1</sup>; <sup>1</sup>Cleveland State University*

**SPG-119: Microstructure Characterization of Rapid Joule Heated Refractory High Entropy Alloys:** *Merbin John<sup>1</sup>; Deepak Pillai<sup>1</sup>; Yao Li<sup>1</sup>; Feng Yan<sup>2</sup>; Liang Qi<sup>3</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Arizona State University; <sup>3</sup>University of Michigan*

**SPG-120: Non-Contact Method to Measure Thermal Conductivity: A Comparative Study of Additive Manufactured SS-316L:** *Jessica Reyes Holguin<sup>1</sup>; Hunter Schonfeld<sup>1</sup>; Bryan Kaehr<sup>2</sup>; Jeffrey Braun<sup>3</sup>; Saman Zare<sup>1</sup>; Patrick Hopkins<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>Laser Thermal*

**SPG-121: Predicting and Understanding Peierls Stress Spectrum in Multi-Principal Element Alloys:** *Kourosh Jafari Ghalejooghi<sup>1</sup>; Penghui Cao<sup>1</sup>; <sup>1</sup>University of California Irvine*

**SPG-122: Rapid Radiation Damage Assessment Using Transient Grating Spectroscopy:** *Elena Botica Artalejo<sup>1</sup>; Gregory Wallace<sup>2</sup>; Michael Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>MIT Plasma Science and Fusion Center*

**SPG-123: Revisiting the Composition and Crystal Structure of WB<sub>2-x</sub> for Fusion Neutron Shielding:** *Sercan Cetinkaya<sup>1</sup>; Edward G. Obbard<sup>1</sup>; Patrick A. Burr<sup>1</sup>; Kevin J. Laws<sup>1</sup>; Vanessa K. Peterson<sup>2</sup>; <sup>1</sup>University of New South Wales Sydney; <sup>2</sup>ANSTO*

**SPG-124: Sigma Phase Transformation Kinetics of a FeCrNi Alloy Studied by In Situ Neutron Diffraction:** *Monika Rolinska<sup>1</sup>; Matthew Tucker<sup>2</sup>; Lewis Owen<sup>3</sup>; Joakim Odqvist<sup>1</sup>; Peter Hedström<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Sheffield*

**SPG-126: The Occurrence and Disappearance of Serrations at 650°C Temperature in IN718 ODS Superalloy Processed by Powder Metallurgy Route:** *Suyog Gaikwad<sup>1</sup>; Vikram Dabhade<sup>1</sup>; SVS Narayana Murty<sup>2</sup>; Sushant Manwatkar<sup>2</sup>; <sup>1</sup>Indian Institute of Technology Roorkee; <sup>2</sup>Vikram Sarabhai Space Centre (VSSC), Indian Space Research Organization (ISRO),*

**SPG-127: Thermal Expansion of MoSi<sub>2</sub>-Si Oxidation Barrier System for RHEA-Based Gas Turbines:** *Matthew Betz<sup>1</sup>; Zachary Moscoso<sup>1</sup>; Don Lipkin<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University*

**SPG-128: Thermo-Mechanical Fatigue Damage in a Single Crystal Nickel Superalloy:** *Alberto Gonzalez Garcia<sup>1</sup>; Jonathan Jones<sup>1</sup>; Mark Whittaker<sup>1</sup>; Julian Mason-Flucke<sup>2</sup>; <sup>1</sup>Swansea University; <sup>2</sup>Rolls-Royce plc*

**SPG-129: Tuning the Microstructure of High Entropy Alloys by Using Spinodal Decomposition to Enhance Ductility:** *Emre Gunes<sup>1</sup>; Eren Kalay<sup>2</sup>; <sup>1</sup>Gazi University Additive Manufacturing Technology Application and Research Center (EKTAM); <sup>2</sup>Middle East Technical University*

**SPG-130: Understanding Compositional Effects on the Oxidation Behavior of Binary Nb-Ti Alloys:** *Lauren Bowling<sup>1</sup>; Elizabeth Opila<sup>1</sup>; <sup>1</sup>University of Virginia*

**SPG-131: Understanding the Role of Microstructure on the Sub Critical Crack Growth Rate and Crack Path in Pipeline Ferritic Stainless Steels:** *Elisabeth Kuebel<sup>1</sup>; Ramgopal Thodla<sup>2</sup>; Aerial Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>DNV GL*

**SPG-132: Using Bernal Holes to Analyze Experimentally Observed Grain Boundaries In FCC Metals:** *Elizabeth Heon<sup>1</sup>; Matthew Chisholm<sup>1</sup>; Gerd Duscher<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville*

## SPECIAL TOPICS

## 2025 Technical Division Student Poster Contest — SMD 2025 Technical Division Undergraduate Student Poster Contest

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**SPU-28: A Comparative Analysis of Anodization Effects on Magnesium-Modified Al 356.1 Alloy:** *Isabelle Holden*<sup>1</sup>; Chase Walraven<sup>1</sup>; Jack Restum<sup>1</sup>; <sup>1</sup>University of Michigan

**SPU-29: Developing a High Temperature Alumina-Forming Bond Coat Alloy in the Nb-Si-Al-Ti-Mo-Cr Composition Space:** *Eddy Rao*<sup>1</sup>; Melina Endsley<sup>1</sup>; Collin Holgate<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**SPU-30: Electron Localization as an Indicator of Macroscopic Properties in Compositionally Complex Brass Alloys:** *Jose Ortiz*<sup>1</sup>; Jared Kim<sup>1</sup>; Aurora Pribram-Jones<sup>2</sup>; Jonas Kaufman<sup>2</sup>; Lori Bassman<sup>3</sup>; Kevin Laws<sup>4</sup>; <sup>1</sup>University of California, Merced; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Harvey Mudd College; <sup>4</sup>University of New South Wales

**SPU-31: Formation and Fractionation of Solid Solution REE-F Compounds:** *Olivia Bahhage*<sup>1</sup>; Natalie Yaw<sup>1</sup>; Malin Dixon Wilkins<sup>1</sup>; John McCloy<sup>1</sup>; Xiaofeng Guo<sup>1</sup>; <sup>1</sup>Washington State University

**SPU-32: High Entropy Lead-Free, Free Machining Brass with Calcium:** *Julien Luu*<sup>1</sup>; Isaiah Jeter<sup>1</sup>; Alejandro Trujillo<sup>2</sup>; Aurora Pribram-Jones<sup>2</sup>; Jane Yang<sup>3</sup>; Lori Bassman<sup>1</sup>; Kevin Laws<sup>3</sup>; <sup>1</sup>Harvey Mudd College; <sup>2</sup>University of California, Merced; <sup>3</sup>University of New South Wales

**SPU-33: Molecular Dynamics Study of  $\Sigma 3$  Grain Boundary Energies in Nickel at Finite Temperatures:** *Madinabonu Nosirova*<sup>1</sup>; Meizhong Lyu<sup>1</sup>; Elizabeth Holm<sup>1</sup>; <sup>1</sup>University of Michigan

**SPU-34: Oxide Dispersion Strengthened Metastable Self-Healing Alloys for Nuclear Applications:** *Sarah McDearis*<sup>1</sup>; Priyanka Agrawal<sup>1</sup>; Amit Singh<sup>1</sup>; Supreeth Gaddam<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>UNT Center for Friction Stir Processing

**SPU-35: Synthesis Characterization and Properties of Steel-Copper Metallic Composites via Additive Manufacturing:** *Mia Mikolajczak*<sup>1</sup>; Yuheng Nie<sup>1</sup>; Nabila Ali<sup>1</sup>; Marie Charpagne<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

## 2D Materials – Preparation, Properties, Modeling & Applications — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Nuggehalli Ravindra, New Jersey Institute of Technology; Madan Dubey, US Army Research Laboratory; Hesam Askari, University of Rochester; Ritesh Sachan, Oklahoma State University; Joshua Young, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Chintalapalle V Ramana, University of Texas

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**Session Chairs:** Nuggehalli Ravindra, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University

**B-1: A Novel Graphene-Enabled Tunable Plasmonic TE-TM Mode Waveguide Filter:** *Yadvendra Singh*<sup>1</sup>; *Harish Subbaraman*<sup>1</sup>; <sup>1</sup>Oregon State University

**B-2: Heterolayered Anion-Mixed Salt-Inclusion Structures:** *Anna Berseneva*<sup>1</sup>; Hans-Conrad zur Loye<sup>2</sup>; <sup>1</sup>National Renewable Energy Laboratory; <sup>2</sup>University of South Carolina

**B-3: In-Situ Characterization of Mechanical and Fracture Behavior in MXene/PVDF Nanocomposites:** *Bita Soltan Mohammadlou*<sup>1</sup>; James Fitzpatrick<sup>1</sup>; Yury Gogotsi<sup>1</sup>; <sup>1</sup>Drexel University

**Mesoscale Simulation of Electrical Performance Degradation on Electronics Due to Defects and Carriers Dynamics Induced by Ionizing Radiation:** *Xiaoyu Guan*<sup>1</sup>; <sup>1</sup>University of Florida

**Synthesis of TiS<sub>2</sub> Magnesium Ion Battery Cathode Material by CVT Method:** *Jinan Wang*<sup>1</sup>; Jiang Diao<sup>1</sup>; Hao Qin<sup>1</sup>; Hongyu Liu<sup>1</sup>; Hongyi Li<sup>1</sup>; Bing Xie<sup>1</sup>; Guangsheng Huang<sup>1</sup>; Jingfeng Wang<sup>1</sup>; Fusheng Pan<sup>1</sup>; <sup>1</sup>Chongqing University

**B-4: Understanding the Negative Poisson's Ratio of Graphene Oxide Through Rotation Mechanisms:** *Jacob Newman*<sup>1</sup>; Yijing Stehle<sup>1</sup>; <sup>1</sup>Union College

## BIOMATERIALS

## Advanced Biomaterials for Biomedical Implants — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Penn State; Vinoy Thomas, University of Alabama at Birmingham

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**Session Chair:** Vinoy Thomas, University of Alabama at Birmingham

**Biodegradable Gel Electrolyte for Bioresorbable and Implantable Biomedical Devices:** *Jaewon Kim*<sup>1</sup>; Giheon Kim<sup>1</sup>; Jahyun Koo<sup>1</sup>; <sup>1</sup>Korea University

**A-1: Innovative Bone Implants: Drawing Inspiration from Marine Sponges for Next-Gen Solutions:** *Armaghan Hashemi Monfared*<sup>1</sup>; Fariborz Tavangarian<sup>2</sup>; Niloofer Fani<sup>2</sup>; Sorour Sadeghzade<sup>3</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Penn State Harrisburg; <sup>3</sup>Westlake University

**Structural Properties of Ti-xNb Alloys for Biomedical Applications:** Ziad Djafia<sup>1</sup>; Mamoun Fellah<sup>1</sup>; Naouel Hezil<sup>1</sup>; Mohammed Abdul Samad<sup>2</sup>; <sup>1</sup>ABBES Laghrour - Khenchela University; <sup>2</sup>KFUPM KSA

**Synthesis and Corrosion Behavior of Nitinol for Biomedical Applications Produced by Mechanical Alloying Method:** Nabila Bouchareb<sup>1</sup>; Mamoun Fellah<sup>1</sup>; Naouel Hezil<sup>1</sup>; Imen Rim<sup>1</sup>; <sup>1</sup>ABBES Laghrour-University

## MATERIALS SYNTHESIS AND PROCESSING

### Advanced Laser Manufacturing of High-Performance Materials — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Adam Hicks, Air Force Research Laboratory; Jared Speltz, University of Dayton Research Institute

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**Experimental Study on the Influence of Scanning Speed and Powder Feeding Rate on the Interface Performance of T15 Laser Cladding Layer:** Mingming Duan<sup>1</sup>; Yingtao Zhang<sup>1</sup>; <sup>1</sup>Hohai University

**D-2: Optical Reflectance Tailoring of Powders for Laser-Based Sintering via Magnetron Sputtering:** Camilo Bedoya Lopez<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2025 — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Energy Conversion and Storage Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Surojit Gupta, University of North Dakota; Jung Choi, Pacific Northwest National Laboratory; Amit Pandey, Lockheed Martin Space; Partha Mukherjee, Purdue University; Soumendra Basu, Boston University; Paul Ohodnicki, University of Pittsburgh; Eric Detsi, University of Pennsylvania; Cengiz Ozkan, University of California

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**Session Chair:** Soumendra Basu, Boston University

**Enhanced Temperature Stability of LLTO (Li<sub>3</sub>xLa<sub>2</sub>/3-xTiO<sub>3</sub>) Solid Electrolyte Through Sr Doping:** Wolil Nam<sup>1</sup>; Moonhee Choi<sup>1</sup>; JiHyun Park<sup>1</sup>; <sup>1</sup>Korea Institute of Ceramic Engineering & Technology

**Enhancing the Thickness Uniformity of Electroplated Cobalt Thin Films on SOFC Interconnectors Through Electrochemical and Microstructural Control:** Ki-Young Lee<sup>1</sup>; Hyun Park<sup>1</sup>; Hyo-Jong Lee<sup>1</sup>; Jung Han Kim<sup>1</sup>; <sup>1</sup>Dong-A University

**Fabrication and Characterization of Polyurea-Polyurethane/Silver Bilayer Shell Phase-Change Nanocapsules:** Sitong Liu<sup>1</sup>; Tonghe Li<sup>1</sup>; Dengti Hu<sup>1</sup>; Hao Bai<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Improved Electrochemical Performance in Sodium-Ion Batteries Using Carbon-Coated, Fe and Cr Co-Doped Sodium Vanadium Fluorophosphate as Cathode Material:** Sanchayan Mahato<sup>1</sup>; Koushik Biswas<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**Layered Intercalated Architecture of Ni<sub>2</sub>V<sub>2</sub>O<sub>7</sub> Nanoparticle and N-Doped Reduced Graphene Oxide Composite Sheet as an Electrode Material for Asymmetric Supercapacitor:** Rohit Anand<sup>1</sup>; Arghyadeep Sau<sup>1</sup>; Karabi Das<sup>1</sup>; Siddhartha Das<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**B-5: Preparation of Carbon Coating Layers for LiFePO<sub>4</sub> with Excellent Performance by Additive Addition:** Da Eun Kim<sup>1</sup>; Yong Joon Park<sup>1</sup>; <sup>1</sup>Kyonggi University

**Study on the Purification Performance of Low Concentration Gas Using Parallel Column Chromatography:** Jun Zhao<sup>1</sup>; <sup>1</sup>China University of Mining and Technology

**B-6: Surface Treatment Using Sulfur for Stabilized Cathode/Sulfide Electrolyte Interface:** Ha Young Ko<sup>1</sup>; Yong Joon Park<sup>1</sup>; <sup>1</sup>Kyonggi University

**B-7: The Impact of UV Irradiation on Dielectric Properties of Graphene Oxide Membranes:** Maren Friday<sup>1</sup>; Yijing Stehle<sup>1</sup>; <sup>1</sup>Union College

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances and Discoveries in Non-Equilibrium Driven Nanomaterials and Thin Films — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Ritesh Sachan, Oklahoma State University; Ashutosh Tiwari, University of Utah; Santosh Kc, San Jose State University; Shikhar Jha, Indian Institute of Technology Kanpur

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**B-8: Conversion of c-Si and a-Si to Q-Si Phases by Ion Irradiation:** Siba Sundar Sahoo<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Ambuj Tripathi<sup>2</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Inter University Accelerator Center

**B-41: Next-Generation Interconnects: Ruthenium and Ruthenium Alloys for Improved EM Resistance and Low Resistivity:** Minju Kang<sup>1</sup>; <sup>1</sup>Sungkunkwan

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Bcc-Superalloys — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Alexander Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU); Howard Stone, University of Cambridge; Oleg Senkov, Air Force Research Laboratory; Eric Lass, University of Tennessee-Knoxville; Thomas Hammerschmidt, Ruhr University Bochum

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**Session Chairs:** Sandy Knowles, University of Birmingham; Christopher Zenk, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

**D-3: Design of Novel Intermetallic Reinforced Nano-Structured Steels for Nuclear:** Iris Carneiro<sup>1</sup>; Luke Howard<sup>1</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham



## BIOMATERIALS

**Advances in Biomaterials for Bioink Formulation and 3D Printing of Scaffolds — Poster Session**

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Changxue Xu, Texas Tech University; Yifei Jin, University of Nevada Reno; Zhengyi Zhang, Huazhong University of Science and Technology; Jun Yin, Zhejiang University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**A-2: 3D Printing of Mechanically Reinforced Hydrogels Based on Ketoenamine-Crosslinked Polyrotaxane Network:** *Kundo Park*<sup>1</sup>; Grace Hu<sup>1</sup>; Zeqing Jin<sup>1</sup>; Dan Zheng<sup>2</sup>; Chenfeng Ke<sup>2</sup>; Grace Gu<sup>1</sup>; <sup>1</sup>University of California Berkeley; <sup>2</sup>Washington University in St. Louis

**A-3: Enhanced Mechanical Properties of 3D Printed Gelatin Methacryloyl (GelMA)-Based Hydrogels for Peripheral Nerve Recovery:** *Yerim Lee*<sup>1</sup>; Jaewon Kim<sup>1</sup>; Prabir Patra<sup>2</sup>; Jahyun Koo<sup>1</sup>; <sup>1</sup>Korea University; <sup>2</sup>Marshall University

**A-4: Rapid 3D Printing of Electro-Active Hydrogels:** *Wenbo Wang*<sup>1</sup>; Xiangfan Chen<sup>1</sup>; <sup>1</sup>Arizona State University

## MATERIALS SYNTHESIS AND PROCESSING

**Advances in Ceramic Materials and Processing — Poster Session**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Bowen Li, Michigan Technological University; Dipankar Ghosh, Old Dominion University; Eugene Olevsky, San Diego State University; Kathy Lu, University of Alabama Birmingham; Faqin Dong, Southwest University of Science and Technology; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut; Jinhong Li, China University of Geosciences; Gregory Thompson, University of Alabama; Babak Anasori, Purdue University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Bowen Li, Michigan Technological University; Jinhong Li, China University of Geosciences

**D-4: Characterization of Bauxite Residue for Feasibility Study of Its Application in the Ceramic Construction Industry:** Marcus Mendes<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; Flávio Ferreira<sup>1</sup>; José Maria Carvalho<sup>1</sup>; Beatryz Mendes<sup>1</sup>; <sup>1</sup>Universidade Federal de Viçosa

**Degradation of Orange II Dye of Zn Doped Copper Oxide Thin Films Deposited by Spin Coating Method:** *Madiha Zerouali*<sup>1</sup>; Dikra Bouras<sup>2</sup>; Mamoun Fellah<sup>3</sup>; Radouane Daira<sup>1</sup>; Regis Barille<sup>4</sup>; Manel Sellam<sup>5</sup>; <sup>1</sup>Laboratory of Research on the Physical-Chemistry of Surfaces and Interfaces; <sup>2</sup>University of Souk-Ahras; <sup>3</sup>ABBES Laghrour University; <sup>4</sup>Université d'Angers/UMR CNRS; <sup>5</sup>University Larbi Ben Mhidi

**D-5: Incorporation of Corn Straw in Soil-Cement Bricks and the Effects on Their Characteristics:** João Antônio Jeunon<sup>1</sup>; Juan Ferreira<sup>1</sup>; Euzebio Zanelato<sup>2</sup>; Samuel Dutra Júnior<sup>1</sup>; Markssuel Marvila<sup>1</sup>; Afonso Azevedo<sup>3</sup>; <sup>1</sup>Universidade Federal de Viçosa - CRP; <sup>2</sup>IFES; <sup>3</sup>Universidade Estadual Do Norte Fluminense

**Na2SO4·10H2O Phase Change Cold Storage Material: Composition Optimization and Performance Regulation:** Qirui Wang<sup>1</sup>; Hongen Nian<sup>1</sup>; Xiaoling Tan<sup>2</sup>; Xiang Wang<sup>3</sup>; Yujing Zhao<sup>1</sup>; Zhaoying Wang<sup>1</sup>; <sup>1</sup>Qinghai Salt Lake Research Institute, Chinese Academy of Sciences; <sup>2</sup>Qinghai University; <sup>3</sup>Peking University

**D-6: Nacre-Inspired CuAgTi Alloy-Alumina Lamellar Composites:** Taeyoon Kim<sup>1</sup>; Je In Lee<sup>1</sup>; <sup>1</sup>Pusan National University

**Structural Comparative Study of Zirconium-Zinc Oxide Thin Films on Ceramic and Glass Substrates:** Dikra Bouras<sup>1</sup>; Mamoun Fellah<sup>2</sup>; Regis Barille<sup>3</sup>; Madiha Zerouali<sup>4</sup>; Nawel Hamblil<sup>1</sup>; Merah Neçar<sup>5</sup>; <sup>1</sup>University of Souk-Ahras; <sup>2</sup>ABBES Laghrour University; <sup>3</sup>Université d'Angers/UMR CNRS; <sup>4</sup>Laboratory of Research on the Physical-Chemistry of Surfaces and Interfaces; <sup>5</sup>King Fahd University of Petroleum and Minerals

**Synthesis and Dielectric Properties of BaTiO<sub>3</sub> Solid Solutions Co-Doped with La<sup>3+</sup> and Bi<sup>3+</sup>:** *Maria Inés Valenzuela Carrillo*<sup>1</sup>; Nely Esmeralda Hernández Pérez<sup>1</sup>; Miguel Pérez Labra<sup>1</sup>; Francisco Raúl Barrientos-Hernández<sup>1</sup>; José Antonio Romero Serrano<sup>2</sup>; Martín Reyes Pérez<sup>1</sup>; Alejandro Cruz Ramírez<sup>2</sup>; Julio César Juárez Tapia<sup>1</sup>; <sup>1</sup>Autonomous University of Hidalgo State; <sup>2</sup>Instituto Politécnico Nacional

**Synthesis and Structural and Dielectric Characterization of Capacitors Based on BaTiO<sub>3</sub> Co-Doped Er<sup>3+</sup> And Cr<sup>3+</sup>:** *E.R Ramirez-Martinez*<sup>1</sup>; M. Pérez-Labra<sup>1</sup>; F.R. Barrientos-Hernández<sup>1</sup>; J.A. Romero-Serrano<sup>2</sup>; A. Hernández-Ramírez<sup>2</sup>; M. Reyes-Pérez<sup>1</sup>; M.I Valenzuela-Carrillo<sup>1</sup>; G. Urbano-Reyes<sup>1</sup>; I.P. Zamudio-García<sup>1</sup>; <sup>1</sup>Autonomous University of Hidalgo; <sup>2</sup>Instituto Politécnico Nacional

**Synthesis of Na-P1 Zeolite from Expanded Perlite:** Imanol González-Ángeles<sup>1</sup>; *M. Garcia-Ramirez*<sup>1</sup>; F.R. Barrientos-Hernández<sup>1</sup>; María I. Reyes-Valderrama<sup>1</sup>; Julio Juárez-Tapia<sup>1</sup>; M. Reyes-Pérez<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo

**Thermodynamic Study of Calcium Oxide Evaporation Under Various Redox Conditions:** *Sergey Shornikov*<sup>1</sup>; <sup>1</sup>Vernadsky Institute of Geochemistry of RAS

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Advances in Magnetism and Magnetic Materials — Poster Session**

**Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee

**Program Organizers:** Matthew Kramer, Ames Laboratory; Eric Theisen, Energy & Environmental Research Center; Yaroslav Mudryk, Ames National Laboratory/Iowa State University; Daniel Salazar, BCMaterials

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Radhika Barua, Virginia Commonwealth University

**B-9: A Study on the Improvement of Coercivity of Nd-Fe-B Permanent Magnets by GBDP of Ternary Alloy:** *Hyun Bin Joo*<sup>1</sup>; Seung-Yeon Park<sup>1</sup>; Seong Min Choi<sup>1</sup>; Se Rin Jeong<sup>1</sup>; Soong Ju Oh<sup>2</sup>; Kyoung-Mook Lim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea University

**B-10: Evolution and Effect of Nd<sub>6</sub>Fe<sub>13</sub>Si-type Grain Boundary Phase on the Coercivity of Nd-Fe-B Sintered Magnet:** *Ikenna Nlebedim*<sup>1</sup>; Xubo Liu<sup>1</sup>; <sup>1</sup>Ames National Laboratory

**B-11: Investigation of Ultra-High-Performance Soft Magnetic Materials with Controlled Nanocrystal Growth Through Nucleation-Dominant Composition Design:** *Subin An*<sup>1</sup>; Wook Ha Ryu<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Kumoh National Institute of Technology



**Magnetic High Entropy Oxide for Water Pollutant Degradation:** *Sanjula Pradhan<sup>1</sup>; Nand Prasad<sup>1</sup>; <sup>1</sup>IIT BHU*

**B-12: Magnetocaloric Effect for Gd(Mn,Fe,Co)Si Alloys:** *Przemyslaw Zackiewicz<sup>1</sup>; Aleksandra Kolano-Burian<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - Imn*

**B-13: Medium Entropy Fe-Co-Ni-B-Al Alloys Obtained by Spark Plasma Sintering:** *Tymon Warski<sup>1</sup>; Krzysztof Pecak<sup>1</sup>; Anna Czech<sup>1</sup>; Anna Wojcik<sup>2</sup>; Robert Chulist<sup>2</sup>; Wojciech Maziarz<sup>2</sup>; Maciej Kowalczyk<sup>3</sup>; Lukasz Hawelek<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals; <sup>2</sup>Institute of Metallurgy and Materials Science of Polish Academy of Sciences; <sup>3</sup>Warsaw University of Technology*

**Synthesis and Characterization Magnetic Membranes Based on PVA-SPION for Hyperthermia and Dielectric Applications:** *Imaddin Al-Omar<sup>1</sup>; Anjitha Biju<sup>2</sup>; Ajeesh Somakumar<sup>3</sup>; Cyriac Joseph<sup>4</sup>; Francis Fernandez<sup>5</sup>; Hari Krishna Varma P R<sup>5</sup>; TN Narayanan<sup>6</sup>; MR Anantharaman<sup>2</sup>; <sup>1</sup>Sultan Qaboos University; <sup>2</sup>Cochin University of Science and Technology; <sup>3</sup>Polish Academy of Sciences; <sup>4</sup>Mahatma Gandhi University; <sup>5</sup>Sree Chitra Tirunal Institute for Medical Sciences and Technology; <sup>6</sup>Tata Institute of Fundamental Research*

**B-14: Synthesis and Magnetic Evaluation of Carbonaceous Spinel Ferrite Nanocomposites:** *Naveen Narasimhachar Joshi<sup>1</sup>; Shivashankar S. A.<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Indian Institute of Science*

**B-44: Thermodynamic Investigation of Rare-Earth Reduced Magnet Systems:** *Emily Moore<sup>1</sup>; Kate Elder<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Akila Raja<sup>1</sup>; German Samolyuk<sup>1</sup>; Olena Palasyuk<sup>2</sup>; Andriy Palasyuk<sup>2</sup>; David Parker<sup>3</sup>; Aurélien Perron<sup>1</sup>; Scott McCall<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Ames National Laboratory; <sup>3</sup>Oak Ridge National Laboratory*

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Poster Session I

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**E-1: A Machine Learning Approach for the Prediction of Formability and Thermodynamic Stability of Refractory Compositionally Complex Alloy Containing Mo and W:** *Carla Joyce Nocheseda<sup>1</sup>; Tao Liang<sup>1</sup>; Haixuan Xu<sup>1</sup>; Eric Lass<sup>1</sup>; <sup>1</sup>The University of Tennessee*

**E-2: As-Cast Microstructure, Hardness and High Temperature Creep Behavior of an Equimolar CoNiFeCr Alloy; Effects of a Ti or Ta Addition:** *Yasmina El Hadad<sup>1</sup>; Lyna Amrouche<sup>1</sup>; Romin Chevalme<sup>1</sup>; Siouare Hammi<sup>1</sup>; Lionel Aranda<sup>1</sup>; Patrice Berthod<sup>1</sup>; <sup>1</sup>University of Lorraine*

**Cluster-Model-Based Composition Design Method for High-Entropy Alloys:** *Shuang Zhang<sup>1</sup>; Cunlei Zou<sup>1</sup>; Wanyu Ding<sup>1</sup>; Yajun Zhao<sup>1</sup>; Chuang Dong<sup>1</sup>; <sup>1</sup>Dalian Jiaotong University*

**Compositional Effect on Microstructure and Deformation Behavior of Metastable Refractory High-Entropy Alloys:** *Yunjong Jung<sup>1</sup>; Kangjin Lee<sup>1</sup>; Kanghyun Park<sup>1</sup>; Chanhoo Lee<sup>2</sup>; Gian Song<sup>1</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>Auburn University*

**Deciphering the Operative Micromechanisms Affecting the Strain Rate Sensitivity in (FeCrNi)99Si1 Medium Entropy Alloy:** *Swati Mahato<sup>1</sup>; Krishanu Biswas<sup>1</sup>; Nilesh Gurao<sup>1</sup>; <sup>1</sup>India Institute of Technology Kanpur*

**Development of Ductile Refractory High Entropy Alloys with High Strength via Controlling Cold-Rolling and Annealing Process:** *Kangjin Lee<sup>1</sup>; Yunjong Jung<sup>1</sup>; Kanghyun Park<sup>1</sup>; Chanhoo Lee<sup>2</sup>; Gian Song<sup>1</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>Auburn University*

**E-3: Development of  $\gamma'$ -Strengthened Medium-Entropy Alloys with Mitigated Mechanical Instability at Extremely Low Temperatures:** *Jun Seok Lee<sup>1</sup>; Tae Hyeon Kim<sup>1</sup>; Jungwan Lee<sup>2</sup>; Young-Kyun Kim<sup>3</sup>; Young-Sang Na<sup>3</sup>; Jae Wung Bae<sup>1</sup>; <sup>1</sup>Pukyong National University; <sup>2</sup>Pohang University of Science and Technology (POSTECH); <sup>3</sup>Korea Institute of Materials Science (KIMS)*

**E-4: Effect of Microstructure on Hot Deformation and Dynamic Recrystallization Behavior of WMoFeNi MPEA Alloy Regulating Alloy Composition:** *Riya Barua<sup>1</sup>; Thomas Balk<sup>1</sup>; <sup>1</sup>University of Kentucky*

**E-5: Effect of Processing Route on the Morphology of Fe-Rich Phase and Concurrent Mechanical Response in Cu-Rich Compositionally Complex Alloy:** *Deeksha Mishra<sup>1</sup>; Rajiv S. Mishra<sup>2</sup>; Jaiveer Singh<sup>1</sup>; Saurabh S. Nene<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur; <sup>2</sup>University of North Texas*

**E-52: Effect of Ti Addition on Strengthening and Deformation Mechanism of Ni-Rich High Entropy Alloy Synthesized via Spark Plasma Sintering: An Experimental and Atomistic Approach:** *Sudhansu Maharana<sup>1</sup>; Manashi Sabat<sup>1</sup>; D.K.V.D. Prasad<sup>1</sup>; Tapas Laha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur*

**E-6: Effects of Molybdenum and Silicon Co-doping on Microstructures and Mechanical Properties of CoCrNi Medium Entropy Alloy:** *Sheng-Wei Chen<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University*

**Engineering Multi-Principal Element Alloys for Hard Metal Binders:** *Tommi Suhonen<sup>1</sup>; Song Lu<sup>1</sup>; Tatu Pinomaa<sup>1</sup>; Tom Andersson<sup>1</sup>; Luis Vallejo Rodriguez<sup>1</sup>; Alexandre Viardin<sup>2</sup>; Markus Apel<sup>2</sup>; Anssi Laukkanen<sup>1</sup>; <sup>1</sup>VTT Technical Research Center of Finland; <sup>2</sup>Access Technology*

**E-7: Enhanced Strain Hardening During Plastic Deformation of FCC Multi-Principal Element Alloys with L12 Nanodomains:** *Wenle Xu<sup>1</sup>; Daniel Salas<sup>1</sup>; Bibhu Sahu<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Mrinalini Mulukutla<sup>1</sup>; Trevor Hastings<sup>1</sup>; <sup>1</sup>Texas A&M University*

**E50: Enhancement of Mechanical Properties of Ni-Based ODS HEA by Optimization of Oxide Dispersoid Content:** *Manashi Sabat<sup>1</sup>; Sudhansu Maharana<sup>1</sup>; Tapas Laha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur*

**E-8: Establishing Composition-Temperature-Grain-Strength Relationship of FCC Complex Concentrated Alloys:** *Dong Whan Kim<sup>1</sup>; Heh Sang Ahn<sup>1</sup>; Wook Ha Ryu<sup>1</sup>; Hwi Yoon Jeong<sup>2</sup>; Je In Lee<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Pusan National University*

**E-9: Expansion of Natural Mixing Guided Design via Understanding the Solidification Behavior:** *Jae Kwon Kim<sup>1</sup>; Min Seok Kim<sup>1</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University*

**E-10: Harnessing Defects for Enhanced Strength in Medium Entropy Alloys:** *Ning Zhang<sup>1</sup>; Charles Matlock<sup>1</sup>; <sup>1</sup>Baylor University*

**E-11: Heterogeneous Failure Mechanisms in an Eutectic High Entropy Alloy Under High Strain-Rate Loading:** *Soumya Dash<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto*

**E-12: High-Density Nanoprecipitates and Phase Reversion via Maraging Enable Ultrastrong Yet Strain-Hardenable Medium-Entropy Alloy:** *Hyeonseok Kwon<sup>1</sup>; Praveen Sathiyamoorthi<sup>2</sup>; Manogna Gangaraju<sup>2</sup>; Alireza Zargarani<sup>1</sup>; Jaemin Wang<sup>1</sup>; Yoon-Uk Heo<sup>1</sup>; Stefanus Harjo<sup>3</sup>; Wu Gong<sup>3</sup>; Byeong-Joo Lee<sup>1</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>Postech; <sup>2</sup>Indian Institute of Technology (BHU) Varanasi; <sup>3</sup>J-PARC center*

**E-47: High and Moderate Temperature Deformation Modeling of High Entropy Alloys:** *Charles Xu<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Stephen Niezgoda<sup>1</sup>; <sup>1</sup>The Ohio State University*

**E-13: In-Situ Compression of Al5Co35CrFe20Ni5 Alloy Studied Using Synchrotron Radiation:** *Pablo Pérez Zubiaur<sup>1</sup>; Gerardo Garces<sup>1</sup>; Judit Medina<sup>1</sup>; Andreas Stark<sup>2</sup>; Norbert Schell<sup>2</sup>; Paloma Adeva<sup>1</sup>; <sup>1</sup>Cenim-Csic; <sup>2</sup>HEREON*

**E-14: In-Situ Deformation Study of Non-Shearable Nanodispersion Strengthened Refractory Complex Concentrated Alloys:** *Md Al Amin Bhuiyan Shuvo<sup>1</sup>; Jaekwon Kim<sup>2</sup>; Eun Soo Park<sup>2</sup>; Hyunseok Oh<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Seoul National University*

**E-46: In situ Neutron Diffraction Study on L12-Precipitation-Strengthened (FeCoNi)86Al7Ti7 High Entropy Alloy:** *Lia Amalia<sup>1</sup>; Zongyang Lyu<sup>1</sup>; Peter Liaw<sup>1</sup>; Yanfei Gao<sup>1</sup>; <sup>1</sup>University of Tennessee*

**Interplay Between Lattice Distortion and Bond Stiffness Towards Strengthening of Refractory BCC High Entropy Alloys:** *Dharmendra Pant<sup>1</sup>; Dilpuneet Aidhy<sup>1</sup>; <sup>1</sup>Clemson University*

**E-15: Investigation of Elastic and Plastic Deformation Behavior of Nature Selected Refractory High Entropy Alloy:** *Jae Kwon Kim<sup>1</sup>; Ji Young Kim<sup>1</sup>; Hyun Seok Oh<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>University of Wisconsin-Madison*

**Investigation of Mechanical and Corrosion Behavior of Nitinol for Biomedical Implant Applications:** *Nabila Bouchareb<sup>1</sup>; Mamoun Fellah<sup>1</sup>; Naouel Hezil<sup>1</sup>; Imen Rim<sup>1</sup>; <sup>1</sup>ABBES Laghrour-University Khenchela*

## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys IV: Mechanical Behavior — Poster Session II

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Peter Liaw, University of Tennessee; Michael Gao, National Energy Technology Laboratory; Jennifer Carter, Case Western Reserve University; E-Wen Huang, National Yang Ming Chiao Tung University; T.S. Srivatsan, University of Akron; Xie Xie, Ford Motor Company; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand**

**E-16: Low Cycle Fatigue of a Medium Entropy Alloy with Short-Range Ordering:** *Hugh Shortt<sup>1</sup>; Nathan Grain<sup>1</sup>; Xuesong Fan<sup>1</sup>; Jochi Tseng<sup>2</sup>; Michael Gao<sup>3</sup>; Lizhi Ouyang<sup>4</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>Spring-8; <sup>3</sup>National Energy Technology Laboratory; <sup>4</sup>Tennessee State University*

**E-17: Mechanical Behavior of 16 Refractory High Entropy Alloys Under Compressive and Tensile Stress: A Molecular Dynamics Study:** *Abdullah Al Mamun<sup>1</sup>; Yanqing Su<sup>1</sup>; Xiang-Guo Li<sup>2</sup>; <sup>1</sup>Utah State University; <sup>2</sup>Sun Yat-Sen University*

**E-18: Microstructural Evolution and Mechanical Behavior of HfTiZrNbX Refractory High-Entropy Alloys Under Different Annealing Conditions:** *Joseph Tamirka Bawah<sup>1</sup>; Peter K. Liaw<sup>1</sup>; Eric A. Lass<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville*

**E-19: Microstructure and Mechanical Properties of In-Situ TiC Reinforced TaNbVTi High Entropy Alloy Matrix Composites:** *Hyeok Jae Choi<sup>1</sup>; Jin Kyu Lee<sup>1</sup>; <sup>1</sup>Kongju National University*

**E-20: Modeling Dense Alloys in Discrete Dislocation Dynamics:** *Yang Li<sup>1</sup>; Benjamin Anglin<sup>2</sup>; Ryan Sills<sup>1</sup>; <sup>1</sup>Rutgers University; <sup>2</sup>Naval Nuclear Laboratory*

**E-21: Overcoming Strength-Ductility Trade-Off Through Periodic Spinodal Decomposition in Ferrous Medium-Entropy Alloy:** *Hyojin Park<sup>1</sup>; Farahanz Haftlang<sup>2</sup>; Yoon-Uk Heo<sup>1</sup>; Jae Bok Seol<sup>3</sup>; Zhijun Wang<sup>4</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>Northwestern University; <sup>3</sup>Gyeongsang National University; <sup>4</sup>Northwestern Polytechnical University*

**E-22: Oxidation Behavior of Low-Density Non-Equiatomic AlCuFeNiTi High Entropy Alloy:** *Manoj Mugale<sup>1</sup>; Mayank Garg<sup>1</sup>; Satyavan Digole<sup>1</sup>; Sanoj Karki<sup>1</sup>; Amit Choudhari<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University*

**Precipitation/TRIP-Induced Heterogeneous Microstructures in Non-Equiatomic CoCrNi Medium Entropy Alloys to Achieve Superior Strength-Ductility Combination:** *Yu-Hsuan Huang<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University*

**E-23: Refractoriness, Thermal Expansion Behavior and Microstructure Stability at 1200°C of an Equimolar Cast CoNiFeCr Alloy and Its Versions with Addition of Titanium or of Tantalum:** *Romin Chevalme<sup>1</sup>; Siouare Hammi<sup>1</sup>; Yasmina El Hadad<sup>1</sup>; Lyna Amrouche<sup>1</sup>; Lionel Aranda<sup>1</sup>; Patrice Berthod<sup>1</sup>; <sup>1</sup>University of Lorraine*

**E-24: Revealing the Deformation Mechanism Competition in Multi-Principal Element Alloys by Nanobending Experiments:** *Novin Rasouli<sup>1</sup>; Matthew Daly<sup>1</sup>; <sup>1</sup>University of Illinois at Chicago (UIC)*

**Sequential Mechanical Alloying of AlNbTaTiV Particles: Phase Formation and Microstructural Evaluation:** *Marvin Tolentino<sup>1</sup>; Aisa Grace Custodio<sup>1</sup>; Gobinda Saha<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; Jubert Pasco<sup>1</sup>; <sup>1</sup>University of New Brunswick*

**E-25: Significant Improvement of Strain Hardening Through Massive Coherent Boundaries in Nano-Lamellar Structured Complex-Concentrated Alloys:** *Tae Jin Jang<sup>1</sup>; You Na Lee<sup>2</sup>; Ju-Hyun Baek<sup>1</sup>; Sang-Ho Oh<sup>2</sup>; Yeon Taek Choi<sup>2</sup>; Byeong-Joo Lee<sup>2</sup>; Hyoung Seop Kim<sup>2</sup>; Alireza Zargarani<sup>2</sup>; Seok Su Sohn<sup>1</sup>; <sup>1</sup>Korea University; <sup>2</sup>Pohang University of Science and Technology*

**Strength-Ductility Synergies in CuCoFeMnNi High-Entropy Alloys: Effects of Deformation and Recrystallization:** *Nitish Bibhanshu*

**E-26: Stretch Formability and Cryogenic Environmental Applicability of Fe(CoNi)90-xCr10 Ferrous Medium-Entropy Alloys:** *Yeon Taek Choi<sup>1</sup>; Jihye Kwon<sup>1</sup>; Rae Eon Kim<sup>1</sup>; Shin-Yeong Lee<sup>1</sup>; Do Won Lee<sup>1</sup>; Jaehun Kim<sup>1</sup>; Jae Wung Bae<sup>2</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>Pukyong National University*

**Study of the Serration Deformation Mechanisms at 15 K:** *You Sub Kim<sup>1</sup>; Taeuk Kang<sup>1</sup>; Soon-Ku Hong<sup>1</sup>; Jamieson Brechtel<sup>2</sup>; Mikhail Lebyodkin<sup>3</sup>; Yi-Hsuan Cheng<sup>4</sup>; E-Wen Huang<sup>4</sup>; Peter K. Liaw<sup>5</sup>; Stefanus Harjo<sup>6</sup>; Wu Gong<sup>6</sup>; Soo Yeol Lee<sup>1</sup>; <sup>1</sup>Chungnam National University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Université de Lorraine; <sup>4</sup>National Yang Ming Chiao Tung University; <sup>5</sup>University of Tennessee; <sup>6</sup>Japan Atomic Energy Agency*

**Study on Superplastic Behavior of L21 Precipitate-Hardened BCC High Entropy Alloy:** *Kanghyun Park<sup>1</sup>; Sang-Hun Shim<sup>2</sup>; Kangjin Lee<sup>1</sup>; Yunjong Jung<sup>1</sup>; Ka Ram Lim<sup>2</sup>; Chanhoo Lee<sup>3</sup>; Gian Song<sup>1</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>Korea Institute of Materials Science (KIMS); <sup>3</sup>Auburn University*

**E-27: The Rule of Mixtures, A New Evans-Polanyi-Semenov Relation, and Twinning Predictions for High Entropy Transition Metal Ceramics:** *Marium Mostafiz Mou<sup>1</sup>; Tarek Haque<sup>1</sup>; Sam Daigle<sup>1</sup>; Donald Brenner<sup>1</sup>; <sup>1</sup>North Carolina State University*

**Theory Guided Combinatorial Design of Metastable High Entropy Alloys:** *Chinmoy Mahata<sup>1</sup>; Sadhasivam M.<sup>1</sup>; Pradeep K. G.<sup>1</sup>; <sup>1</sup>IIT Madras*

**E-28: Tribological Stress Field Model Validation by Using Deformation Twins as Probes:** *Antje Dollmann<sup>1</sup>; <sup>1</sup>KIT*

**E-29: Unveiling Yield Strength of High Entropy Alloys Using Physics-Enhanced Machine Learning Under Diverse Experimental Conditions:** Jeong Ah Lee<sup>1</sup>; Roberto B. Figueiredo<sup>2</sup>; Hyojin Park<sup>1</sup>; Jae Hoon Kim<sup>3</sup>; Hyoungseop Kim<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology (POSTECH); <sup>2</sup>Universidade Federal de Minas Gerais; <sup>3</sup>Cornell Tech

**E-30: Welding-Driven Compositional Heterogeneity Enhances Cryogenic Mechanical Properties in Metastable Ferrous Medium-Entropy Alloy Welds:** Yoona Lee<sup>1</sup>; Jeong Min Park<sup>2</sup>; Nokeun Park<sup>3</sup>; Hyoung Seop Kim<sup>4</sup>; Namhyun Kang<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Korea Institute of Materials Science; <sup>3</sup>Yeungnam University; <sup>4</sup>Pohang University of Science and Technology

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VII — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Surface Engineering Committee

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Ning Zhu, Baylor University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Advanced Nanocrystalline Oxide Coatings with High Conformality for 3D Complex Cutting Tools:** Joonbong Lee<sup>1</sup>; Dae Haa Ryu<sup>1</sup>; Ki Buem Kim<sup>1</sup>; Taekjib Choi<sup>1</sup>; <sup>1</sup>Sejong University

**D-7: Controlling the Spangle Size and Crystallographic Texture of Hot-Dip Galvanized Coatings Through Substrate Surface Modification:** Eui-Jin Jung<sup>1</sup>; Gu-Jin Chung<sup>1</sup>; Joo-Youl Huh<sup>1</sup>; Tae-Chul Kim<sup>2</sup>; <sup>1</sup>Korea University; <sup>2</sup>POSCO Technical Research Laboratories

**D-8: Correlating Pile Up Height from Indentation with Surface Residual Stress in H-Shaped Steel Beam Processed by Quenching and Self-Tempering:** So-Hyeon Lee<sup>1</sup>; Gyeong-Seok Hwang<sup>1</sup>; Ju-Young Kim<sup>1</sup>; <sup>1</sup>UNIST (Ulsan National Institute of Science and Technology)

**Enhancing Electrochemical Performance of LiCoO<sub>2</sub> Cathodes With BaTiO<sub>3</sub> and Ba(Zr,Ti)O<sub>3</sub> Coatings of Different Dielectric Properties for High-Rate Applications:** Seokha Heo<sup>1</sup>; Moonhee Choi<sup>2</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Korea Institute of Ceramic Engineering & Technology

**Enhancing High Rate Performance of Cathodes Through Surface Modification and Dielectric Coating:** JiHye Seo<sup>1</sup>; Moonhee Choi<sup>1</sup>; <sup>1</sup>Korea Institute of Ceramic Engineering & Technology

**D-62: High-Temperature Wear Characteristics According to Nitrided Layer at the AISI H13 Steel Using Controlled Nitriding:** Seok Won Son<sup>1</sup>; Heon Kang<sup>1</sup>; Dae-Young Kim<sup>2</sup>; Kee-Ahn Lee<sup>3</sup>; Hyoung Seop Kim<sup>1</sup>; <sup>1</sup>KITECH; <sup>2</sup>DS-LIQUID; <sup>3</sup>Inha University

**Micro-Textured Slippery Aluminium Alloys for Marine Applications:** Nishkarsh Srivastava<sup>1</sup>; Aaqib Khan<sup>1</sup>; Rakesh Choubey<sup>1</sup>; Sriharitha Rowthu<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XIII — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Hsin-Jay Wu, National Taiwan University; Sinn-wen Chen, National Tsing Hua University; Franck Gascoin, CNRS Crismat Unicaen; Philippe Jund, Montpellier University; Yoshisato Kimura, Tokyo Institute of Technology; Takao Mori, National Institute for Materials Science; Wan-Ting Chiu, Institute of Science Tokyo; Chenguang Fu, Zhejiang University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**B-15: Cation Disorder as an Effective Strategy for Improving Near Room-Temperature Performance of SnSe:** Bo-Chia Chen<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang-Ming Chiao Tung University

**B-16: Co-Based Diffusion Barrier for n- and p-Type Skutterudite-Based Thermoelectric Materials Obtained via Pulse Plasma Sintering:** Mirosław Kruszewski<sup>1</sup>; Konrad Cymerman<sup>1</sup>; Jakub Flaga<sup>1</sup>; Marcin Chmielewski<sup>2</sup>; Dorota Moszczyńska<sup>1</sup>; Łukasz Ciupiński<sup>1</sup>; <sup>1</sup>Warsaw University of Technology; <sup>2</sup>Lukasiewicz Research Network - Institute of Microelectronics and Photonics

**B-17: Development of Thin-Film Diffusion Barrier for AgSbTe<sub>2</sub> Single Leg Thermoelectric Device:** Yi-Hsuan Lai<sup>1</sup>; Yun-Han Huang Lu<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**B-18: Enhanced Thermoelectric Performance of n-Type PbTe:** Ming-Yu Cheng<sup>1</sup>; Wen-Ching Wu<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**B-19: Enhancing Thermoelectric Performance of Ta, Sb Added NbCoSn Half-Heusler with the Atomic-Scale Microstructure Analysis:** Donghyeon Chae<sup>1</sup>; Pyuckpa Choi<sup>1</sup>; Hail Park<sup>1</sup>; Chanwon Jung<sup>2</sup>; <sup>1</sup>KAIST; <sup>2</sup>Pukyong National University

**B-20: Enhancing Thermoelectric Performance of p-Type Bi<sub>2</sub>Te<sub>3</sub> via Light-Doping and Defect Engineering:** Cheng-Yu Tsai<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**B-21: Hybridization of Bi<sub>2</sub>Te<sub>3</sub> with Self-Healing Ni-bpyPTD for Advanced Thermoelectric Device:** Jen-Hsun Weng<sup>1</sup>; Wan-ting Yen<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**Influence of SnTe Stoichiometry on Thermoelectric Performance:** Chun-Han Ku<sup>1</sup>; Alber T. Wu<sup>1</sup>; <sup>1</sup>National Central University

**B-22: Phase Equilibria of Co-Ge-Sb System:** Cheng-Hsi Ho<sup>1</sup>; Yung-Chun Tsai<sup>1</sup>; Hong-Dian Chiang<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**B-23: Whisker Inhibition and Thermoelectric Properties Enhancement in Silver Chalcogenide Materials:** Yun-Han Huang Lu<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University



## BIOMATERIALS

**Bio-Nano Interfaces and Engineering Applications — Poster Session**

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Candan Tamerler, University of Kansas; Kalpana Katti, North Dakota State University; Hannes Schniepp, William & Mary; Terry Lowe, Colorado School of Mines; Po-Yu Chen, National Tsing Hua University; David Kisailus, University of California-Irvine

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**3D Printed Scaffolds with Metal Nanoparticles as Sensing Modalities:** *Nate Lucas*<sup>1</sup>; Taylor Bader<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas Bioengineering

**Synthetic Salmon Calcitonin Alters the Mineral: Matrix Nanostructure of Mice with Chronic Kidney Disease:** *Elizabeth Montagnino*<sup>1</sup>; William Bush<sup>1</sup>; Thomas Siegmund<sup>1</sup>; John Howarter<sup>1</sup>; Rachel Surowiec<sup>1</sup>; <sup>1</sup>Purdue University

## BIOMATERIALS

**Biological Materials Science — Poster Session**

**Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee

**Program Organizers:** Yuxiao Zhou, Texas A&M University; Ling Li, University of Pennsylvania; Steven Naleway, University of Utah; Ning Zhang, Baylor University; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Yuxiao Zhou, Texas A&M University; Steven Naleway, University of Utah; Ling Li, University of Pennsylvania; Grace Gu, University of California, Berkeley; Debora Lyn Porter, University of California Merced; Ning Zhang, Baylor University

**Dendrometric Characteristics of Reforested Brazilian Wood Trees Paubrasilia Echinata Lam:** *Sinval Marques*; Jose Oliveira<sup>1</sup>; Fabricio Gonçalves<sup>1</sup>; <sup>1</sup>UFES

**A-5: Deriving Biodegradable Polymers From Spent Coffee Grounds:** *Cristina Gandolfo*<sup>1</sup>; Richard Alan Gross<sup>1</sup>; Josh Draper<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute

**Durability Performance of Enzymatic Cementitious Materials:** *Sara Heidarneshad*<sup>1</sup>; Nima Rahbar<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**A-6: Effects of Intratrabecular Architecture on the Mechanical Behavior of Trabeculae:** *Chenxu Yue*<sup>1</sup>; Yichun Tang<sup>1</sup>; Chengyao Gao<sup>1</sup>; Yuxiao Zhou<sup>2</sup>; Jing Du<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Texas A&M University

**A-7: Exploring Biomechanical Variations Between Medial and Adventitial Layers of Porcine Aorta:** *Hanwen Fan*<sup>1</sup>; Hutomo Tanato<sup>1</sup>; Yuxiao Zhou<sup>1</sup>; <sup>1</sup>Texas A&M University

**A-8: Micro-Mechanical Structure-Property Relationships in Filamentous Fungi for Biomedical Applications:** *Jessica Redmond*<sup>1</sup>; Ihsan Elnunu<sup>1</sup>; James Gallagher<sup>1</sup>; Steven Naleway<sup>1</sup>; <sup>1</sup>University of Utah

**A-9: Micromechanical Investigations of the Remarkable Damage Tolerance in Tooth-Enamel of Hadrosaurid Dinosaurs:** *Amruta Vaghela*<sup>1</sup>; Soumya Varma<sup>2</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>KLA Corporation

**A-10: Mushroom Biotemplating Material Properties and Methods:** *Emmely Villata*<sup>1</sup>; *Debora Lyn Porter*<sup>1</sup>; <sup>1</sup>University of California, Merced

**A-11: Orientation-Dependent Biomechanical Properties of Bovine Tibial Cortical Bone:** *Hutomo Tanoto*<sup>1</sup>; Hanwen Fan<sup>1</sup>; Yuxiao Zhou<sup>1</sup>; <sup>1</sup>Texas A&M University

**A-12: Survive the Cold: On the Thermal Protective Roles of the Hairy Trichomes From the Common Mullein Leaves:** *Yang Geng*<sup>1</sup>; Asma Meem<sup>2</sup>; Christian Machado<sup>2</sup>; Ruduan Yuan<sup>3</sup>; James Weaver<sup>4</sup>; Meng Li<sup>3</sup>; Kyoo-Chul Park<sup>2</sup>; Ling Li<sup>1</sup>; <sup>1</sup>University of Pennsylvania; <sup>2</sup>Northwestern University; <sup>3</sup>Chongqing University; <sup>4</sup>Harvard University

**A-13: Understanding and Modifying the Microstructure of Fungi for Tunable Mechanical Properties:** *Atul Agrawal*<sup>1</sup>; Steven Naleway<sup>1</sup>; <sup>1</sup>University of Utah

## MATERIALS SYNTHESIS AND PROCESSING

**Composite Materials: Sustainable and Eco-Friendly Material Development and Applications — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS: Composite Materials Committee

**Program Organizers:** Yahya Al-Majali, Ohio University; Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Yahya Al-Majali, Ohio University

**D-59: Comparative Analysis of the Flexural Resistance of Epoxy Resin Hybrid Composites Reinforced With Coconut Fiber:** *Rebeca Seixas Quintanilha Gomes*<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; Pedro Rabello Neves<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**D-60: Comparative Analysis of the Tensile Resistance of Epoxy Resin Hybrid Composites Reinforced With Coconut Fiber:** *Rebeca Seixas Quintanilha Gomes*<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; Pedro Rabello Neves<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**Eco-Friendly Photocatalytic Degradation of Textile Dye by Nickel-Doped Zinc Oxide Synthesized via Spray Pyrolysis Under UV and Solar Irradiation:** *Manel Sellam*<sup>1</sup>; Bouras Dikra<sup>2</sup>; Mamoun Fellah<sup>3</sup>; Zerouali Mediha<sup>4</sup>; <sup>1</sup>Laboratoire des Sciences Analytiques, Matériaux et Environnement (LASME), Université Larbi ben M'Hidi; <sup>2</sup>University of Souk-Ahras, Algeria; <sup>3</sup>ABBES Laghrour University; <sup>4</sup>Physico Chemistry of Surfaces and Interfaces Research Laboratory (LRPCS)

**Effect of Heat Treatment on Wear Mechanism of TiC/FC250 Composites:** *Yujin Lim*<sup>1</sup>; ilguk Jo<sup>1</sup>; Jaeseoung Choi<sup>1</sup>; <sup>1</sup>Dong-Eui University

**Effect of Replacing Fly Ash With Portland Cement in the Residence on the Compression of Mortars at 7, 14 and 28 Days:** *Hugo Garcia Ortiz*<sup>2</sup>; Julio Cesar Juarez Tapia<sup>1</sup>; Alma Victoria Sánchez Mendoza<sup>1</sup>; Marco Antonio Escamilla García<sup>1</sup>; Francisco Omar Lagarda García<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo



**Recycling of Construction Waste in the Composition of Artificial Finishing Stones:** Marcelo Reis<sup>1</sup>; *Carlos Fontes Vieira*<sup>1</sup>; Henry Lopera<sup>2</sup>; Afonso Azevedo<sup>1</sup>; Elaine Carvalho<sup>1</sup>; <sup>1</sup>State University of North Fluminense Darcy Ribeiro-UENF; <sup>2</sup>Universidad de Antioquia

**Study on the Effect of High Active Solid Waste Mineral Admixture on Mechanical Properties of High-Performance Concrete:** *Gang Du*<sup>1</sup>; Canhua Li<sup>1</sup>; Bo Gao<sup>1</sup>; Jiamao Li<sup>1</sup>; Lanyue Zhang<sup>1</sup>; <sup>1</sup>Anhui University of Technology

**Use of Steel Fibers to Develop High-Strength Artificial Stones:** José Lucas Lirio<sup>1</sup>; José Alexandre Tostes Linhares Júnior<sup>1</sup>; Elaine de Carvalho<sup>1</sup>; Afonso de Azevedo<sup>1</sup>; Djalma Souza<sup>1</sup>; *Carlos Mauricio Vieira*<sup>1</sup>; <sup>1</sup>UENF

## MATERIALS SYNTHESIS AND PROCESSING

### Electrical Steels — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Magnetic Materials Committee, TMS: Steels Committee

**Program Organizers:** Youliang He, CanmetMATERIALS, Natural Resources Canada; Kester Clarke, Los Alamos National Laboratory; Jun Cui, Iowa State University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Youliang He, CanmetMATERIALS, Natural Resources Canada

**Effect of Intercritical Annealing Time During Hot Rolling on the Microstructure and Magnetic Properties of Low-C Grain Non-Oriented Electrical Steels With 2% Si:** *Jesus Garcia Magana*<sup>1</sup>; Constantin Alberto Hernandez Bocanegra<sup>1</sup>; Nancy Margarita Lopez Granados<sup>1</sup>; Jose Angel Ramos Banderas<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials II — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Electronic Packaging and Interconnection Materials Committee

**Program Organizers:** C. Kao, National Taiwan University; Yu-An Shen, Feng Chia University; Christopher Gourlay, Imperial College London; Fan-Yi Ouyang, National Tsing Hua University; Hiroshi Nishikawa, Osaka University; Hannah Fowler, Sandia National Laboratories; Kazuhiro Nogita, University of Queensland; Praveen Kumar, Indian Institute of Science; Tae-Kyu Lee, Cisco Systems; Yan Li, Samsung Semiconductor Inc.

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Yu-An Shen, Feng Chia University

**B-31: Advancing Reliability in Low-Temperature Solders Using Hybrid SAC/SnBi Alloys:** *Po-Kai Chang*<sup>1</sup>; Shang-Yang Chen<sup>1</sup>; Kelvin Li<sup>2</sup>; Chang-Meng Wang<sup>2</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>Nation Central University; <sup>2</sup>Shenmao Technology Inc.

**B-32: Designing Mechanically Resilient Thermal Interface Materials:** *Geeta Pokhrel*<sup>1</sup>; Chelsea Davis<sup>2</sup>; John Howarter<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Delaware, Newark

**B-33: Developing High-Reliability Solder Alloys for Automotive Electronics:** *Wei-Ting Lin*<sup>1</sup>; Kelvin Li<sup>2</sup>; Watson Tseng<sup>2</sup>; Chang-Meng Wang<sup>2</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>National Central University; <sup>2</sup>Shenmao Technology Inc.

**Electromigration Failure Mechanisms and Microstructural Changes of Silver Sintered Joints Under Different Bonding Thickness:** *Yun-Chan Kim*<sup>1</sup>; Dong-Yurl Yu<sup>1</sup>; Shin-Il Kim<sup>1</sup>; Min-Ji Yu<sup>2</sup>; Dongjin Byun<sup>3</sup>; Junghwan Bang<sup>4</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Korea University; <sup>2</sup>Korea Institute of Industrial Technology, Konkuk University; <sup>3</sup>Korea University; <sup>4</sup>Korea Institute of Industrial Technology

**B-34: Innovative Graphene Coated Cu Powder for Sintering in Air Atmosphere:** *Seoyeong Lee*<sup>1</sup>; Minsu Kim<sup>1</sup>; Sangwoo Ryu<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Kyonggi University

**B-35: Interconnect-Based Sensor Array for Characterizing Thermal Management of IC Chips:** *Graham Werner*<sup>1</sup>; Oliver Trzcinski<sup>1</sup>; Weili Cui<sup>2</sup>; Ping-Chuan Wang<sup>1</sup>; <sup>1</sup>SUNY New Paltz; <sup>2</sup>Binghamton University

## NUCLEAR MATERIALS

### Elucidating Microstructural Evolution Under Extreme Environments — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Mukesh Bachhav, Idaho National Laboratory; Boopathy Kombaiyah, Idaho National Laboratory; Janelle Wharry, University of Illinois; Assel Aitkaliyeva, University of Florida; Miaomiao Jin, Pennsylvania State University; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Mukesh Bachhav, Idaho National Laboratory; Farida Selim, Arizona State University; Nathan Almirall, GE Aerospace

**F-1: Advanced In-Situ Strain Mapping for Zr Oxidation by Precession-Assisted 4D-STEM:** *Yongwen Sun*<sup>1</sup>; Ying Han<sup>1</sup>; Dan Zhou<sup>2</sup>; Athanassios Galanis<sup>3</sup>; Alejandro Gomez-Perez<sup>3</sup>; Stavros Nicolopoulos<sup>3</sup>; Hugo Garza<sup>4</sup>; Yang Yang<sup>1</sup>; <sup>1</sup>The Pennsylvania State University; <sup>2</sup>Leibniz-Institut für Kristallzüchtung; <sup>3</sup>NanoMEGAS SPRL; <sup>4</sup>DENSsolutions

**Al-Mg-Si Alloy Sheet Through Cryogenic Two-Speed Rolling Processing Simultaneous Improvement in Strength, Ductility and Microstructural Behavior:** *Yong Hwan Lee*<sup>1</sup>; Dae Wook Kim<sup>1</sup>; Uro Heo<sup>1</sup>; Hae Woong Yang<sup>1</sup>; <sup>1</sup>Pohang Institute of Metal Industry Advancement

**F-2: Characterization and Irradiation of YH for Microreactors:** *Ryan Pena*<sup>1</sup>; Caitlin Kohnert<sup>2</sup>; Khalid Hattar<sup>3</sup>; Chester Ramsey<sup>3</sup>; Aditya Shivprasad<sup>2</sup>; Darrell Cheu<sup>2</sup>; Eric Lang<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of Tennessee

**F-3: Irradiation Resistance Behavior Study of MoNbTaVW Refractory High Entropy Alloy Using Molecular Dynamic Simulation:** *Abdullah Al Mamun*<sup>1</sup>; Yanqing Su<sup>1</sup>; Xiang-Guo Li<sup>2</sup>; <sup>1</sup>Utah State University; <sup>2</sup>Sun Yat-Sen University

**F-4: Mechanisms of Chloride-Induced Stress Corrosion Cracking in Welded Spent Nuclear Fuel Canister Steel:** *Nathan Gehmlich*<sup>1</sup>; Haozheng Qu<sup>2</sup>; Rebecca Schaller<sup>3</sup>; Mychailo Toloczko<sup>4</sup>; Janelle Wharry<sup>1</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>GE Vernova Advanced Research Center; <sup>3</sup>Sandia National Laboratories; <sup>4</sup>Pacific Northwest National Laboratory

**Mesoscale Simulation of Performance Degradation of Electronic Devices Caused by Ionizing Radiation:** *Xiaoyu Guan*<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

**Phase Field Modeling of Isothermal Grain-Growth in Pure Titanium:** *Aiden Long*<sup>1</sup>; Md Ali Muntaha<sup>1</sup>; Ankit Kumar<sup>1</sup>; Sudipta Mondal<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; Kenneth Sandhage<sup>1</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University

**F-8: Oxidation Kinetics for UB<sub>2</sub> in Air Atmospheres:** *Natasha Engel*<sup>1</sup>; Jennifer Stansby<sup>2</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio; <sup>2</sup>University of New South Wales

**F-5: Prediction of Neutron-Irradiated Cavity Microstructures via Dual-Ion Irradiation up to 184 dpa in T91 Steel:** *Valentin Pauly*<sup>1</sup>; Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan

**F-6: Synergistic Effects of In-Situ Proton Irradiation and Corrosion on Metals and Ceramics in Liquid Pb-4Bi:** *Wande Cairang*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Mark Lapington<sup>2</sup>; Keshav Vasudeva<sup>1</sup>; Yong Zhang<sup>1</sup>; Minyi Zhang<sup>2</sup>; Paola Massiello Amadeo<sup>1</sup>; Kevin Woller<sup>1</sup>; Sara Ferry<sup>1</sup>; Felix Hofmann<sup>2</sup>; Xing Gong<sup>3</sup>; Michael Short<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Oxford; <sup>3</sup>Shenzhen University

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO<sub>2</sub> Management — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Light Metals Division, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Onuralp Yucel, Istanbul Technical University; Chukwunwike Illoeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Finland Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Alafara Baba, University of Ilorin; Tuan Nguyen, University of Queensland; Adam Powell, Worcester Polytechnic Institute; Thomas Battle; Duhan Zhang, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Cold Experimental Study on the Gas-Solid Two-Phase Fluidization Characteristics of Fluidized Reduction Reactors:** *Zhengjiang Yang*<sup>1</sup>; Mingmei Zhu<sup>1</sup>; Chenghong Li<sup>1</sup>; Xianwu Zhang<sup>1</sup>; <sup>1</sup>Chongqing University

**B-24: Industrial Symbiosis for Reduced CO<sub>2</sub> Emissions and Energy Optimisation in Ferroalloys Production:** *Halvor Dalaker*<sup>1</sup>; Torbjørn Pettersen<sup>1</sup>; Bernd Wittgens<sup>1</sup>; <sup>1</sup>Sintef

**B-25: Influence of Carbon Level on Reaction Behavior of High-Carbon Metallic Briquette in Blast Furnace:** *Huiqing Tang*<sup>1</sup>; Yan Liu<sup>1</sup>; Jian Yao<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Low-Temperature Synthesis and Thermodynamic Properties of the AgGaGeS<sub>4</sub> Compound for Potential Applications in Optoelectronics and Gas Sensors:** *Mykola Moroz*<sup>1</sup>; Pavlo Demchenko<sup>2</sup>; Myroslava Prokhorenko<sup>3</sup>; Bohdan Rudyk<sup>1</sup>; Oleksiy Garashchenko<sup>1</sup>; Serhiy Prokhorenko<sup>3</sup>; Oleksandr Lazarenko<sup>4</sup>; Oleksandr Reshetnyak<sup>2</sup>; *Fiseha Tesfaye*<sup>5</sup>; Leena Hupa<sup>6</sup>; <sup>1</sup>National University of Water and Environmental Engineering; <sup>2</sup>Ivan Franko National University of Lviv; <sup>3</sup>Lviv Polytechnic National University; <sup>4</sup>Lviv State University of Life Safety; <sup>5</sup>Metso Metals Oy, Åbo Akademi University; <sup>6</sup>Åbo Akademi University

**Numerical Analysis of Coalbed Methane Injection Into Blast Furnace Tuyeres:** *Xing Peng*<sup>1</sup>; <sup>1</sup>Hunan Valin LY Steel Company

**B-43: Recovery of Base and Minor Metals From By-Products Considering Energy Consumption and CO<sub>2</sub> - Minimization:** *Juergen Antrekowitsch*<sup>1</sup>; <sup>1</sup>University of Leoben

**B-26: Reduction Kinetics of High-Phosphorus-Iron-Ore Pellet Under Hydrogen Atmosphere:** *Huiqing Tang*<sup>1</sup>; Yan Liu<sup>1</sup>; Jian Yao<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Additively Manufactured Materials — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Kinga Unocic, North Carolina State University; Sebastien Dryepont, Oak Ridge National Laboratory; Michael Kirka, Oak Ridge National Laboratory; Xiaoyuan Lou, Purdue University; Emma White, DECHEMA Forschungsinstitut; Benjamin Adam, Oregon State University; Mark Stoudt, National Institute of Standards and Technology; Xiaolei Guo, Colorado School of Mines

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**C-1: Microstructure and Corrosion Behavior of Ni-Based Coating Alloy:** *Song Yi Kim*<sup>1</sup>; JunHee Han<sup>1</sup>; Hwi-Jun Kim<sup>1</sup>; Min-Ha Lee<sup>1</sup>; <sup>1</sup>Kitech

**Spheroidization of Refractory Tungsten Metal Powder for Additive Manufacturing Using Inductively Coupled Thermal Plasma:** *Chulwoong Han*<sup>1</sup>; Song Yi Kim<sup>1</sup>; Ji-Woon Lee<sup>2</sup>; <sup>1</sup>Kitech; <sup>2</sup>Kongju National University

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Multiple Principal Component Materials — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Wenjun Cai, Virginia Polytechnic Institute and State University; XiaoXiang Yu, Novelis Inc.; Vilupanur Ravi, California State Polytechnic University Pomona; Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia; Bai Cui, University of Nebraska Lincoln; Mark Weaver, University of Alabama; Bronislava Gorr, Kit; Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**C-2: Atomistic Exploration of Orientation-Dependent Tribological Properties of CrCoNiFe at Elevated Temperatures:** *Anton Hengst*<sup>1</sup>; Jonathan Cappola<sup>1</sup>; Wenjun Cai<sup>2</sup>; Zhengyu Zhang<sup>2</sup>; Lin Li<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Virginia Polytechnic Institute and State University

**Exploring the Synergistic Benefits of Al and Ti Addition on Aqueous Passivation of Cr Containing Fe-Cr-Al-Ti Alloys:** *Kaitlyn Anderson*<sup>1</sup>; Debashish Sur<sup>1</sup>; Samuel Inman<sup>1</sup>; Jie Qi<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

**C-3: Investigation of Electrochemical Behavior of Novel Liquid-Phase Reinforced Cu-Ga-In Ternary Alloys:** *Mo Rizwan Ahmad Qureshi*<sup>1</sup>; Rakesh Das<sup>2</sup>; Chandra Sekhar Tiwary<sup>2</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar; <sup>2</sup>Indian Institute of Technology Kharagpur

**C-4: Metallographic Follow-Up of the Oxidation Progress With Time of Cast Cantor Alloys at 1000°C:** *Lyna Amrouche*<sup>1</sup>; Romin Chevalme<sup>1</sup>; Siouare Hammi<sup>1</sup>; Yasmina El Hadad<sup>1</sup>; Erwan Etienne<sup>1</sup>; *Patrice Berthod*<sup>1</sup>; <sup>1</sup>University Of Lorraine

**C-5: Oxidized Surfaces and Deteriorated Subsurfaces of HEAs and MC-Strengthened HEAs Oxidized at High Temperature in Presence of Water Vapor:** *Patrice Berthod*<sup>1</sup>; Lionel Aranda<sup>1</sup>; Ghouti Medjahdi<sup>1</sup>; <sup>1</sup>University Of Lorraine

## MECHANICS OF MATERIALS

### Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Orion Kafka, National Institute of Standards and Technology; J.C. Stinville, University of Illinois Urbana-Champaign; Garrett Pataky, Clemson University; Brian Wisner, Ohio University; Krzysztof Stopka, Purdue University; Kelly Nygren, Cornell University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Effect of Residual Stress in Powder Metallurgy Hot Isostatic Pressing Process:** *Sam Sobhani*<sup>1</sup>; Andy Fan<sup>1</sup>; <sup>1</sup>Oregon State university

## MATERIALS SYNTHESIS AND PROCESSING

### Friction Stir Welding and Processing XIII — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee

**Program Organizers:** Yuri Hovanski, Brigham Young University; Yutaka Sato, Tohoku University; Piyush Upadhyay, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Anton Naumov, Peter The Great St. Petersburg Polytechnic University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**EBS Analysis of AA7075-T6 Thin Sheets Butt Joints Obtained by Impulse Friction Stir Welding:** *Keqi Wang*<sup>1</sup>; Anton Naumov<sup>1</sup>; Qibao Li<sup>2</sup>; Baiyang Chen<sup>2</sup>; Peihu Gao<sup>2</sup>; <sup>1</sup>Peter The Great St. Petersburg Polytechnic University; <sup>2</sup>Xi'an Technological University

**D-9: Friction Stir Butt-Lap Welding of Aluminum to Steel: A New Joint Design to Improve Mechanical Properties:** *Olivia Russell*<sup>1</sup>; <sup>1</sup>South Dakota School of Mines

**Temperature and Stresses in AA 6082-T6 Friction Stir Spot Welding (FSSW) Using Coupled Eulerian-Lagrangian Finite Element Method:** *Ahmad Bawagnih*<sup>1</sup>; Fadi Al-Badour<sup>1</sup>; <sup>1</sup>King Fahd University of Petroleum and Minerals

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Nanomaterials Committee

**Program Organizers:** Wenzhuo Wu, Purdue University; Keerti Kappagantula, Pacific Northwest National Laboratory; Bishnu Khanal, Sandia National Laboratories; Ying Zhong, Harbin Institute of Technology (Shenzhen); Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Effect of Polymerization Temperature on the Photocatalytic Activity of Polyaniline:** *Sadia Rafiq*<sup>1</sup>; *Masuma Lovely*<sup>1</sup>; Md Muktedir Billah<sup>1</sup>; Mahbub Hasan<sup>1</sup>; <sup>1</sup>Bangladesh University of Engineering and Technology

**Facile Synthesis of Aloe-Gold Nanoclusters and Their Molecular Binding, Antibacterial and Cytotoxicity Profiling:** *Thabang Lebepe*<sup>1</sup>; Oluwatobi Samuel Oluwafemi<sup>1</sup>; <sup>1</sup>University of Johannesburg

**B-27: High-Performance Interfacial Water Evaporation of Black TiO<sub>2</sub>-x With High-Concentration Bulk Oxygen Vacancies:** *Young-In Lee*<sup>1</sup>; Jongmin Byun<sup>1</sup>; Hee Yeon Jeon<sup>1</sup>; <sup>1</sup>Seoul National University of Science and Technology

**B-28: Improving Supercapacitor Performance via Multi-Layer Transition Metal Oxide Thin Films:** *Kiran Lochun*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**B-29: One-Dimensional Titanium Oxide Lepidocrocite Nanofilaments: From Fabrication to Application:** *Adam Walter*<sup>1</sup>; Gregory Schwenk<sup>1</sup>; Hussein Badr<sup>1</sup>; Michel Barsoum<sup>1</sup>; <sup>1</sup>Drexel University

**Synthesis, Characterization, and Bactericidal Application of Zinc Oxide Nanoparticles Obtained by Coprecipitation Method:** *Mizraim Flores*<sup>1</sup>; Laura Garcia<sup>1</sup>; Iván Reyes<sup>2</sup>; Elia Palacios<sup>3</sup>; Pedro Ramirez<sup>1</sup>; Edwin Pérez<sup>1</sup>; José Barrera<sup>2</sup>; Kevin Lagunes<sup>1</sup>; José Ozornio<sup>4</sup>; <sup>1</sup>Universidad Tecnológica de Tulancingo; <sup>2</sup>Universidad Autónoma de San Luis Potosí; <sup>3</sup>Instituto Politécnico Nacional; <sup>4</sup>Centro de Bachillerato Tecnológico Industrial y de Servicios No. 179

**The Utilization of Cellulose Nanocrystals-Infused Hydrogels for Enhanced Efficacy in Cancer Chemotherapy:** *Terungwa Iorkula*<sup>1</sup>; Emmanuel Faderin<sup>2</sup>; Rofiat Kajola<sup>3</sup>; Odo Onyinyechi<sup>4</sup>; Juliet Igboanugo<sup>5</sup>; Jane Frances Chukwu<sup>6</sup>; Obembe Oluwafunke<sup>7</sup>; Clinton Ehigie<sup>8</sup>; Ikhuazuagbe Ifijen<sup>9</sup>; *Ademulegun Ikponwmonsa*<sup>8</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Southern Illinois University; <sup>3</sup>Tufts University; <sup>4</sup>University of Nigeria; <sup>5</sup>Department of Health, Human Performance and Recreation; <sup>6</sup>West Virginia University; <sup>7</sup>Universite Paris-Cite; <sup>8</sup>University of Benin; <sup>9</sup>Rubber Research Institute of Nigeria



## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

## Innovations in Energy Materials: Unveiling Future Possibilities of Computational Modelling and Atomically Controlled Experiments — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Structural Materials Division, TMS: Energy Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Composite Materials Committee

**Program Organizers:** Paolo Mele, Shibaura Institute of Technology; Julio Gutierrez Moreno, Barcelona Supercomputing Center; Hussein Assadi, RIKEN (The Institute of Physical and Chemical Research); Esmail Doustkhah, Istinye University; Marco Fronzi, The University of Sydney; Donna Guillen, Idaho National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.; Tuan Nguyen, University of Queensland

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**B-30: Machine Learned Multiphysics Modeling: Enhancing Uniform Distribution of Low-Energy Lithium-Ion Transport Channels in Solid Electrolyte Interphase of Electrodes:** *Arjun S. Kulathuvayal<sup>1</sup>*; Yanqing Su<sup>2</sup>; <sup>1</sup>Utah State University

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

## Materials and Chemistry for Molten Salt Systems — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Stephen Raiman, University of Michigan; Michael Short, Massachusetts Institute of Technology; Kumar Sridharan, University of Wisconsin-Madison; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Nathaniel Hoyt, Argonne National Laboratory; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Weiyue Zhou, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Stephen Raiman, University of Michigan

**C-6: Assessment of Mixed Cation Lanthanide/Actinide Surrogate Systems Toward Reduction of Molten Salt Pyroprocessing Waste:** *Kelly Varnell<sup>1</sup>*; Hojong Kim<sup>1</sup>; Tae-Sic Yoo<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Idaho National Laboratory

**Comparative Study on Stress Assisted Corrosion Behavior of Oxide-Oxide & Carbon-Silicon Carbide Ceramic Matrix Composites in a Molten NaCl-Na<sub>2</sub>SO<sub>4</sub> Salt:** *Wylie Simpson<sup>1</sup>*; James Earthman<sup>1</sup>; <sup>1</sup>University of California Irvine

**Corrosion of Nickel Alloys and Stainless Steels in Molten Chloride Salt:** *Daniel Koury<sup>1</sup>*; Thomas Hartmann<sup>2</sup>; <sup>1</sup>University of Nevada; <sup>2</sup>Pacific Northwest National Laboratory

**Dealloying of Post-Cold Rolled Model Ni-Cr Alloy in Molten FLiNaK Salts:** *Harjot Singh<sup>1</sup>*; Ho Lun Chan<sup>1</sup>; Elena Romanovskaia<sup>1</sup>; Valentin Romanovski<sup>1</sup>; Iliana Marrujo<sup>2</sup>; Peter Hosemann<sup>2</sup>; Andrew Minor<sup>2</sup>; John Scully<sup>1</sup>; Sean Mills<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>University of California, Berkeley

**C-7: Development of a New Nickel-Based Alloy Hardened by Nano<sup>1</sup> (Ni<sub>3</sub>Al) for Molten Salt Reactors:** *Adrien Delagnes<sup>1</sup>*; Martin Madelain<sup>1</sup>; Nicolas Mari<sup>1</sup>; Romain Malacarne<sup>2</sup>; Olivier Taché<sup>3</sup>; Jacques Perrin Toinin<sup>1</sup>; Brigitte Bacroix<sup>4</sup>; Yann De Carlan<sup>1</sup>; <sup>1</sup>Université Paris-Saclay, CEA, Service de Recherche en Matériaux et procédés Avancés; <sup>2</sup>Université Paris-Saclay, CEA, Service de Recherche en Corrosion et Comportement des Matériaux; <sup>3</sup>Université Paris-Saclay, CEA-CNRS (UMR 3685), Nanosciences et Innovation pour les Matériaux, la Biomédecine et l'Energie; <sup>4</sup>CNRS, Université Sorbonne Paris Nord, Laboratoire des Sciences des Procédés et des Matériaux, LSPM-CNRS (UPR 3407), F-93430

**Dissolution and Diffusion Processes of Metallic Titanium in Liquid Tin and the Electrochemical Behavior of Ti-Sn Alloy Separation:** *Xuena Men<sup>1</sup>*; Zepeng Lv<sup>1</sup>; Jianxun Song<sup>1</sup>; Shaolong Li<sup>1</sup>; <sup>1</sup>Zhengzhou University

**C-8: Effect of Aluminum Content on the Corrosion Resistance of Ni<sub>70</sub>Mo<sub>10</sub>Cr<sub>20-x</sub>Al<sub>x</sub> Alloys for Molten Salt Reactors:** *Oscar Sonzogni<sup>1</sup>*; Jean-Philippe Couzinié<sup>2</sup>; Romain Malacarne<sup>3</sup>; Dimitri Mercier<sup>4</sup>; Patrick Olier<sup>1</sup>; Pascal Aubry<sup>1</sup>; <sup>1</sup>Université Paris-Saclay, CEA, Service de recherche en matériaux et procédés avancés, F-91191; <sup>2</sup>Université Paris Est, ICMPE (UMR 7182) CNRS-UPEC, 2-8 rue Henri Dunant, F-94320, F-94320; <sup>3</sup>Université Paris-Saclay, CEA, Service de recherche en corrosion et comportement des matériaux dans leur environnement, F-91191; <sup>4</sup>PSL Research University, CNRS – Chimie ParisTech, Institut de Recherche de Chimie Paris, Physical Chemistry of Surfaces Group, 11 Rue Pierre et Marie Curie

**C-9: Evaluation of Corrosion in Ni-Based Alloys in Molten Fluoride Salt:** *Ryan Gordon<sup>1</sup>*; Will Ward<sup>1</sup>; Kasturi Sasidhar<sup>1</sup>; Ryan Thier<sup>2</sup>; Adrien Couet<sup>1</sup>; Jaimie Tiley<sup>3</sup>; Soumya Nag<sup>3</sup>; Rishi Pillai<sup>3</sup>; Bruce Pint<sup>3</sup>; Steve Zinkle<sup>2</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of Tennessee; <sup>3</sup>Oak Ridge National Laboratory

**First Principles Investigation of the Structural and Thermophysical Properties of Ni<sup>2+</sup> in Alkali-Halide Eutectic Molten Salts:** *Linu Malakkal<sup>1</sup>*; Nirmalendu Patra<sup>2</sup>; Alejandro Ramos-Ballesteros<sup>1</sup>; Benjamin Beeler<sup>3</sup>; Gregory Holmbeck<sup>1</sup>; Simerjeet Gill<sup>2</sup>; Ruchi Gakhar<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>North Carolina State University

**C-10: FLiNaK Corrosion of Cermet Structural Materials for Applied Advanced Coating Designs in Molten Salt Reactors:** *Kevin Yan<sup>1</sup>*; Dong Zhao<sup>1</sup>; Saurabh Sharma<sup>1</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute

**C-11: Impact of EuCl<sub>3</sub> on the Morphological Evolution of Ni-20Cr Alloys in LiCl-KCl Eutectic Molten Salt Environments:** *Ankita Mohanty<sup>1</sup>*; Yuxiang Peng<sup>1</sup>; Kaifeng Zheng<sup>1</sup>; Bobby Layne<sup>2</sup>; Kazuhiro Iwamatsu<sup>2</sup>; Ellie Kim<sup>3</sup>; Phillip Halstenberg<sup>3</sup>; Mingyuan Ge<sup>2</sup>; Denis Leshchev<sup>2</sup>; Xianghui Xiao<sup>2</sup>; Sheng Dai<sup>3</sup>; Eli Stavitski<sup>2</sup>; James Wishart<sup>2</sup>; Yu-chen Karen Chen-Wiegart<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>University of Tennessee Knoxville

**C-12: Impact of Sample Preparation on Corrosion Behavior of Alloys in Molten Salts:** *Weiyue Zhou<sup>1</sup>*; Aaron De Leon<sup>1</sup>; Nayoung Kim<sup>1</sup>; Kevin Woller<sup>1</sup>; Michael Short<sup>1</sup>; Guiqui (Tony) Zheng<sup>2</sup>; Caroline Sorensen<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Commonwealth Fusion Systems

**C-13: Investigating the Combined Corrosion and Radiative Effects on 316SS and Welded Joints in Static FLiNaK Salt:** *Nicholas Borrego<sup>1</sup>*; Minghui Chen<sup>1</sup>; Khalid Hattar<sup>2</sup>; Eric Lang<sup>1</sup>; <sup>1</sup>The University of New Mexico; <sup>2</sup>University of Tennessee

**Investigating the Corrosion of NITE-SiC/SiC in Molten FLiNaK Salt:** *Keshav Vasudeva<sup>1</sup>*; Wande Cairang<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Sara Ferry<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**C-14: Laser-Based Spectroscopy Techniques to Evaluate Molten Salt/Liquid Metal Corrosion Properties:** *Chaitanya Peddeti<sup>1</sup>*; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley



**C-15: Silicide-Based Coatings to Prevent Molten Chloride Corrosion:** *Seongwon Ham*<sup>1</sup>; Sangtae Kim<sup>1</sup>; <sup>1</sup>Hanyang University

**Thermodynamic Assessment of Reciprocal Salt Systems Involving Cesium, Rubidium, and Iodine With LiF-NaF-KF and NaCl-KCl-MgCl<sub>2</sub> for Molten Salt Reactor Applications:** *Clara Dixon*<sup>1</sup>; Mina Aziziha<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Jorge Paz Soldan Palma<sup>1</sup>; Jack Wilson<sup>1</sup>; Amir Mofrad<sup>1</sup>; Theodore Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

**C-16: Thermodynamic Assessment of the NaCl-ZrCl<sub>4</sub>, KCl-ZrCl<sub>4</sub>, and MgCl<sub>2</sub>-ZrCl<sub>4</sub> Systems for Molten Chloride Reactors:** *Jack Wilson*<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Mina Aziziha<sup>1</sup>; Ronald Booth<sup>1</sup>; Hunter Tisdale<sup>1</sup>; Hans-Conrad zur Loye<sup>1</sup>; Theodore Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

**C-24: Tuning Fabrication Parameters to Produce Unique, Microstructurally Tailored Ni-Cr and Fe-Cr Samples for Corrosion and Irradiation Testing:** *Santiago de Stefano Cavazos*<sup>1</sup>; Mira Khair<sup>1</sup>; Kayla Yano<sup>2</sup>; Ho Lun Chan<sup>3</sup>; John Scully<sup>3</sup>; Elena Romanovskaia<sup>2</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>University of Texas San Antonio; <sup>2</sup>Pacific Northwest National Lab; <sup>3</sup>University of Virginia

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Materials for Sustainable Hydrogen Energy — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Energy Committee

**Program Organizers:** Wenwen Song, University of Kassel; Enrique Galindo-Nava, University College London; Jinwoo Kim, Korea Institute of Science and Technology (KIST); Binhan Sun, Max-Planck Institute

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

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**B-42: High Temperature Hydrogen Degradation of Structural Materials of Nuclear-Hydrogen Generating Systems:** *Jun Yeong Jo*<sup>1</sup>; Hwasung Yeom<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Thermodynamics and Rate Phenomena — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Phase Transformations Committee

**Program Organizers:** Allie Anderson, RHI Magnesita; Adrian Sabau, Oak Ridge National Laboratory; Chukwunwike Iloeje, Argonne National Laboratory; Adamantia Lazou, National Technical University of Athens; Kayla Molnar, Los Alamos National Laboratory

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

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**D-10: Analysis of Circulation Flow and Mixing Time in Ruhrstahl-Heraeus Degasser With Argon Ladle Bottom Blowing Through Numerical Modeling:** *Alejandro Alcaraz Ramirez*<sup>1</sup>; José Ramos Banderas<sup>1</sup>; Constantin Hernández Bocanegra<sup>1</sup>; Aldo Figueroa Fierros<sup>1</sup>; Gildardo Solorio Diaz<sup>2</sup>; <sup>1</sup>Instituto Tecnológico de Morelia

**D-11: Comparative Study Between Actual Conditions and Proposed Operating Conditions for a Floor Furnace Used in the Heating of a Metallurgical Ladle Through Numerical Simulation:** *Brayann Alvarado*<sup>1</sup>; *José Ramos Banderas*<sup>2</sup>; Constantin Hernández Bocanegra<sup>2</sup>; Mario-Ulises Calderon Rojas<sup>2</sup>; Gildardo Solorio Diaz<sup>3</sup>; Nancy López Granados<sup>2</sup>; <sup>1</sup>Association for Iron & Steel Technology (AIST); <sup>2</sup>Instituto Tecnológico de Morelia; <sup>3</sup>Universidad Michoacana de San Nicolas de Hidalgo

**Comparative Study of Two Methodologies for the Analysis of the Thermal Evolution of Steel Slabs in a Reheating Furnace:** *Mario-Ulises Calderon Rojas*<sup>1</sup>; José-Ángel Ramos-Banderas<sup>1</sup>; Constantin-Alberto Hernandez-Bocanegra<sup>1</sup>; Gildardo Solorio-Diaz<sup>2</sup>; José-Jaime López-Soria<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Michoacana de San Nicolas de Hidalgo

**Effect of Ladle Shroud Blockage on Flow Dynamics and Cleanliness of Steel in Coupled Ladle-Shroud-Tundish System:** *Favio Ocampo-Vaca*<sup>1</sup>; Constantin Hernández-Bocanegra<sup>1</sup>; José Ramos-Banderas<sup>1</sup>; Nancy López-Granados<sup>1</sup>; Gildardo Solorio-Diaz<sup>2</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Michoacana de San Nicolás de Hidalgo

**Numerical Modeling of SEN Depth on Heat Transfer, Fluid Flow and Solidification in Thin Slab Continuous Casting Mold:** *Raul Tinajero Alvarez*<sup>2</sup>; Jonathan García Merino<sup>1</sup>; *Constantin Hernández Bocanegra*<sup>1</sup>; José Ramos Banderas<sup>1</sup>; Gildardo Solorio Diaz<sup>2</sup>; Nancy López Granados<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Michoacana de San Nicolas de Hidalgo

**Numerical Simulation of Multiphase Flow in a Single Snorkel Refining Furnace With Dual Injections of Argon Gas for the Degassing Process:** *Aldo Emmanuel Figueroa Fierros*<sup>1</sup>; *José Ángel Ramos Banderas*<sup>1</sup>; Constantin Alberto Hernandez Bocanegra<sup>1</sup>; Nancy López Granados<sup>1</sup>; Alberto Beltran<sup>2</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Nacional Autónoma de México (UNAM)/ campus Morelia

**D-12: Numerical Simulation of Stirring Coil System for Use in the Steel Refining Ladle:** *Jorge Munguia*<sup>1</sup>; Jose-Angel Ramos<sup>1</sup>; Constantin-Alberto Hernandez<sup>1</sup>; Mario Herrera<sup>1</sup>; Alberto Beltran<sup>2</sup>; Ilse-Ivette Becerril<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia; <sup>2</sup>Universidad Autonoma de Mexico

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## NUCLEAR MATERIALS

### Mechanical Behavior of Nuclear Reactor Materials and Components IV — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee

**Program Organizers:** Kayla Yano, Pacific Northwest National Laboratory; Assel Aitkaliyeva, University of Florida; Eric Lang, University of New Mexico; Eda Aydogan, Pacific Northwest National Laboratory; Caleb Massey, Oak Ridge National Laboratory; Benjamin Eftink, Los Alamos National Laboratory; Tanvi Ajantiwalay, Pacific Northwest National Laboratory

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

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**Annealing Study of Highly Embrittled RPV Weld:** *Mikhail Sokolov*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**Comparative Analysis of SMR Powder Formation and Properties Using VIGA and EIGA:** *Jeongchan Lee*<sup>1</sup>; Sung-Min Park<sup>1</sup>; Jeongkil Kim<sup>2</sup>; Dongsoo Kim<sup>2</sup>; Sehawn Ahn<sup>2</sup>; Seoksu Sohn<sup>3</sup>; Kwangsuk Park<sup>1</sup>; Chang-Soo Park<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Doosan Enerbility; <sup>3</sup>Korea University

**F-7: Grain Size Effect on Helium Ion Irradiation and Mechanical Response of Ti-Zr-Ni Quasicrystals:** *Myeongjun Lee*<sup>1</sup>; Geun Hee Yoo<sup>1</sup>; Kook Noh Yoon<sup>2</sup>; Mehdi Balooch<sup>2</sup>; Peter Hosemann<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>University of California, Berkeley

## MECHANICS OF MATERIALS

### Mechanical Behavior Related to Interface Physics IV — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Nuclear Materials Committee, TMS: Surface Engineering Committee

**Program Organizers:** Stanislav Zak, Austrian Academy of Sciences; Nathan Mara, University of Minnesota; Barbara Putz, Empa Swiss Federal Laboratories for Materials Science and Technology; Glenn Balbus, MRL Materials Resources LLC; Kevin Schmalbach, Bruker Nano; Youxing Chen, University of North Carolina Charlotte

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**E-31: Evaluation of Interfacial Failure Characteristics and Its Prediction Based on Finite Element Method for Epoxy Adhesive:** *Minki Kim*<sup>1</sup>; Yujin Chae<sup>1</sup>; Min-Su Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**E-32: Influence of Temperature on the Interlayer Strength of Muscovite, a Layered Solid:** *Henry Afful*<sup>1</sup>; Frank DelRio<sup>2</sup>; Anastasia Ilgen<sup>2</sup>; Corinne Packard<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Sandia National Laboratories

**E-33: Thin Film Adhesion Measurement With Micro-Scale Bulge Tester:** *Stanislav Zak*<sup>1</sup>; <sup>1</sup>Austrian Academy of Sciences

## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated Through Novel In-Situ Experiments and Modeling — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Minh-Son Pham, Imperial College London; Saurabh Puri, Microstructure Engineering; Amit Pandey, Lockheed Martin Space; Dongchan Jang, Korea Advanced Institute of Science and Technology; Josh Kacher, Georgia Institute of Technology; Jagannathan Rajagopalan, Arizona State University; Robert Wheeler, Microtesting Solutions LLC; Dhriti Bhattacharyya, Australian Nuclear Science and Technology Organization

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**E-34: An Experimental Technique for Probing Cavitation Pressure in Soft Matter Under Azimuthal Shear:** *Alexandria Rogers*<sup>1</sup>; Yuan Ji<sup>1</sup>; Christopher Karber<sup>1</sup>; Jacob Rogers<sup>1</sup>; Justin Wilkerson<sup>1</sup>; <sup>1</sup>Texas A&M University

**E-51: Microstructure and Mechanical Property Correlation of Multi-Component Materials Using the PI 89 Auto SEM PicoIndenter:** Kevin Schmalbach<sup>1</sup>; Justin Cheng<sup>2</sup>; Eric Hintsala<sup>1</sup>; Nathan Mara<sup>3</sup>; Douglas Stauffer<sup>4</sup>; *Sanjit Bhowmick*<sup>1</sup>; <sup>1</sup>Bruker Nano Surfaces and Metrology; <sup>2</sup>University of Minnesota Twin Cities; <sup>3</sup>University of Minnesota; <sup>4</sup>Bruker Nano Surfaces & Metrology

**E-35: Tensile Deformation Behavior of Polycrystalline Pure Cobalt With HCP / FCC Dual Phase Studied by In-Situ X-Ray Diffraction:** *Takumi Suzumura*<sup>1</sup>; Si Gao<sup>1</sup>; Shuhei Yoshida<sup>1</sup>; Nobuhiro Tsuji<sup>1</sup>; <sup>1</sup>Kyoto University

**E-36: The Role of Precipitates on Cyclic Stability of NiTi and NiTiCu Shape Memory Alloy Thin Films:** *Hyemin Ryu*<sup>1</sup>; Zhuo Feng Lee<sup>1</sup>; Ji-Young Kim<sup>1</sup>; Sunkun Choi<sup>1</sup>; Gi-Dong Sim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

**E-37: Thermo-Mechanical Performance of Composite Metal Foams:** *Zubin Chacko*<sup>1</sup>; Afsaneh Rabiei<sup>1</sup>; <sup>1</sup>North Carolina State University

## NUCLEAR MATERIALS

### Meeting Materials Challenges for the Future of Fusion Energy — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Tianyi Chen, Oregon State University; Amy Gandy, United Kingdom Atomic Energy Authority; Reuben Holmes, Kyoto Fusionering; Ian Mccue, Northwestern University; Sneha Prabha Narra, Carnegie Mellon University; Jason Trelewicz, Stony Brook University; Weicheng Zhong, Oak Ridge National Laboratory

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**F-9: Improved Damage Detection Around Grain Boundaries in Tungsten from Atomistic Calculations:** Youngguk Shin<sup>1</sup>; Keonwook Kang<sup>2</sup>; *Byeongchan Lee*<sup>1</sup>; <sup>1</sup>Kyung Hee University; <sup>2</sup>Yonsei University

**F-10: In Situ Micropillar Compression Study of Ultra-Fine-Grained Tungsten at Elevated Temperature:** *Yifan Zhang*<sup>1</sup>; Chao Shen<sup>2</sup>; Adil Wazeer<sup>2</sup>; Ke Xu<sup>2</sup>; Tanner McElroy<sup>2</sup>; Anyu Shang<sup>2</sup>; Haiyan Wang<sup>2</sup>; Xinghang Zhang<sup>2</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Purdue University

**F-11: RAFM Welding with In-Situ Thermal Processing for Simplified First Wall Fabrication:** *Daniel Codd*<sup>1</sup>; Joseph McCrink<sup>2</sup>; Xiang (Frank) Chen<sup>3</sup>; Timothy Lach<sup>3</sup>; <sup>1</sup>University of San Diego; <sup>2</sup>KVA Technologies; <sup>3</sup>Oak Ridge National Laboratory

**F-12: Synergetic Effects of Hydrogen on Cavity Formation in Candidate Fusion Blanket Materials: Past and Future Studies:** *Lihao Shi*<sup>1</sup>; Fei Gao<sup>1</sup>; <sup>1</sup>University of Michigan, Ann Arbor

**Thermal Permeation of Tungsten Wafers:** *Muhammed Kose*<sup>1</sup>; Enrique Martinez-Saez<sup>1</sup>; <sup>1</sup>Clemson University

**Temperature Dependent Thermal-Mechanical Properties of Plasma-Facing Materials - W, SiC, and Fe-Cr Alloy:** *Jie Peng*; David Cerecedar<sup>1</sup>; <sup>1</sup>Villanova University

## NUCLEAR MATERIALS

## Microstructural, Mechanical, and Chemical Behavior of Solid Nuclear Fuel and Fuel-Cladding Interface II — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Nuclear Materials Committee, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Xing Wang, Pennsylvania State University; Miaomiao Jin, Pennsylvania State University; Jason Harp, Oak Ridge National Laboratory; Fabiola Cappia, Idaho National Laboratory; Dong (Lilly) Liu, University of Oxford; Caleb Clement, Westinghouse Electric Company; Jennifer Watkins, Idaho National Laboratory; Michael Tonks, University of Florida; Yi Xie, Peking University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Xing Wang, Pennsylvania State University

**F-13: A Comparative Study of the Third Element Effect in FeCrAl Oxidation and Corrosion:** *Catherine Lynch*<sup>1</sup>; Debashish Sur<sup>1</sup>; Benjamin Redemann<sup>2</sup>; John Scully<sup>1</sup>; Elizabeth Opila<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>John Hopkins University

**F-14: Advanced Electron Microscopy Characterization of the Fuel-Cladding Chemical Interaction Region in a High Burnup U-10Zr Fuel:** *Bao-Phong Nguyen*<sup>1</sup>; Daniele Salvato<sup>2</sup>; Fei Teng<sup>2</sup>; Fei Xu<sup>2</sup>; Yachun Wang<sup>2</sup>; Fidelma Di Lemma<sup>2</sup>; Luca Capriotti<sup>2</sup>; Assel Aitkaliyeva<sup>2</sup>; Tiankai Yao<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

**F-16: Deep Learning Potential for Exploring High Temperature Properties of Yttrium Hydride:** *Yuqing Huang*<sup>1</sup>; Jacob Eapen<sup>1</sup>; <sup>1</sup>North Carolina State University

**F-17: Density Functional Theory Study of Charge Distribution and Transport at Metal-ZrO<sub>2</sub> Interface:** *Ximeng Wang*<sup>1</sup>; Junliang Liu<sup>1</sup>; Maryam Zahedian<sup>1</sup>; Ricardo Vidrio<sup>1</sup>; Yuhang Tong<sup>1</sup>; Adrien Couet<sup>1</sup>; Jennifer Choy<sup>1</sup>; Alexander Kvit<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**F-18: Evolution of Sputtered Protective Bilayer Coatings Under LOCA Steam Exposure:** *Brook Nowak*<sup>1</sup>; Fei Long<sup>1</sup>; Kevin Daub<sup>1</sup>; Suraj Persaud<sup>1</sup>; Zhongwen Yao<sup>1</sup>; <sup>1</sup>Queen's University

**F-20: Impact of Uranium Feedstock Impurities on the Microstructure and Oxidation Resistance of Uranium Nitride (UN):** *Max Salata-Barnett*<sup>1</sup>; Tim Abram<sup>1</sup>; <sup>1</sup>University of Manchester

**F-21: Improving Radiation and Corrosion Resistance of Cr-Based Coatings Through Structural and Compositional Optimization:** *Nabil Daghbouj*<sup>1</sup>; Tomas Polcar<sup>1</sup>; <sup>1</sup>Czech Technical University in Prague

**F-23: Investigating Microstructural Effects on TRISO Fuel Mechanics via Multiphysics and Multiscale Modeling:** *Merve Gencturk*<sup>1</sup>; Karim Ahmed<sup>1</sup>; Nicholas Faulkner<sup>1</sup>; Claire Griesbach<sup>2</sup>; Ramathanan Thevamaran<sup>2</sup>; Tyler Gerczak<sup>3</sup>; Yongfeng Zhang<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of Wisconsin-Madison; <sup>3</sup>Oak Ridge National Laboratory

**F-24: Investigating Porosity and Swelling Evolution in Uranium-10wt%Zirconium Fuels Under Varied Irradiation Conditions:** *Morgan Smith*<sup>1</sup>; Nicole Rodriguez Perez<sup>1</sup>; Janelle Wharry<sup>1</sup>; Maria Okuniewski<sup>1</sup>; <sup>1</sup>Purdue University

**Mitigating FCCI in Metallic Fuels: Evaluating Cladding Liners with Multiscale Modeling:** *Shehab Shousha*<sup>1</sup>; Benjamin Beeler<sup>1</sup>; Larry Aagesen<sup>2</sup>; Geoffrey Beausoleil II<sup>2</sup>; Nicole Rodriguez Perez<sup>3</sup>; Maria Okuniewski<sup>3</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Purdue University

**Numerical Modelling of Delayed Hydride Cracking Using the Phase Field Modelling:** *Shyam Kishor Sharma*<sup>1</sup>; B.K. Mishra<sup>1</sup>; Indra Vir Singh<sup>1</sup>; Rishi Sharma<sup>2</sup>; <sup>1</sup>Indian Institute of Technology Roorkee; <sup>2</sup>Nuclear Power Corporation of India Limited

**F-26: Obtaining the Chemical Information of Secondary Phases and Precipitates Induced by Fission Products in FCCI Region of a High Burnup Metallic Fuel Using Nano SIMS and TEM-EELS:** *Arnold Pradhan*<sup>1</sup>; Tiankai Yao<sup>2</sup>; Indrajit Charit<sup>3</sup>; <sup>1</sup>INL; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of Idaho; Center for Advanced Energy Studies

**F-27: Phase-Field Modeling of Constituent Redistribution in U-Zr Metallic Fuel Considering Porosity Effects:** *Woojin Jung*<sup>1</sup>; Kunok Chang<sup>1</sup>; Ju-Seong Kim<sup>2</sup>; <sup>1</sup>Kyung Hee University; <sup>2</sup>Korea Atomic Energy Research Institute

**Point Defect Mobility and Phase Stability of Novel UZrCN Nuclear Fuel from First Principles:** *R. Seaton Ullberg*<sup>1</sup>; Jinyi Liu<sup>1</sup>; Sarah Hamilton<sup>2</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

**F-28: Tracking Structure Evolution and Alloy Element Redistributions During Zircaloy-4 Oxidation via Complementary In-Situ XRD, Ex-Situ Electron Microscopy, and Atom Probe Tomography:** *Josephine Hartmann*<sup>1</sup>; Tamas Varga<sup>2</sup>; Chris McRobie<sup>1</sup>; Caleb Schenck<sup>1</sup>; Fu-Yun Tsai<sup>1</sup>; Vaithiyalingam Shutthanandan<sup>2</sup>; Arun Devaraj<sup>2</sup>; David Senor<sup>2</sup>; Bharat Gwalani<sup>1</sup>; Elizabeth Kautz<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory

**F-29: Understanding the Process-Microstructure-Property Relationship of FeCrAl Alloy Deposited via L-DED:** *Salikh Omarov*<sup>1</sup>; Prayag Burad<sup>1</sup>; Christopher Silligman<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

**Unraveling the Mechanisms of Oxide Texture Formation on Zirconium Alloys:** *Junliang Liu*<sup>1</sup>; Houzhi Liu<sup>2</sup>; Bhagwat Ghule<sup>1</sup>; Hongliang Zhang<sup>3</sup>; Gene Lucadamo<sup>4</sup>; William Howland<sup>4</sup>; Sergio Lozano-Perez<sup>2</sup>; Chris Grovenor<sup>2</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison; <sup>2</sup>University of Oxford; <sup>3</sup>Fudan University; <sup>4</sup>Naval Nuclear Laboratory

## BIOMATERIALS

## Natural Fibers and Biocomposites: A Sustainable Solution — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Biomaterials Committee, TMS: Composite Materials Committee

**Program Organizers:** Henry Colorado, Universidad de Antioquia; Sergio Monteiro, Instituto Militar de Engenharia; Marc Meyers, University of California, San Diego; Carlos Castano Londono, Virginia Commonwealth University; George Youssef, San Diego State University; Felipe Perisse Duarte Lopes, Universidade Estadual do Norte Fluminense; Daniel Salazar, BCMaterials

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** George Youssef, San Diego State University; Daniel Salazar, BCMaterials; Henry Colorado, Universidad de Antioquia

**3D Printing in Additive Manufacturing In Stereolithography: Coconut Shell Powder Additive:** *Victor Goncalves*<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Henry Alonso Colorado Lopera<sup>2</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; Felipe Perisse Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF; <sup>2</sup>Universidad de Antioquia UdeA

**A-14: Additive Manufacturing of Polymer Matrix Composites with Coffee Waste:** *Henry Colorado*<sup>1</sup>; <sup>1</sup>Universidad de Antioquia



**A-17: Characterization of a Novel Ecofriendly Polymeric Composites Based in Montmorillonite Clay:** Nicole Coutinho<sup>1</sup>; David Velasco<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; Geovana Carla Girondi Delaqua<sup>2</sup>; Afonso Rangel Garcez de Azevedo<sup>1</sup>; Jaqueline Moreira de Oliveira<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense; <sup>2</sup>UENF

**A-18: Characterization of Composites Polymers Reinforced with Coconut Sheath Fibers:** João Chaim Almeida<sup>1</sup>; Luis Fernando Fortunato de Freitas<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>2</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro; <sup>2</sup>Universidade Estadual do Norte Fluminense

**A-19: Comparative Analysis of Compressive Resistance of Epoxyde Composites Reinforced with Silica:** Jaqueline de Oliveira<sup>1</sup>; David Velasco<sup>1</sup>; Nicole Coutinho<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**A-20: Compressive Resistance of Epoxyde Hybrid Composites Reinforced with Açai Fiber and Chamotte Powders:** Jaqueline de Oliveira<sup>1</sup>; David Velasco<sup>1</sup>; Rebeca Gomes<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**A-21: Compressive Strength of Composites Reinforced with Casuarina Particulate for Protective Coatings:** Nicole Coutinho<sup>1</sup>; Afonso Rangel Garcez de Azevedo<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; David Velasco<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; Geovana Carla Girondi Delaqua<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**A-22: Effects of Hardener Content on Properties of Epoxy-Granite Composite Artificial Stones:** José Lucas Lirio<sup>1</sup>; David Coverdale Velasco<sup>2</sup>; Elaine Carvalho<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; Djalma Souza<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense; <sup>2</sup>IFFluminense/UENF

**Eva and Ramie Fiber: 3D Filament Manufacturing and Additives:** Victor Goncalves<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Luis Fernando Fortunato De Freitas<sup>1</sup>; Henry Alonso Colorado Lopera<sup>2</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; Felipe Perissé Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF; <sup>2</sup>Universidad de Antioquia UdeA

**A-23: Evaluating Impact Resistance of Epoxy Composites Incorporating FGD Gypsum:** Júlia Souza<sup>1</sup>; David Coverdale Velasco<sup>2</sup>; José Lucas Lirio<sup>3</sup>; Djalma Souza<sup>3</sup>; *Felipe Perisse Duarte Lopes*<sup>3</sup>; Carlos Mauricio Vieira<sup>3</sup>; <sup>1</sup>IFFluminense; <sup>2</sup>IFFluminense/UENF; <sup>3</sup>Universidade Estadual do Norte Fluminense

**Fatigue in High-Performance Bicycles: Comparing Natural and Synthetic Fiber Composites with Epoxy and 3D Resins:** Luis Fernando Fortunato de Freitas<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; Luis Arrubla Agudelo<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; Felipe Perissé Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF

**A-24: Hardness Properties of Epoxy Composites Reinforced with Sugarcane Bagasse Dust for High Performance Flooring:** Juliana Ribeiro<sup>1</sup>; Luis Fernando de Freitas<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>2</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro; <sup>2</sup>Universidade Estadual do Norte Fluminense

**Incorporation of Coffee Grounds Powder as Reinforcement in Epoxy Resin for High-Performance Industrial Coatings: A Blue Ocean Strategy Analysis:** Bruna Cobuci<sup>1</sup>; Hugo Soares<sup>1</sup>; Frederico Margem<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; Felipe Lopes<sup>1</sup>; <sup>1</sup>UENF

**A-25: Izod Impact Tests on Epoxy Matrix Composites Reinforced with Montmorillonite Clay Particulate:** Juam Pierott Cabral<sup>1</sup>; Rebeca Seixas Quintanilha Gomes<sup>2</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Sergio Neves Monteiro<sup>3</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense; <sup>2</sup>UENF; <sup>3</sup>Instituto Militar de Engenharia

**Processing of Composites Incorporated with Glass Waste in 3D Printing as a Potential for High-Performance Sunglasses:** Rogério Rabello<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; Victor Gonçalves<sup>1</sup>; Carlos Vieira<sup>1</sup>; Sergio Monteiro<sup>1</sup>; Felipe Lopes<sup>1</sup>; <sup>1</sup>UENF

**A-26: Protection and Waterproofing of Natural Limestone Rocks:** Magno Padua<sup>1</sup>; José Lucas Carvalho Lirio<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**A-15: Revealing Properties of Primary vs. Secondary Plant Cell Wall for Designing Bioinspired Composites:** Anamika Prasad<sup>1</sup>; Salman Jamal<sup>1</sup>; <sup>1</sup>Florida International University

**A-16: Structure and Properties of Two Natural Fibers From South America:** Henry Colorado<sup>1</sup>; Marc Meyers<sup>2</sup>; Sergio Neves Monteiro<sup>3</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>University of California San Diego; <sup>3</sup>Instituto Militar de Engenharia

**A-27: Tensile Resistance of Epoxyde Composites Reinforced Chamotte Residues Powder:** Jaqueline de Oliveira<sup>1</sup>; David Velasco<sup>1</sup>; Darcy Lucas Oliveira<sup>1</sup>; Noan Simonassi<sup>1</sup>; Carlos Vieira<sup>1</sup>; *Felipe Perisse Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense

**Torque Resistance of Polymeric Composites Reinforced with Natural and Synthetic Fibers: A Comparison:** Luis Fernando Fortunato de Freitas<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; Luis Arrubla Agudelo<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; Felipe Perissé Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF

**Torsional Strength of Polymer Composites Reinforced with Natural and Synthetic Fibers Under Accelerated Uv Aging:** Luis Fernando Fortunato de Freitas<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; Luis Luis Arrubla Agudelo<sup>1</sup>; Carlos Carlos Fontes Vieira<sup>1</sup>; Felipe Perisse Duarte Lopes<sup>1</sup>; <sup>1</sup>UENF

**A-28: Utilization of FGD Gypsum in Epoxy Composites: A Flexural Strength Evaluation:** Júlia Souza<sup>1</sup>; David Coverdale Velasco<sup>2</sup>; José Lucas Lirio<sup>3</sup>; Djalma Souza<sup>3</sup>; *Felipe Perisse Duarte Lopes*<sup>3</sup>; Carlos Mauricio Vieira<sup>3</sup>; <sup>1</sup>IFFluminense; <sup>2</sup>IFFluminense/UENF; <sup>3</sup>Universidade Estadual do Norte Fluminense

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

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### Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIV — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Alloy Phases Committee

**Program Organizers:** Yu-Chen Liu, National Cheng Kung University; Hiroshi Nishikawa, Osaka University; Shih-kang Lin, National Cheng Kung University; Yee-wen Yen, National Taiwan University of Science and Technology; Chih-Ming Chen, National Chung Hsing University; Chao-hong Wang, National Chung Cheng University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, Korea Institute of Industrial Technology; Ping-Chuan Wang, Suny New Paltz; Yu-An Shen, Feng Chia University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Yu-Chen Liu, National Cheng Kung University; Yu-An Shen, Feng Chia University

**Flux-Less Solder Ball Attachment Technology (FLAT) for Advanced BGA Assembly:** Dongjin Kim<sup>1</sup>; Seonghui Han<sup>1</sup>; Sang Eun Han<sup>1</sup>; Dong-Gyu Choi<sup>1</sup>; Kwansik Chung<sup>2</sup>; Eunhae Kim<sup>2</sup>; Sehoon Yoo<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Prinsol Co., Ltd



**B-36: Liquidus Projection and Invariant Reactions of Bi-Cu-Sn System:** *Hsin-Chieh Huang*<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**B-37: Orientation Effects on the Electrically Induced Phase Transformation in Zirconia:** *Muhammad Waseem Ashraf*<sup>1</sup>; Eric Homer<sup>1</sup>; <sup>1</sup>Brigham Young University

**B-38: Phase Equilibria, Solidification and Properties of Al-Cu-Ni-Sn Alloys:** Wen-yu Chang<sup>1</sup>; *Yung-Chun Tsaï*<sup>1</sup>; Cheng-Hsi Ho<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**B-39: Simulation of Polycrystalline Microstructure Formation in Thin Film for Nanoscale Device Using Phase-Field Method:** Hwanwook Lee<sup>1</sup>; Jungin Park<sup>1</sup>; Daeun Choi<sup>1</sup>; *Yongwoo Kwon*<sup>1</sup>; <sup>1</sup>Hongik University

**B-40: Sn-Zn-Bi Low-Melting Alloy with Great Aging Resistance and Wettability:** Hao-Zhe Kao<sup>1</sup>; Chih-Ming Liang<sup>1</sup>; *Yu-An Shen*<sup>1</sup>; <sup>1</sup>Feng Chia University

## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Phase Transformations Committee

**Program Organizers:** Bharat Gwalani, North Carolina State University; Ashley Paz y Puente, University of Cincinnati; Jonah Klemm-Toole, Colorado School of Mines; Sriram Vijayan, Michigan Technological University; Mohsen Asle Zaeem, Colorado School of Mines; Le Zhou, Marquette University; Adriana Eres-Castellanos, Colorado School of Mines; Sophie Primig, University of New South Wales

Monday PM | March 24, 2025  
Marquee Ballroom | MGM Grand

**D-13: Analysis of Self-Healing Behavior in Co-Based Superalloy by Spontaneous Segregation of B and Y During In-Situ Tensile Test at Elevated Temperature:** *Hyun Gi Min*<sup>1</sup>; Kooknoh Yoon<sup>2</sup>; Jungsoo Lee<sup>3</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>University of California Berkeley; <sup>3</sup>Max-planck-Institut fur Eisenforschung

**D-14: Analysis of the L12 to hP24 Phase Transformation Behavior of a Co3Ti Precipitate During High Temperature Tensile Deformation of a Co-Based Superalloy System:** *Hyun Gi Min*<sup>1</sup>; William Cunningham<sup>2</sup>; Kooknoh Yoon<sup>3</sup>; Minseok Kim<sup>1</sup>; Daniel Gianola<sup>2</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>University of California Santa Barbara; <sup>3</sup>University of California Berkeley

**D-16: As-Cast Microstructure of the Ni-Based Superalloy Rene N5 Fabricated via Lost-Wax Casting:** *Rafal Cygan*<sup>1</sup>; Andrzej Trojan<sup>2</sup>; Tomasz Szczech<sup>2</sup>; Grzegorz Labaj<sup>2</sup>; Jadwiga Pipala<sup>2</sup>; Mateusz Orzel<sup>2</sup>; Grzegorz Boron<sup>2</sup>; Ewelina Halon<sup>2</sup>; Pawel Koziol<sup>2</sup>; Lukasz Rakoczy<sup>3</sup>; <sup>1</sup>Consolidated Precision Products Corporation / AGH University of Krakow; <sup>2</sup>Consolidated Precision Products Corporation; <sup>3</sup>AGH University of Science and Technology

**D-17: Characterizing the Phase Transformations in  $W_{0.125}Mo_{0.375}FeNi$  with Thermal Analysis:** *Ryan Chapman*<sup>1</sup>; Thomas Balk<sup>1</sup>; <sup>1</sup>University of Kentucky

**D-18: Effect of Co/Ni Ratio on Shape Memory Effect of the CrMnFeCoNi Multi-Component Alloys:** *Jinsurang Lim*<sup>1</sup>; Hwi Yun Jeong<sup>1</sup>; Hyun Seok Oh<sup>2</sup>; Je In Lee<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>University of Wisconsin-Madison

**Effect of Pass Rolling Reduction on Martensite Variant, Texture, and Mechanical Properties of Hot-Rolled Nb-V Low Carbon Steel:** *Murugesh kumar Ramar*<sup>1</sup>; Sadhan Ghosh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Roorkee

**D-19: Effect of Zr Addition on Microstructural Evolution and Mechanical Properties of Deformed and Annealed Cu-Fe Alloys:** *Hajoon Moon*<sup>1</sup>; Jungwook Cho<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology

**Effect on the Mechanical and Microstructural Properties of Welding Using Different Commercial E7018 Electrodes Via the SMAW Process:** Eduardo Guzmán-Ríos<sup>1</sup>; *M. Garcia-Ramirez*<sup>1</sup>; Julio Juárez-Tapia<sup>1</sup>; Raúl Barrientos-Hernández<sup>1</sup>; Martín Reyes-Pérez<sup>1</sup>; María I. Reyes-Valderrama<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo

**D-20: Effects of Rapid Thermal Processing Parameters on the Microstructural Evolution of 4140 Steel:** *David Starr*<sup>1</sup>; Thomas Balk<sup>1</sup>; <sup>1</sup>University of Kentucky

**D-21: Healable Ti-6Al-4V Base Alloy with Cyclability Between Stress-Induced Martensite Transformation and Thermally Induced Transformation:** *Kiwan Seo*<sup>1</sup>; Ji Young Kim<sup>1</sup>; Cham Il Kim<sup>2</sup>; Eun Soo Park<sup>1</sup>; Do-Hyang Kim<sup>2</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Yonsei University

**Investigating Atomic Size Misfit Effects in Refractory High-Entropy Alloys:** *Juree Jung*<sup>1</sup>; Jongtae Kim<sup>1</sup>; Jiwoon Lee<sup>2</sup>; Gian Song<sup>2</sup>; Mihye Lee<sup>1</sup>; Donghyun Bae<sup>3</sup>; Junhee Han<sup>1</sup>; Leeseung Kang<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Kongju National University; <sup>3</sup>Yonsei university

**Investigation on the NiTiCoHf Multicomponent Shape Memory Alloys:** *Jongtae Kim*<sup>1</sup>; Juree Jung<sup>1</sup>; Jaeyeol Jeon<sup>1</sup>; Leeseung Kang<sup>1</sup>; Konrad Kosiba<sup>2</sup>; Donghyun Bae<sup>3</sup>; Junhee Han<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Leibniz Institute for Solid State and Materials Research; <sup>3</sup>Yonsei University

**D-22: Knowledge-Processing-Microstructure of Pure Fe Produced by Laser Powder Bed Fusion:** *Ethan Freed*<sup>1</sup>; Thinh Huynh<sup>1</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida

**D-61: Microstructural Characterization of Quenched and Partitioned Ductile Iron (Q&PDI):** *Kumar Karuna Nidhi*<sup>1</sup>; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**D-23: Microstructure Evolution of Directionally Solidified Ni-Based Superalloy MAR-M247 Induced by Solution Heat-Treatment:** *Dorota Wyrobek*<sup>1</sup>; Rafal Cygan<sup>2</sup>; Lukasz Rakoczy<sup>3</sup>; <sup>1</sup>Consolidated Precision Products; <sup>2</sup>Consolidated Precision Products / AGH University of Krakow; <sup>3</sup>AGH University of Science and Technology

**Microstructure Modification of Cu-Al-Zn-Sn Alloys for Control Optical and Mechanical Properties:** *Gyeol Chan Kang*<sup>1</sup>; Haejin Park<sup>1</sup>; Hyo Soo Lee<sup>2</sup>; Jinkyu Lee<sup>3</sup>; TaekJib Choi<sup>1</sup>; Ki Buem Kim<sup>1</sup>; <sup>1</sup>Sejong University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Kongju National University

**D-24: Microstructure of Repair Welding Technology of the Co-Based Superalloy X40:** *Dorota Wyrobek*<sup>1</sup>; Rafal Cygan<sup>2</sup>; Lukasz Rakoczy<sup>3</sup>; <sup>1</sup>Consolidated Precision Products; <sup>2</sup>Consolidated Precision Products / AGH University of Krakow; <sup>3</sup>AGH University of Science and Technology

**Negative Strain Rate Sensitivity in Al0.3CoCrFeNi High Entropy Alloy During Hot Deformation:** *Ji-Woon Lee*<sup>1</sup>; Kwang Tae Son<sup>2</sup>; Gian Song<sup>1</sup>; Junhee Han<sup>3</sup>; Chulwoong Han<sup>3</sup>; Hyoseop Kim<sup>3</sup>; <sup>1</sup>Kongju National University (CAMP2); <sup>2</sup>Oregon State University; <sup>3</sup>Korea Institute of Industrial Technology

**D-25: Novel Lightweight CoCrNiAlSi Medium-Entropy Alloys with High Strength and Ductility:** *Pei-Yu Chen*<sup>1</sup>; Jhen-Yu Yen<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University

**D-26: Phase Stability in Rene 125 Ni-Based Superalloy – Thermodynamic Predictions and Microstructure Observation:** *Lukasz Rakoczy<sup>1</sup>; Rafal Cygan<sup>2</sup>; Dorota Wyrobek<sup>1</sup>; <sup>1</sup>AGH University of Science and Technology; <sup>2</sup>Consolidated Precision Products / AGH University of Krakow*

**D-27: Prediction of Steel Plate Deformation Using Phase Transformation-Based Finite Element Analysis:** *Jin Mo Koo<sup>1</sup>; Kyung Mun Min<sup>2</sup>; Seo Yeon Jo<sup>3</sup>; Sung Chul Lee<sup>3</sup>; Jeong Hoon Kim<sup>3</sup>; Myoung Gyu Lee<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Korea Institute of Materials Science; <sup>3</sup>Rolling Process Research Team, Hyundai Steel*

**D-28: Resistivity and Its Temperature Coefficient in Fe-Mn-Al-C-Based Alloy:** *Nobuaki Takeuchi<sup>1</sup>; Masatoshi Iizuka<sup>1</sup>; Kosuke Kemmotsu<sup>1</sup>; Daisuke Ando<sup>1</sup>; Kiyohito Ishida<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University (Eng.)*

**D-29: Selective Acceleration of Carbide Evolution Kinetics on Phase Boundaries by Electric Current Treatment:** *Siwhan Lee<sup>1</sup>; Yijae Kim<sup>1</sup>; Junyoung Chae<sup>1</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University*

**D-30: Solidification Microstructures in Mixtures of Superalloys 625 and 718:** *Kyrus Tsai<sup>1</sup>; Kyle Wade<sup>1</sup>; Lesley Frame<sup>1</sup>; Rainer Hebert<sup>1</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut*

**D-31: Study of Deformation Mechanism and Microstructural Evolution in a Dual-Precipitation Strengthened Novel CoCrNi Medium Entropy Alloy by Al and Nd Co-Doping:** *Chung Chih Tsai<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University*

**D-32: Study of Recrystallization Behavior and Mechanical Properties-Crystallographic Texture Correlation in Hot/Cold Rolled and Annealed 6.8Al-Fe and 9.7Al-Fe (wt%) Ferritic Low-Density Steels:** *Vinit Kumar Singh<sup>1</sup>; Amrita Kundu<sup>2</sup>; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>IIT Kharagpur; <sup>2</sup>Jadavpur University*

**Study on Banded Segregation of High-Strength Hot-Rolled Grade Steel and the "Void" Defect in Casting Slabs:** *Feifei Yang<sup>1</sup>; Zhanpeng Yin<sup>1</sup>; Yanzhao Luo<sup>1</sup>; Xin Li<sup>1</sup>; Guobiao Di<sup>1</sup>; <sup>1</sup>Shougang Group Co.,Ltd. Technology Research Institute*

**D-33: Sustainable NiTi Shape Memory Metallurgy:** *Sakia Noorzayee<sup>1</sup>; Jan Frenzel<sup>1</sup>; Gunther Eggeler<sup>1</sup>; <sup>1</sup>Ruhr University Bochum*

**D-34: The Effect of Copper Content on High Strength Precipitation Hardened Aluminum Alloys Processed Via Additive Friction Stir Deposition:** *Jacob Strain<sup>1</sup>; Luke Brewer<sup>1</sup>; <sup>1</sup>University of Alabama*

**D-35: Thermal Analysis of Austenite Decomposition in an Experimental UHSS Cr-Mo-V Steel:** *Ricardo Guzman-Garfias<sup>1</sup>; Octavio Vázquez-Gómez<sup>1</sup>; Héctor Vergara-Hernández<sup>1</sup>; Monserrat López-Cornejo<sup>1</sup>; Julio Villalobos<sup>1</sup>; Florelia Garcia-Izquierdo<sup>1</sup>; <sup>1</sup>Tecnológico Nacional de México / I.T. Morelia*

## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Powder Materials Committee

**Program Organizers:** Elisa Torresani, San Diego State University; Kathy Lu, University of Alabama Birmingham; Eugene Olevsky, San Diego State University; Diletta Giuntini, Eindhoven University of Technology; Paul Prichard, Oak Ridge National Laboratory; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology; Charles Maniere, CNRS

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**D-36: Controlling Embrittlement in Refractory Nanophase Separation Sintering Alloys:** *Colton Gilleland<sup>1</sup>; Michael Pavel<sup>1</sup>; B. Chad Hornbuckle<sup>2</sup>; Kris Darling<sup>2</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Army Research Laboratories*

**D-37: Effect of Vacuum Heat Treatment on the Oxygen Concentration and Microstructural Features of 316H Stainless Steel Powder for PM-HIP:** *Arpan Arora<sup>1</sup>; Peng Wang<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan*

**Enhancing Performance of Aluminium Metal Matrix Composites Through Customized Reinforcement Distribution in Multi-Scale Segregated Structures:** *Snehasish Adhikari<sup>1</sup>; Karabi Das<sup>1</sup>; Siddhartha Das<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur*

**D-38: Evaluation of Effect of Particle Shape on Sintering Behavior by Large-Scale Phase-Field Simulations:** *Aoi Nakazawa<sup>1</sup>; Shinji Sakane<sup>1</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology*

**Experimentally and Computationally Driven High-Throughput Materials by Design:** *Sean Fudger<sup>1</sup>; <sup>1</sup>US Army Research Laboratory*

**D-39: Impurity Analysis of Powder from Different Material Systems Synthesized via Vacuum-Induction-Melting and Ultrasonic Atomization Powder:** *Michael Rademacher<sup>1</sup>; Eduardo Lago Chamero<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

**D-40: Investigating the Stability and Electronic Structure of Chromium Copper Oxide Catalysts Using XPS and DFT Modeling:** *Carlos Blank<sup>1</sup>; Camilo Bedoya<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University*

**D-41: Mechano-Chemical Competition in Mechanically Driven Complex Concentrated Alloys:** *Luyan Li<sup>1</sup>; Yuan Yao<sup>1</sup>; Mostafa Hassani<sup>1</sup>; <sup>1</sup>Cornell University*

**D-42: Pm-HIP Production of Ductile Tungsten:** *Dekota Thies<sup>1</sup>; <sup>1</sup>University of Michigan*

**D-43: Structural Engineering of (Bi/Mn) Double Perovskites for Photodetector Applications:** *Francesca Bellevu<sup>1</sup>; Amr Elattar<sup>1</sup>; Tarik Dickens<sup>1</sup>; <sup>1</sup>FAMU-FSU College of Engineering*

**D-44: Structure-Property Relationship for Bioinspired Ceramic-Metal Composites:** *Sourabh Kumar<sup>1</sup>; Hortense Le Ferrand<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore*

**Thermal and Mechanical Property of Cu Material Composites as a Function of Ti and Cr Content by a Spark Plasma Sintering (SPS):** *Minhyeok Yang<sup>1</sup>; Bum soon Park<sup>1</sup>; Yu gyun Park<sup>1</sup>; Hyoung seok Moon<sup>1</sup>; Hyun kuk Park<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology*

**D-45: Use of Field Assisted Sintering Technology (FAST) for the Manufacture of a Metallic Ultra-High Temperature Materials System:** *Matthew Gelmetti<sup>1</sup>; <sup>1</sup>University of Sheffield*

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

## Refractory Metals 2025 — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Matthew Osborne, Global Advanced Metals; Paul Rottmann, University of Kentucky; Gianna Valentino, University of Maryland

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Matthew Osborne, Global Advanced Metals

**C-17: Fabrication of Mo-Si-B Alloy Through Spark Plasma Sintering using Mo Powder Containing  $\text{La}_2\text{O}_3$  Nanoparticles Uniformly Dispersed via Ultrasonic Spray Pyrolysis:** Woocheol Kim<sup>1</sup>; Wonjune Choi<sup>2</sup>; Young-In Lee<sup>1</sup>; Sung-Tag Oh<sup>1</sup>; Jongmin Byun<sup>1</sup>; <sup>1</sup>Seoul National University of Science and Technology; <sup>2</sup>Dankook University

**C-18: Get Low: Achieving Ultra-Fine Grain Sizes in Niobium with High-Pressure Torsion:** Lethicia Calderon<sup>1</sup>; Miranda Bell<sup>1</sup>; Ruben Ochoa<sup>1</sup>; Adam Freund<sup>1</sup>; Joshua Edwards<sup>1</sup>; Nicholas Krienke<sup>1</sup>; Suveen Mathaudhu<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**C-19: Investigating the Microstructure and High-Temperature Mechanical Properties of Additively Manufactured W-Re Alloys:** Elliott Wallace<sup>1</sup>; Alex Lark<sup>2</sup>; Gianna Valentino<sup>1</sup>; <sup>1</sup>University of Maryland, College Park; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory

**C-20: New Family of Refractory Ti-Rich HEA Superconductors with High Upper Critical Field:** Piotr Sobota<sup>1</sup>; Bartosz Rusin<sup>1</sup>; Daniel Gnida<sup>2</sup>; Rafal Topolnicki<sup>1</sup>; Tomasz Ossowski<sup>3</sup>; Wojciech Nowak<sup>1</sup>; Adam Pikul<sup>2</sup>; Rafal Idczak<sup>3</sup>; <sup>1</sup>University of Wrocław / Polish Academy of Sciences; <sup>2</sup>Polish Academy of Sciences; <sup>3</sup>University of Wrocław

## MATERIALS SYNTHESIS AND PROCESSING

## REWAS 2025: Sustainable End-of-Life Management and Recycling Solutions for Batteries, Wind Turbines, and Photovoltaics — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Christina Meskers, SINTEF; Mertol Gokelma, Izmir Institute of Technology; Adamantia Lazou, National Technical University of Athens; Elsa Olivetti, Massachusetts Institute of Technology

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**D-46: A Preliminary Study on the Recycling of Oxide-Based Solid-State Electrolytes:** Hyunjoon Lee<sup>1</sup>; Hyunju Lee<sup>2</sup>; Mooki Bae<sup>2</sup>; Jongwon Choi<sup>2</sup>; Sookyoung Kim<sup>1</sup>; <sup>1</sup>Korea National University of Science and Technology; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources

**D-47: Assessing Circular Economy in Photovoltaics: Life Cycle Perspective of Material Recovery, Reuse, and Remanufacturing:** Kirula Kahanavitage Don<sup>1</sup>; Sahar Shata<sup>1</sup>; Haoyang He<sup>1</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>Texas A&M University

**D-48: Enhancing Graphite Flotation Efficiency in the Presence of PVDF Binder via Surface Modifications by Ultrasound and UV Irradiation:** Shamanta Shafique<sup>1</sup>; Mostafa Khodakarami<sup>1</sup>; Md Shariful Islam<sup>1</sup>; Manoranjan Misra<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**D-49: Pilot-Scale Hydrometallurgical Recycling of NMC Blackmass:** Firat Tekmanli<sup>1</sup>; Bengi Yagmurlu<sup>1</sup>; <sup>1</sup>Technische Universität Clausthal

**Re-Use of Wind Turbine Blades as Pedestrian Bridges in Beaverbrook Park:** Cayleigh Nicholson<sup>1</sup>; Gabriel Ackall<sup>1</sup>; W. Jud Ready<sup>1</sup>; Russell Gentry<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**D-50: Solubilities of Lithium, Nickel, and Cobalt Oxides in Deep Eutectic Solvents:** Rejwanur Rahman<sup>1</sup>; Andreas Schwetter<sup>1</sup>; Sneha Jayaram<sup>2</sup>; Jihye Kim<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Gettysburg College

**D-51: Solvo-Metallurgical Process for the Extraction of Lithium from End-of-Life Electric Vehicle Lithium-Ion Batteries:** MD Shariful Islam<sup>1</sup>; Manoranjan Misra<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**D-52: Supply Risk Aware Alloy Discovery and Design:** Mrinalini Mulukutla<sup>1</sup>; Robert Robinson<sup>1</sup>; Brent Vela<sup>1</sup>; Daniel Khatamsaz<sup>2</sup>; Nhu Vu<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**Sustainable Route for Nd Recycling from End-of-Life NdFeB Magnet Using a Deep Eutectic Solvent:** Jai Shree<sup>1</sup>; Nawshad Haque<sup>2</sup>; Shuronjit Sarker<sup>1</sup>; Warren Bruckard<sup>2</sup>; Veeriah Jegatheesan<sup>1</sup>; Biplob Pramanik<sup>1</sup>; <sup>1</sup>RMIT University; <sup>2</sup>CSIRO

## MECHANICS OF MATERIALS

## Solid-State Diffusion Bonding of Metals and Alloys — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Mohamed Elbakhshwan, University of Wisconsin Madison; Peng Wang, University of Michigan; Tate Patterson, Idaho National Laboratory; Fei Gao, University of Michigan; Todd Allen, University of Michigan; Mark Anderson, University of Wisconsin Madison

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Xinchang Zhang, Idaho National Laboratory

**E-38: Analysis of Kirkendall Voids Formation in Ni(W) Diffusion-Induced Recrystallization Region:** Minho Oh<sup>1</sup>; Hee-Soo Kim<sup>2</sup>; Equo Kobayashi<sup>1</sup>; Masanori Kajihara<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology; <sup>2</sup>Chosun University

**E-39: Solid-State Bonding of Composite Metal Foam:** John Cance<sup>1</sup>; Afsaneh Rabiei<sup>1</sup>; <sup>1</sup>North Carolina State University

**Solid-State Diffusion as a Tool for Alloy Design Optimization:** Joao Henrique Mota<sup>1</sup>; Nelson Neto<sup>2</sup>; Francisco Coury<sup>3</sup>; <sup>1</sup>Programa de Pós-Graduação em Ciência e Engenharia de Materiais; <sup>2</sup>Colorado School of Mines; <sup>3</sup>Universidade Federal de São Carlos



## NUCLEAR MATERIALS

**Solid-state Processing and Manufacturing for Extreme Environment Applications: Integrating Insights and Innovations — Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Nuclear Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Priyanka Agrawal, University of North Texas; Hang Yu, Virginia Polytechnic Institute and State University; Boopathy Kombariah, Idaho National Laboratory; Joao Oliveira, Faculdade Ciencias Tecnologias; Tianhao Wang, Pacific Northwest National Laboratory; Mukesh Bachhav, Idaho National Laboratory; John Shelton, Northern Illinois University; Shivakant Shukla, Pacific Northwest National Laboratory; Efthymios Polatidis, University of Patras; Lakshmi Narayan Ramasubramanian, Indian Institute of Technology; Sanya Gupta, Cummins Inc.

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**E-53: Characteristics of B4C-Based Aluminum Matrix Composites for Nuclear Applications:** *Seungchan Cho*<sup>1</sup>; Minwoo Kang<sup>1</sup>; Tae Gyu Lee<sup>1</sup>; Donghyun Lee<sup>1</sup>; Junnghwan Kim<sup>1</sup>; Sang-Bok Lee<sup>1</sup>; Sang-Kwan Lee<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science (KIMS)

**F-30: Laser Welding Effects on Microstructure and Mechanical Properties on Oxide Dispersion Strengthened Steel MA956:** *Ryan Sundburg*<sup>1</sup>; Elizabeth Getto<sup>2</sup>; Brad Baker<sup>2</sup>; Matthew Swenson<sup>1</sup>; <sup>1</sup>University of Idaho; <sup>2</sup>United States Naval Academy

## MECHANICS OF MATERIALS

**Spatially Tailored Materials: Processing-Structure-Properties — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Gianna Valentino, University of Maryland; Marie Charpagne, University of Illinois; Ian Mccue, Northwestern University; J.C. Stinville, University of Illinois Urbana-Champaign

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** J.C. Stinville, University of Illinois Urbana-Champaign; Gianna Valentino, University of Maryland

**E-40: Abnormal Martensitic Transformation and Morphology Induced by Chemical Heterogeneity in Additively Manufactured Maraging Steel:** *Hyeonbeen Noh*<sup>1</sup>; Jeongho Han<sup>2</sup>; KenHee Ryou<sup>3</sup>; Pyuck-Pa Choi<sup>1</sup>; <sup>1</sup>KAIST; <sup>2</sup>Hanyang University; <sup>3</sup>Northwestern University

**E-41: Effects of Stacking-Fault Energy and Thermo-Mechanical Treatments on Evolution of Heterogeneous Nanostructure and Mechanical Properties of SUS316LN Stainless Steels:** *Hiromi Miura*<sup>1</sup>; Yojiro Oba<sup>1</sup>; Masakazu Kobayashi<sup>1</sup>; Chihiro Watanabe<sup>2</sup>; <sup>1</sup>Toyohashi University of Technology; <sup>2</sup>Kanazawa University

**E-42: Evaluation of the Mechanical and Thermal Properties of Directed Energy Deposited 316L Stainless Steel-Copper Composite With Complex 3D Structures:** *Dongin Cho*<sup>1</sup>; Yong Hwan Cho<sup>1</sup>; Sung-gyu Kang<sup>2</sup>; Kyeongjae Jeong<sup>1</sup>; HyunJoo Choi<sup>3</sup>; In-Suk Choi<sup>1</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Gyeongsang National University; <sup>3</sup>Kookmin University

**Fine-Tuning of Heat Treatment Parameters for Nano-Scale Cu-Precipitates:** *Kapil Dev Sharma*<sup>1</sup>; Anish Karmakar<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Roorkee

**E-43: High Strain Rate Properties and Microstructure of Fe-Cu Alloys Made Through Laser Powder Bed Fusion:** *Daniel Rubio-Ejchel*<sup>1</sup>; Lauren Poole<sup>2</sup>; Daniel Yin<sup>1</sup>; Frank Zok<sup>2</sup>; Amit Misra<sup>1</sup>; Jerard Gordon<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

**E-44: Mechanical and Material Characterization of BP-DED Ti-Nb-Cu Functionally Graded Materials:** *Michael Lester*<sup>1</sup>; Daniel Rubio-Ejchel<sup>2</sup>; Teresa Valenzuela<sup>1</sup>; Jun Fan<sup>2</sup>; Wenda Tan<sup>2</sup>; Jerard Gordon<sup>2</sup>; William LePage<sup>1</sup>; <sup>1</sup>University of Tulsa; <sup>2</sup>University of Michigan

**E-48: Multi-Material PBF-LB Additive Manufacturing of Aluminum and Copper Combinations:** *Sven Gründer*<sup>1</sup>; Florian Hengsbach<sup>1</sup>; Mirko Schaper<sup>1</sup>; <sup>1</sup>Paderborn University

**Research Progress of Continuous Graded Alloy Fabrication by LPBF:** *Baicheng Zhang*<sup>1</sup>; <sup>1</sup>University of Science and Technology, Beijing

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

**Steels in Extreme Environments — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Hyunseok Oh, University of Wisconsin - Madison; Lawrence Cho, Colorado School of Mines; Jeongho Han, Hanyang University; Motomichi Koyama, Tohoku University; Peeyush Nandwana, Oak Ridge National Laboratory; Fnu Kasturi Narasimha Sasidhar, University of Wisconsin - Madison

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Adsorption Studies on Corrosion Inhibition Performance of Waste For Pipeline Steel in Oil and Gas Production:** *Omotayo Sanni*<sup>1</sup>; Jianwei Ren<sup>1</sup>; Tien-Chien Jen<sup>1</sup>; <sup>1</sup>University of Johannesburg

**Corrosion Inhibition of Mild Steel in Hydrochloric Acid Solution Using Agricultural Waste as a Possible Environmentally Friendly Corrosion Inhibitor for Oil and Gas Industry:** *Omotayo Sanni*<sup>1</sup>; Jianwei Ren<sup>1</sup>; Tien-Chien Jen<sup>1</sup>; <sup>1</sup>University of Johannesburg

**Developing an Atomistic Corrosion Model of Austenitic Steel Alloys from Ab-Initio Simulations of MnCr<sub>2</sub>O<sub>4</sub> and Cr<sub>2</sub>O<sub>3</sub>:** *R. Seaton Ullberg*<sup>1</sup>; Xueyang Bogdanova<sup>2</sup>; Michael Tonks<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Los Alamos National Laboratory

**C-21: Influence of Processing Conditions and Loading Rate on the Fracture Toughness of 316L Welds at Cryogenic Temperatures:** *Jake Benzing*<sup>1</sup>; *Nicholas Derimow*<sup>1</sup>; Enrico Lucon<sup>1</sup>; Timothy Weeks<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**C-25: Mechanisms of Pore Collapse in Additively Manufactured 316L Stainless Steel Under High Strain Rates:** Taylor Sloop<sup>1</sup>; Elias Winterscheidt<sup>1</sup>; *Ella Parker*<sup>1</sup>; Kevin Lamb<sup>2</sup>; Josh Kacher<sup>1</sup>; Naresh Thadhani<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>CNS-Y12 Oak Ridge, TN



**C-22: Surface and Corrosion Characteristics of High-Alloyed Steel Tubes Under Annealing Conditions:** *Sung Jin Kim<sup>1</sup>; Jin Sung Park<sup>1</sup>; Yi Je Cho<sup>1</sup>*; <sup>1</sup>Sunchon National University

**C-23: Susceptibility to Hydrogen Embrittlement of 22Mn All-Weld Metals: Effect of Temperature on Deformation Behavior:** *Donghyeon Cho<sup>1</sup>; Jimin Nam<sup>1</sup>; Jaeseok Yoo<sup>2</sup>; Namhyun Kang<sup>1</sup>*; <sup>1</sup>Pusan National University; <sup>2</sup>Hanwha Ocean

**Validation and Characterisation of Advanced Coating Solutions Applied to Tool Steels Used as Aluminum Extrusion Die: Creep and Life Time:** *Zeynep Tutku Ozen<sup>1</sup>; Ilyas Artunc Sari<sup>1</sup>; Irem Yaren Siyah<sup>1</sup>; Berat Bayramoglu<sup>1</sup>; Ibrahim Bat<sup>1</sup>; Gorkem Ozcelik<sup>1</sup>*; <sup>1</sup>Asas Aluminum

**D-54: Evaluation of Forming Stability and Crack Resistance in Inconel 718 Under Heat Treatment Conditions in Hot Forging Processes:** *Ji Seob An<sup>1</sup>; Seung-Hyun Yeo<sup>1</sup>; A-Ra Jo<sup>1</sup>; Myeong-Sik Jeong<sup>2</sup>; Jong-Sik Kim<sup>3</sup>; Sunkwang Hwang<sup>2</sup>*; <sup>1</sup>KITECH / Pusan National University; <sup>2</sup>KITECH; <sup>3</sup>Korea Precision Casting Metal

**D-55: Microstructure, Mechanical, Oxidation and Electrochemical Behavior of Thermo-Plastically Deformed High Entropy Alloys:** *Mayank Garg<sup>1</sup>; Tushar Borkar<sup>1</sup>*; <sup>1</sup>Cleveland State University

**D-56: Optimization of Ductility and Creep Life of Inconel 939-Type Nickel-Based Superalloys:** *Dong Whan Kim<sup>1</sup>; Min Seok Kim<sup>1</sup>; Eun Soo Park<sup>1</sup>*; <sup>1</sup>Seoul National University

## MECHANICS OF MATERIALS

### Structure and Dynamics of Metallic Glasses — Metallic Glasses Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Katharine Flores, Washington University in St. Louis; Daniel Sopu, Erich Schmid Institute; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**E-49: 4D-STEM of Medium Range Ordering and Their Correlation to Properties in ZrCu, ZrCuAl, and ZrCuNiTiAl Metallic Glasses:** *Minhazul Islam<sup>1</sup>; Gabriel Calderon Ortiz<sup>1</sup>; Soohyun Im<sup>1</sup>; Yuchi Wang<sup>1</sup>; Yuchu Wang<sup>2</sup>; Yue Fan<sup>2</sup>; Yunzhi Wang<sup>1</sup>; Jinwoo Hwang<sup>1</sup>*; <sup>1</sup>The Ohio State University; <sup>2</sup>University of Michigan

**E-45: Development of Zr-Based Metallic Glasses with Low Glass Transition Temperature for Thermoplastic Forming:** *Wook Ha Ryu<sup>1</sup>; Min Kyung Kwak<sup>2</sup>; Chae Woo Ryu<sup>3</sup>; Eun Soo Park<sup>2</sup>*; <sup>1</sup>Kumoh National Institute of Technology & RIAM, Seoul National University; <sup>2</sup>Seoul National University; <sup>3</sup>Hongik University

## MATERIALS SYNTHESIS AND PROCESSING

### Sustainability of High Temperature Alloys — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: High Temperature Alloys Committee

**Program Organizers:** Mark Hardy, Rolls-Royce Plc; Caspar Schwalbe, MTU Aero Engines AG; Jeremy Rame, Naarea; Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Martin Detrois, National Energy Technology Laboratory; Katerina Christofidou, University of Sheffield

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**D-53: Enhancement of Crack Propagation Resistance by Healing Treatment in Boron Containing FeNi-Base Superalloy:** *Cham Il Kim<sup>1</sup>; Ji Yeong Lee<sup>2</sup>; Won Tae Kim<sup>3</sup>; Eun Soo Park<sup>4</sup>; Do-Hyang Kim<sup>1</sup>*; <sup>1</sup>Yonsei University; <sup>2</sup>Korea Institute of Science and Technology; <sup>3</sup>Cheongju University; <sup>4</sup>Seoul National University

## MATERIALS SYNTHESIS AND PROCESSING

### Thin Films and Coatings: Properties, Processing and Applications — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Tomas Grejtak, Oak Ridge National Laboratory; Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Tomas Babuska, Sandia National Laboratories; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougou, CNRS, Is2m; Brandon Krick, Florida A&M University-Florida State University

**Monday PM | March 24, 2025**  
**Marquee Ballroom | MGM Grand**

**Hydrophobic Behaviour of Polyurethane Based Metal Oxide Composite Coating for the Protection of Ancient Artefacts and Monuments:** *Pankaj Kumar<sup>1</sup>; Karabi Das<sup>1</sup>; Ramkrishna Sen<sup>1</sup>; Siddhartha Das<sup>1</sup>*; <sup>1</sup>Indian Institute of Technology Kharagpur

**D-57: Microstructural Characterization and Mechanical Behavior of Mg-Ti Alloys Fabricated by Physical Vapor Deposition:** *Reza Motallebi<sup>1</sup>; Yuhyun Park<sup>2</sup>; Digvijay Yadav<sup>1</sup>; Raj Patel<sup>1</sup>; Gi-Dong Sim<sup>2</sup>; Kelvin Xie<sup>1</sup>*; <sup>1</sup>Texas A&M University; <sup>2</sup>Korea Advanced Institute of Science and Technology

**MOF-Based Self-Healing Coating Material with Triple Distinct and Efficient Healing Bond for Preventing Fat, Oil, and Grease Deposition and Corrosion in Sewer System:** *Sachin Yadav<sup>1</sup>; Biplob Pramanik<sup>1</sup>*; <sup>1</sup>RMIT University

**Pseudocapacitive Behaviour of Zn-TiO<sub>2</sub>-SnO<sub>2</sub> Nano-Composite Coatings:** *Ayodele Daniyan<sup>1</sup>; Lasisi Umoru<sup>1</sup>; Ojo Fayomi<sup>2</sup>; Kunle Oluwasegun<sup>3</sup>*; <sup>1</sup>Obafemi Awolowo University; <sup>2</sup>Bells University of Technology, Ota, Nigeria; <sup>3</sup>University of Manitoba

**D-58: Reactive Multilayer Induced Self-Healing in Thin Films — The Importance of Diffusion Barriers:** *Nensi Toncich<sup>1</sup>; Patricia Moll<sup>1</sup>; Kristian Skailand<sup>1</sup>; Ralph Spolenak<sup>1</sup>*; <sup>1</sup>ETH Zürich

## ADDITIVE MANUFACTURING

## A Career in Powder Processing and Additive Manufacturing: A MPMD Symposium Honoring David Bourell — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Powder Materials Committee

**Program Organizers:** Paul Prichard, Oak Ridge National Laboratory; Allison Beese, Pennsylvania State University; Iver Anderson, Iowa State University Ames Laboratory

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Research and Application of Shougang's Thick Material Layer Sintering Technology:** Dongqing Wang<sup>1</sup>; Wen Pan<sup>1</sup>; Zhixing Zhao<sup>1</sup>; Yapeng Zhang<sup>1</sup>; Huaiying Ma<sup>1</sup>; <sup>1</sup>Shougang Group

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Advanced Materials

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-25: Achieving Excellent Mechanical Properties and Unique Phase Transformation in High-Entropy Alloys Via Additive Manufacturing:** Haiming Wen<sup>1</sup>; Matthew Luebke<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

**G-26: Additive Manufacturing of Co-Based Superalloys with High Volume Fraction via Direct Ink Writing:** Jian Liu<sup>1</sup>; Wen Chen<sup>1</sup>; <sup>1</sup>University of Massachusetts Amherst

**G-27: Additive Manufacturing of Removable Partial Dentures:** Saber Goodarzi<sup>1</sup>; Shamaita Shabnam<sup>1</sup>; Jyoti Prakash Naidu<sup>2</sup>; Abu Syed Kabir<sup>1</sup>; <sup>1</sup>Carleton University; <sup>2</sup>SleepLabs

**Advanced Additively Manufactured Permanent Magnets for New Energy and Mobility Applications:** Amin Azar<sup>1</sup>; Spyros Diplas<sup>2</sup>; <sup>1</sup>3D-Components AS; <sup>2</sup>SINTEF

**Dislocation Glide Under the Correlated Stacking Fault Noise in Random Alloys:** Hyunsoo Lee<sup>1</sup>; Enrique Martinez<sup>1</sup>; <sup>1</sup>Clemson University

**G-28: Microstructural and Crystallographic Aspects Affecting MFIS in NiMnGa Magnetic Shape Memory Alloys Manufactured by LPBF:** Anna Wojcik<sup>1</sup>; Wojciech Maziarz<sup>1</sup>; Arkadiusz Szewczyk<sup>1</sup>; Lukasz Zrodowski<sup>2</sup>; Bartosz Moronczyk<sup>2</sup>; Rafal Wroblewski<sup>2</sup>; Maciej Kowalczyk<sup>2</sup>; Robert Chulist<sup>1</sup>; <sup>1</sup>Institute of Metallurgy and Materials Science, Polish Academy of Sciences; <sup>2</sup>Warsaw University of Technology

**G-29: Microstructural Development in Ni-Fe-Mo Permalloy Produced by Laser Powder Bed Fusion:** Nicolas Ayers<sup>1</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida

**G-30: Microstructure, Mechanical Properties, and Conductivity of CuNiSi Alloy Fabricated by Laser Powder Bed Fusion:** Siyu Sun<sup>1</sup>; Simon Ringer<sup>1</sup>; Keita Nomoto<sup>1</sup>; <sup>1</sup>The University of Sydney

**G-31: Non-Equimolar Cantor High Entropy Alloy Fabrication Using Metal Powder Cored Wire Arc Hot Wire Laser Deposition Additive Manufacturing:** Eric MacDonald<sup>1</sup>; Anatoliy Zavdoveev<sup>2</sup>; Pedro Cortes<sup>1</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>Paton Electric Welding Institute of NAS of Ukraine

**Selective Powder Deposition of Refractory Zirconium Alloys: Challenges and Opportunities:** Phylis Makurumje<sup>1</sup>; Jack Callaghan<sup>2</sup>; <sup>1</sup>Nuclear Futures Institute; <sup>2</sup>Bangor University

**G-32: Semi-Autonomous Multi-Objective Bayesian Optimization with Decision Maker Preference for Improving Performance and Manufacturability of Refractory High Entropy Alloy:** Md. Shafiqul Islam<sup>1</sup>; Doguhan Sariturk<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**G-33: Superior Strengthening via Nanoscale Lamellae in Eutectic Multi-Principal Element Alloy Additively Manufactured by Laser Powder Bed Fusion:** Thinh Huynh<sup>1</sup>; Kevin Graydon<sup>1</sup>; Tanner Olson<sup>2</sup>; Amberlee Haselhuhn<sup>2</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>LIFT

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Aluminum Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Additive Friction Stir Deposition of Al-Ce Alloys:** Vishal Soni<sup>1</sup>; Devin Davis<sup>1</sup>; Liam Menchaca<sup>1</sup>; Naveen Kumar Nagaraja<sup>1</sup>; David Weiss<sup>2</sup>; Rajiv Mishra<sup>1</sup>; Vijay Vasudevan<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Loukus Technologies, Inc.

**G-10: Additive Manufacturing of A356 Aluminum Alloy with Incorporated Oxygen Atoms:** Juyeon Han<sup>1</sup>; Soomin Kim<sup>1</sup>; Soomin Lee<sup>1</sup>; Zhenxing Zhou<sup>2</sup>; Soomin Lee<sup>1</sup>; Weiwei Zhou<sup>2</sup>; Naoyuki Nomura<sup>2</sup>; Hyunjo Choi<sup>1</sup>; <sup>1</sup>Kookmin University; <sup>2</sup>Tohoku University

**G-11: Designing a Wire Feedstock From Recycled Aluminum for Additive Manufacturing:** *Jamie McIntyre<sup>1</sup>; John Carsley<sup>2</sup>; Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Novelis*

**G-12: Development of Aluminum Copper Alloys for LPBF Applications via In Situ Alloying of Commercial Powders:** *John O'Connell<sup>1</sup>; Anne Dunn<sup>1</sup>; Timothy Nice<sup>1</sup>; Nataniel Badgett<sup>1</sup>; Mahmudul Hasan<sup>1</sup>; Hunter Wilkinson<sup>1</sup>; Deep Choudhuri<sup>1</sup>; Bhaskar Majumdar<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology*

**G-122: Formation of Al(Fe,Mn)Si Nano-Scale Precipitates in WAAM Aluminum:** *Jacob Aljundi<sup>1</sup>; Aditya Pulipaka<sup>1</sup>; Mo-Rigen He<sup>2</sup>; Kevin Hemker<sup>2</sup>; <sup>1</sup>Naval Surface Warfare Center Carderock Division; <sup>2</sup>Johns Hopkins University*

**G-13: Insights Towards the Grain Refinement of Al-Mn-Fe-Si Alloy via In Situ Reaction During Laser Direct Energy Deposition:** *Qingyu Pan<sup>1</sup>; Fan Zhang<sup>2</sup>; Deepak Vikraman Pillai<sup>3</sup>; Zilong Zhang<sup>4</sup>; Yufeng Zheng<sup>3</sup>; Lang Yuan<sup>4</sup>; Monica Kapoor<sup>5</sup>; John Carsley<sup>5</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>National Institute of Standards and Technology; <sup>3</sup>University of North Texas; <sup>4</sup>University of South Carolina; <sup>5</sup>Novelis Global Research and Technology Center*

**G-14: Nano-Treated Aluminum Alloy 2024 with Exceptional Strength and Ductility via Laser Powder Bed Fusion:** *Tianqi Zheng<sup>1</sup>; Guan-Cheng Chen<sup>1</sup>; Bingbing Li<sup>2</sup>; Xiaochun Li<sup>1</sup>; <sup>1</sup>University Of California, Los Angeles; <sup>2</sup>California State University, Northridge*

**G-15: Strength Enhancement of Al Alloy via Microstructure Design Strategy Using Laser Powder Bed Fusion:** *Ankita Roy<sup>1</sup>; Roopam Jain<sup>1</sup>; Priyanka Agrawal<sup>1</sup>; Ravi Haridas<sup>1</sup>; Clara Mock<sup>2</sup>; Brandon McWilliams<sup>2</sup>; Kyu Cho<sup>2</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Army Research Lab*

**G-16: The 3D Microstructure of Annealed LPBF AlSi10Mg Characterized by a Combination of Synchrotron Microdiffraction and Transmission X-Ray Microscopy:** *Marion Defer<sup>1</sup>; Yubin Zhang<sup>1</sup>; Soumyadeep Dasgupta<sup>2</sup>; Ashwin Shahani<sup>2</sup>; Xianghui Xiao<sup>3</sup>; Wenjun Liu<sup>4</sup>; Dorte Juul Jensen<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>University of Michigan - Ann Arbor; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>Argonne National Laboratory*

## ADDITIVE MANUFACTURING

**Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Nickel-Based Superalloys**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**G-17: Fabricating Crack-Free, High-Density Inconel 738LC Using Direct Energy:** *Yusufu Ekubaru<sup>1</sup>; Nakabayashi Takuya<sup>1</sup>; <sup>1</sup>Nikon Corporation*

**G-18: Homogenization Heat Treatment Simulation of DED-Arc Haynes 282:** *Gideon Crawford<sup>1</sup>; Sophia Hill<sup>1</sup>; Jonah Klemm-Toole<sup>1</sup>; Joy Gockel<sup>1</sup>; <sup>1</sup>Colorado School of Mines*

**G-19: Impact of High Energies Laser Beam Shapes on Microstructure Development After Solution Annealing of Inconel 718:** *Crtoimir Donik<sup>1</sup>; Matjaz Godec<sup>1</sup>; Irena Paulin<sup>1</sup>; Simon Malej<sup>1</sup>; Bojan Podgornij<sup>1</sup>; Borut Žužek<sup>1</sup>; Danijela Skobir Balantič<sup>1</sup>; Richard Off<sup>2</sup>; Narges Mirsabeigi<sup>3</sup>; Katrin Wudy<sup>3</sup>; <sup>1</sup>Institute Of Metals And Technology; <sup>2</sup>EOS GmbH Electro Optical Systems; <sup>3</sup>Technical University of Munich*

**G-20: Investigating the Influence of Heat Treatment on LPBF IN718 with Varied Beam Shapes: Insights into Static and Dynamic Mechanical Properties:** *Matjaz Godec<sup>1</sup>; rtomir Donik<sup>1</sup>; Irena Paulin<sup>1</sup>; Simon Malej<sup>1</sup>; Bojan Podgornik<sup>1</sup>; Borut Žužek<sup>1</sup>; Danijela Skobir Balantič<sup>1</sup>; Richard Off<sup>2</sup>; Narges Mirsabeigi<sup>3</sup>; Katrin Wudy<sup>2</sup>; <sup>1</sup>Institute Of Metals And Technology; <sup>2</sup>Technical University of Munich; <sup>3</sup>EOS GmbH Electro Optical Systems*

**Microstructure, Mechanical Properties and Thermal Expansion Behavior of Laser Powder Bed Fusion Fabricated IN718-YSZ Compositionally Graded Composite:** *Amey Parnai<sup>1</sup>; V. Chakkravarthy<sup>2</sup>; Jitendar Kumar Tiwary<sup>3</sup>; Yaojie Wen<sup>4</sup>; Baicheng Zhang<sup>4</sup>; Lakshmi Narayan Ramasubramanian<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Delhi; <sup>2</sup>Cranfield University; <sup>3</sup>Chalmers University of Technology; <sup>4</sup>University of Science and Technology Beijing*

**G-21: Oxide Dispersion Strengthened 718 Ni Alloy Fabricated Through Direct Energy Deposition:** *Emiliano Flores<sup>1</sup>; Benjamin Stegman<sup>1</sup>; Anyu Shang<sup>1</sup>; William Jarosinski<sup>2</sup>; Joseph Corpus<sup>2</sup>; Haiyan Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Linde Advanced Material Technologies*

**G-22: Process and Properties Relationships of Solidification in Solid-Solution Ni-Based Superalloys Fabricated via Laser Powder Bed Fusion:** *Amanda Heimbrook<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory*

**G-23: Solidification Behavior and Dissolution Mechanism of Laves Phase in Additively Manufactured Inconel 718:** *Vivek Singh<sup>1</sup>; Murugaiyan Amirthalingam<sup>2</sup>; Shyamprasad Karagadde<sup>1</sup>; Sushil Mishra<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay; <sup>2</sup>Indian Institute of Technology Madras*

**G-24: Solidification Condition Effect on Cracking Behavior in Rene 80 Thin-Wall Components Fabricated by Directed Energy Deposition:** *Can Sun<sup>1</sup>; Hamedreza Seyyedhosseinzadeh<sup>2</sup>; Changjie Sun<sup>3</sup>; Alexander Kitt<sup>4</sup>; Lang Yuan<sup>1</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>The University of Texas at Tyler; <sup>3</sup>GE Research; <sup>4</sup>EWI*

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Processing, Defect Formation and Detection

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-35: Additive Friction Stir Deposition of Consolidated Metal Powder Feedstock:** *Amit Kumar Singh*<sup>1</sup>; Aishani Sharma<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

**G-36: Detection and Classification of Cracking via Acoustic Emission in Laser-Melting Experiments:** *Evan Raeker*<sup>1</sup>; Kaitlyn Mullin<sup>1</sup>; Nikhil Tulshibagwale<sup>1</sup>; James Lamb<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**G-37: Development and Validation of Topology Optimization Methodologies for Lattice Structured Architectures:** *Calvin Downey*<sup>1</sup>; Max Nezdlyur<sup>1</sup>; Lynn Munday<sup>1</sup>; Swapnil Morankar<sup>1</sup>; Cameron Howard<sup>1</sup>; Jakub Toman<sup>1</sup>; Carolyn Seepersad<sup>1</sup>; Boone Beausoleil<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**G-38: The Use of Extraction Replication to Study Nano Precipitates in Powder Feedstocks and the Corresponding Additively Manufactured Builds:** *Qiushi Jin*<sup>1</sup>; Manuel Sanchez-Poncela<sup>2</sup>; Rainer Hebert<sup>1</sup>; Mark Aindow<sup>2</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>ArcelorMittal Global R&D Spain

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Solidification and Related Phenomena

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-118: Comparative Analysis of Different Inoculant Addition Methods on the Microstructure of Additively Manufactured Geometries:** *Ehiremen Asemewanlen*<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**G-39: Predictive Modeling of Grain Morphology and Phase Fraction in Metal Additive Manufacturing Using Coupled Thermal Simulation, a PF-CA Model, and a Kinetic Model:** *Hamed Hosseinzadeh*<sup>1</sup>; <sup>1</sup>Manufacturing Technology Project

**G-40: Quantifying Thermal History in Laser Powder Bed Fusion Using In-Situ Sensing Techniques:** *Holden Hyer*<sup>1</sup>; Brandon Schreiber<sup>1</sup>; Daniel Sweeney<sup>1</sup>; Christian Petrie<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**G-41: Rapid Estimation of the Liquidus Curve for Unexplored Multicomponent Alloy Chemistries:** *Joshua Willwerth*<sup>1</sup>; Shibo Tan<sup>1</sup>; Abrar Rauf<sup>1</sup>; Alan Taub<sup>1</sup>; Wenhao Sun<sup>1</sup>; <sup>1</sup>University of Michigan

**G-42: Revealing the Complexity of Reactive Inoculation in Laser Powder Bed Fusion by Advanced In-Situ and Ex-Situ Characterization and Modeling:** *Adriana Eres-Castellanos*<sup>1</sup>; Kamel Fezzaa<sup>2</sup>; John Martin<sup>3</sup>; Xinyi He<sup>4</sup>; Sophie Primig<sup>4</sup>; Amy Clarke<sup>5</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>HRL Laboratories; <sup>4</sup>UNSW Sydney; <sup>5</sup>Los Alamos National Laboratory



## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Steels and Iron Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-1: Additive Manufacturing of Alumina-Forming Austenitic Steels for Next-Generation Nuclear Systems:** *Lorenzo Notari<sup>1</sup>; Enrico Virgillito<sup>2</sup>; Daniele De Caro<sup>2</sup>; Mariangela Lombardi<sup>1</sup>; Francisco Ferrè<sup>2</sup>; <sup>1</sup>Politecnico di Torino; <sup>2</sup>newcleo Srl*

**G-2: Development of Additively Manufactured Austenitic Stainless Steel with Excellent Strength and Ductility Combination Through Ti Addition:** *Hyejin Song<sup>1</sup>; Dongyong Park<sup>1</sup>; Hojin Lee<sup>1</sup>; Jin Seok Jang<sup>1</sup>; <sup>1</sup>KITECH*

**G-3: Effects Combined Homogenization and Cryogenic Treatment on the Microstructure and Mechanical Properties of 17-4 PH Stainless Steel Fabricated by Laser-Powder Bed Fusion:** *Hyun-Hak Kang<sup>1</sup>; Seung-Chang Han<sup>1</sup>; Si-Mo Yeon<sup>2</sup>; Vladimir Luzin<sup>3</sup>; Tea-Sung Jun<sup>1</sup>; <sup>1</sup>Incheon National University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Australian Nuclear Science and Technology Organisation*

**G-4: Evaluating Printed 316L Stainless Steel Samples Using Novel Dry Metal Alloy (DMA) Powder Feedstock for Compositionally Uniform:** *Stephen Hanson<sup>1</sup>; Nathan Huft<sup>1</sup>; Sudhakar Vadiraja<sup>1</sup>; Peter Lucon<sup>1</sup>; <sup>1</sup>Montana Technological University*

**G-5: Heat Treatment of QT 17-4 Steel: Impacts on Microstructure, Mechanical Properties, and Corrosion Resistance:** *Abheepsit Raturi<sup>1</sup>; Vyas Sharma<sup>1</sup>; Eyal Sabatani<sup>1</sup>; Vladimir Popov<sup>1</sup>; Amir Farkoosh<sup>2</sup>; Dieter Isheim<sup>2</sup>; Amir Natan<sup>1</sup>; David Seidman<sup>2</sup>; Noam Eliaz<sup>1</sup>; <sup>1</sup>Tel Aviv University; <sup>2</sup>Northwestern University*

**G-6: Improvement of the Mechanical Properties of Austenitic Stainless Steel by Incorporating TiN-WC Ceramic Nanoparticles Fabricated Via Selective Laser Melting:** *Baibhav Karan<sup>1</sup>; Qiyang Tan<sup>1</sup>; Ayan Bhowmik<sup>2</sup>; Mingxing Zhang<sup>1</sup>; <sup>1</sup>The University of Queensland; <sup>2</sup>Indian Institute of Technology Delhi*

**G-7: L-PBF Duplex Stainless Steel Graded Lattice Structure (GLS): Mechanical Performance and Residual Stresses on the Magnetic Properties:** *Kamal Sleem<sup>1</sup>; <sup>1</sup>Università Politecnica delle Marche*

**G-8: Maraging Steels with Enhanced Strength-Ductility Synergy via Additive Manufacturing:** *Wuxian Yang<sup>1</sup>; Wen Chen<sup>1</sup>; <sup>1</sup>University of Massachusetts Amherst*

**G-9: Twin-Related Grain Boundary Engineering of 316L Stainless Steel by Laser Additive Manufacturing:** *Chenglu Tang<sup>1</sup>; Jingfan Yang<sup>2</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory*

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Alloy Design: Bridging Fundamental Physical Metallurgy, Advanced Characterization Techniques, and Integrated Computational Materials Engineering for Advanced Materials — Poster Session - Titanium Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: High Temperature Alloys Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Amir Farkoosh, Northwestern University; David Seidman, Northwestern University; Enrique Lavernia, Texas A&M University; Noam Eliaz, Tel-Aviv University; Lee Semiatin, MRL Materials Resources LLC

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Atomic Layer Deposition (ALD) for Improved Ti64 Feedstocks for Laser Powder Bed Fusion Processes:** *Chris Gump<sup>1</sup>; Joseph Gauspohl<sup>1</sup>; Brandon Castro<sup>1</sup>; Brianna Boeyink<sup>1</sup>; Jeremy Iten<sup>2</sup>; Anthony Manerbino<sup>2</sup>; Arrelaine Dameron<sup>1</sup>; <sup>1</sup>Forge Nano; <sup>2</sup>Elementum 3D*

**G-34: Effect of Fe Alloying on Phase Evolution, Microstructure, Mechanical and Tribological Properties of Ti64 Alloy via Laser-Material-Deposition:** *Ipsita Mohanty<sup>1</sup>; Saurav Misra<sup>1</sup>; Sujoy Kar<sup>1</sup>; Partha Saha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur*

**Optimizing Process Parameters in Laser Powder Bed Fusion of Ti-6Al-4V: Understanding Melt Pool Dynamics and Pore Splitting Phenomena Using Ultra-High-Speed Synchrotron Radiography:** *Elena Ruckh<sup>1</sup>; Samy Hocine<sup>1</sup>; Ruben Lambert-Garcia<sup>1</sup>; Anna Getley<sup>1</sup>; Maureen Fitzpatrick<sup>1</sup>; Caterina Iantaffi<sup>2</sup>; Sebastian Marussi<sup>1</sup>; Andy Farndell<sup>3</sup>; Marta Majkut<sup>4</sup>; Alexander Rack<sup>4</sup>; Nick Jones<sup>3</sup>; Chu Lun Alex Leung<sup>1</sup>; Peter D. Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>European Space Agency (ESA); <sup>3</sup>Renishaw plc.; <sup>4</sup>European Synchrotron Radiation Facility*

## ADDITIVE MANUFACTURING

## Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee, TMS: Powder Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Markus Chmielus, University of Pittsburgh; Henry Colorado, Universidad de Antioquia; Riccardo Casati, Politecnico Di Milano

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Session Chairs:** Daniel Salazar, BCMaterials; Riccardo Casati, Politecnico Di Milano

**G-123: 3D Printing of Hierarchical Porous Metal Structures:** *Luyang Liu<sup>1</sup>; Natalya Kublik<sup>1</sup>; Bruno Azeredo<sup>1</sup>; Xiangfan Chen<sup>1</sup>; <sup>1</sup>Arizona State University*

**G-117: Analyzing Production Cost and Powder Quality of Additive Manufacturing Feedstock Made Through Ultrasonic Atomization:** *Eduardo Lago Chamero*<sup>1</sup>; Michael Rademacher<sup>1</sup>; <sup>1</sup>Georgia Institute Of Technology

**Binder Jet Powder-Based 3D Printing of 17-4 Stainless Steel with Comprehensive Property Characterization:** *Amin Mianjiy*<sup>1</sup>; Deep Virai<sup>1</sup>; Sandesh Giri<sup>1</sup>; Sen Liu<sup>1</sup>; <sup>1</sup>University Of Louisiana At Lafayette

**G-43: Effect of Interpass Cooling Temperature on Microstructure and Mechanical Properties by WAAM Process Using Steel Wire:** *Changwook Ji*<sup>1</sup>; Chung-Soo Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**G-44: Effects of Processing Parameters on Joining Strength of 316L-Cu Interface in Multi-Materials Laser Powder Bed Fusion:** *Dehao Liu*<sup>1</sup>; Jiaqi Yang<sup>1</sup>; <sup>1</sup>Binghamton University

**G-45: Enhanced Cryogenic Tensile Properties of Additive Manufacturing STS316L Steel Using Nano-Oxide Dispersion of Reusable Powder:** *Chohyeon Lee*<sup>1</sup>; Jo Wonhui<sup>1</sup>; Saurabh Tiwari<sup>1</sup>; Cho Kisub<sup>1</sup>; Kim Hyoungseop<sup>2</sup>; Seol Jaebok<sup>1</sup>; <sup>1</sup>Kookmin University; <sup>2</sup>Pohang University of Science and Engineering

**Fabrication of Heterogenous Steel Alloy Using Multi-Wire Arc Additive Manufacturing:** *Ganesan Gunasekaran*<sup>1</sup>; Siddhartha .; Shahu Karade<sup>1</sup>; Narasimhan K<sup>1</sup>; Karunakaran K.P<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**G-46: From Rotational to Translational and Interlocking Particle Rearrangement: Exploring Binder Jet Printing of Controlled Irregular-Shaped and Fully-Dense Copper Powder:** *Mahsa Beyk Khorasani*<sup>1</sup>; Markus Chmielus<sup>1</sup>; John Barnes<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Metal Powder Works

**G-47: Heterogenic Interface Stability of Multiple Alloy Systems by Additive Manufacturing and Sintering Process:** *Seong Gyu Chung*<sup>1</sup>; Omer Cakmak<sup>1</sup>; Seung Hoon Lee<sup>1</sup>; Jung Wook Cho<sup>1</sup>; Kumar Sridharan<sup>3</sup>; Hwasung Yeom<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>University of Wisconsin Madison

**Innovative Use of Glass Waste and Additives for Additive Manufacturing of Ceramic Bricks:** *Carlos Fernando Revelo Huertas*<sup>1</sup>; Henry Alonso Colorado Lopera<sup>2</sup>; Carlos Mauricio Fontes Vieira<sup>1</sup>; <sup>1</sup>State University of Northern Rio de Janeiro; <sup>2</sup>University of Antioquia

**Manufacturing of Spherical Maraging Steel Powders for Additive Manufacturing Using by Waste Precision Mold:** *Donghee Ryu*<sup>1</sup>; Yulhee Kim<sup>1</sup>; Junhee Han<sup>1</sup>; Sahn Nahm<sup>2</sup>; Leeseung Kang<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea University

**G-48: Manufacturing of Spherical Molybdenum Powder for Additive Techniques Using Plasma Atomization:** *Marcin Lis*<sup>1</sup>; Adriana Wrona<sup>1</sup>; Adam Sekuta<sup>1</sup>; Anna Czech<sup>1</sup>; Magorzata Osadnik<sup>1</sup>; Adrian Kukofka<sup>2</sup>; Jacek Mazur<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network-Institute of-Non Ferrous Metals; <sup>2</sup>Progresja S.A.

**Tailoring Microstructure for 2 GPa Class AISI D2 Tool Steel by Material Extrusion Additive Manufacturing (MEX):** *Min Su Jeon*<sup>1</sup>; So-Yeon Park<sup>1</sup>; Yong-Hoon Cho<sup>1</sup>; Michelle Baek<sup>2</sup>; Hyoung-Seop Kim<sup>3</sup>; Kee-Ahn Lee<sup>1</sup>; <sup>1</sup>Inha University; <sup>2</sup>Markforged; <sup>3</sup>Pohang University of Science and Technology

## ADDITIVE MANUFACTURING

### Additive Manufacturing Fatigue and Fracture: Towards Accurate Prediction — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** Nik Hrabe, National Institute of Standards and Technology; Nima Shamsaei, Auburn University; John Lewandowski, Case Western Reserve University; Mohsen Seifi, ASTM International/Case Western Reserve University

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Nik Hrabe, National Institute of Standards and Technology (NIST)

**G-119: Analysis of Wear Behavior in CoCrFeMnNi Alloys Additively Manufactured by Directed Energy Deposition Process:** *Geonwoo Baek*<sup>1</sup>; SungJae Jo<sup>1</sup>; Daehyeon Kim<sup>1</sup>; Gyeongwuk Kim<sup>1</sup>; Ji-won Ha<sup>1</sup>; Soon-jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University

**G-49: Directed Energy Deposition of TiNbVZr Based Complex Concentrated Alloy for High Temperature Applications:** *Jan Dzukan*<sup>1</sup>; Jan Kout<sup>1</sup>; Martina Koukolikova<sup>1</sup>; Josef Strasky<sup>2</sup>; Milos Janecek<sup>2</sup>; Petr Hrcuba<sup>2</sup>; Libor Kraus<sup>1</sup>; <sup>1</sup>COMTES FHT; <sup>2</sup>Charles University

**G-50: Fatigue Properties of Laser-Powder Bed Fusion Fabricated Dissimilar IN718/SS316 Components:** *Sumit Choudhary*<sup>1</sup>; Vedit Gaur<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

**High-Cycle & Low-Cycle Fatigue Study of Additively Manufactured Nanoprecipitation Strengthened High Entropy Alloys:** *Poresh Kumar*<sup>1</sup>; Tu-Ngoc Lam<sup>1</sup>; Mao-yaun Luo<sup>1</sup>; Lia Amalia<sup>2</sup>; Jing-Syuan Lai<sup>1</sup>; Ke An<sup>3</sup>; Yan Chen<sup>3</sup>; Dunji Yu<sup>3</sup>; Peter Liaw<sup>2</sup>; Po-Heng Chou<sup>4</sup>; An-Chou Yeh<sup>5</sup>; Soo Lee<sup>6</sup>; Jayant Jain<sup>7</sup>; Sudhanshu Singh<sup>8</sup>; E-Wen Huang<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University; <sup>2</sup>University of Tennessee Knoxville; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>University of Tennessee Knoxville; <sup>5</sup>National Tsing Hua University; <sup>6</sup>Chungnam National University; <sup>7</sup>Indian Institute of Technology Delhi; <sup>8</sup>Indian Institute of Technology Kanpur

**G-51: High-Temperature Damage Mechanisms in Additively Manufactured Nickel-Based Superalloy IN939:** *Marketa Galikova*<sup>1</sup>; Ivo Kuběna<sup>1</sup>; Ivo Šulák<sup>1</sup>; <sup>1</sup>Institute of Physics of Materials, CAS

**G-52: Impact of Hatching Strategy on Mechanical Properties and Residual Stresses in Additively Manufactured AlSi10Mg Components:** Sebastian Gersch<sup>1</sup>; Jörg Bagdahn<sup>1</sup>; <sup>1</sup>Hochschule Anhalt

**Influence of Raster Angle and Infill Density on Impact Resistance of High Impact Polystyrene (HIPS):** *Mechack Nduwa*<sup>1</sup>; Aaron Adams<sup>1</sup>; Edgar Bryant<sup>1</sup>; David Stollberg<sup>1</sup>; Cameron Coates<sup>1</sup>; <sup>1</sup>Kennesaw State University

**G-120: Influence of Wear Sliding Condition on the Wear Behavior of 316L by Directed Energy Deposition Process:** *Sung-jae Jo*<sup>1</sup>; Dae-Hyeon Kim<sup>1</sup>; Geonwoo Baek<sup>1</sup>; HyunJoong Kim<sup>1</sup>; Ji-won Ha<sup>1</sup>; Gyeongwuk Kim<sup>1</sup>; Soon-jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University

**Microanalysis of Defects, Grain Structure, Surface Treatment and Its Correlation to Fatigue Behavior of Additively-Manufactured 316L Stainless Steel:** *Jackelin Amorin*<sup>1</sup>; Can Uysalel<sup>1</sup>; Maziar Ghazinejad<sup>1</sup>; <sup>1</sup>University of California San Diego

## ADDITIVE MANUFACTURING

## Additive Manufacturing Materials in Energy Environments II — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nuclear Materials Committee

**Program Organizers:** Isabella Van Rooyen, Pacific Northwest National Laboratory; Subhashish Meher, Pacific Northwest National Laboratory; Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Purdue University; Yi Xie, Peking University; Michael Kirka, Oak Ridge National Laboratory; Mohan Sai Kiran Nartu, Pacific Northwest National Laboratory

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Mohan Nartu, Pacific Northwest National Laboratory

**G-53: Characterization of Aerosol Jet Printed Polyimide/h-BN Nanocomposite Thin Films for Space Applications:** *Lucas Clark*<sup>1</sup>; Fahima Ouchen<sup>2</sup>; Laura Davidson<sup>2</sup>; Oshadha Ranasingha<sup>3</sup>; Emily Heckman<sup>4</sup>; Carrie Bartsch<sup>4</sup>; Ahsan Mian<sup>1</sup>; <sup>1</sup>Wright State University; <sup>2</sup>KBR; <sup>3</sup>University of Massachusetts Lowell; <sup>4</sup>Air Force Research Laboratory

**G-54: Cold Spray Coating to Mitigate Chlorine-Induced Stress Corrosion Cracking (CISCC) of Stainless Steel Dry Cask Storage System for Spent Nuclear Fuel:** *Jinwook Choi*<sup>1</sup>; Kumar Sridharan<sup>2</sup>; Hwasung Yeom<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>University of Wisconsin

**G-55: Functionally Graded Joints Between Ferritic SA508 Low Alloy Steel to Austenitic 316L Stainless Steel Via Laser Directed Energy Deposition:** *Chenglu Tang*<sup>1</sup>; John Snitzer<sup>1</sup>; Jingfan Yang<sup>2</sup>; Evan Mcdermott<sup>1</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory

**G-56: Investigation of Scan Speed Effects on Recrystallization of LPBF Processed 316H Stainless Steel:** *Ousmane Ndiaye*<sup>1</sup>; Jim Stubbins<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

**G-57: ODS Steels Produced by Laser Powder Bed Fusion for Fusion Power Systems:** *Irena Paulin*<sup>1</sup>; rtomir Donik<sup>1</sup>; Anna Dobkowska<sup>2</sup>; Jiri Kubasek<sup>3</sup>; Matjaž Godec<sup>1</sup>; <sup>1</sup>Institute Of Metals And Technology; <sup>2</sup>Warsaw University of Technology; <sup>3</sup>University of Chemistry and Technology

## ADDITIVE MANUFACTURING

## Additive Manufacturing Modeling, Simulation and Machine Learning — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Jing Zhang, Purdue University; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Changwon National University

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Jing Zhang, Purdue University

**G-58: A Data Driven Framework to Predict and Bridge Multiscale Mechanical Phenomenon in Additively Manufactured Component:** *Abhijeet Dhal*<sup>1</sup>; Dilip Banerjee<sup>2</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>National Institute of Standards and Technology

**G-59: A Deep Learning Framework for Predicting Surface Deformation of Alloys Under Uniaxial Tensile Loading at Microscopic Length Scale:** *Kavindu Wijesinghe*<sup>1</sup>; Steven Arnold<sup>2</sup>; Ajit Achuthan<sup>1</sup>; <sup>1</sup>Clarkson University; <sup>2</sup>NASA Glenn Research Center

**G-60: A Machine Learning-Based Approach for Process Optimization in Laser Based 3-D Printing of High-Performance Al-Alloys:** Jun Zheng<sup>1</sup>; *Ruobin Qi*<sup>1</sup>; John O'Connell<sup>1</sup>; Jack White<sup>1</sup>; Bhaskar Majumdar<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**G-61: A New Fast Solidification Cracking Indexing Tool for Metallic Alloys:** Henry Leon-Henao<sup>1</sup>; Kaue C. Riffel<sup>1</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>The Ohio State University

**G-62: Additive Manufacturing Guided with High-Speed Photography and Machine Learning:** *Stanford White*<sup>1</sup>; Samrat Choudhury<sup>1</sup>; Yiwei Han<sup>1</sup>; <sup>1</sup>University of Mississippi

**G-63: AM Microstructure Image Prediction Using Dimension Reduction:** *Arulmurugan Senthilnathan*<sup>1</sup>; Paromita Nath<sup>2</sup>; Sankaran Mahadevan<sup>1</sup>; <sup>1</sup>Vanderbilt University; <sup>2</sup>Rowan University

**Can Machine Learning Predict the Liquidus Temperature of Binary Alloys?:** *Yifei He*<sup>1</sup>; <sup>1</sup>Yale University

**G-64: Controlling Bubble Transport with External Magnetic Fields in Additive Manufacturing:** *Ivars Krastins*<sup>1</sup>; Xianqiang Fan<sup>2</sup>; Harry Chapman<sup>2</sup>; Catherine Tonry<sup>1</sup>; Peter Soar<sup>1</sup>; Koulis Pericleous<sup>1</sup>; Peter Lee<sup>2</sup>; Andrew Kao<sup>1</sup>; <sup>1</sup>University of Greenwich; <sup>2</sup>University College London

**G-124: Controlling Microstructure and Defect Through Physics-Informed Machine Learning in Laser Powder Bed Fusion Process:** *Aditya Pandey*<sup>1</sup>; Vidit Gaur<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

**Correlating Processing, Microstructure and Property with Machine Learning for Powder-Bed Fusion Additive Manufacturing:** *Xipeng Tan*<sup>1</sup>; <sup>1</sup>National University Of Singapore

**G-65: Development of a Steady-State 3D Heat Transfer and Materials Flow Model for Multi-Layer Additive Friction Stir Deposition:** *Prachi Sharma*<sup>1</sup>; Amit Arora<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar

**G-66: Effect of Nucleation Model and Data Resolution on Cellular Automata Texture Strength Prediction:** *Matthew Rolchigo*<sup>1</sup>; John Coleman<sup>1</sup>; Gerald Knapp<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**G-67: Elastoplastic Thermomechanical Simulation of Powder Bed Fusion Incorporating Isotropic Strain Hardening and Cyclic Hardening/Softening Effects: A Comprehensive Approach:** *Hamed Hosseinzadeh*<sup>1</sup>; <sup>1</sup>Manufacturing Technology Project

**Evaluating Absorptivity from Surface Temperature Measurements of Tracks Produced by Direct Laser Metal Deposition:** *Andrii Maksymenko*<sup>1</sup>; <sup>1</sup>San Diego State University

**Finite Element Analysis of Deposition Strategies in Dissimilar Metal Additive Manufacturing:** *Nishkarsh Srivastava*<sup>1</sup>; *Amit Arora*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Gandhinagar

**Finite Element Analysis of Porous Implants Used for Forearm Free Flap Implant:** *Leila Ladani*<sup>1</sup>; *Adithi Muruganandam*<sup>1</sup>; *Sahana Sundaran*<sup>1</sup>; *Michael Palmieri*<sup>1</sup>; *David Lott*<sup>2</sup>; *Brent Chang*<sup>2</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Mayo Clinic

**G-69: Gaussian Process Regression Modelling and Texture Control During Hot Deformation of Additively Manufactured Maraging Steels:** *Jubert Pasco*<sup>1</sup>; *Clodualdo Aranas Jr.*<sup>1</sup>; *Thomas McCarthy*<sup>1</sup>; <sup>1</sup>University of New Brunswick

**Hierarchical Machine Learning Framework for Optimizing Material Properties:** *Zahra Zanjani Foumani*<sup>1</sup>; *Mahsa Amiri*<sup>1</sup>; *Ramin Bostanabad*<sup>1</sup>; *Lorenzo Valdevit*<sup>1</sup>; <sup>1</sup>University of California Irvine

**Hyperspectral In-Situ Process Monitoring with High-Speed Infrared Pyrometry, Eddy Current Testing, and Machine Learning, for Predictive Analysis of AM Part Properties:** *Medad Monu*<sup>1</sup>; *Dermot Brabazon*<sup>1</sup>; <sup>1</sup>Dublin City University

**Impact of Infill Density and Raster Angle on 3D Printed High Impact Polystyrene (HIPS) Tensile Behavior:** *Mechack Nduwa*<sup>1</sup>; *Aaron Adams*<sup>1</sup>; *Edgar Bryant*<sup>1</sup>; *David Stollberg*<sup>1</sup>; *Cameron Coates*<sup>1</sup>; <sup>1</sup>Kennesaw State University

**G-70: Integrating CAFE with MOOSE for Microstructure Evolution Analysis in 316L Stainless Steel 3D Printing Process:** *Tsu-Chun Teng*<sup>1</sup>; *Dewen Yu*<sup>2</sup>; *Luis Nuñez*<sup>2</sup>; *Wen Jiang*<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory

**G-71: Large Language Models for Distilling Knowledge in Additive Manufacturing:** *Achuth Chandrasekhar*<sup>1</sup>; *Jonathan Chan*<sup>1</sup>; *Francis Ogoke*<sup>1</sup>; *Olabode Ajenifujah*<sup>1</sup>; *Amir Barati Farimani*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**G-72: LLM Agents for 3D Printing Error Detection and Correction:** *Yayati Jadhav*<sup>1</sup>; *Peter Pak*<sup>1</sup>; *Amir Barati Farimani*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**G-73: Local Stress Analysis of Ti5553 Lattice Structures Under Mixed Mode Stresses:** *Subhadip Sahoo*<sup>1</sup>; *Mohammad M. Keleshteri*<sup>1</sup>; *Jason Mayeur*<sup>2</sup>; *Thomas Voisin*<sup>3</sup>; *Kavan Hazeli*<sup>1</sup>; <sup>1</sup>The University of Arizona; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Lawrence Livermore National Laboratory

**G-74: Machine Learning Guided Prediction of Printability During Additive Manufacturing:** *Stanford White*<sup>1</sup>; *Yu Zhang*<sup>1</sup>; *Samrat Choudhury*<sup>1</sup>; *Mo Maniruzzaman*<sup>1</sup>; <sup>1</sup>University of Mississippi

**G-126: Mathematical Quantification of Meniscus Fluctuations and Asymmetries in a Medium-Thin Slab Mold:** *Eriwiht Tello*<sup>1</sup>; *Saul Garcia-Hernandez*<sup>1</sup>; *Enif Gutierrez*<sup>1</sup>; *Marbella Durán González*<sup>1</sup>; *Rodolfo Davila Morales*<sup>2</sup>; <sup>1</sup>TecNM-Instituto Tecnológico de Morelia; <sup>2</sup>Instituto Politécnico Nacional-ESIQIE

**G-75: Mathematical Study of Partial Blockage of SEN in Specific Zones on Flow Patterns in the Mold:** *Marbella Durán González*<sup>1</sup>; *Enif Gutiérrez*<sup>1</sup>; *Saul Garcia-Hernandez*<sup>1</sup>; *Eriwiht D. Tello Cabrera*<sup>1</sup>; <sup>1</sup>Instituto Tecnológico de Morelia

**G-76: Mechanical Evaluation of Nested Structures Using Finite Element Analysis:** *Niloofar Fani*<sup>1</sup>; *Armaghan Hashemi Monfared*<sup>2</sup>; *Chao Gao*<sup>3</sup>; *Farihorz Tavangarian*<sup>1</sup>; <sup>1</sup>Penn State Harrisburg; <sup>2</sup>Pennsylvania State University; <sup>3</sup>Norwegian University of Science and Technology

**G-77: Microstructural Investigation and Numerical Analysis and Observation of Additively Manufactured Anti-Tetra-Chiral 316L Stainless Steel Samples:** *Gabriele Grima*<sup>1</sup>; *Alberto Santoni*<sup>1</sup>; *Kamal Sleem*<sup>1</sup>; *Maria Laura Gatto*<sup>1</sup>; *Anna Maria Schiavone*<sup>1</sup>; *Marcello Cabibbo*<sup>1</sup>; *Stefano Spigarelli*<sup>1</sup>; *Eleonora Santecchia*<sup>1</sup>; <sup>1</sup>Università Politecnica delle Marche

**G-78: Microstructure Prediction in Laser Powder Bed Fusion via Physics-Based Modeling and In-Situ Sensor Data Fusion:** *Kaustubh Deshmukh*<sup>1</sup>; *Mihir Darji*<sup>1</sup>; *Antonio Carrington*<sup>1</sup>; *Alex Riensche*<sup>1</sup>; *Christopher Williams*<sup>1</sup>; *Prahalada Rao*<sup>1</sup>; <sup>1</sup>Virginia Tech

**Modeling GMA-DED Bead and Layer Geometry for Defect Elimination:** *Sophia Hill*<sup>1</sup>; *Jonah Klemm-Toole*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**G-79: Multi-Objective Study on Optimization of WAAM Parameters for Optimal Material Properties:** *Anthony Gonzalez*<sup>1</sup>; *Alexander Aleman*<sup>1</sup>; *Arvind Agarwal*<sup>1</sup>; *Tyler Dolmetsch*<sup>1</sup>; *Abderrachid Hamrani*<sup>1</sup>; <sup>1</sup>Florida International University

**G-80: Multi-Phase-Field Modeling and High-Performance Simulations for Grain Structures Depending on Scanning Strategy During PBF Additive Manufacturing:** *Tomohiro Takaki*<sup>1</sup>; *Yuki Takahashi*<sup>1</sup>; *Konosuke Ikeda*<sup>1</sup>; *Shinji Sakane*<sup>1</sup>; *Takayuki Aoki*<sup>2</sup>; <sup>1</sup>Kyoto Institute of Technology; <sup>2</sup>Tokyo Institute of Technology

**On the of Rapid Solidification in Additive Manufacturing Conditions by Combining Multiscale Simulations and In-Situ Monitoring Techniques:** *Tatu Pinomaa*<sup>1</sup>; *Adriana Eres-Castellanos*<sup>2</sup>; *Joni Kaipainen*<sup>3</sup>; *Joni Kaipainen*<sup>4</sup>; *Nikolas Provatas*<sup>4</sup>; *Amy Clarke*<sup>5</sup>; *Anssi Laukkanen*<sup>1</sup>; *Joseph McKeown*<sup>6</sup>; *Thomas Voisin*<sup>6</sup>; <sup>1</sup>VTT Technical Research Centre of Finland; <sup>2</sup>Colorado School of Mines; <sup>3</sup>University of Arizona; <sup>4</sup>McGill University; <sup>5</sup>Los Alamos National Laboratory; <sup>6</sup>Lawrence Livermore National Laboratory

**Performance Optimization of Additively Manufactured -Ti5553 Alloy Lattice Structures: A Methodical Approach Integrating Topology and Strut-Level Microstructure:** *Mohammad M Keleshteri*<sup>1</sup>; *Subhadip Sahoo*<sup>1</sup>; *Jason Mayeur*<sup>2</sup>; *Thomas Voisin*<sup>3</sup>; *Kavan Hazeli*<sup>1</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Lawrence Livermore National Laboratory

**G-81: Quantifying the Characteristics of Pore Features Using Gaussian Process Machine Learning in LPBF Process Parameter Space:** *Tasrif Ul Anwar*<sup>1</sup>; *Maher Alghalayini*<sup>2</sup>; *Nadia Kouraytem*<sup>1</sup>; <sup>1</sup>Utah State University; <sup>2</sup>Lawrence Berkeley National Laboratory

**G-82: Sensing-Based AM Process Mapping to Improve Reliability:** *Glenn Bean*<sup>1</sup>; <sup>1</sup>The Aerospace Corporation

**G-83: Simulation of Melt Pool Dynamics in Wire-Based and Powder-Based Directed Energy Deposition:** *Mohammad Younes Aragh*<sup>1</sup>; *Shuozhi Xu*<sup>1</sup>; <sup>1</sup>University of Oklahoma

**G-84: Towards a Fully Predictive Additive Manufacturing Module:** *Amer Malik*<sup>1</sup>; *Minh-Do Quang*<sup>1</sup>; *Johan Jeppsson*<sup>1</sup>; *Andreas Markström*<sup>1</sup>; <sup>1</sup>Thermo-Calc Software

**G-85: Understanding Structure-Property Interplay in 3D Printed Gyroid TPMS Lattices:** *Kunal Gide*<sup>1</sup>; <sup>1</sup>George Mason University



## ADDITIVE MANUFACTURING

## Additive Manufacturing of Refractory Metallic Materials — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Refractory Metals & Materials Committee

**Program Organizers:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Faramarz Zarandi, RTX Corporation; Jeffrey Sowards, NASA Marshall Space Flight Center; Antonio Ramirez, Ohio State University; Eric Brizes, NASA Glenn Research Center; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias; Ian Mccue, Northwestern University; Zachary Sims, Small Business Consulting Corporation

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Fernando Reyes Tirado, Nasa Marshall Space Flight Center

**G-88: Alloy Design and Microstructure-Property Relationships for Non-Equiatomic Ti-Zr-Nb-Ta-V-Cr Alloys with Tensile Ductility Made By Laser Powder Bed Fusion:** *Dillon Jobes*<sup>1</sup>; Daniel Rubio-Ejchel<sup>1</sup>; Lucero Lopez<sup>1</sup>; William Jenkins<sup>2</sup>; Christopher Tandoc<sup>3</sup>; Jacob Hochhalter<sup>2</sup>; Amit Misra<sup>1</sup>; Liang Qi<sup>1</sup>; Yong-Jie Hu<sup>3</sup>; Jerard Gordon<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Utah; <sup>3</sup>Drexel University

**Directed Energy Deposition of Vanadium for Interlayers in Laser Welding:** *Brett Roper*<sup>1</sup>; Dalton Pierce<sup>1</sup>; Austin Pisani<sup>1</sup>; Jack Herrmann<sup>1</sup>; Andrew Kustas<sup>1</sup>; Erin Barrick<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**G-86: High Temperature Mechanical Properties of Laser Powder Bed Fusion Processed Nb-Based C103 Alloy:** *Sucharita Banerjee*<sup>1</sup>; Advika Chesse<sup>2</sup>; Tirthesh Ingle<sup>2</sup>; Monica Martinez<sup>1</sup>; Thomas Bennett<sup>1</sup>; Rajarshi Banerjee<sup>2</sup>; Narendra Dahotre<sup>2</sup>; Eric Taleff<sup>1</sup>; <sup>1</sup>University of Texas at Austin; <sup>2</sup>University of North Texas

**G-87: Laser Assisted Additive Manufacturing of W and W-Re for Fusion Power Application: Material Response in Manufacturing Environment:** *Katie Estrada*<sup>1</sup>; Krishna Kamlesh Verma<sup>1</sup>; Rameshwari Naorem<sup>2</sup>; Hailong Huang<sup>2</sup>; Nicolas Argibay<sup>2</sup>; Vijay K. Vasudevan<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Ames National Laboratory

## ADDITIVE MANUFACTURING

## Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Sezer Ozerinc, University of Illinois at Urbana-Champaign; Yu Zou, University of Toronto; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Pacific Northwest National Laboratory; Keivan Davami, University of Alabama

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Mechanical Behavior of Additively Manufactured Metals at Nanoscale: From Pillars to Architectures:** *Wenxin Zhang*<sup>1</sup>; Zhi Li<sup>2</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology; <sup>2</sup>Institute of High Performance Computing, A\*STAR

## ADDITIVE MANUFACTURING

## Additive Manufacturing: Marine Materials and Structures — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Mohsen Mohammadi, University Of New Brunswick; Meysam Haghshenas, University Of Toledo; Charles Fisher, Naval Surface Warfare Center - Carderock

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chair:** Mohsen Mohammadi, University Of New Brunswick

**G-89: 3D Printing of High-Sensitivity Architected Piezoelectric Hydrophones with Designed Beam Patterns:** *Victor Couedel*<sup>1</sup>; Haotian Lu<sup>1</sup>; Rayne Zheng<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**G-90: Collection, Processing and Use of In-situ Assessment Data to Support the Qualification of Additively Manufactured Parts:** *Derek Hass*<sup>1</sup>; Yuri Plotnikov<sup>1</sup>; Kyle Snyder<sup>1</sup>; John Sions<sup>1</sup>; Reagan Orth<sup>1</sup>; Banafsheh Zee<sup>1</sup>; <sup>1</sup>Commonwealth Center for Advanced Manufacturing

**G-91: Exploring the Effect of Build Height on Microstructure and Tensile Behavior of Large-Scale Wire-Arc Additive Manufactured Duplex Stainless Steel 2209:** *Vishal Mahey*<sup>1</sup>; Grant Johnson<sup>1</sup>; Prayag Burad<sup>1</sup>; Peter Collins<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

**G-92: Exploring the Process-Microstructure-Property Relationship of Nano-Treated Aluminum Alloy Deposited via Wire Arc Additive Manufacturing:** *Pial Das*<sup>1</sup>; Roman Savinov<sup>2</sup>; Yashwant Bandari<sup>3</sup>; Shuvodeep De<sup>4</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Cincinnati; <sup>3</sup>Fastech LLC; <sup>4</sup>Texas State University

**G-93: Nano-indentation Tomography of Wire-Arc Additive Manufactured Nickel Aluminum Bronze Alloy:** *Faizan Hijazi*<sup>1</sup>; Mostafa Omar<sup>1</sup>; Justin Norkett<sup>2</sup>; David Rowenhorst<sup>3</sup>; Charles Fisher<sup>2</sup>; Jaafar ElAwady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Naval Surface Warfare Center; <sup>3</sup>U.S. Naval Research Laboratory

**G-94: Process-Microstructure-Property Relationship of Duplex Stainless Steel Deposited via L-DED Process: Build Orientation and Alloying Perspectives:** *Prayag Burad*<sup>1</sup>; Vishal Mahey<sup>1</sup>; Grant Johnson<sup>1</sup>; Peter Collins<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

**G-95: Seawater Corrosion Resistance of Austenitic Stainless Steel Claddings on Low Carbon Steel Fabricated with Laser-Wire Directed Energy Deposition:** *Scott Bozeman*<sup>1</sup>; Julie Tucker<sup>1</sup>; O Isgor<sup>1</sup>; <sup>1</sup>Oregon State University

**G-96: Solidification Behavior and Weldability of Cu-Based Feedstock in Gas Metal Arc Directed Energy Deposition:** *Joe Kleindienst*<sup>1</sup>; Nick Bagshaw<sup>2</sup>; Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Fortius Metals

## ADDITIVE MANUFACTURING

## Additive Manufacturing: Microstructural and Mechanical Long-Term Stability of AM Materials — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Benjamin Adam, Oregon State University; Jonah Klemm-Toole, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; John Carpenter, Los Alamos National Laboratory; Eric Payton, University of Cincinnati; Emma White, DECHEMA Forschungsinstitut; Sudarsanam Babu, University of Maryland; Markus Chmielus, University of Pittsburgh

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Additive Manufacturing and Characterization of A709 Stainless Steels for Nuclear Applications:** *Subhashish Meher*<sup>1</sup>; Asif Mahmud<sup>1</sup>; Peter Renner<sup>1</sup>; John Snitzer<sup>2</sup>; Xiaoyuan Lou<sup>2</sup>; Isabella van Rooyen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Purdue University

**Effect of Number of Wires in Microstructure and Mechanical Properties of Wire Arc Additive Manufactured Components:** *Ganesan Gunasekaran*<sup>1</sup>; Neel Kamal Gupta<sup>1</sup>; Siddhartha J.; Shahu Karade<sup>1</sup>; Narasimhan K<sup>1</sup>; Karunakaran K.P<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**Enhanced Properties of SS316 Manufactured Using Direct Energy Deposition:** *Sung Eun Kim*<sup>1</sup>; Jong Dae Hong<sup>2</sup>; Hong Ryoul Oh<sup>2</sup>; Hyunggil Kim<sup>2</sup>; <sup>1</sup>Inha University; <sup>2</sup>Korea Atomic Energy Research Institute

**G-105: Fatigue Life Evaluation of Binder Jet Printed and Sintered Metal Components:** *Pierangeli Rodriguez De Vecchis*<sup>1</sup>; Katerina Frederick<sup>2</sup>; Joseph Hayes<sup>3</sup>; John Reidy<sup>4</sup>; Kyle Myers<sup>3</sup>; Markus Chmielus<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Formerly Desktop Metal, Currently at Westinghouse Electric Company; <sup>3</sup>Desktop Metal; <sup>4</sup>Formerly Desktop Metal, Currently at Northwestern University

**G-97: Investigation of M2 Tool Steel Fabricated by Selective Laser Melting Compared to Binder Jetting: Microstructural, Mechanical, and Tribological Insights:** *Amit Choudhary*<sup>1</sup>; Manoj Mugale<sup>1</sup>; Sanoj Karki<sup>1</sup>; Sambhaji Kusekar<sup>1</sup>; Satyavan Digole<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

**Mechanical and Micro-structural Characterization of Continuous Fiber Reinforced 3D Printed Composite via Finite Element Analysis:** Jinyoung Jung<sup>1</sup>; Geun Sik Shin<sup>1</sup>; Simon Willenbrink<sup>2</sup>; Robert Boehm<sup>2</sup>; Jun Yeon Hwang<sup>1</sup>; <sup>1</sup>Korea Institute of Science and Technology; <sup>2</sup>Leipzig University

**Microstructure & Porosity Analysis in Forced-Cooled WAAMED Al-Mg Alloys:** Sara Soliman<sup>1</sup>; Mohamed Abdelaziz<sup>2</sup>; Hanadi Salem<sup>3</sup>; Gildas L'Hostis<sup>1</sup>; <sup>1</sup>Université de Haute Alsace, UHA; <sup>2</sup>Université Française d'Égypte; <sup>3</sup>American University in Cairo

**Minimizing Directional Anisotropy Through Point Melt Scanning Strategies for IN718 Bulk Parts- Fabricated Via EB-PBF:** *Shadman Tahsin Nabil*<sup>1</sup>; Cristian Banuelos<sup>1</sup>; Michael Madigan<sup>2</sup>; Sammy Tin<sup>2</sup>; Gael Fierro<sup>3</sup>; Ryan Wicker<sup>1</sup>; Francisco Medina<sup>1</sup>; <sup>1</sup>W.M. Keck Center for 3D Innovation; <sup>2</sup>University of Arizona

**G-98: Optimization of Processing Conditions of a High-Strength, Additively Manufactured Aluminum Alloy for IR Mirror Applications:** *Julian Lohser*<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Paul Adams<sup>1</sup>; Jenn-Ming Yang<sup>2</sup>; Rafael Zaldivar<sup>1</sup>; <sup>1</sup>The Aerospace Corporation; <sup>2</sup>University of California, Los Angeles

**G-99: Temperature-Dependent Fracture Behavior of Laser Powder Bed Fusion SUS316L: Charpy Impact and Tensile Testing:** *Tae Hyeong Kim*<sup>1</sup>; Jun Seok Lee<sup>1</sup>; Haeum Park<sup>2</sup>; Jeong Min Park<sup>2</sup>; Jae Wung Bae<sup>1</sup>; <sup>1</sup>Pukyong National University; <sup>2</sup>Korea Institute of Materials Science (KIMS)

## ADVANCED CHARACTERIZATION METHODS

## Advanced Characterization Techniques for Quantifying and Modeling Deformation — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS Extraction and Processing Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Materials Characterization Committee

**Program Organizers:** Wolfgang Pantleon, Technical University of Denmark; Irene Beyerlein, University of California, Santa Barbara; C. Tasan, Massachusetts Institute of Technology; M. Arul Kumar, Indian Institute of Technology Kanpur

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**H-1: 3D Indentation of Metallic Composites to Study the Effects of Particle Shape and Particle Orientation:** *Luo Li*<sup>1</sup>; Tariq Khraishi<sup>1</sup>; Yu-Lin Shen<sup>1</sup>; <sup>1</sup>University of New Mexico

**H-2: Crystal Orientation Dependence of Dislocation Structure in Tensile-Deformed High Purity Iron:** *Wing Sum Lau*<sup>1</sup>; Shuhei Yoshida<sup>1</sup>; Nobuhiro Tsuji<sup>1</sup>; <sup>1</sup>Kyoto University

**H-3: Length-Scale Effects on Geometrically Necessary Dislocation Characterization in Aluminum 6016 Using HR-EBSD:** *Sarah Sanderson*<sup>1</sup>; Sajjad Izadpanah<sup>2</sup>; Marko Knezevic<sup>2</sup>; Michael Miles<sup>1</sup>; David Fullwood<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

**H-4: Micro-Scale Digital Image Correlation for Reliability Characterization of Epoxy/Al Joint in High Precision Sensing Camera Assembly:** *Minhyuck Lee*<sup>1</sup>; Minjeong Sohn<sup>2</sup>; Seongkyu Choi<sup>2</sup>; Nakyung Jeong<sup>2</sup>; Sang-Eui Lee<sup>3</sup>; Tae-Ik Lee<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Inha University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Inha University

**H-5: Microstructural Investigation of Strained Aluminum with External Electrical Pulses by Using an Electrical-Straining Stage in TEM:** *Youngeun Kim*<sup>1</sup>; Seok-Yong Hong<sup>1</sup>; Mingzhe Li<sup>1</sup>; Jin-Wook Kim<sup>1</sup>; <sup>1</sup>Seoul National University

**H-6: Oxygen, a Strengthening and Embrittling Element for Titanium Inherited From High Temperature Oxidation: A Multimodal Framework Using High Speed Nanoindentation Mapping:** *Damien Texier*<sup>1</sup>; Ayyoub Dziri<sup>1</sup>; Quentin Sirvin<sup>1</sup>; Thiebaud Richeton<sup>2</sup>; Henry Proudhon<sup>3</sup>; Marc Legros<sup>4</sup>; <sup>1</sup>Institut Clement Ader - UMR CNRS 5312; <sup>2</sup>LEM3 - UMR CNRS 7239; <sup>3</sup>Centre des Matériaux - Mines Paris PSL; <sup>4</sup>CEMES

**Rate-Dependent Serration Flow and Mechanical Properties of High Manganese Steel at 15 K:** *Taeho Lee*<sup>1</sup>; SooYeol Lee<sup>1</sup>; Chetan Singh<sup>1</sup>; YouSub Kim<sup>1</sup>; JunYun Kang<sup>2</sup>; JunHyun Han<sup>1</sup>; Dong-Hyun Lee<sup>1</sup>; <sup>1</sup>ChungNam National University; <sup>2</sup>Korea Institute of Materials Science

## ADVANCED CHARACTERIZATION METHODS

## Advanced Real Time Imaging — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials Committee, TMS: Thin Films and Interfaces Committee

**Program Organizers:** Jinichiro Nakano, MatterGreen; David Alman, National Energy Technology Laboratory; Il Sohn, Yonsei University; Hiroyuki Shibata, Tohoku University; Antoine Allanore, Massachusetts Institute of Technology; Noritaka Saito, Kyushu University; Zuotai Zhang, Southern University of Science and Technology; Bryan Webler, Carnegie Mellon University; Wangzhong Mu, KTH Royal Institute of Technology; Pranjal Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**In Situ Synthesis and 3D Visualization of Hierarchically-Assembled ZnS Nanostructures:** Yu-Jin Song<sup>1</sup>; Taehwan Lim<sup>2</sup>; Hee-Suk Chung<sup>3</sup>; Jung Han Kim<sup>1</sup>; <sup>1</sup>Dong-A University; <sup>2</sup>Kangwon National University; <sup>3</sup>Korea Basic Science Institute

## LIGHT METALS

## Advances in Titanium Technology — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Titanium Committee

**Program Organizers:** Abhishek Sharma, University of North Texas; Srinivas Aditya Mantri, Argonne National Laboratory; Zachary Kloenne, Imperial College London; Fan Sun, Centre National de la Recherche Scientifique - Paris Sciences et Lettres University; Stoichko Antonov, National Energy Technology Laboratory

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**K-1: Analysis of Additively Manufactured Ti64 Alloy Premixed with TiO<sub>2</sub> Nanoparticles Using Directed Energy Deposition:** Shamaita Shabnam<sup>1</sup>; Saber Goodarzi<sup>1</sup>; Jyoti Prakash Naidu<sup>2</sup>; Abu Syed Kabir<sup>1</sup>; <sup>1</sup>Carleton University; <sup>2</sup>SleepLabs

**K-2: Backstress Characterization in Grade 4 & 5 Titanium Through Stress Dip Testing:** Joshua Lim<sup>1</sup>; Zahidul Sarkar<sup>2</sup>; Michael Miles<sup>1</sup>; Marko Knezevic<sup>2</sup>; David Fullwood<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

**K-3: Characterization and Modeling of Ti-6Al-4V Sheet Undergoing Cyclic Bending Under Tension:** Blake Jensen<sup>1</sup>; David Fullwood<sup>1</sup>; Michael Miles<sup>1</sup>; Marko Knezevic<sup>2</sup>; Brad Kinsey<sup>2</sup>; Weston Bartlett<sup>2</sup>; Brigham Stacey<sup>1</sup>; Tyson Neville<sup>1</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

**K-4: Designing a Novel Ti-6Al-4V Based Alloy System Exhibiting TRIP Behavior via Controlled Beta Phase Metastability:** Kiwan Seo<sup>1</sup>; Ji Young Kim<sup>1</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University

**K-6: Microstructure and Mechanical Properties of Wire-Based Electron Beam Additively Manufactured Ti-6Al-4V:** Okay Tutar<sup>1</sup>; <sup>1</sup>Roketsan

**K-5: Powder Characterization for Additive Manufacturing of Recycled Titanium Powder:** Daehyeon Kim<sup>1</sup>; Sungjae Jo<sup>1</sup>; Geonwoo Baek<sup>1</sup>; Hyunjoong Kim<sup>1</sup>; Gyeongwuk Kim<sup>1</sup>; Jiwon Ha<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University

**Tribo-Corrosion Behavior of Near Betta Alloys for Biomedical Applications:** Toulalbia Khaled<sup>1</sup>; Mamoun Fellah<sup>2</sup>; Naouel Hezil<sup>1</sup>; Nabila Bouchareb<sup>1</sup>; Dhikra Bouras<sup>3</sup>; Majeed Ali Habeeb<sup>4</sup>; Rim Imen<sup>1</sup>; Alex Montagne<sup>5</sup>; Alejandro Perez Larios<sup>6</sup>; Gamal A. El-Hiti<sup>7</sup>; <sup>1</sup>Abbas Laghrour University- Khenchela-Algeria; <sup>2</sup>Abbes Laghrour University Khenchela; <sup>3</sup>University of Souk-Ahras, Algeria; <sup>4</sup>University of Babylon Babil, Iraq; <sup>5</sup>Laboratory of Mechanics Surfaces and Materials Processing, ARTS ET METIERS ParisTech; <sup>6</sup>Centro Universitario de los Altos, University of Guadalajara; <sup>7</sup>King Saud University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

## AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Computational Materials Science and Engineering Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Alloy Phases Committee

**Program Organizers:** Darren Pagan, Pennsylvania State University; Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dehao Liu, Binghamton University; Matt Kasemer, The University of Alabama; Ashley Spear, University of Utah; Christopher Stiles, Johns Hopkins University Applied Physics Laboratory; Anh Tran, Sandia National Laboratories

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Session Chair:** Darren Pagan, Pennsylvania State University

**J-1: A Data Structure and Collection System for Experimental Processes in Materials Science:** Masaya Kumagai<sup>1</sup>; Hirofumi Tsuruta<sup>2</sup>; Ryosuke Tanaka<sup>2</sup>; Ken Kurosaki<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>SAKURA internet Inc.

**J-2: Construction of Physical Property Temperature-Dependency Benchmarks for High-Accuracy Machine Learning Models:** Takeshi Yokomizo<sup>1</sup>; Yifan Sun<sup>1</sup>; Masaya Kumagai<sup>1</sup>; Hirofumi Tsuruta<sup>2</sup>; Yuji Ohishi<sup>3</sup>; Ken Kurosaki<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>SAKURA internet Inc.; <sup>3</sup>Osaka University

**J-3: Data-Centric Engineering of Materials and Structures - Dissimilar Metal Welds as Use Case:** Samuel Eka<sup>1</sup>; <sup>1</sup>University of Manchester

**J-57: Data-Driven Study on Multi-Target Prediction of Mechanical Properties of Aluminum Alloys:** Mohammed Quraishy<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Kharagpur

**J-4: Data Management of Through-Life Structural Integrity Assessment of Dissimilar Metal Welds for Nuclear Application:** Samuel Eka<sup>1</sup>; <sup>1</sup>University of Manchester

**J-5: Enhancing Computational Materials Research Through Large Language Model (LLM) Interfaces:** Juan Verduzco<sup>1</sup>; Ethan Holbrook<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

**J-6: Forward Prediction and Inverse Design of Additively Manufacturable Alloys via Autoregressive Language Models:** Bo Ni<sup>1</sup>; Benjamin Glaser<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**Intelligent Optimization Algorithm-Based Optimization Model of Water Volume in Secondary Cooling Zone of Continuous Casting:** *Chenghong Li<sup>1</sup>; Mingmei Zhu<sup>1</sup>; Xianwu Zhang<sup>1</sup>; Zhengjiang Yang<sup>1</sup>; KunChi Jiang<sup>1</sup>; <sup>1</sup>Chongqing University*

**J-7: Investigation of Phase-Field Data Assimilation System for Dendrite Growth Problem:** *Aya Maruhashi<sup>1</sup>; Ayano Yamamura<sup>1</sup>; Shinji Sakane<sup>1</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology*

**J-8: ML-DiCE: A Machine Learning Framework for Predicting Diffusion Coefficients in Impure Metallic and Multi-Component Alloy Media:** *Arjun S. Kulathuvayal<sup>1</sup>; Yi Rao<sup>1</sup>; Yanqing Su<sup>1</sup>; <sup>1</sup>Utah State University*

**Models of Magnetic Properties for Rapid Screening of Alternative Materials:** *Nam Le<sup>1</sup>; Georgia Leigh<sup>2</sup>; Elizabeth Pogue<sup>1</sup>; Anna Langham<sup>2</sup>; Michael Pekala<sup>1</sup>; Vincent La<sup>1</sup>; Douglas Trigg<sup>1</sup>; Bianca Piloseno<sup>1</sup>; Sebastian Lech<sup>2</sup>; Christopher Stiles<sup>1</sup>; Mitra Taheri<sup>2</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>Johns Hopkins University*

**J-9: Optimizing Microstructure Prediction and Control in Advanced Structural Materials Using Deep Generative Models and Physics-Based Methods:** *Xiaofan Zhang<sup>1</sup>; Junya Inoue<sup>1</sup>; Satoshi Noguchi<sup>1</sup>; <sup>1</sup>The University of Tokyo; <sup>2</sup>JAMSTEC*

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithms Development in Materials Science and Engineering — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee, TMS: Phase Transformations Committee, TMS: Process Technology and Modeling Committee, TMS: Alloy Phases Committee

**Program Organizers:** Remi Dingreville, Sandia National Laboratories; Saaketh Desai, Sandia National Laboratories; Hojun Lim, Sandia National Laboratories; Jeremy Mason, University of California, Davis; Vimal Ramanuj, Oak Ridge National Laboratory; Sam Reeve, Oak Ridge National Laboratory; Douglas Spearot, University of Florida

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**J-10: Bayesian Classification for Constraining the Design of Compositionally Graded Alloys (CGAs):** *James Hanagan<sup>1</sup>; Eli Norris<sup>1</sup>; Maryam Ghotbi<sup>1</sup>; Brent Vela<sup>1</sup>; Raymundo Arróyave<sup>1</sup>; <sup>1</sup>Texas A&M University*

**J-11: High-Throughput Optimization of Cermet Coatings Using Simulation and Experiments:** *Dylan Zilifian<sup>1</sup>; Kevin Yan<sup>1</sup>; Dong Zhao<sup>1</sup>; Subrato Sarkar<sup>1</sup>; Rahul Rahul<sup>1</sup>; Jie Lian<sup>1</sup>; <sup>1</sup>Rensselaer Polytechnic Institute*

## LIGHT METALS

### Alumina and Bauxite — Poster Session

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Efthymios Balomenos, Metlen Energy and Metals; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Improvement Mechanical Properties Has Exposure to Hot Isostatic Pressing at Different Times of Ceramics -Al<sub>2</sub>O<sub>3</sub> for Total Hip Arthroplasty:** *Hannachi Bouzid<sup>1</sup>; <sup>1</sup>Univ-khenchela.dz*

## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Poster Session

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Mihaiela Isac, McGill Metals Processing Centre; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Sumanth Shankar, McMaster University; Alex Chun Lun Leung, University College London; Musa Javidani, Quebec University of Chicoutimi

**K-7: A Study on New Precipitates in Al-Cu Alloys with La or Sr Additions Designed Using Machine Learning Based on OQMD:** *Seoyeon Jeon<sup>1</sup>; Suwon Park<sup>1</sup>; Ahyeon Cho<sup>1</sup>; Sehoon Kim<sup>2</sup>; Yongjoo Kim<sup>3</sup>; Hyunjoo Choi<sup>1</sup>; <sup>1</sup>Kookmin University; <sup>2</sup>Korea Automotive Technology Institute (KATECH); <sup>3</sup>Korea University*

**Al-Ca Eutectic Alloy: A New Candidate for Heat-Resistant Aluminum Alloys:** *Jinshian Huang<sup>1</sup>; Daisuke Ando<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University*

**Computational Design of a Novel Recycled Aluminum Die Casting Alloy for Improved Thermal Conductivity:** *Umit Koc<sup>1</sup>; Bars Kara<sup>1</sup>; Samet Sahin<sup>2</sup>; Sezgin Bayram<sup>2</sup>; Emre Cinkilic<sup>3</sup>; <sup>1</sup>Yesilova Holding; <sup>2</sup>Can Metal; <sup>3</sup>Hakkari University*

**K-8: Controlling Precipitation in AlMgCu Alloys via Microalloying and Heat Treatment:** *Witold Chrominski<sup>1</sup>; Marta Lipinska<sup>1</sup>; Micha Misiak<sup>1</sup>; Grzegorz Cieślak<sup>1</sup>; Małgorzata Lewandowska<sup>1</sup>; <sup>1</sup>Warsaw University of Technology*

**K-9: Corrosion Resistance of an AlCeMg/Stainless-Steel Reactive Bond:** *Jamieson Brecht<sup>1</sup>; Melanie Moses-DeBusk<sup>1</sup>; Yan-Ru Lin<sup>1</sup>; Ercan Cakmak<sup>1</sup>; Tracie Lowe<sup>1</sup>; James Keiser<sup>1</sup>; Michael Kesler<sup>1</sup>; David Weiss<sup>2</sup>; Kashif Nawaz<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Loukus Technologies, Inc.*

**Development and Characterization of Microporous Al-Si-Zr Alloys with Enhanced Porosity for Filtration Applications:** *Dikra Bouras<sup>1</sup>; Mamoun Fellah<sup>2</sup>; Regis Barille<sup>3</sup>; Manel Sellam<sup>4</sup>; Madiha Zerouali<sup>5</sup>; Neçar Merah<sup>6</sup>; Gamal A. El-Hiti<sup>7</sup>; <sup>1</sup>University of Souk-Ahras, Algeria; <sup>2</sup>ABBS Laghrour University; <sup>3</sup>MOLTECH-Anjou, Université d'Angers/UMR CNRS 6200; <sup>4</sup>Laboratoire des Sciences Analytiques, Matériaux et Environnement (LASME), Université Larbi ben M'Hidi; <sup>5</sup>Laboratory of Research on the Physical-Chemistry of Surfaces and Interfaces (LRPSCI), University of 20 Août 1955-Skikda; <sup>6</sup>King Fahd University of Petroleum and Minerals; <sup>7</sup>King Saud University*



**Effect of T6 Heat Treatment on Microstructure and Mechanical Properties of A356 Aluminum Alloy:** *Shaoguang Yang*<sup>1</sup>; Junming Chen<sup>2</sup>; Lu Jin<sup>3</sup>; Aimin Zhao<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>Beijing Guowang Fuda Science and Technology Development Co., Ltd.; <sup>3</sup>Shandong Iron & Steel Group Rizhao Co., Ltd.

**K-10: Effect of Tungsten Content on the Thermal Conductivity and Thermal Expansion of Aluminum-Graphite Composites:** *Hyun-Kuk Park*<sup>1</sup>; Min-Hyeok Yang<sup>1</sup>; Yu-Gyun Park<sup>1</sup>; Hyoung-Seok Moon<sup>1</sup>; <sup>1</sup>The Korea Institute of Industrial Technology

**K-11: Effect of Weld Microstructure on Solidification Cracking During Laser Welding of Extruded Al-Mg-Si Alloys:** *Jaeheon Lee*<sup>1</sup>; Junmyoung Jang<sup>1</sup>; Yeongcheol Shin<sup>1</sup>; Yongjoon Kang<sup>2</sup>; Mungu Kang<sup>3</sup>; Taeseong Lim<sup>3</sup>; Seung Hwan Lee<sup>1</sup>; <sup>1</sup>Hanyang University; <sup>2</sup>Korea Institute of Materials Science; <sup>3</sup>Hyundai Motor Group

**K-12: Effect of Zirconium on the Microstructure and Mechanical Properties of Laser Powder Bed Fused Eutectic Al-Ce Alloy:** *Hajjian Yang*<sup>1</sup>; Thinh Huynh<sup>2</sup>; Yongho Sohn<sup>2</sup>; Le Zhou<sup>1</sup>; <sup>1</sup>Marquette University; <sup>2</sup>University of Central Florida

**K-13: Effects of Melt Conditioning and Filtration on Recycled Aluminum Ingots for Sheet:** *Hyunky Lim*<sup>1</sup>; Umar Daraz<sup>2</sup>; Seongho Ha<sup>1</sup>; Bonghwan Kim<sup>1</sup>; Young Ok Yoon<sup>1</sup>; Shae K. Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**Elucidating Mechanisms of Thermal Stability and Performance Enhancement in Hypoeutectic Al-Si Alloys with Trace Transition Metal Additions:** *Jaehui Bang*<sup>1</sup>; Hyunchoel Lee<sup>1</sup>; Nawon kwak<sup>1</sup>; Eunhyung Lee<sup>1</sup>; <sup>1</sup>National Korea Maritime And Ocean University

**Evaluation of Mechanical Properties with Less Proportions of Rare Earth Element Reinforced to AA 2024:** *Jyothi Babu Racharla*<sup>1</sup>; <sup>1</sup>NIT AP

**K-14: Influence on the Microstructure, Mechanical Properties and Electrical Conductivity of the Addition of Rare Earth to Al-Si Alloys:** *Eunchan Ko*<sup>1</sup>; ByeongKwon Lee<sup>1</sup>; HyoSang Yoo<sup>2</sup>; YongHo Kim<sup>2</sup>; HyeonTaek Son<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Chonnam National University; <sup>2</sup>Korea Institute of Industrial Technology

**Intermetallic Formation and Defects Control in Spray Forming AA7055 Alloy:** *Zexiang Deng*<sup>1</sup>; Wei Sun<sup>1</sup>; Xiaojuan Hu<sup>1</sup>; Yong Zhang<sup>1</sup>; Sansan Shuai<sup>2</sup>; Guang Zeng<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>Shanghai University

**Microstructure and Elevated Temperature Mechanical Properties of a Novel Heat-Resistant Al-6Cu-0.5Mn-2Ni-X Alloy:** *Diya Mukherjee*<sup>1</sup>; Himadri Roy<sup>2</sup>; Manidipto Mukherjee<sup>2</sup>; Dong Qiu<sup>1</sup>; Nilrudra Mandal<sup>2</sup>; Mark A Easton<sup>1</sup>; <sup>1</sup>RMIT University; <sup>2</sup>CSIR-Central Mechanical Engineering Research Institute

**K-15: Microstructure Characterizations and Electrical Conductivity of Aluminum Alloys by Heat Treatment Temperature:** *Hyo-Sang Yoo*<sup>1</sup>; YongHo Kim<sup>1</sup>; ByeongKwon Lee<sup>1</sup>; EunChan Ko<sup>1</sup>; CheolWoo Kim<sup>1</sup>; HyeonTaek Son<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**K-24: Natural Aging Behavior of Al-Mg-Si Alloy Sheets Derived from 6xxx Series Aluminum Scrap for Automotive Applications:** *Heon Kang*<sup>1</sup>; Seok Won Son<sup>1</sup>; Young Kil Jung<sup>2</sup>; Jae Hyuck Shin<sup>2</sup>; Yong Shin Kim<sup>3</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea Automotive Technology Institute; <sup>3</sup>Dong Shin Motech

**K-16: Precipitation and Its Thermal Stability in a Conventionally Non-Heat Treatable AA3xxx Aluminum Alloy:** *Suqin Zhu*<sup>1</sup>; Xiangyuan Cui<sup>1</sup>; Yasuhiro Aruga<sup>2</sup>; Hongwei Liu<sup>1</sup>; Simon Ringer<sup>1</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>Kobe Steel, Ltd.

**Progressive Dynamic Recrystallization (DRX) and Texture Behaviors of Al-7Mg Alloy During Hot Torsion:** *Ji-Woon Lee*<sup>1</sup>; Kwang Tae Son<sup>2</sup>; Jongun Moon<sup>1</sup>; Gian Song<sup>1</sup>; Jin-Kyu Lee<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University (CAMP2); <sup>2</sup>Oregon State University

**K-17: Study of Microstructure, Thermal Conductivity And Forming Processes of the Al-xRE Based Alloys for Electric Motor Housing:** *Hyeon-Taek Son*<sup>1</sup>; Yong-Ho Kim<sup>1</sup>; Kyu-Seok Lee<sup>1</sup>; Seong-Ho Lee<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**Study on the Effect of Adding La on the Microstructure and Corrosion Characteristics of Al-Si-Cu Alloy:** *Haewoong Yang*<sup>1</sup>; Uro Heo<sup>1</sup>; Jong Goo Park<sup>1</sup>; Dae Wook Kim<sup>1</sup>; Kyeonghun Kim<sup>1</sup>; <sup>1</sup>Pohang Institute of Metal Industry Advancement

**Correlation Analysis of Surface Residual Stress and Microstructure via Design of Experiments (DOE):** *Nawon Kwak*<sup>1</sup>; Jaehui Bang<sup>1</sup>; Hyunchoel Lee<sup>1</sup>; Eunhyung Lee<sup>1</sup>; <sup>1</sup>National Korea Maritime And Ocean University

**Weld Quality Improvement Using Electrode Patterning in Resistance Spot Welding of Al6061 Alloy:** *Jae Hun Kim*<sup>1</sup>; Changwook Ji<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Artificial Intelligence Applications in Integrated Computational Materials Engineering — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Wenwu Xu, San Diego State University; Ram Devanathan, Pacific Northwest National Laboratory; Vikas Tomar, Purdue University; Qiaofu Zhang, University of Alabama; Eshan Ganju, Purdue University; Avanish Mishra, Los Alamos National Laboratory; Victoria Miller, University of Florida; Ghanshyam Pilania, General Electric (GE Aerospace Research)

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Data Assimilation of Multi-Phase-Field Model Based on Physically Informed Neural Network:** *Chang Liu*<sup>1</sup>; Meng Zhang<sup>1</sup>; Junya Inoue<sup>1</sup>; Ryoya Tsuruoka<sup>1</sup>; Satoshi Noguchi<sup>1</sup>; <sup>1</sup>University of Tokyo

**J-12: Establishing a Novel Systematic Alloy Design Strategy Based on Large Language Model Framework:** *Kiwan Seo*<sup>1</sup>; Min Seok Kim<sup>1</sup>; Jae Kwon Kim<sup>1</sup>; Eun Soo Park<sup>1</sup>; <sup>1</sup>Seoul National University

**J-13: Harnessing Graph Neural Networks for Classification of Unique Glassy Structures in CuZr Metallic Glasses:** *Emily Gurniak*<sup>1</sup>; Suyue Yuan<sup>2</sup>; Xuezhen Ren<sup>1</sup>; Paulo Brancio<sup>1</sup>; <sup>1</sup>University of Southern California; <sup>2</sup>LLNL

**J-14: Prediction of Material Parameters Using Machine Learning Supported by Large-Scale Phase-Field Simulations of Dendrite Growth:** *Haruki Yano*<sup>1</sup>; Souta Fujikawa<sup>1</sup>; Ayano Yamamura<sup>1</sup>; Shinji Sakane<sup>1</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology

**J-15: Starrydata Explorers: Visualization Platforms to Overview the Past Reported Experimental Samples:** *Yukari Katsura*<sup>1</sup>; Tomoya Mato<sup>1</sup>; Yu Takada<sup>1</sup>; Dewi Yana<sup>1</sup>; Erina Fujita<sup>2</sup>; Fumikazu Hosono<sup>1</sup>; Eiji Koyama<sup>1</sup>; Naoto Saito<sup>1</sup>; Yoshihiro Sakamoto<sup>3</sup>; Atsumi Tanaka<sup>1</sup>; Masaya Kumagai<sup>4</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>The Institute of Statistical Mathematics; <sup>3</sup>RIKEN; <sup>4</sup>SAKURA Internet, inc.

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Bridging Scale Gaps in Multiscale Materials Modeling in the Age of Artificial Intelligence — Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Liang Qi, University of Michigan; Yue Fan, University of Michigan; Katsuyo Thornton, University of Michigan; Peter Voorhees, Northwestern University; Eric Homer, Brigham Young University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Study of Xe Binding in Ag-Exchange Chabazite for Radio-Nuclide Absorption:** *Soham Savarkar*<sup>1</sup>; Preston Vargas<sup>2</sup>; Richard Hennig<sup>1</sup>; Juan Nino<sup>3</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Sandia National Laboratories

## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Poster Session I**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, CanmetMATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**Session Chairs:** Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory

**H-8: Activation of Granite Waste by Grinding for Applications as a Precursor In Geopolymers:** Cássia Souza<sup>1</sup>; Beatryz Mendes<sup>1</sup>; Leonardo Pedroti<sup>1</sup>; <sup>1</sup>Universidade Federal De Vicos

**Addition of Particulate Material From Sintering Plant to a Red Ceramics Mass:** *Carlos Vieira*<sup>1</sup>; Geovana Carla Delaqua<sup>1</sup>; <sup>1</sup>State University of Northern Rio de Janeiro

**H-9: Analysis of Accelerated Degradation in the Laboratory of Pressed Ceramic Blocks of Red Ceramic:** Izzis Simões<sup>1</sup>; Mayara Almeida<sup>1</sup>; *Niander Cerqueira*<sup>1</sup>; Jonathan Madalena<sup>1</sup>; Luiz Henrique Barbosa Jr.<sup>1</sup>; Bruno Silva<sup>1</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense (UNEF)

**Atom Probe Tomography on a Novel Mg-Er Alloy:** *Rashi Rajanna*<sup>1</sup>; Jayant Jain<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Delhi

**H-10: Characterization and Mechanical Analysis of Different Types of Biochar Incorporated Into Coating Mortar:** Jane Santos<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; Angélica de Cassia Oliveira Carneiro<sup>1</sup>; José Carlos Ribeiro<sup>1</sup>; Flavio Ferreira<sup>1</sup>; Ricardo André Fiorotti Peixoto<sup>2</sup>; Nathália Albuini-Oliveira<sup>1</sup>; Wellington Fernandes<sup>1</sup>; <sup>1</sup>Universidade Federal de Viçosa; <sup>2</sup>Universidade Federal de Ouro Preto

**H-11: Characterization of Feedstock and Recovered End-of-Life NdFeB Magnet Using X-Ray Absorption and Emission Spectroscopy:** *Khagesh Kumar*<sup>1</sup>; Mikhail Solovyev<sup>1</sup>; Matthew Earlam<sup>1</sup>; Michael Dziekan<sup>1</sup>; Eva Allen<sup>1</sup>; Jessica Macholz<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**H-12: Characterization of Yellow and Red Clays and Bauxite Residue: Analysis of Properties and Potential for Ceramic Products:** Marcus Mendes<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; Jose Maria Carvalho<sup>1</sup>; Flavio Ferreira<sup>1</sup>; Beatryz Mendes<sup>1</sup>; Leslie Xavier<sup>1</sup>; Wellington Fernandes<sup>1</sup>; Nathália Oliveira<sup>1</sup>; <sup>1</sup>Universidade Federal de Viçosa

**H-13: Contribution of Mineral Oil on Pore Stability of Alkali-Activated Composites for Co2 Capture:** Laura Silvestro<sup>1</sup>; Madeleing Barraza<sup>2</sup>; Alexandre Esteves<sup>2</sup>; Clara Vieira<sup>2</sup>; Carlos Mauricio Vieira<sup>2</sup>; Sergio Monteiro<sup>3</sup>; *Afonso Azevedo*<sup>2</sup>; <sup>1</sup>UFTPR; <sup>2</sup>Universidade Estadual Do Norte Fluminense; <sup>3</sup>IME

**Dendrite Growth Observation of the Ni-Based System Using In-Situ Synchrotron Imaging:** Won Sang Shin<sup>1</sup>; Dae-yoon Kim<sup>1</sup>; Min-Seo Kim<sup>1</sup>; Jae-Won You<sup>1</sup>; Yoo-Seok Kim<sup>1</sup>; Jun-Pyo Park<sup>1</sup>; Myung Gwan Hahm<sup>1</sup>; *Yoon-Jun Kim*<sup>1</sup>; <sup>1</sup>Inha University

**H-15: Durability Evaluation of Cement-Based Composites Reinforced With Guaruman Fibers:** *Thuany Lima*<sup>1</sup>; Afonso Azevedo<sup>2</sup>; Sergio Monteiro<sup>3</sup>; <sup>1</sup>CEFET-RJ; <sup>2</sup>UENF; <sup>3</sup>IME

**H-16: Effects of Red Mud on the Mechanical and Piezoresistive Properties of Mortars:** Henrique Ribeiro Oliveira<sup>1</sup>; Gustavo Henrique Nalon<sup>1</sup>; *Gustavo Emilio Soares De Lima*<sup>1</sup>; Leonardo Gonçalves Pedroti<sup>1</sup>; José Carlos Lopes Ribeiro<sup>1</sup>; José Maria Franco de Carvalho<sup>1</sup>; Flávio Antônio Ferreira<sup>1</sup>; <sup>1</sup>Universidade Federal De Vicos

**H-17: Evaluation of Applicability of Natural Pineapple Leaf Fibers for Preparation of Coating Mortars:** lully Pereira<sup>1</sup>; José Linhares Junior<sup>1</sup>; Isabela Devesa<sup>1</sup>; Elias Júnior<sup>1</sup>; Manoel Santos<sup>1</sup>; Juliana Natalli<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**H-18: Evaluation of the Physical and Mechanical Properties of Extruded, Pressed, and Fired Red Ceramic Blocks:** Bruno Silva<sup>1</sup>; *Niander Cerqueira*<sup>1</sup>; Jonathan Madalena<sup>1</sup>; Jonas Alexandre<sup>1</sup>; Elias Cruz Junior<sup>1</sup>; Rafael Oliveira<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UNEF)

**H-19: Experimental and Numerical Evaluation of Soil-Cement Blocks Under Simple Compression and Cyclic Shear Loads:** Mayara Almeida<sup>1</sup>; Elias Nascimento Junior<sup>1</sup>; *Niander Cerqueira*<sup>1</sup>; Andryl Ferreira<sup>1</sup>; Afonso Azevedo<sup>1</sup>; Jonathan Madalena<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense (UNEF)

**H-20: Experimental and Numerical Modeling of Thermal Performance of Extruded, Pressed and Fired Ceramic Blocks:** Jonathan Madalena<sup>1</sup>; Bernard Sá<sup>1</sup>; *Niander Cerqueira*<sup>1</sup>; Bruno Silva<sup>1</sup>; Afonso Azevedo<sup>1</sup>; Jonas Alexandre<sup>1</sup>; Mayara Almeida<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense (UNEF)

**H-21: Feasibility of Incorporating Water Treatment Plant Sludge Into Ceramic Blocks:** *Wellington Fernandes*<sup>1</sup>; André Coelho<sup>2</sup>; Leonardo Pedroti<sup>1</sup>; Gustavo Lima<sup>1</sup>; Mateus Neves<sup>2</sup>; <sup>1</sup>Universidade Federal De Vicos; <sup>2</sup>UNIVICOSA

**H-22: Influence of Marble Granulometry on the Hardened State Properties of Mortars:** Euzebio Zanelato<sup>1</sup>; *Afonso Azevedo*<sup>2</sup>; Markssuel Marvila<sup>3</sup>; <sup>1</sup>IFF; <sup>2</sup>Universidade Estadual Do Norte Fluminense; <sup>3</sup>UFV

**Investigating the Tribological Behavior of Nitinol Alloys Manufactured via Mechanical Alloying for Hip Implant Applications:** Nabila Bouchareb<sup>1</sup>; Naouel Hezil<sup>1</sup>; Mamoun Fellah<sup>1</sup>; Bouras Dikra<sup>2</sup>; Majeed Ali Habeeb<sup>3</sup>; Imen Rim<sup>1</sup>; Merah Neçar<sup>4</sup>; Alejandro Perez Larios<sup>5</sup>; A. EL-Hiti Gamal<sup>6</sup>; Obrosov Aleksei<sup>7</sup>; Montagne Alex<sup>8</sup>; <sup>1</sup>Abbes Laghrour University Khenchela; <sup>2</sup>University of Souk-Ahras; <sup>3</sup>University of Babylon Babil; <sup>4</sup>King Fahd University of Petroleum and Minerals; <sup>5</sup>Centro Universitario de los Altos, University of Guadalajara; <sup>6</sup>King Saud University; <sup>7</sup>Brandenburg Technical University; <sup>8</sup>Université Polytechnique Hauts-de-France

**Investigation of Laves Phase Dissolution and Homogenization Kinetics in IN718 With Varying Si Content Through a Combination of Characterization and Calculation:** Dattatreya Patil<sup>1</sup>; Manas Paliwal<sup>1</sup>; <sup>1</sup>IIT Kharagpur

## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2025: In-Situ Characterization Techniques — Poster Session II

**Sponsored by:** TMS Extraction and Processing Division, TMS; Materials Characterization Committee

**Program Organizers:** Zhiwei Peng, Central South University; Kelvin Xie, Texas A&M University; Mingming Zhang, Baowu Ouyee Co. Ltd; Jian Li, Canmet MATERIALS; Bowen Li, Michigan Technological University; Sergio Monteiro, Instituto Militar de Engenharia; Rajiv Soman, AnalytiChem Group, USA; Jiann-Yang Hwang, Michigan Technological University; Yunus Kalay, Middle East Technical University; Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory; Andrew Brown, Devcom Arl Army Research Office; Shadia Ikhmayies, The University of Jordan

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Juan Escobedo-Diaz, University of New South Wales; John Carpenter, Los Alamos National Laboratory

**H-26: Microstructural Characterization of Nitrided Low Alloy Steel Using EPMA Scatter Diagram Method:** Kazunori Tsukamoto<sup>1</sup>; Takashi Kimura<sup>2</sup>; Kim Minheon<sup>3</sup>; Osamu Umezawa<sup>3</sup>; <sup>1</sup>JEOL Ltd.; <sup>2</sup>NIMS; <sup>3</sup>Yokohama National University

**H-27: Physico-Chemical and Mineralogical Characterization of Soils for the Production of Extruded, Pressed, and Fired Red Ceramic Blocks:** Bruno Silva<sup>1</sup>; Niander Cerqueira<sup>1</sup>; Jonathan Madalena<sup>1</sup>; Jonas Alexandre<sup>1</sup>; Izzis Simões<sup>1</sup>; Luisa Barreto<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF)

**H-28: Production and Evaluation of Technological Properties of Artificial Agglomerated Rock With Black Rock Waste São Gabriel:** Evanizis Frizzera<sup>1</sup>; Matheus Silva<sup>1</sup>; Mônica Castoldi Borlini Gadioli<sup>2</sup>; Mariane Aguiar<sup>2</sup>; Carlos Mauricio Vieira<sup>3</sup>; Afonso Azevedo<sup>3</sup>; <sup>1</sup>IFES; <sup>2</sup>CETEM; <sup>3</sup>Universidade Estadual Do Norte Fluminense

**H-29: Rheological and Mechanical Viability of Alkali-Activated Pastes for Oil Well Application:** Carlos Mauricio Vieira<sup>1</sup>; Sheila Silva<sup>1</sup>; Madeleine<sup>1</sup>; Lucas Cruz<sup>1</sup>; Sergio Monteiro<sup>1</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**Role of Biogas Recirculation in Direct Reduction of Iron Ore with Woody Biomass:** Yang Shu<sup>1</sup>; Bing Deng<sup>1</sup>; Hongrao Zhang<sup>1</sup>; Lingyun Yi<sup>1</sup>; Yating Zhang<sup>1</sup>; Zhiwei Peng<sup>1</sup>; <sup>1</sup>Central South University

**H-30: Soil Blocks Using Geopolymer and Partial Replacement of Soil With Construction Waste:** Niander Cerqueira<sup>1</sup>; Luisa Barreto<sup>2</sup>; Esthevão Silva<sup>1</sup>; Josué Santos<sup>1</sup>; Sabrina Silva<sup>2</sup>; Isabella Souza<sup>1</sup>; Thomas Perez<sup>1</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense (UENF); <sup>2</sup>Instituto Federal Fluminense (IFF)

**Structural and Dielectric Properties Analysis of Batio3 Doped Single and Double With Gadolinium and Europium:** Ricardo Martínez<sup>1</sup>; <sup>1</sup>UAEH

**Synthesis and Characterization of Conventional and Non-Conventional Adsorbent Materials:** V. Acosta-Sánchez<sup>1</sup>; M. García-Hernández<sup>2</sup>; M. Pérez-Labra<sup>1</sup>; A. Cruz-Ramírez<sup>2</sup>; F. Patiño-Cardona<sup>3</sup>; M. Reyes-Pérez<sup>1</sup>; J. Juárez-Tapia<sup>1</sup>; J. Martínez-Soto<sup>1</sup>; F. Barrientos-Hernández<sup>1</sup>; <sup>1</sup>Autonomous University of Hidalgo State; <sup>2</sup>ESIQIE-IPN; <sup>3</sup>Consejo de Ciencia, Tecnología e Innovación de Hidalgo

**Synthesis and Characterization of Surfactant Modified Clays for Adsorption Applications:** Imen Rim<sup>1</sup>; Mamoun Fellah<sup>1</sup>; Naouel Hezil<sup>1</sup>; Nabila Bouchareb<sup>2</sup>; Gamal A El-Hiti<sup>3</sup>; Neçar Merah<sup>4</sup>; Aleksei Obrosov<sup>5</sup>; Alex Montagne<sup>6</sup>; <sup>1</sup>ABBES Laghrour-University, Khenchela; <sup>2</sup>ABBES Laghrour-University, Khenchela; <sup>3</sup>King Saud University; <sup>4</sup>King Fahd University of Petroleum and Minerals; <sup>5</sup>Brandenburg Technical University; <sup>6</sup>Université Polytechnique Hauts-de-France

**H-31: Technological Properties of Soil-Cement Bricks Produced With Soils From the Red Ceramic Industry of Campos Dos Goytacazes:** Bruno Silva<sup>1</sup>; Niander Cerqueira<sup>1</sup>; Jonas Alexandre<sup>1</sup>; Natália Gomes<sup>1</sup>; Gustavo Xavier<sup>1</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF)

**The Reaction Behavior and Removal Law of Alkali Metals in the Pellet Process of Belt Roaster:** Tian Yunqing<sup>1</sup>; <sup>1</sup>Research Institute of Technology, Shougang Group Corporation

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS; Chemistry and Physics of Materials Committee, TMS; Mechanical Behavior of Materials Committee, TMS; Thin Films and Interfaces Committee

**Program Organizers:** Timofey Frolov, Lawrence Livermore National Laboratory; Fadi Abdeljawad, Lehigh University; Kaila Birtsch, Los Alamos National Laboratory; Daniel Moore, Lehigh University; Christopher Schuh, Northwestern University

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**J-16: Diffusion Behavior at the Interface of (110) Aluminum Substrates via Molecular Dynamics Simulation:** Armin Shashaani<sup>1</sup>; Panthea Sepehrband<sup>1</sup>; <sup>1</sup>Santa Clara University

**J-17: Elemental Segregation and Cohesion in Ferritic Iron Grain Boundaries: A First Principles Perspective:** Han Mai<sup>1</sup>; Xiang-Yuan Cui<sup>2</sup>; Tilmann Hickel<sup>3</sup>; Jörg Neugebauer<sup>1</sup>; Simon Ringer<sup>2</sup>; <sup>1</sup>Max Planck Institute for Sustainable Materials GmbH; <sup>2</sup>The University of Sydney; <sup>3</sup>Bundesanstalt für Materialforschung und -prüfung (BAM)

**J-18: Impact of Thermal Gradient on Interfacial Energy and its Anisotropy in Al-Cu Alloy:** Amrutdyuti Swamy<sup>1</sup>; Pabitra Choudhury<sup>1</sup>; Anthony Lavelle<sup>1</sup>; <sup>1</sup>New Mexico Tech

**J-19: Interface Energy and Structure Anisotropy of Coherent Heterophase Interfaces:** Christian Brandt<sup>1</sup>; <sup>1</sup>The University of Melbourne

**J-20: Interfacial Process Underlying the Environment-Dependent Friction on Calcite Single Crystals:** Binxin Fu<sup>1</sup>; Rosa Espinosa-Marzal<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**J-21: Molecular Dynamics and Machine Learning Investigation of Segregation Effects on the Mechanical Behavior of 5 Cu-Ag Grain Boundaries:** Shimanta Das<sup>1</sup>; Chongze Hu<sup>1</sup>; <sup>1</sup>The University of Alabama



**J-22: Optimizing Grain Boundary Structures With LAMMPS Using Evolutionary Algorithms:** Jarin French<sup>1</sup>; Chaitanya Bhavne<sup>1</sup>; Larry Aagesen<sup>1</sup>; Yifeng Che<sup>1</sup>; *Shuxiang Zhou<sup>1</sup>*; <sup>1</sup>Idaho National Laboratory

**J-23: Phase-Field Modeling of Woven Carbon Fiber Oxidation:** Robert Clayton<sup>1</sup>; Michael Tonks<sup>1</sup>; Ryan Gosse<sup>1</sup>; Michael Sakano<sup>2</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Spectral Energies

**J-24: Shifting of Failure Patterns in Aluminium-Magnesium Alloy Incorporated With Faceted Grain Boundary: An Atomistic-Scale Investigation:** Akarsh Verma<sup>2</sup>; Sandeep Singh<sup>1</sup>; Shigenobu Ogata<sup>1</sup>; <sup>1</sup>University of Petroleum and Energy Studies (UPES)

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Poster Session I - Phase-Field Modeling (Focus)

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**J-25: Nucleation and Coarsening of Multicomponent Precipitates in an Aluminum Matrix: The Combined Impacts of Interfacial Mobility and Interfacial Energy:** Daniel Larouche<sup>1</sup>; <sup>1</sup>Laval University

**J-26: Optimizing The Kinetic Properties of Materials Gradients:** Samuel Price<sup>1</sup>; Zhaoxi Cao<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

**J-27: Phase-Field Model of Solution and Stoichiometric Phases With Molar Volume Difference:** Chengyin Wu<sup>1</sup>; Yanzhou Ji<sup>1</sup>; <sup>1</sup>Ohio State University

**J-28: Phase-Field Modeling of Droplet Entrapment During Directional Solidification in Hypomonotectic Systems:** Lingxia Shi<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**J-29: Phase-Filed Multi-Physics Modeling and Simulations for Fragmentation of Semi-Solid Grains:** Gensei Kobayashi<sup>1</sup>; Mitsuteru Asai<sup>2</sup>; Shinji Sakane<sup>1</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology; <sup>2</sup>Kyushu University

**J-30: Simulation of General Shape Precipitate Using Phase-Field Model Incorporating Interfacial Energy Anisotropy:** Hwijae Cho<sup>1</sup>; Hyung-Uk Jang<sup>1</sup>; Dong-Uk Kim<sup>1</sup>; Pil-Ryung Cha<sup>1</sup>; <sup>1</sup>Kookmin University

**J-31: Solidification Simulation of Aluminum Alloys: Controlling Beta Phase Formation With Phase-Field Simulation:** Hyung-Uk Jang<sup>1</sup>; Hwi Jae Cho<sup>1</sup>; Dong-Uk Kim<sup>1</sup>; Pil Ryung Cha<sup>1</sup>; <sup>1</sup>Kookmin University

**J-32: The Influence of Spatially Stochastic Toughness on Intergranular Fracture: A Phase Field Fracture Study:** Miguel Fernandez<sup>1</sup>; Douglas Spearot<sup>1</sup>; Remi Dingreville<sup>2</sup>; Joseph Monti<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Sandia National Laboratories

**J-33: Thermodynamic Theory of Strained Thin Films of Incipient Ferroelectric KTaO<sub>3</sub>:** Utkarsh Saha<sup>1</sup>; <sup>1</sup>Penn State

**J-34: Uniaxial Compression Simulations of Solid-Liquid Mixture by Phase-Field Lattice Boltzmann Method:** Tomoki Uchiyama<sup>1</sup>; Namito Yamanaka<sup>1</sup>; Shinji Sakane<sup>1</sup>; Tomohiro Takaki<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Poster Session II - Thermodynamic Modeling, and Phase Transformation (Focus)

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Alloy Phases Committee, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Integrated Computational Materials Engineering Committee

**Program Organizers:** Prashant Singh, Ames National Laboratory; Rodrigo Freitas, Massachusetts Institute of Technology; Nicolas Argibay, Ames National Laboratory; Raymundo Arroyave, Texas A&M University; James Morris, Ames Laboratory

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**J-35: Advancing Mineral Extraction: Predictive Modeling of Colloidal Cluster Dynamics via Diglycolamide Complexants:** Kaustubh Bawankule<sup>1</sup>; John Howarter<sup>1</sup>; <sup>1</sup>Purdue University

**J-36: Density Functional Theory Study on the Phase Transformation Behaviors of Mg-Sc Shape Memory Alloys:** Hye-Hyun Ahn<sup>1</sup>; Won-Seok Ko<sup>1</sup>; <sup>1</sup>Inha University

**First-Principles Exploration of Cr/Co/Ni-Doping Impact on Electronic and Optical Properties of PrAlO<sub>3</sub> Perovskites:** Sijie Wang<sup>1</sup>; Zixian Li<sup>1</sup>; Liangying Wen<sup>1</sup>; <sup>1</sup>Chongqing University

**J-37: First-Principles Prediction of Band Edges of Ultra-Wide Bandgap Polar Wurtzite B<sub>1-x</sub>Al<sub>x</sub>N System:** Cody Milne<sup>1</sup>; Tathagata Biswas<sup>2</sup>; Arunima Singh<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Université catholique de Louvain

**J-38: High-Temperature Refractory Al-M-Si-O (M= Nb, Ta) Systems:** Julian Gebauer<sup>1</sup>; Peter Franke<sup>1</sup>; Hans Jürgen Seifert<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology

**J-61: Kinetic and Thermodynamic Considerations for Grain Boundary Microstates in Compositionally Complex Alloys:** Mitra Taheri<sup>1</sup>; Emily Mang<sup>1</sup>; Annie Barnett<sup>1</sup>; Jaime Marian<sup>2</sup>; Michael Falk<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California, Los Angeles

**J-39: Predicting Elemental Segregation Tendency via Ab Initio and Machine Learning Methods:** Ho Lee<sup>1</sup>; Sangtae Kim<sup>1</sup>; Liang Qi<sup>2</sup>; <sup>1</sup>Hanyang University; <sup>2</sup>University of Michigan

**J-40: Regulating Stress-Strain Behavior of NiTi Shape Memory Alloys via 1D Nanoscale Concentration Modulations:** Zexu Chen<sup>1</sup>; Hariharan Sriram<sup>1</sup>; Longsheng Feng<sup>1</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>The Ohio State University

**J-41: Simulation of Systematic Concentration Variation in CrTaVW High Entropy Alloys:** Bochuan Sun<sup>1</sup>; Enrique Saez<sup>1</sup>; Osman Atwani<sup>2</sup>; Duc Nguyen-Manh<sup>3</sup>; Jan Wróbel<sup>4</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>United Kingdom Atomic Energy Authority; <sup>4</sup>Warsaw University of Technology

**Thermodynamic Analysis of Nb-Si-Ti Alloys Prepared by Molten Salt Electrolysis:** Lingyue Song<sup>1</sup>; Hui Li<sup>1</sup>; Jinglong Liang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

**Thermodynamic Simulation of LiF Obtaining of A-Spodumene by Direct Roasting With NaF:** M. Pérez-Labra<sup>1</sup>; A. Hernandez-Ramirez<sup>2</sup>; J.A. Romero-Serrano<sup>2</sup>; M. U. Flores-Guerrero<sup>3</sup>; M. Reyes-Pérez<sup>1</sup>; A. Cruz-Ramírez<sup>2</sup>; F. R. Barrientos-Hernández<sup>1</sup>; F. Patiño-Cardona<sup>4</sup>; <sup>1</sup>UAEH; <sup>2</sup>ESIQUIE-IPN; <sup>3</sup>Technological University of Tulancingo; <sup>4</sup>Consejo de Ciencia, Tecnología e Innovación de Hidalgo Science Building



**Thermodynamics of Amorphization in Heterostructural AlN-Based Alloys:** Neha Yadav<sup>1</sup>; Cheng-Wei Lee<sup>2</sup>; Prashun Gorai<sup>2</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Rensselaer Polytechnic Institute

## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Poster Session I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-100: Cell Boundary Engineering of Ferrous Medium-Entropy Alloy Fabricated by Laser Powder Bed Fusion:** Jeong-Min Park<sup>1</sup>; Hyeonseok Kwon<sup>2</sup>; Jungcho Choe<sup>1</sup>; Kyung Tae Kim<sup>1</sup>; Ji-Hun Yu<sup>1</sup>; Hyoung Seop Kim<sup>2</sup>; <sup>1</sup>Korean Institute of Materials Science; <sup>2</sup>Pohang University of Science and Technology

**G-101: Enhancing Mechanical Properties of Alloys With Non-Equilibrium Microstructures Formed During Hydrogel Infusion-Based Additive Manufacturing (HIAM):** Thomas Tran<sup>1</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology

**G-103: Understanding the Effect Build Orientation and Alloying Strategy in Microstructure and Mechanical Behavior of Laser Metal Deposited Duplex Stainless Steel:** Prayag Burad<sup>1</sup>; Vishal Mahey<sup>1</sup>; Sougata Roy<sup>1</sup>; <sup>1</sup>Iowa State University

## ADDITIVE MANUFACTURING

### Designing Complex Microstructures through Additive Manufacturing — Poster Session II

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Additive Manufacturing Committee

**Program Organizers:** Matteo Seita, University Of Cambridge; Hang Yu, Virginia Polytechnic Institute and State University; Alain Reiser, KTH Royal Institute of Technology; Yuntian Zhu, City University of Hong Kong; Xiaozhou Liao, University of Sydney

Tuesday PM | March 25, 2025  
Marquee Ballroom | MGM Grand

**G-104: A Synchrotron Imaging Investigation of the Application of Ultrasound on Directed Energy Deposition:** Harry Chapman<sup>1</sup>; Xianqiang Fan<sup>1</sup>; Catherine Tonry<sup>2</sup>; Ivars Krastins<sup>2</sup>; Kai Zhang<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Martyn Jones<sup>3</sup>; Chu Lun Leung<sup>1</sup>; Andrew Kao<sup>2</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>University of Greenwich; <sup>3</sup>Rolls-Royce plc.

**Creating Mechanically Superior 3D Microscale Metal-Ceramic Metamaterials Using Template-Assisted Electrodeposition:** Alexander Groetsch<sup>1</sup>; Christopher Gunderson<sup>2</sup>; Peter Schweizer<sup>3</sup>; Janne-Petteri Niemelä<sup>2</sup>; Ivo Utke<sup>2</sup>; Xavier Maeder<sup>2</sup>; Johann Michler<sup>2</sup>; <sup>1</sup>KTH Royal Institute of Technology; <sup>2</sup>Empa - Swiss Federal Laboratories for Materials Science and Technology; <sup>3</sup>Lawrence Berkeley National Laboratory

**Effect of Alumina Doping at SS-Al Bimetallic Interface:** Amrit Paul<sup>1</sup>; <sup>1</sup>CSIR-CMERI

**G-106: Effect of Laser Melt Schedule on the Microstructure of Additively Manufactured IN718 Alloy:** Gyan Shankar Nlin<sup>1</sup>; Gerald Knapp<sup>1</sup>; John Coleman<sup>1</sup>; Matt Rolchigo<sup>1</sup>; Jay Reynolds<sup>1</sup>; Chris Fancher<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**G-107: Enhancing Alloy Development for Additive Manufacturing Through Combinatorial High-Throughput Experimentation:** Sertaç Altınok<sup>1</sup>; Umut Gülletutan<sup>1</sup>; Koray Yurtışık<sup>2</sup>; Yunus Kalay<sup>2</sup>; <sup>1</sup>Advanced Manufacturing Technologies, Turkish Aerospace Inc; <sup>2</sup>Middle East Technical University

**G-108: Enhancing Mechanical Properties of Bio-Inspired, 3D-Printed Composites via Topological Interlocking:** Jie Yang<sup>1</sup>; Chien-Chih Lin<sup>1</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**Formation of a Novel Nano-Lamellar Microstructure in Peritectic Alloys via Laser Surface Remelting:** Shanmukha Kiran Aramanda<sup>1</sup>; Metin Kayitmazbatır<sup>1</sup>; Amit Misra<sup>1</sup>; Ashwin Shahani<sup>1</sup>; <sup>1</sup>University of Michigan

**G-109: Invar-Ag Microcomposites Formed by Ag Dendritic/Cellular Infiltration of Pre-Cast or Pre-Additively Manufactured Invar-Cu:** Haobo Wang<sup>1</sup>; Prosenjit Biswas<sup>1</sup>; Ji Ma<sup>1</sup>; Jerrold Floro<sup>1</sup>; <sup>1</sup>University of Virginia

**G-110: Investigating Microstructural Evolution and Internal Stress Development in Additively Manufactured Metals Using Phase Field Modeling:** Mahshad Fani<sup>1</sup>; Mohammad Younes Araghi<sup>1</sup>; Anirban Patra<sup>2</sup>; Shuozi Xu<sup>1</sup>; <sup>1</sup>University of Oklahoma; <sup>2</sup>Indian Institute of Technology Bombay

**G-111: Laser Powder Bed Fusion of In718/GRCop-42 Bimetallic Structures: Effect of Deposition Order and Process Parameters:** Alasdair Bulloch<sup>1</sup>; Andy Harris<sup>2</sup>; Allin Groom<sup>2</sup>; Amanda Cruchley<sup>3</sup>; Chris Tuck<sup>1</sup>; Richard Hague<sup>1</sup>; Marco Simonelli<sup>1</sup>; <sup>1</sup>University of Nottingham; <sup>2</sup>Autodesk Research; <sup>3</sup>The Manufacturing Technology Centre

**G-112: Microstructural Control in Directed Energy Deposition: In-Situ Layer Thickness Control and Analytical Modeling With 316L Stainless Steel:** William Kunkel<sup>1</sup>; Dan Thoma<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**G-113: Processing-Microstructure Relationships in Ferrous Alloys via Mixed Powder Laser Powder Bed Fusion:** Mustafa Tobah<sup>1</sup>; Zenan Zhang<sup>1</sup>; Mohsen Taheri Andani<sup>2</sup>; Veera Sundararaghavan<sup>1</sup>; Amit Misra<sup>2</sup>; <sup>1</sup>University of Michigan Ann Arbor; <sup>2</sup>University of Michigan, Ann Arbor / Texas A&M University

**G-114: Tailoring the Microstructure of AA6061 Using Pulsed Laser in Powder Bed Fusion:** Sivaji Karna<sup>1</sup>; Tianyu Zhang<sup>1</sup>; Can Sun<sup>1</sup>; Andrew J. Gross<sup>1</sup>; Daniel Morrall<sup>2</sup>; Timothy Krentz<sup>2</sup>; Dale Hitchcock<sup>2</sup>; Lang Yuan<sup>1</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>Savannah River National Lab

**G-115: The Effect of Scan Strategies on 316 Grade Stainless Steel Fabricated Using Laser Powder Bed Fusion:** Justin Warner<sup>1</sup>; Sriram Vijayan<sup>1</sup>; <sup>1</sup>Michigan Tech

## ADVANCED CHARACTERIZATION METHODS

**Heterostructured and Gradient Materials (HGM VI): Principle, Processing and Properties — Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Shaping and Forming Committee

**Program Organizers:** Yuntian Zhu, City University of Hong Kong; Kei Ameyama, Ritsumeikan University; Irene Beyerlein, University of California, Santa Barbara; Yuri Estrin, Monash University; Huajian Gao, Tsinghua University; Ke Lu, Liaoning Academy of Materials; Hyoung Seop Kim, Pohang University of Science and Technology; Xiaolei Wu, Institute of Mechanics

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Investigating the Effect of Spatially Controlled Heat Treatments of a Compositionally Graded Ti-Cr Alloy Produced by Powder Bed Laser Additive Manufacturing:** *Nicholas Oldham*<sup>1</sup>; Matthew Dolde<sup>1</sup>; Fatih Sikan<sup>1</sup>; Maria Quintana<sup>1</sup>; Brian Martin<sup>1</sup>; Peter Collins<sup>1</sup>; Richard Smith<sup>2</sup>; Wenqi Li<sup>2</sup>; Rikesh Patel<sup>2</sup>; Matt Clark<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Nottingham

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**High Performance Steels — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee

**Program Organizers:** Benjamin Adam, Oregon State University; C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Pello Uranga, University of Navarra

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Effect of HIP and Annealing Conditions on Mechanical Properties of 15-5PH Stainless Steel:** *Sung-Min Park*<sup>1</sup>; Jun-Won Yoon<sup>1</sup>; Jeongchan Lee<sup>1</sup>; Kwangsuk Park<sup>1</sup>; Sung-Hwa Ji<sup>2</sup>; Donghoe Kim<sup>3</sup>; Chang-Soo Park<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Pumster; <sup>3</sup>Korea University

**Evaluation of Dynamic Recrystallization Behavior and Dislocation Density of 1.6 wt. % High Carbon Steel During Hot Deformation:** *JaeYeol Jeon*<sup>1</sup>; Jun-Hee Han<sup>1</sup>; *Dae-Geun Kim*<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Institute for Advanced Engineering

**Manufacturing of Advanced High Strength High Mn Steel:** *José Arcos*<sup>1</sup>; *Nancy Margarita Lopez-Granados*<sup>1</sup>; *Constantin Alberto Hernández-Bocanegra*<sup>1</sup>; *José Angel Ramos-Banderas*<sup>1</sup>; <sup>1</sup>TecNM-Instituto Tecnológico de Morelia

**Numerical Study on the Flow and Degassing Behavior of High Performance Steel in Vacuum Tank Degasser:** *Jiang Zhong*<sup>1</sup>; Jin Xu<sup>1</sup>; Ruorong Zhou<sup>1</sup>; Diqiang Luo<sup>1</sup>; <sup>1</sup>Jiang Xi University of Science and Technology

**J-42: On the Effect of Carbide Decomposition on the Wear Resistance of Ultra-High Strength Steels:** *Julian Rackwitz*<sup>1</sup>; *Sebastian Arevalo*<sup>1</sup>; *Minho Yun*<sup>1</sup>; *Cemal Tasan*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**Study on the Control of Impurity Elements and the Evolution Mechanism of Inclusions in Ultra-Low Sulfur 310S Stainless Steel:** *Rensheng Li*<sup>1</sup>; *Ligang Liu*<sup>1</sup>; *You Zhou*<sup>1</sup>; *Xu Gao*<sup>1</sup>; *Wanlin Wang*<sup>1</sup>; <sup>1</sup>Central South University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Local Chemical Ordering and Its Impact on Mechanical Behaviors, Radiation Damage, and Corrosion — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Corrosion and Environmental Effects Committee, TMS: Nuclear Materials Committee, TMS: Phase Transformations Committee

**Program Organizers:** Rodrigo Freitas, Massachusetts Institute of Technology; Sriswaroop Dasari, University of Texas at El Paso; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Mitra Taheri, Johns Hopkins University; Megan McCarthy, Sandia National Laboratories; Irene Beyerlein, University of California, Santa Barbara; Rajarshi Banerjee, University of North Texas; Srinivasan Srivilliputhur, University of North Texas

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Session Chairs:** Rajarshi Banerjee, University of North Texas; Rodrigo Freitas, Massachusetts Institute of Technology; Penghui Cao, University of California, Irvine; Yang Yang, Pennsylvania State University; Sriswaroop Dasari, University of Texas at El Paso

**Effect of Nb Concentration on the Oxidation Behavior of Zr-Nb Alloys:** *Sean Li*<sup>1</sup>; *Chaitanya Deo*<sup>1</sup>; *Remi Dingreville*<sup>2</sup>; *Scott Monismith*<sup>2</sup>; *Preet Singh*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Sandia National Laboratories, Center for Integrated Nanotechnologies

**J-43: Temperature-Dependent Behavior of Local Chemical Ordering in the Structure of CrCoNi:** *Guilherme Stumpf*<sup>1</sup>; *Vinicius Bacurau*<sup>1</sup>; *Caroline Stoco*<sup>1</sup>; *Gustavo Bertoli*<sup>1</sup>; *Eric Mazzer*<sup>1</sup>; *Francisco Coury*<sup>1</sup>; <sup>1</sup>UFSCar

## LIGHT METALS

**Magnesium Technology 2025 — Poster Session**

**Sponsored by:** TMS Light Metals Division, TMS: Magnesium Committee

**Program Organizers:** Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; Aaron Palumbo, Big Blue Technologies; Aerial Murphy-Leonard, Ohio State University; Neale Neelameggham, IND LLC

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Characteristics of Advanced Thermo-Mechanical Multi Composite Core Rod:** *Junghwan Kim*<sup>1</sup>; *Tae-Ho Lee*<sup>1</sup>; *Sangmin Shin*<sup>1</sup>; *Hyeonjae Park*<sup>1</sup>; *Seungchan Cho*<sup>1</sup>; *Taegyu Lee*<sup>1</sup>; *Sang-Bok Lee*<sup>1</sup>; *Sang-Kwan Lee*<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science (KIMS)

**K-18: Comparative Studies on Corrosion of Short Fibre-Reinforced Mg Composites With and Without PEO Coatings:** *Hongfa Hu*<sup>1</sup>; <sup>1</sup>Mame, University of Windsor

**K-23: Deformation Behavior of Mg-Zn-Ca Alloy During Uniaxial Compression:** *Aman Shukla*<sup>1</sup>; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology-Kharagpur

**K-19: Effect of Al Additions and Heat Treatment on the Microstructure and Mechanical Properties of Mg-9.5Li-0.5Zn Alloys:** *Yong-Ho Kim*<sup>1</sup>; Hyo-Sang Yoo<sup>1</sup>; Byeong-Kwon Lee<sup>1</sup>; Eun-Chan Ko<sup>1</sup>; Hyeon-Taek Son<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**K-20: Evaluation of Post Annealing on DSR-Processed AXM Alloys:** *Christopher Hale*<sup>1</sup>; <sup>1</sup>North Carolina A&T State University

**K-21: Influence of Al Content on Mechanical Properties and Microstructure of Ultralight Mg-Li-Bi Alloy:** *Byeongkwon Lee*<sup>1</sup>; Eun Chan Ko<sup>1</sup>; Yong Ho Kim<sup>1</sup>; HyoSang Yoo<sup>1</sup>; HyeonTaek Son<sup>1</sup>; Sungkil Hong<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Chonnam National University

**K-22: Magnesium Primary Production from MgO Using Molten Salt Electrolysis and G-METS Distillation:** Connor Wirsing<sup>1</sup>; Charles Logman<sup>1</sup>; Sarah Fenton<sup>1</sup>; Dimitry Blazy<sup>1</sup>; Jameson Courtney<sup>1</sup>; Daniel McArthur Sehar<sup>1</sup>; Artem Iurkovskyi<sup>1</sup>; *Adam Powell*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

##### Materials Aging and Compatibility: Experimental and Computational Approaches to Enable Lifetime Predictions — Poster Session

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Corrosion and Environmental Effects Committee

**Program Organizers:** Bishnu Khanal, Sandia National Laboratories; Michael Melia, Sandia National Laboratories; Coby Davis, Sandia National Laboratories; Kerri Blobaum, Lawrence Livermore National Laboratory; Anthony Van Buuren, Lawrence Livermore National Laboratory; Nan Butler, Sandia National Laboratories

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**J-44: Accelerated Aging and Lifetime Performance Predictions of Silicone Cushions Under Compression:** *Karly Knox*<sup>1</sup>; Hannah Eshelman<sup>1</sup>; Nancy Merino<sup>1</sup>; Maira Ceron<sup>1</sup>; Patrick Campbell<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**J-45: Impacts of Aging Additively Manufactured Silicone Polymers in the Presence of Organic Solvents:** *Nancy Merino*<sup>1</sup>; Hannah Eshelman<sup>1</sup>; Karly Knox<sup>1</sup>; Maira Ceron<sup>1</sup>; Patrick Campbell<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**J-62: Microstructure Influence on the Intergranular Corrosion of Aluminum Alloys by Integrating Experimental Data and Microstructure Incorporated Computational Modeling:** *Mohammad Umar Farooq Khan*<sup>1</sup>; Leila Saberi<sup>1</sup>; I-Wen Huang<sup>2</sup>; Christopherr Taylor<sup>2</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Novelis Global R&T Center

#### LIGHT METALS

##### Melt Processing, Casting and Recycling — Poster Session

**Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee

**Program Organizers:** Arild Hakonsen, Hycast As; Les Edwards, Rain Carbon Inc.

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**Ultra-Short Process for Producing Pure Nickel Casting Strip:** *Ligang Liu*<sup>1</sup>; Rensheng Li<sup>1</sup>; Peisheng Lyu<sup>1</sup>; Wanlin Wang<sup>1</sup>; Lejun Zhou<sup>1</sup>; <sup>1</sup>Central South University

#### DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

##### Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Poster Session

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**J-48: Advantages and Limitations of the Coupled Random Cellular Automata Finite Element Model of Dynamic Recrystallization:** *Lukasz Madej*<sup>1</sup>; Kacper Pawlikowski<sup>1</sup>; Mateusz Sitko<sup>1</sup>; Konrad Perzynski<sup>1</sup>; <sup>1</sup>AGH University of Krakow

**J-49: Effects of Cellular Microstructure on Strength, Fatigue and Hydrogen Embrittlement of Additively Manufactured Alloys:** *Minh-Son Pham*<sup>1</sup>; <sup>1</sup>Imperial College London

**J-59: Evaluation of Additively Manufactured Parts Using a Work-Hardening Analysis:** *Ryan Holdsworth*<sup>1</sup>; Joshua Yee<sup>2</sup>; Diran Apelian<sup>3</sup>; Enrique Lavernia<sup>1</sup>; Alan Jankowski<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>University of California, Irvine

**J-51: Improving Mechanical Durability of SLA Printed Components for Load-Bearing:** *Niloofer Fani*<sup>1</sup>; *Armaghan Hashemi Monfared*<sup>2</sup>; Sorour Sadeghzade<sup>3</sup>; Fariborz Tavangarian<sup>1</sup>; <sup>1</sup>Penn State Harrisburg; <sup>2</sup>Pennsylvania State University; <sup>3</sup>Westlake University

**Morphological Stability of Recrystallization Fronts: Theory and Simulations:** *Moneesh Upmanyu*<sup>1</sup>; <sup>1</sup>Northeastern University

**J-60: Revealing the Influence of Rolling Reduction and Temperature on the Deformation and Recrystallization Behavior of Ta-10W Alloy:** *Ki-Seong Park*<sup>1</sup>; *Shi Hoon Choi*<sup>2</sup>; <sup>1</sup>Sunchon National University

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Microstructural Evolution and Material Properties Due to Manufacturing Processes: A Symposium in Honor of Anthony Rollett — Student Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Jonathan Zimmerman, Sandia National Laboratories; Curt Bronkhorst, University of Wisconsin-Madison; Elizabeth Holm, University of Michigan; Ricardo Lebensohn, Los Alamos National Laboratory; Sukbin Lee, Ulsan National Institute Of Science And Technology; Nathan Mara, University of Minnesota

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**J-46: Enhanced Thermal Stability in Additive Friction Stir Deposited ODS IN9052 Al Alloy:** *Aishani Sharma*<sup>1</sup>; Roopam Jain<sup>1</sup>; Priyanka Agrawal<sup>1</sup>; Shreya Mukherjee<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Davin F. Davis<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

**J-63: Evolution of Grain Boundary Character Distribution in High-Mn Steel:** *Poorna Chander K*<sup>1</sup>; Sumantra Mandal<sup>1</sup>; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**Impact of Cold-Wire Gas Metal Arc Welding (CW-GMAW) Parameters on Microstructure and Microhardness Characteristics in Repairing S275JR Structural Steel:** *Zahradeen Musa*<sup>1</sup>; Supriyo Ganguly<sup>1</sup>; Wojciech Suder<sup>1</sup>; Victor Igwemezie<sup>1</sup>; Kuladeep Rajamudili<sup>1</sup>; <sup>1</sup>Cranfield University

**J-47: Investigating Microstructural Changes in Wrought 316L and As-Deposited Wire Arc Additively Manufactured 316LSi After Forging Using Double Cone Samples:** *Brett Ley*<sup>1</sup>; Vishnu Ramasamy<sup>1</sup>; Jennifer Carter<sup>1</sup>; Glenn Daehn<sup>2</sup>; Zhigang Xu<sup>3</sup>; Bradley Jared<sup>4</sup>; Kornel Ehmann<sup>5</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>The Ohio State University; <sup>3</sup>North Carolina Agricultural and Technical State University; <sup>4</sup>University of Tennessee Knoxville; <sup>5</sup>Northwestern University

**J-56: Microstructure Evolution and Mechanical Behavior of As-Cast Chromium-Contained Ductile Cast Iron:** *Kumar Karuna Nidhi*<sup>1</sup>; Siddhartha Roy<sup>1</sup>; Shiv Brat Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**J-58: Role of Relative Amount of Mn and Ni on Chemical and Mechanical Stability of Austenite in -Ferrite Containing Medium-Mn Steels:** *Navanit Kumar*<sup>1</sup>; Tapas Kumar Bandyopadhyay<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Kharagpur

**J-55: Understanding the TRIP Effect in Hot- and Cold-Rolled Al-Added Medium-Mn Steels: Insights Into Austenite Stability and Martensitic Transformation Kinetics:** *Deepak Kumar*<sup>1</sup>; Indrani Sen<sup>1</sup>; Tapas Kumar Bandyopadhyay<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

## ADDITIVE MANUFACTURING

**Nano and Micro Additive Manufacturing — Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Electronic Packaging and Interconnection Materials Committee, TMS: Nanomechanical Materials Behavior Committee

**Program Organizers:** Alain Reiser, KTH Royal Institute of Technology; Wendy Gu, Stanford University; Yu Zou, University of Toronto; Mostafa Hassani, Cornell University; Ming Chen, University of Nevada, Reno

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**G-116: Enhancing In-Situ Resource Utilization: Additive Manufacturing of Lunar Highlands Regolith with Graphene Nanoplatelets:** *Katrina Rodriguez*<sup>1</sup>; Brandon Aguiar<sup>1</sup>; Ambreen Nisar<sup>1</sup>; Tony Thomas<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

## ADVANCED CHARACTERIZATION METHODS

**Neutron and X-Ray Scattering in Materials Science and Engineering — Poster Session**

**Sponsored by:** TMS Functional Materials Division, TMS: Chemistry and Physics of Materials Committee

**Program Organizers:** Michael Manley, Oak Ridge National Laboratory; Chen Li, University of California-Riverside; Hillary Smith, Swarthmore College; Jennifer Niedziela, Oak Ridge National Laboratory

**Tuesday PM | March 25, 2025**  
**Marquee Ballroom | MGM Grand**

**H-32: Anomalous Neutron Nuclear-Magnetic Interference Spectroscopy:** *Chuliang Fu*<sup>1</sup>; Phum Siriviboon<sup>1</sup>; Artittaya Boonkird<sup>1</sup>; Michael Landry<sup>1</sup>; Chen Li<sup>2</sup>; Weiwei Xie<sup>3</sup>; Mingda Li<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of California, Riverside; <sup>3</sup>Michigan State University

**In-Situ and Multimodal Capabilities of Laue Diffraction Instrument at 34-ID-E of the Advanced Photon Source:** *Dina Sheyfer*<sup>1</sup>; Wenjun Liu<sup>1</sup>; Jonathan Tischler<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**H-33: Machine Learning Models For X-Ray Diffraction Temperature Inference:** *Griffin Hess*<sup>1</sup>; Georgios Zipitis<sup>1</sup>; Sachith Dissanayake<sup>1</sup>; Chenliang Xu<sup>1</sup>; Niaz Abdolrahim<sup>1</sup>; <sup>1</sup>University of Rochester



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**ADVANCED CHARACTERIZATION METHODS**
**Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques — Poster Session**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Advanced Characterization, Testing, and Simulation Committee

**Program Organizers:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory; Austin Mcdannald, National Institute of Standards and Technology; Fan Zhang, National Institute of Standards and Technology; Sarshad Rommel, University of Connecticut

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**H-35: Artificial Intelligence X-Ray Imaging for Sustainable Metal Manufacturing:** *Enzo Liotti*<sup>1</sup>; <sup>1</sup>University of Oxford

**H-34: Classification of Defects in Tomographic Reconstructions of Hyperscale Advanced Packages:** *Orion Kafka*<sup>1</sup>; Jason Killgore<sup>2</sup>; Newell Moser<sup>1</sup>; Zachary Grey<sup>1</sup>; Jake Rezac<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**Enhanced Quantification of Reinforcement Particles in Additively Manufactured IN718 Using Microfocus X-Ray Computed Tomography and CGAL Alpha Wrapping Tool:** *I-Ting Ho*<sup>1</sup>; Devin Bayly<sup>1</sup>; Pascal Thome<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**
**Verification, Calibration, and Validation Approaches in Modeling the Mechanical Performance of Metallic Materials — Poster Session**

**Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee

**Program Organizers:** George Weber, NASA Langley Research Center; Joshua Pribe, Analytical Mechanics Associates; Saikumar Reddy Yeratapally, Science and Technology Corporation; Kirubel Teferra, Naval Research Laboratory; Diwakar Naragani, Cornell University

**Tuesday PM | March 25, 2025**  
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**J-54: Explicit Finite Element Model of Composite Metal Foam's Mechanical Response During Quasi-Static and Dynamic Compression:** *Aman Kaushik*<sup>1</sup>; Afsaneh Rabiei<sup>1</sup>; <sup>1</sup>North Carolina State University

- A**
- Aagesen, L . . . . .33, 66, 157, 205, 231, 275, 296
- Aalbers, E. . . . .93
- Abad, G . . . . .144
- Abando, N . . . . .8
- Abba, M . . . . .171
- Abbey, B . . . . .20, 51, 90
- Abdelaziz, M . . . . .290
- Abdeljawad, F . . . . .21, 22, 42, 52, 91, 125, 157, 193, 203, 231, 295
- Abdelsamie, M . . . . .86
- Abdoelatef, M . . . . .66
- Abdolrahim, N . . . . .135, 151, 154, 190, 300
- Abdul Aziz, M . . . . .93
- Abdulhafez, M . . . . .139
- Abdul-Jabbar, N . . . . .177
- Abdulkareem, A . . . . .131
- Abdullaev, F . . . . .259
- Abdullah, A . . . . .179
- Abdul Samad, M . . . . .263
- Abdul Samad, Y . . . . .8
- Abedrabbo, S . . . . .8, 42, 75, 111, 144, 179, 262
- Abe, H . . . . .73
- Abels, K . . . . .28
- Abergel, R . . . . .36, 70, 107, 140, 177, 210
- Abernathy, D . . . . .172
- Abernathy, H . . . . .117
- Abidov, A . . . . .259
- Abney, M . . . . .139
- Abraham, J . . . . .119
- Abraham, S . . . . .74
- Abramova, M . . . . .238
- Abrams, T . . . . .65
- Abram, T . . . . .243, 275
- Abreu-Faria, G . . . . .180
- Abtahi, S . . . . .246
- Acar, P . . . . .84, 144
- Acemi, C . . . . .176, 212, 254
- Acevedo, C . . . . .32, 155
- Achard, J . . . . .65
- Acharya, R . . . . .96
- Acheampong, E . . . . .192
- Achuthan, A . . . . .41, 287
- Ackall, G . . . . .279
- Ackelid, U . . . . .115
- Ackölf, K . . . . .20, 53, 124, 190, 207, 218
- Acosta-Sánchez, V . . . . .295
- Acquah, E . . . . .25, 57
- Actis Grande, M . . . . .113, 145
- Aczel, A . . . . .172
- Adaan-Nyia, M . . . . .150
- Adair, C . . . . .98
- Adam, B . . . . .24, 26, 56, 58, 95, 97, 130, 164, 178, 182, 189, 212, 214, 237, 239, 270, 281, 290, 298
- Adams, A . . . . .286, 288
- Adams, D . . . . .31, 91, 143, 251
- Adamska, A . . . . .108
- Adams, P . . . . .290
- Adam, T . . . . .69
- Addamane, S . . . . .143
- Adeeko, O . . . . .114
- Adegbola, S . . . . .175
- Adekola, F . . . . .175
- Adeleke, A . . . . .175
- Adeniji, S . . . . .257
- Adeosun, S . . . . .148
- Aderibigbe, M . . . . .100
- Adesina, K . . . . .124
- Adeva, P . . . . .132, 227, 266
- Adeyemi, C . . . . .128
- Adhikari, S . . . . .242, 278
- Adibi, N . . . . .259
- Adkins, C . . . . .231
- Admal, N . . . . .21, 31, 52
- Adnan, S . . . . .137, 172, 177
- Adorno Lopes, D . . . . .143, 243
- Adrovic, D . . . . .261
- A. El-Hiti, G . . . . .292
- Aeppli, G . . . . .20
- Afful, H . . . . .31, 274
- Afonin, A . . . . .135
- Afrasiabi, M . . . . .13, 141
- Agarwal, A . . . . .13, 66, 71, 82, 83, 141, 144, 182, 257, 288, 300
- Agarwal, S . . . . .63
- Agava, R . . . . .128, 131, 180
- Ager, J . . . . .144
- Aggarwal, A . . . . .180, 239
- Aghasi beig, M . . . . .15, 45, 82, 119
- Agnew, S . . . . .10, 15, 21, 43, 46, 106, 129, 132, 151, 200
- Agraffeil, C . . . . .106
- Agraharam Chan, P . . . . .218
- Agrawal, A . . . . .50, 65, 187, 268
- Agrawal, P . . . . .35, 37, 71, 157, 217, 247, 262, 280, 283, 300
- Agrawal, R . . . . .57, 224
- Agrawal, V . . . . .151
- Agren, J . . . . .40, 74, 110, 143
- Agudo Jácome, L . . . . .197, 214
- Aguiar, B . . . . .300
- Aguiar, M . . . . .295
- Aguilera-Navarrete, I . . . . .147
- Aguirre, T . . . . .122
- Agyemang, P . . . . .124, 192
- Ahlawat, S . . . . .160
- Ahli, N . . . . .219
- Ahlquist, J . . . . .208
- Ahlström, J . . . . .134
- Ahmad, A . . . . .48, 212
- Ahmadikia, B . . . . .50, 225
- Ahmad, L . . . . .97
- Ahmed, K . . . . .25, 66, 103, 275
- Ahmed, M . . . . .31
- Ahmed, S . . . . .184
- Ahn, H . . . . .190, 265, 296
- Ahn, M . . . . .260
- Ahn, S . . . . .116, 273
- Ahn, Y . . . . .22
- Aich, S . . . . .149
- Aidhy, D . . . . .40, 53, 73, 85, 110, 158, 266
- Aidukas, T . . . . .20
- Aifantis, E . . . . .26
- Ailiang, C . . . . .149
- Aimone, E . . . . .43
- Aindow, M . . . . .84, 95, 105, 171, 278, 284
- Ainger, K . . . . .206
- Airoudj, A . . . . .212
- Aitkaliyeva, A . . . . .23, 30, 36, 55, 56, 63, 65, 70, 75, 94, 100, 107, 127, 134, 137, 140, 142, 160, 167, 177, 196, 202, 205, 210, 223, 229, 231, 248, 269, 273, 275
- Aizawa, T . . . . .18
- Ajam, A . . . . .101
- Ajantiwalay, T . . . . .15, 30, 63, 99, 100, 119, 134, 167, 202, 229, 248, 273
- Ajayan, P . . . . .206
- Ajenifujah, O . . . . .145, 213, 288
- Ajjarapu, P . . . . .78
- Akamatsu, H . . . . .43
- Akamatsu, S . . . . .65
- Akande, R . . . . .175
- Akanji, F . . . . .175
- Akbarkermani, M . . . . .234
- Akbar, M . . . . .61
- Akerson, A . . . . .80
- Akin, S . . . . .215
- Akiyama, E . . . . .72, 173
- Akram, N . . . . .84
- Aksenova, D . . . . .176
- Aksu, E . . . . .10
- Aktaa, J . . . . .157
- Akter, A . . . . .12
- Akter, T . . . . .259
- Alamdari, H . . . . .55
- Al Amiri, E . . . . .91
- Alam, M . . . . .8, 25, 166, 229, 248
- Alam, S . . . . .24, 56, 94, 128, 175, 208, 234, 270
- Al Assadi, M . . . . .98
- Alavi, M . . . . .221
- Alawein, M . . . . .144
- Alazemi, R . . . . .57
- Al-Badour, F . . . . .271
- Albakri, M . . . . .53
- Albalushi, T . . . . .219
- Al Balushi, Z . . . . .8
- AlBaraghteh, T . . . . .28
- Albar, N . . . . .252
- Albert, M . . . . .114, 215
- Al-Boqami, S . . . . .49
- Albuhairan, H . . . . .92
- Albuini-Oliveira, N . . . . .294

- Alcaraz Ramirez, A .....273  
Aldhanhani, M .....50, 219  
Alduaij, A .....61  
Aleksei, O .....295  
Alema, F .....238  
Aleman, A .....182, 288  
Alem, N .....14, 179  
Alem, T .....144, 240  
Ales, T .....121, 150  
Alewi, D .....105  
Alexander, M .....258  
Alexandre, J .....294, 295  
Alex, M .....295  
Alfarsi, Y .....49  
Alfreider, M .....58, 205  
Algendy, A .....177  
Alghalayini, M .....184, 288  
Al Ghawi, M .....55  
Alhammadi, H .....50, 219  
Alhammadi, M .....50  
Alhayas, H .....219  
Al Hunaini, M .....49  
Ali, A .....162  
Ali, F .....53  
Ali Habeeb, M .....295  
Ali, M .....13, 147, 223  
Ali, N .....58, 262  
Ali, S .....172  
Al Jaziri, M .....219  
Aljundi, J .....283  
Alkan, M .....118, 128, 241  
Al Kotob, M .....25  
Allaire, D .....218, 238  
Al-Lami, J .....135  
Allano, B .....153  
Allanore, A .....13, 43, 80, 133, 291  
Allard, L .....110, 113, 214, 239  
Alla, S .....204  
Alleman, C .....38  
Allen, A .....250  
Allen, B .....45  
Allen, C .....78  
Allen, E .....294  
Allen, L .....87, 235  
Allen, M .....99  
Allen, Q .....198  
Allen, R .....249  
Allen, T .....37, 70, 279  
Allgor, E .....78  
Allison, J .....27, 28, 43, 61, 85, 102,  
105, 233, 241, 253, 260  
Allison, P .....225, 232  
Al-Majali, Y .....21, 53, 91, 126, 147, 268  
Alman, D .....13, 43, 80, 291  
Almarzooqi, A .....223  
Al Marzooqi, A .....55  
Almasri, R .....205  
Almeida, M .....294  
Almeida, R .....82  
Almer, J .....101  
Almirall, N .....23, 55, 94, 127, 160,  
196, 223, 269  
Almishal, S .....14  
Al Obaidli, J .....55  
Alomari, A .....248  
Al-Omari, I .....265  
Aloui, R .....252  
Alqahtani, B .....163  
Al Rabie, Y .....261  
Alshaikh, A .....223  
Al-Shami, A .....49  
Al-Shammari, A .....49  
Alshammari, S .....49  
Al-Shammari, S .....49  
Alshamsi, A .....50  
Alshannaq, M .....94, 137  
Al Sharji, A .....55, 223  
Altinok, S .....139, 213, 297  
Alturk, S .....53, 169  
Altwater, M .....75  
Altzar, O .....235  
Aluie, H .....20  
Alustad, M .....189  
Alvarado, B .....273  
Alvaredo, P .....174, 234  
Alvarez Montano, V .....14, 208  
Alverson, M .....47  
Alvi, S .....218  
Alwen, A .....107, 232  
Alyousif, O .....257  
Alzarooni, A .....219  
Alzarouni, A .....189  
Alzubail, A .....261  
Amadeo, P .....30, 270  
Amalia, L .....16, 50, 161, 186, 226,  
266, 286  
Amann, F .....187  
Amano, N .....207  
Amaral, H .....104  
Amaro, R .....37  
Amatya, V .....232  
Ambard, A .....249  
Ameyama, K .....26, 58, 96, 129, 163,  
199, 298  
Amin, A .....147, 148  
Amini, S .....191  
Amiri Gheivandi, A .....242  
Amiri, M .....130, 158, 288  
Amirthalingam, M .....283  
Ammigan, K .....141, 197, 236  
Amon, A .....15, 176  
Amon, L .....173  
Amorin, J .....286  
Amos, R .....27  
Amouretti, A .....172  
Amouyal, Y .....48, 184  
Amrouche, L .....224, 265, 266, 271  
Amroussia, A .....223  
Anand, A .....34  
Anand, R .....80, 263  
Anantharaman, M .....265  
Anantharaman, S .....240  
Anas, J .....49  
Anasori, B .....14, 44, 81, 118, 144,  
149, 264  
Anayee, M .....42  
Anber, E .....141, 161, 209, 232, 246  
Anderoglu, O .....30, 62, 100, 206  
Anderson, A .....54, 92, 167, 202,  
228, 273  
Anderson, I .....22, 30, 38, 76, 108, 112,  
147, 149, 157, 249, 252, 282  
Anderson, K .....160, 258, 270  
Anderson, M .....37, 70, 279  
Anderson, N .....15, 37  
Anderson, P .....123, 129  
Andersson, A .....52  
Andersson, D .....33, 66, 94, 170  
Andersson, J .....81, 182, 237  
Andersson Neretnieks, I .....170  
Andersson, T .....265  
Ando, D .....278, 292  
Ando, M .....230  
Andorful, I .....198  
András, K .....15  
Andreev, A .....36  
Andreev Batat, S .....113  
André Fiorotti Peixoto, R .....294  
Andreoli, A .....200  
Andrew, M .....90, 151  
Andrews, D .....32, 221  
Andrews, J .....106  
Andrews, W .....17, 62, 233  
Andreyev, A .....90, 151  
Andri, R .....219  
Anegbe, B .....179  
An, G .....258  
Angell, R .....70  
Anglin, B .....116, 136, 151, 266  
Angot, T .....135  
Angus, X .....62  
Anilkumar, V .....134  
An, J .....281  
Anjaria, D .....141, 216  
An, K .....16, 46, 50, 83, 186, 226,  
232, 239, 286  
Ankem, S .....130  
Ankit, K .....206, 240  
Ånnhagen, L .....54  
Anovitz, L .....251  
An, Q .....51, 123, 208  
An, S .....92, 211, 264  
Ansari, K .....189  
Ansart, F .....252  
Anthony, B .....12  
Anthony, R .....48  
Antillon, E .....26, 200

- Antinozzi, S . . . . .57  
 Antonov, S . . . . .16, 34, 47, 58, 84,  
 120, 150, 186, 291  
 Antony Jose, S . . . . .46  
 Antoun, B . . . . .209  
 Antrekowitsch, J . . . . .270  
 Anwar, T . . . . .288  
 An, X . . . . .246  
 An, Y . . . . .116  
 Aoki, T . . . . .141, 288  
 Aoki, Y . . . . .230  
 Ao, T . . . . .218  
 Apelian, D . . . . .120, 157, 171, 235, 253, 299  
 Apel, M . . . . .110, 122, 265  
 Apodaca, S . . . . .101  
 Apostolov, Z . . . . .113  
 Appel, F . . . . .93  
 Appelhans, L . . . . .221  
 Appel, M . . . . .211  
 Appel, O . . . . .41  
 Appolaire, B . . . . .59  
 Appunhi Nair, K . . . . .96  
 Arachige, H . . . . .206  
 Aragon, N . . . . .18, 41, 156  
 Aramanda, S . . . . .218, 297  
 Aranas, C . . . . .22, 23, 182, 240, 266  
 Aranas Jr., C . . . . .288  
 Aranda, L . . . . .224, 265, 266, 271  
 Arata, E . . . . .222  
 Araujo, J . . . . .49  
 Archambeau, C . . . . .186  
 Archer, A . . . . .156, 188  
 Archibald, C . . . . .89  
 Arciniaga, L . . . . .207  
 Arcos, J . . . . .298  
 Aremu, A . . . . .131  
 Arevalo, S . . . . .298  
 Argibay, N . . . . .22, 30, 46, 53, 92, 108,  
 126, 147, 158, 176, 194, 204,  
 221, 226, 244, 252, 261, 289, 296  
 Arhatari, B . . . . .20  
 Arias Hernandez, J . . . . .195  
 Arif, S . . . . .68  
 Ari, G . . . . .118  
 Aristeidakis, J . . . . .41, 146  
 Arkhipov, A . . . . .189  
 Arkoub, H . . . . .62, 246  
 Armanfard, N . . . . .84  
 Armenta, C . . . . .73  
 Arms, B . . . . .211  
 Armstrong, D . . . . .32, 57, 62, 135  
 Árnadóttir, L . . . . .257  
 Arndt, D . . . . .48  
 Arnold, S . . . . .41, 188, 190, 287  
 Arola, D . . . . .9, 32, 51, 191  
 Arora, A . . . . .79, 161, 190, 198, 244, 251,  
 271, 278, 287, 288  
 Arora, G . . . . .236  
 Arora, H . . . . .109  
 Arpon, A . . . . .100  
 Arputharaj, J . . . . .182  
 Arregui-Mena, D . . . . .194, 249  
 Arregui Mena, J . . . . .94  
 Arrè, L . . . . .140  
 Arroyave, R . . . . .12, 22, 40, 46, 53, 76,  
 92, 126, 130, 153, 158, 172, 176, 194,  
 213, 218, 221, 238, 244, 261, 265, 279,  
 282, 296  
 Arróyave, R . . . . .19, 34, 84, 292  
 Arrubla Agudelo, L . . . . .67, 104, 276  
 Arslanoglu, M . . . . .42, 118, 144  
 Arthanari, M . . . . .72  
 Artini, C . . . . .18  
 Aruga, Y . . . . .293  
 Arul Kumar, M . . . . .11, 42, 79, 116, 147,  
 184, 216, 290  
 Arzoumanidis, A . . . . .168  
 Arzt, E . . . . .101  
 Asadi, P . . . . .90, 151  
 Asai, M . . . . .296  
 Asemewanlen, E . . . . .284  
 Asghari-Rad, P . . . . .80, 133  
 Ashad, F . . . . .49  
 Ashburn, M . . . . .56  
 Ashman, P . . . . .49  
 Ashraf, M . . . . .277  
 Askari, H . . . . .8, 42, 75, 111, 144, 179,  
 190, 262  
 Asle Zaeem, M . . . . .34, 59, 68, 75, 89, 92,  
 101, 105, 131, 138, 173,  
 207, 233, 251, 277  
 Asli, A . . . . .197  
 Assadi, H . . . . .27, 59, 98, 131, 171, 272  
 Asta, M . . . . .15, 18, 22, 29, 43, 62, 83, 91,  
 99, 120, 141, 164, 165, 186,  
 217, 222, 243, 261  
 Astecker, T . . . . .15, 33  
 Asumadu, T . . . . .46  
 Atale, N . . . . .58  
 Athanasakis, N . . . . .123  
 Athanasiou, C . . . . .124  
 Athar, S . . . . .48  
 Athon, M . . . . .211  
 Atkin, H . . . . .94  
 Atkin, R . . . . .94  
 Atlas, S . . . . .180  
 Atta-Fynn, R . . . . .70  
 Attallah, M . . . . .9, 10  
 Attarian, S . . . . .243  
 Attari, V . . . . .12, 180, 238  
 Atwani, O . . . . .296  
 Atwood, R . . . . .122, 139, 239  
 Aubert, A . . . . .45  
 Aubertin, K . . . . .243  
 Aubry, P . . . . .249, 272  
 Aubry, S . . . . .29, 61  
 Auguste, R . . . . .141  
 Aune, R . . . . .145  
 Autones, L . . . . .249  
 Autran, P . . . . .97  
 Averbach, R . . . . .33, 56, 160  
 Aversa, R . . . . .85  
 Ávila Calderón, L . . . . .85  
 Avila, L . . . . .197, 214  
 Avtzi, Y . . . . .123  
 Awasthi, P . . . . .79, 100, 217  
 Aworinde, O . . . . .124  
 Awoyemi, R . . . . .192  
 Ayala Calderon, C . . . . .74  
 Aybarc, U . . . . .241  
 Aydin, G . . . . .182  
 Aydogan, E . . . . .10, 11, 30, 38, 63, 79, 100,  
 115, 134, 157, 167, 181, 202,  
 204, 229, 248, 261, 273, 289  
 Aydogmus, D . . . . .128  
 Aye, K . . . . .161  
 Ayers, N . . . . .282  
 Ayers, T . . . . .79, 140  
 Ayinla, K . . . . .128  
 Aymon, B . . . . .156  
 Aytug, T . . . . .35, 68, 106, 139, 174  
 Ayush, K . . . . .86  
 Ayyagari, S . . . . .14  
 Azakli, Y . . . . .68  
 Azar, A . . . . .282  
 Azeredo, B . . . . .69, 250, 259, 285  
 Azevedo, A . . . . .264, 269, 294, 295  
 Azimi, A . . . . .216  
 Azimi, G . . . . .28, 36, 60, 175, 208, 234  
 Aziziha, M . . . . .273  
 Azpeitia, X . . . . .97  
 Azu, S . . . . .45  
 Azzaz, R . . . . .210  
**B**  
 Bała, P . . . . .183  
 Baba, A . . . . .24, 56, 94, 128, 131, 175,  
 208, 234, 270  
 Babakr, A . . . . .10  
 Babij, M . . . . .257  
 Babu, S . . . . .146, 147, 182, 214, 239, 290  
 Babuska, T . . . . .143, 179, 212, 238, 255, 281  
 Bacher, G . . . . .179  
 Bachhav, M . . . . .23, 37, 55, 71, 94, 117,  
 127, 160, 196, 197, 223,  
 246, 249, 269, 280  
 Bachmaier, A . . . . .21, 96  
 Bachman, C . . . . .259  
 Bachu, P . . . . .260  
 Bacroix, B . . . . .272  
 Bacurau, V . . . . .200, 298  
 Bader, T . . . . .191, 268  
 Badgett, N . . . . .283  
 Badowski, M . . . . .169  
 Badr, H . . . . .271  
 Bae, D . . . . .277



- Bae, J. . . . . 138, 165, 196, 265, 266, 290  
 Baek, G. . . . . 286, 291  
 Baek, J. . . . . 266  
 Baek, M. . . . . 70, 145, 286  
 Bae, M. . . . . 28, 60, 234, 279  
 Bae, S. . . . . 257  
 Baganis, A. . . . . 222  
 Bagdahn, J. . . . . 286  
 Bagheri, E. . . . . 259  
 Bagherpour, E. . . . . 224  
 Bagot, P. . . . . 135  
 Bagshaw, N. . . . . 146, 289  
 Bahat, S. . . . . 219  
 Bahhage, O. . . . . 262  
 Bahl, S. . . . . 103, 105, 110, 113, 214  
 Bahn, J. . . . . 201  
 Bahr, D. . . . . 20, 23, 39, 72  
 Baiges, J. . . . . 245  
 Baig, S. . . . . 9, 151  
 Bai, H. . . . . 109, 263  
 Baihaqi, Z. . . . . 219  
 Bailey, N. . . . . 248  
 Baird, S. . . . . 98, 218  
 Bair, J. . . . . 244  
 Bai, X. . . . . 18, 92, 192  
 Bai, Y. . . . . 252  
 Bajpai, P. . . . . 17  
 Bajpai, S. . . . . 171  
 Baker, A. . . . . 15, 185, 208, 211  
 Baker, B. . . . . 280  
 Baker, D. . . . . 25  
 Baker, J. . . . . 119  
 Baksi, M. . . . . 185  
 Balachandramurthi, A. . . . . 115  
 Balachandran, R. . . . . 247  
 Balani, K. . . . . 192  
 Balasubramaniam, R. . . . . 260  
 Balbus, G. . . . . 31, 63, 100, 134, 168,  
 203, 225, 229, 248, 274  
 Balcorta, V. . . . . 156  
 Baldinozzi, G. . . . . 108, 206  
 Baldivieso, S. . . . . 166  
 Baldwin, J. . . . . 34, 58, 248  
 Baldwin, O. . . . . 66  
 Baldwin, S. . . . . 114  
 Bale, H. . . . . 20, 220  
 Balila, N. . . . . 11  
 Balk, T. . . . . 45, 255, 265, 277  
 Ballesteros, A. . . . . 133  
 Ball, J. . . . . 230  
 Ballor, J. . . . . 17, 193  
 Bally-Le Gall, F. . . . . 212  
 Balog, N. . . . . 192  
 Balogun, O. . . . . 59  
 Balomenos, E. . . . . 49, 86, 123, 154,  
 191, 292  
 Balooch, M. . . . . 33, 102, 248, 274  
 Balpande, A. . . . . 180  
 Balusu, K. . . . . 32, 242  
 Bambach, M. . . . . 141  
 Bamer, F. . . . . 89  
 Bamney, D. . . . . 50, 216  
 Bamrud, F. . . . . 47  
 Bandari, Y. . . . . 146, 183, 215, 258, 289  
 Bandi, S. . . . . 137  
 Bandla, D. . . . . 168  
 Bandyopadhyay, A. . . . . 220, 250  
 Bandyopadhyay, R. . . . . 212  
 Bandyopadhyay, S. . . . . 62, 97  
 Bandyopadhyay, T. . . . . 300  
 Banerjee, D. . . . . 143, 181, 182, 209, 287  
 Banerjee, R. . . . . 10, 13, 16, 17, 37, 44,  
 46, 47, 60, 81, 92, 115, 118, 119, 132,  
 159, 165, 175, 200, 209, 216, 220, 222,  
 226, 235, 246, 247, 253, 259, 289, 298  
 Banerjee, S. . . . . 10, 12, 47, 116, 117,  
 156, 184, 216, 252, 289  
 Banerjee, T. . . . . 53  
 Bang, J. . . . . 257, 269, 293  
 Bang, S. . . . . 108  
 Ban, H. . . . . 98, 103  
 Banik, R. . . . . 138  
 Banno, Y. . . . . 162  
 Bano, S. . . . . 188  
 Banos, A. . . . . 228  
 Banuelos, C. . . . . 290  
 Bao, S. . . . . 136  
 Baraheem, R. . . . . 55  
 Baral, A. . . . . 176  
 Baranack, G. . . . . 126  
 Barati Farimani, A. . . . . 145, 213, 288  
 Barati, M. . . . . 54  
 Barber, J. . . . . 14  
 Barbier, T. . . . . 18  
 Barbosa Jr., L. . . . . 294  
 Barela, M. . . . . 234  
 Bargon, M. . . . . 176  
 Bar, H. . . . . 68  
 Barham, S. . . . . 217  
 Baril-Boudreault, X. . . . . 55  
 Barile, C. . . . . 25  
 Barille, R. . . . . 264, 292  
 Barka, N. . . . . 207  
 Barker, Z. . . . . 64  
 Barmak, K. . . . . 179, 193  
 Barnard, D. . . . . 118  
 Barnard, P. . . . . 249  
 Barnes, J. . . . . 112, 286  
 Barnett, A. . . . . 125, 165, 224, 296  
 Barnett, M. . . . . 177, 210  
 Barnett, S. . . . . 43, 80  
 Barnhill, N. . . . . 225  
 Barnum, T. . . . . 246  
 Barooni, A. . . . . 165  
 Barpaga, D. . . . . 237  
 Barras, A. . . . . 231  
 Barraza, M. . . . . 294  
 Barrera, J. . . . . 271  
 Barreto, L. . . . . 295  
 Barrett, C. . . . . 140  
 Barrett, M. . . . . 133  
 Barrick, E. . . . . 78, 167, 289  
 Barrie, C. . . . . 254  
 Barrientos, H. . . . . 254  
 Barrientos-Hernandez, F. . . . . 264  
 Barrientos-Hernández, F. . . . . 264, 295, 296  
 Barrientos-Hernández, R. . . . . 277  
 Barriobero-Vila, P. . . . . 233  
 Barrios, A. . . . . 31  
 Barron, P. . . . . 221  
 Barsotti, A. . . . . 171  
 Barsoum, M. . . . . 271  
 Bartel, C. . . . . 53  
 Bartha, K. . . . . 233  
 Barthelat, F. . . . . 51  
 Barthelemy, P. . . . . 80  
 Bartlett, L. . . . . 65  
 Bartlett, M. . . . . 19  
 Bartlett, S. . . . . 100  
 Bartlett, W. . . . . 291  
 Barton, D. . . . . 34, 92, 196, 211  
 Bartsch, C. . . . . 287  
 Bartsch, G. . . . . 244  
 Baruah, S. . . . . 245  
 Barua, R. . . . . 15, 82, 264, 265  
 Barwick, S. . . . . 230  
 Baryshev, S. . . . . 48  
 Basavanagowda, B. . . . . 219  
 Baski, A. . . . . 165  
 Bassen, G. . . . . 213, 217  
 Bassett, K. . . . . 209  
 Bassman, L. . . . . 34, 119, 260, 262  
 Bastos da Silva, A. . . . . 156  
 Basu, R. . . . . 167, 208  
 Basu, S. . . . . 12, 43, 80, 116, 148, 184, 263  
 Bates, J. . . . . 155, 203  
 Bates, K. . . . . 198  
 Bathula, V. . . . . 160  
 Bat, I. . . . . 281  
 Batta, L. . . . . 257  
 Battalgazy, B. . . . . 153  
 Battas, B. . . . . 66  
 Batteas, J. . . . . 221  
 Battle, T. . . . . 24, 56, 94, 128, 270  
 Baudequin, X. . . . . 25  
 Bauer, A. . . . . 47  
 Bauer, E. . . . . 18, 152  
 Bauman, A. . . . . 145  
 Bauman, R. . . . . 260  
 Baumbach, R. . . . . 36  
 Baumgarten, A. . . . . 217  
 Bauret, N. . . . . 65  
 Baus, C. . . . . 221  
 Bavdekar, S. . . . . 19, 51, 248  
 Bawagnih, A. . . . . 162, 271  
 Bawah, J. . . . . 266  
 Bawane, K. . . . . 33, 53, 94, 177, 223, 246

- Bawankule, K ..... 210, 296  
 Bawa, R ..... 37  
 Bay, B ..... 10, 168  
 Bayly, D ..... 251, 301  
 Bayramoglu, B ..... 281  
 Bayram, S ..... 292  
 Bazarnik, P ..... 223  
 Beals, R ..... 28  
 Beamer, C ..... 11, 78, 81, 209  
 Bean, C ..... 48, 141  
 Bean, G ..... 288  
 Beatty, J ..... 182  
 Beaudoin, A ..... 187  
 Beaudry, D ..... 38, 141, 161, 183, 186,  
 209, 246  
 Beausir, B ..... 83  
 Beausoleil, B ..... 170, 284  
 Beausoleil, G ..... 249  
 Beausoleil II, G ..... 275  
 Beaver, L ..... 64  
 Becerril, I ..... 273  
 Béchade, J ..... 187  
 Beck, M ..... 32, 131  
 Beck, S ..... 171  
 Beckwith, C ..... 53  
 Becquart, C ..... 250  
 Bedard, B ..... 171  
 Bedekar, V ..... 117  
 Bedewy, M ..... 129, 139, 163, 199, 226,  
 246, 271  
 Bednarczyk, B ..... 41  
 Bednarczyk, W ..... 64, 183  
 Bedoya, C ..... 183, 278  
 Bedoya Lopez, C ..... 151, 263  
 Bedrov, D ..... 215  
 Beeler, B ..... 164, 168, 231, 249, 272, 275  
 Beersaerts, G ..... 123  
 Beese, A ..... 38, 76, 77, 112, 222, 239, 282  
 Begley, B ..... 12, 28, 120  
 Begley, M ..... 78  
 Behera, G ..... 191  
 Behera, S ..... 105, 126  
 Beheshti, A ..... 16, 171  
 Behura, S ..... 240  
 Behzadinasab, M ..... 161  
 Beidaghi, M ..... 35, 44  
 Beishline, R ..... 151  
 Beijger, G ..... 14  
 Bejjipurapu, A ..... 197  
 Belak, J ..... 75, 111  
 Belcher, C ..... 120, 163, 171  
 Belik, A ..... 257  
 Bellah, M ..... 126  
 Bell, C ..... 107, 108  
 Bell, E ..... 118  
 BellÉ, M ..... 193  
 Bellet, M ..... 113  
 Bellevu, F ..... 278  
 Bellino, J ..... 181, 205  
 Bell, M ..... 254, 279  
 Bellon, P ..... 33, 56, 113, 130, 160  
 Bell, S ..... 63  
 Bellus, J ..... 64  
 Belof, J ..... 239  
 Beltran, A ..... 273  
 Beltrán, A ..... 228  
 Belure, A ..... 260  
 Benafan, O ..... 157  
 Bencharef, N ..... 252  
 Benedetti, L ..... 257  
 Beneduce, F ..... 257  
 Benefan, O ..... 126  
 Benigni, P ..... 250  
 Beniwal, D ..... 226  
 Ben Jedidia, Y ..... 25  
 Ben Messaoud, H ..... 219  
 Bennett, T ..... 209, 289  
 Bennett, W ..... 149  
 Benoudia, M ..... 147  
 Benson, C ..... 95, 105  
 Bentley, D ..... 57  
 Bentoumi, G ..... 260  
 Benzeşik, K ..... 24, 56, 128  
 Benzerga, A ..... 133  
 Benzesik, K ..... 128, 131  
 Benzing, J ..... 11, 20, 75, 78, 130, 280  
 Beraud, M ..... 93  
 Berbalk, S ..... 186  
 Beretta, S ..... 9, 113, 151  
 Berfield, T ..... 9, 146, 183  
 Berggren, S ..... 154  
 Bergin, A ..... 235  
 Berglund, I ..... 41, 146  
 Berlia, R ..... 105, 150, 199, 232  
 Berman, M ..... 147  
 Berman, T ..... 28, 43, 105, 227, 233  
 Bernal-Choban, C ..... 244  
 Bernholdt, D ..... 178  
 Bernstein, L ..... 102  
 Bernstein, N ..... 131  
 Berseneva, A ..... 140, 262  
 Bertheau, D ..... 84  
 Berthebaud, D ..... 48, 78, 121  
 Berthel, J ..... 215  
 Bertherat, M ..... 65, 86, 94, 136  
 Berthod, P ..... 224, 265, 266, 271  
 Bertin, N ..... 123, 168, 203  
 Bertoli, G ..... 298  
 Bertsch, K ..... 38, 71, 126, 195, 222  
 Berziou, C ..... 25  
 Besmann, T ..... 62, 227, 273  
 Besson, J ..... 72  
 Bethell, T ..... 87, 235  
 Betzing, M ..... 87  
 Betz, K ..... 243  
 Betz, M ..... 261  
 Beuth, J ..... 114, 145, 215  
 Beyerlein, I ..... 11, 13, 18, 26, 33, 42, 50,  
 58, 60, 66, 79, 96, 101, 103, 105, 116,  
 123, 129, 132, 137, 147, 163, 165, 171,  
 184, 199, 200, 204, 206, 216, 217, 225,  
 226, 246, 254, 290, 298  
 Beygelzimer, Y ..... 26  
 Beyk Khorasani, M ..... 112, 286  
 Bezold, A ..... 19, 132, 173, 178, 253  
 Bhagavath, S ..... 113  
 Bhandari, B ..... 69  
 Bhanu, V ..... 167  
 Bhashyam, G ..... 96  
 Bhattacharjee, P ..... 35, 239  
 Bhattacharya, A ..... 92, 101, 108, 230  
 Bhattacharya, K ..... 80, 130, 203  
 Bhattacharya, R ..... 254  
 Bhattacharya, S ..... 229, 247  
 Bhattacharyay, D ..... 55  
 Bhattacharyya, D ..... 31, 64, 83, 101,  
 135, 168, 203, 230, 274  
 Bhattacharyya, J ..... 15, 46, 106, 132,  
 151, 200  
 Bhatta, L ..... 199, 233  
 Bhatt, S ..... 70  
 Bhave, C ..... 168, 205, 296  
 Bhesania, A ..... 166, 187  
 Bhowmick, S ..... 168, 238, 274  
 Bhowmik, A ..... 285  
 Bhowmik, S ..... 71, 198, 226  
 Bhure, S ..... 235  
 Bianchi, G ..... 44  
 Bian, M ..... 227  
 Bibhanshu, N ..... 266  
 Bichler, L ..... 82  
 Bidhar, S ..... 236  
 Bieberdorf, N ..... 29, 62, 99, 164  
 Bienvenu, P ..... 250  
 Bie, X ..... 25, 72  
 Biggs, K ..... 222  
 Bijjala, S ..... 180  
 Biju, A ..... 265  
 Bilal, H ..... 40  
 Billionis, I ..... 197  
 Billah, M ..... 271  
 Billinge, S ..... 246  
 Billy, E ..... 106  
 Binde Stoco, C ..... 218  
 Bing, C ..... 184  
 Bingham, M ..... 215  
 Bin Habib, S ..... 108, 248  
 Biolchini, F ..... 223  
 Birchall, F ..... 213  
 Birchall, S ..... 145  
 Birch, R ..... 130  
 Birch, T ..... 235  
 Birnbaum, A ..... 56  
 Birtsch, K ..... 21, 52, 91, 125, 157,  
 193, 295  
 Bishara, H ..... 193

- Bishop, C . . . . . 21, 207, 209, 213  
 Bishop, O . . . . . 15  
 Bisht, A . . . . . 179  
 Bisikalov, A . . . . . 37  
 Bisson, R . . . . . 135  
 Biswal, H . . . . . 35  
 Biswas, A . . . . . 14, 82, 154, 160  
 Biswas, K . . . . . 263, 265  
 Biswas, P . . . . . 297  
 Biswas, S . . . . . 33, 145  
 Biswas, T . . . . . 296  
 Bitzek, E . . . . . 85  
 Bjorseth, A . . . . . 93  
 Bjurström, A . . . . . 257  
 Blackburn, T . . . . . 81, 103  
 Blackman, O . . . . . 109  
 Black, R . . . . . 128, 141  
 Blacksher, C . . . . . 255  
 Blades, W . . . . . 161  
 Blagojevic, A . . . . . 191  
 Blais, B . . . . . 152  
 Blank, C . . . . . 183, 278  
 Blankenau, B . . . . . 60  
 Blankenburg, M . . . . . 233  
 Blankenship, D . . . . . 225  
 Blankley, S . . . . . 119  
 Blassino, A . . . . . 45  
 Blay, T . . . . . 250  
 Blazy, D . . . . . 299  
 Blendell, J . . . . . 23  
 Blobaum, K . . . . . 29, 61, 133, 299  
 Blocher, M . . . . . 162  
 Blondel, S . . . . . 56, 178  
 Bloom, R . . . . . 216  
 Blue, C . . . . . 214  
 Blust, S . . . . . 57  
 Boakye, D . . . . . 160, 197  
 Bobbitt, S . . . . . 42, 143  
 Bobel, A . . . . . 180, 213, 238  
 Bobev, S . . . . . 120  
 Boccardo, A . . . . . 222  
 Boch, D . . . . . 182  
 Bochtler, B . . . . . 73  
 Bocklund, B . . . . . 38, 126, 222, 265  
 Boebinger, M . . . . . 34  
 Boehlert, C . . . . . 17, 31, 68, 193, 223, 233  
 Boehm, R . . . . . 290  
 Boese, S . . . . . 58, 82  
 Boeyink, B . . . . . 285  
 Bognarova, X . . . . . 62, 164, 280  
 Bo, H . . . . . 189  
 Bohanon, B . . . . . 248  
 Bohn, A . . . . . 232  
 Bohra, P . . . . . 87  
 Bolden, D . . . . . 12  
 Boleininger, M . . . . . 211  
 Boleis, G . . . . . 178  
 Bolintineanu, D . . . . . 145, 234  
 Bollapragada, S . . . . . 41  
 Bollineni, R . . . . . 97  
 Bollu, G . . . . . 252  
 Bolme, C . . . . . 20, 73  
 Bolster, L . . . . . 46  
 Bölükbaşı, P . . . . . 219  
 Bolyachkin, A . . . . . 118  
 Bolzowski, R . . . . . 93, 139  
 Bombač, D . . . . . 74  
 Bond, L . . . . . 118  
 Bonebrake, J . . . . . 12  
 Bongao, H . . . . . 240  
 Bong, H . . . . . 120  
 Bonini, J . . . . . 78  
 Bonnet, G . . . . . 24, 95  
 Bonnin, A . . . . . 61  
 Bonora, N . . . . . 118, 184  
 Bonzu Ackah, M . . . . . 155  
 Boone, K . . . . . 155, 243  
 Boonkird, A . . . . . 300  
 Booth, R . . . . . 62, 273  
 Borchers, T . . . . . 116  
 Bordas, A . . . . . 173  
 Bordas, R . . . . . 64, 187  
 Borenstein, A . . . . . 201  
 Borgenstam, A . . . . . 130  
 Borges, P . . . . . 15, 43, 83, 120, 123, 165, 217  
 Borgi, S . . . . . 80, 151  
 Borkar, T . . . . . 16, 46, 83, 84, 234, 260, 261, 266, 267, 281, 290  
 Bornfeldt, K . . . . . 32  
 Borodin, N . . . . . 241  
 Boroff, H . . . . . 136  
 Boro, J . . . . . 15, 70  
 Boron, G . . . . . 277  
 Borovikov, V . . . . . 154  
 Borowiack, L . . . . . 128  
 Borowski, L . . . . . 221  
 Borra, C . . . . . 36, 175, 191  
 Borra, V . . . . . 175  
 Borrego, N . . . . . 272  
 Borrossi, R . . . . . 233  
 Bortoluci Ormastroni, L . . . . . 212  
 Bose, P . . . . . 49, 86  
 Bose, S . . . . . 155  
 Bosker, J . . . . . 225  
 Bosomworth, P . . . . . 251  
 Bostanabad, R . . . . . 144, 158, 288  
 Bostan, B . . . . . 56  
 Botelho Junior, A . . . . . 28  
 Botica Artalejo, E . . . . . 261  
 Böttger, B . . . . . 110  
 Bottin-Rousseau, S . . . . . 65  
 Bouchareb, N . . . . . 263, 266, 291, 295  
 Boudreault, C . . . . . 203  
 Bouhattate, J . . . . . 25  
 Boukellal, A . . . . . 222  
 Bouobda Moladje, G . . . . . 33  
 Bouras, D . . . . . 264, 291, 292  
 Bourdin, B . . . . . 203  
 Bourges, C . . . . . 18  
 Bouteiller, H . . . . . 121, 122  
 Bouville, F . . . . . 234  
 Bouzid, H . . . . . 292  
 Bowden, D . . . . . 117, 249  
 Bowden, M . . . . . 43, 99  
 Bowling, L . . . . . 10, 261  
 Bowman, K . . . . . 126, 159, 195, 222  
 Bowman, W . . . . . 216  
 Boyce, B . . . . . 29, 31, 103, 143, 153, 178, 221  
 Boyce, D . . . . . 187  
 Boyne, A . . . . . 144  
 Bozeman, S . . . . . 10, 289  
 Bozzolo, N . . . . . 102  
 Braatz, J . . . . . 194  
 Brabazon, D . . . . . 288  
 Brachtl, S . . . . . 260  
 Bracker, G . . . . . 202, 260  
 Bradaškja, B . . . . . 74  
 Bradford, V . . . . . 131  
 Bradshaw, A . . . . . 88  
 Bradshaw, N . . . . . 133  
 Bradshaw, R . . . . . 234  
 Bradshaw, T . . . . . 201  
 Brady, M . . . . . 164  
 Bragado, P . . . . . 170  
 Bram, M . . . . . 252  
 Brandenburg, C . . . . . 161, 209, 224  
 Brandl, C . . . . . 52, 88, 295  
 Brandt, W . . . . . 238  
 Brancio, P . . . . . 50, 73, 154, 293  
 Branscum, A . . . . . 64, 65  
 Brasiliense, M . . . . . 223  
 Braun, A . . . . . 31  
 Braun, J . . . . . 20, 261  
 Braun, M . . . . . 200  
 Brecht, J . . . . . 15, 46, 83, 119, 150, 186, 217, 240, 265, 266, 292  
 Brennan, D . . . . . 45  
 Brennan, M . . . . . 78, 81, 209  
 Brennecke, G . . . . . 131  
 Brenner, D . . . . . 266  
 Brewer, L . . . . . 83, 134, 232, 278  
 Brian, E . . . . . 243  
 Brice, C . . . . . 11  
 Bridenstine, E . . . . . 125  
 Bringa, E . . . . . 112  
 Brinkley, W . . . . . 103  
 Brink, T . . . . . 22  
 Bristow, A . . . . . 139  
 Britton, B . . . . . 42, 126, 159, 195, 222  
 Britton, D . . . . . 91, 125, 251  
 Britton, T . . . . . 21, 42  
 Britz, D . . . . . 207  
 Brizes, E . . . . . 10, 78, 115, 146, 289  
 Broadhead, J . . . . . 225  
 Broderick, K . . . . . 89  
 Broderick, T . . . . . 225

- Broeckmann, C. . . . .157  
 Broek, S . . . . .87, 189  
 Broker, E . . . . .221  
 Bromstad Myrvold, E. . . . .153  
 Bronikowski, M . . . . .140  
 Bronkhorst, C . . . . .102, 116, 136, 168,  
 170, 184, 204, 261, 299, 300  
 Brookins, J. . . . .72, 81  
 Brooks, J. . . . .257  
 Broucek, J. . . . .47  
 Broughton, J . . . . .180  
 Broussard, A . . . . .103, 167  
 Brown, A . . . . .20, 52, 90, 125, 156, 193,  
 221, 294, 295  
 Brown, B . . . . .47  
 Brown, D . . . . .21, 43, 68, 74  
 Brown, F . . . . .14, 208  
 Brown, J . . . . .39, 72, 109  
 Brown, N . . . . .62, 63, 130, 153, 202, 218  
 Brown, P . . . . .229  
 Brozak, S . . . . .218  
 Bruckard, W . . . . .69, 279  
 Brumblay, H . . . . .50  
 Brunet, J. . . . .222  
 Brunner, R. . . . .34  
 Bruno, G . . . . .151  
 Brupbacher, M . . . . .254  
 Bryan, T. . . . .12  
 Bryant, E . . . . .286, 288  
 Bryantsev, V . . . . .133  
 Buandra, A . . . . .219, 242  
 Buarque de Macedo, R. . . . .160  
 Buchbaum, S . . . . .29  
 Buchsbaum, S . . . . .29  
 Buckley, J . . . . .261  
 Buckner, J. . . . .160, 234  
 Bucsek, A. . . . .28, 33, 66, 103, 137, 154,  
 168, 171, 206, 260  
 Buğdaycı, M. . . . .165  
 Buehler, M. . . . .124  
 Bueno Villoro, R. . . . .134  
 Bufford, D . . . . .39, 72, 73, 109, 208, 234  
 Bugdayci, M. . . . .128  
 Bukulmez, I. . . . .10  
 Bulatov, V . . . . .123  
 Bulloch, A . . . . .72, 297  
 Bunn, J . . . . .129  
 Bunstine, W. . . . .217  
 Burad, P . . . . .258, 259, 261, 275, 289, 297  
 Burak, A. . . . .140, 227  
 Burch, A. . . . .39, 72  
 Burdová, K. . . . .259  
 Buresh, S . . . . .81  
 Burets, Y . . . . .42  
 Burgos, N. . . . .258  
 Burlatsky, S . . . . .175  
 Burleigh, A . . . . .197, 236  
 Burlingame, S . . . . .139  
 Burlot, G . . . . .141  
 Burns, J. . . . .9, 57, 95, 161, 222  
 Burns, K. . . . .144, 240  
 Burr, D . . . . .32  
 Burrows, R. . . . .62  
 Burr, P . . . . .14, 261  
 Burtscher, M . . . . .228  
 Busch, R. . . . .189  
 Bush, W . . . . .268  
 Busse, B . . . . .64  
 Butala, M . . . . .80  
 Butch, N. . . . .36  
 Butler, A. . . . .48, 221  
 Butler, B . . . . .61, 64, 238, 250  
 Butler, N. . . . .29, 61, 133, 299  
 Butler, T . . . . .81, 134  
 Butterling, M. . . . .141  
 Butt, H . . . . .8, 191  
 Buttice, K. . . . .29, 201, 227  
 Buturlim, V . . . . .36, 107, 210  
 Buzzy, M . . . . .241  
 Byerly, K. . . . .246  
 Byers, E . . . . .50, 216  
 Bykov, E. . . . .82  
 Byloff, J. . . . .203  
 Byrd, D. . . . .112  
 Byrne, D. . . . .128  
 Byun, D . . . . .269  
 Byun, J . . . . .271, 279  
 Byun, T. . . . .229, 249  
**C**  
 Cabeza, S . . . . .232  
 Cabibbo, M . . . . .115, 183, 213, 216, 288  
 Cabo Rios, A. . . . .174  
 Cabral De Oliveira, F. . . . .123  
 Cabrera, H. . . . .89  
 Cacciamani, G. . . . .73  
 Cackett, A . . . . .44  
 Cai, C . . . . .250  
 Cai, L . . . . .90  
 Cai, Q. . . . .172  
 Cairang, W . . . . .30, 196, 270, 272  
 Cai, W . . . . .92, 95, 119, 156, 160, 197,  
 224, 270  
 Cai, Z . . . . .209  
 Çakıcı, M . . . . .131  
 Cakmak, E. . . . .292  
 Cakmak, O . . . . .10, 286  
 Calderoni, P. . . . .135  
 Calderon, L . . . . .254, 279  
 Calderon Ortiz, G. . . . .39, 281  
 Calderon Rojas, M . . . . .273  
 Callaghan, J. . . . .282  
 Callahan, P . . . . .26, 58, 141, 165  
 Calta, N . . . . .13, 52  
 Calvat, M . . . . .44, 48, 141  
 Campanhão, A . . . . .67  
 Campbell, A. . . . .94, 157, 194, 205, 221, 243  
 Campbell, C. . . . .180, 195  
 Campbell, P . . . . .299  
 Campbell, Q . . . . .58, 82  
 Camp, I . . . . .139  
 Campos, M . . . . .104, 174, 234  
 Canal, G. . . . .217  
 Cance, J . . . . .279  
 Çancı, Z . . . . .24  
 Cândido, V . . . . .104  
 Canfield, P . . . . .248  
 Canulette, M . . . . .134  
 Cao, C. . . . .35, 68, 106, 139, 174  
 Cao, F. . . . .142  
 Cao, J . . . . .42, 71  
 Cao, L. . . . .120, 190, 216, 220, 233  
 Cao, P . . . . .55, 60, 66, 132, 157, 158, 165,  
 171, 192, 200, 217, 226, 246, 261, 298  
 Cao, W . . . . .40, 73  
 Cao, X. . . . .87, 189  
 Cao, Y. . . . .53, 60, 92, 97, 134, 192, 200, 225  
 Cao, Z. . . . .38, 54, 70, 296  
 Capolungo, L. . . . .31, 41, 50, 62, 66, 85,  
 102, 103, 126, 151, 164, 167, 216  
 Capote, G. . . . .46  
 Capote Sanchez, A . . . . .46, 137  
 Cappia, F . . . . .33, 66, 103, 137, 170, 202,  
 205, 231, 249, 275  
 Cappola, J . . . . .156, 208, 270  
 Capps, N . . . . .33, 63, 66, 103, 137, 202  
 Cappuccini, F . . . . .212  
 Capriotti, L . . . . .137, 142, 211, 231,  
 249, 275  
 Caputo, A. . . . .78, 96  
 Caranchini, M. . . . .233, 252  
 Carbajales, R. . . . .234  
 Carballo-López, G . . . . .191  
 Carcassi, M . . . . .258  
 Carlos Fontes Vieira, C . . . . .276  
 Carlson, J. . . . .260  
 Carlson, K . . . . .254  
 Carlsson, M. . . . .90  
 Carlton, H . . . . .181, 205  
 Carneiro De Oliveira, J . . . . .212  
 Carneiro, I. . . . .117, 263  
 Carney, C. . . . .197  
 Caron, P. . . . .147  
 Carotti, F . . . . .166  
 Carpenter, D . . . . .21  
 Carpenter, E . . . . .15  
 Carpenter, J . . . . .20, 52, 90, 125, 146, 156,  
 167, 182, 183, 193, 214, 215,  
 221, 222, 239, 290, 294, 295  
 Carpenter, W. . . . .83  
 Carpick, R . . . . .143  
 Carpman, B . . . . .99  
 Carradó, A. . . . .212, 233  
 Carradó, A. . . . .212, 233, 252  
 Carrell, A. . . . .185  
 Carriero, A. . . . .32



- Carrington, A .....288  
 Carrion, P .....167  
 Carroll, J .....41, 203  
 Carroll, S .....29  
 Carruthers, A .....81  
 Carsley, J .....49, 52, 110, 188, 283  
 Carson, R .....75, 111  
 Carter, J .....15, 35, 46, 68, 83, 119, 150,  
 186, 217, 240, 265, 266, 300  
 Carter, M .....245  
 Carter, W .....10  
 Carvajal, J .....170  
 Carvalho, E .....269, 276  
 Carvalho, J .....264, 294  
 Carvalho Lirio, J .....276  
 Cary, J .....225  
 Casalena, L .....207  
 Casari, D .....203  
 Casati, R .....8, 77, 113, 145, 180, 285  
 Casella, A .....32  
 Casey, D .....260  
 Cassagne, A .....61, 96, 173  
 Cassese, A .....81  
 Castagnet, S .....247  
 Castano, C .....151, 183, 263, 278  
 Castano Londono, C .....67, 104, 275  
 Castany, P .....47  
 Castelluccio, G .....111  
 Castillo, J .....24  
 Castillo-Sanchez, J .....65  
 Castin, N .....55  
 Castonguay, S .....61  
 Castro, B .....285  
 Castro Baldivieso, S .....140, 228  
 Castro-Ceseña, A .....191  
 Castro Chavarria, C .....252  
 Castro, R .....208  
 Cater, S .....129  
 Caudill, J .....45  
 Caulle, O .....106  
 Cavalcante, V .....28  
 Cavaliere, P .....25  
 Cavanaugh, N .....167, 243  
 Cavazos, S .....62, 103, 205  
 Cawkwell, M .....39, 73  
 Cazacu, O .....170, 181, 241  
 Cazares, E .....218  
 Ceballos, S .....77  
 Ceccacci, A .....118, 184  
 Cecchini, A .....16  
 Cech, M .....69  
 Ceder, G .....60  
 Cederqvist, L .....225  
 Celebi, O .....119, 121, 154, 168  
 Celebi, T .....154, 168  
 Celina, M .....133  
 Cerecedar, D .....274  
 Cernatescu, I .....84  
 Ceron, M .....299  
 Cerqueira, N .....294, 295  
 Cervantes, L .....229  
 Cervantes-Luevano, K .....191  
 Cervellon, A .....141  
 Cesarano, P .....101  
 Ceteznik, S .....32  
 Cetinkaya, S .....14, 261  
 Chaari-Schule, N .....249  
 Chacko, Z .....274  
 Chada, S .....111  
 Chadwick, A .....113  
 Cha, E .....175  
 Chae, D .....267  
 Chae, I .....60  
 Chae, J .....278  
 Chae, S .....69  
 Chae, Y .....274  
 Chagnes, A .....60  
 Chahar, S .....261  
 Chaillly, N .....153  
 Chaim Almeida, J .....276  
 Chaithanya Kumar, K .....174  
 Chai, Y .....92  
 Chakka, J .....213  
 Chakkravarthy, V .....283  
 Chakrabarti, D .....54  
 Chakraborty, S .....28, 105, 124, 156,  
 192, 233  
 Chaliha, R .....120, 121  
 Chamberlain, J .....133  
 Chamberlain, M .....39, 72  
 Chambers, T .....35, 68  
 Champagne, D .....122  
 Champagne, V .....171  
 Champion, Y .....218  
 Chan, C .....207  
 Chancey, M .....29, 99, 128  
 Chander K, P .....300  
 Chandiran, E .....119  
 Chandra, A .....259  
 Chandra, K .....160  
 Chandra, L .....94  
 Chandran, K .....84, 96  
 Chandran, N .....44  
 Chandrasekaran, S .....117  
 Chandrasekhar, A .....213, 288  
 Chandross, M .....21, 42, 143, 221, 222  
 Chaney, D .....107  
 Chang, A .....139, 160  
 Chang, B .....216, 246, 288  
 Chang, C .....114, 139, 215, 250  
 Chang, F .....23, 55  
 Chang, H .....80, 117, 127  
 Chang, J .....48, 196, 199, 246  
 Chang, K .....164, 275  
 Chang, P .....55, 269  
 Chang, S .....192  
 Chang, W .....277  
 Chang, Y .....33, 257  
 Chan, H .....29, 99, 141, 272, 273  
 Chan, J .....288  
 Chankitmongkong, S .....49  
 Chan, Y .....100  
 Chao, K .....257  
 Chao, P .....173, 251  
 Chao, Y .....233  
 Cha, P .....244, 296  
 Chapman, H .....139, 180, 215, 239,  
 287, 297  
 Chapman, R .....277  
 Chaput, L .....59  
 Charalambides, M .....109  
 Charatsidou, E .....137, 178  
 Charit, I .....100, 229, 275  
 Charpagne, M .....33, 38, 58, 68, 71, 76,  
 107, 113, 141, 195, 232, 262, 280  
 Chartrand, P .....74  
 Chasetti, A .....13  
 Chastukhin, A .....164  
 Chater, P .....132  
 Chatterjee, A .....33, 57, 108, 128, 248  
 Chattopadhyay, K .....234, 235  
 Chattopadhyay, S .....40  
 Chaudhuri, S .....166  
 Chauhan, N .....48  
 Chauhan, R .....99, 134, 137, 202, 247  
 Chavira, A .....211  
 Cha, W .....59, 90  
 Chawla, N .....52, 80, 127, 147, 162,  
 192, 196, 251, 270  
 Checkeye, J .....87  
 Chen, A .....90, 125, 149, 185  
 Chen, B .....86, 116, 121, 188, 267, 271  
 Chen, C .....34, 56, 64, 67, 86, 93, 104,  
 127, 138, 139, 152, 159,  
 160, 179, 203, 209, 230, 276  
 Chen, D .....29, 211, 230  
 Chen, E .....22, 35, 68, 134  
 Chen, G .....90, 188, 283  
 Cheng, C .....232  
 Cheng, D .....194, 200  
 Cheng, G .....8, 205  
 Cheng, I .....98  
 Cheng, J .....41, 72, 101, 115, 145, 166,  
 209, 274  
 Cheng, M .....120, 188, 257, 267  
 Cheng, N .....139  
 Cheng, P .....68  
 Cheng, T .....164  
 Cheng, Y .....156, 252, 266  
 Chen, H .....74, 132, 160  
 Chen, I .....93  
 Chen, J .....87, 92, 125, 128, 199,  
 228, 233, 250, 293  
 Chen, K .....86, 114, 195, 260  
 Chen, L .....24, 27, 70, 86, 130, 131,  
 164, 170, 232

- Chen, M. . . . . 36, 83, 135, 149, 171, 205, 228, 231, 250, 272, 300
- Chen, N. . . . . 168, 261
- Chen, P. . . . . 88, 93, 127, 155, 191, 192, 220, 243, 254, 268, 277, 297
- Chen, Q. . . . . 73, 74, 169
- Chen, R. . . . . 89
- Chen, S. . . . . 18, 35, 40, 48, 55, 60, 74, 83, 85, 102, 104, 110, 121, 127, 143, 152, 188, 251, 265, 267, 269, 277
- Chen, T. . . . . 11, 30, 32, 38, 65, 66, 79, 83, 102, 104, 115, 134, 135, 164, 169, 181, 204, 230, 249, 274, 289
- Chen, w. . . . . 15
- Chen, W. . . . . 10, 30, 34, 55, 79, 83, 86, 110, 114, 125, 127, 128, 132, 160, 165, 172, 205, 211, 217, 223, 224, 228, 229, 240, 250, 282, 285
- Chen-Wiegart, K. . . . . 29, 62
- Chen-Wiegart, Y. . . . . 29, 62, 99, 133, 166, 201, 227, 247, 272
- Chen, X. . . . . 9, 96, 102, 122, 149, 173, 174, 177, 188, 209, 230, 241, 261, 264, 274, 285
- Chen, Y. . . . . 13, 30, 31, 33, 46, 50, 63, 66, 67, 73, 80, 83, 93, 100, 103, 134, 137, 141, 156, 160, 168, 171, 186, 203, 206, 221, 222, 229, 233, 248, 252, 257, 274, 286
- Chen, Z. . . . . 58, 186, 207, 215, 244, 254, 296
- Chernenko, V. . . . . 77, 152
- Chern, J. . . . . 117
- Chernov, A. . . . . 168
- Cherukara, M. . . . . 20, 51, 90
- Chesetti, A. . . . . 10, 17, 44, 168
- Chesser, I. . . . . 52, 88, 125
- Chesetti, A. . . . . 289
- Chester Jude Emmanuel, M. . . . . 32
- Cheu, D. . . . . 194, 269
- Chevalier, C. . . . . 82, 85
- Chevalier, G. . . . . 48, 78
- Chevallier, G. . . . . 252
- Chevalme, R. . . . . 224, 265, 266, 271
- Che, Y. . . . . 296
- Chhetri, S. . . . . 75
- Chhotaray, A. . . . . 48
- Chiang, C. . . . . 93
- Chiang, H. . . . . 48, 267
- Chi, C. . . . . 186
- Chidambaram, D. . . . . 166, 184, 201, 227, 254
- Chidere, S. . . . . 36
- Chien, T. . . . . 150
- Chi Ho, N. . . . . 145
- Chikada, T. . . . . 32
- Childers, M. . . . . 189
- Childs, B. . . . . 70
- Childs, H. . . . . 159
- Childs, M. . . . . 94
- Chin, J. . . . . 213
- Chino, Y. . . . . 227
- Chintalapalle, R. . . . . 8, 111, 143, 179, 212, 238, 255, 281
- Chinwego, C. . . . . 175
- Chipman, G. . . . . 140
- Chisholm, M. . . . . 194, 261
- Chitnis, K. . . . . 213
- Chittick, C. . . . . 246
- Chitturi, V. . . . . 170
- Chiu, H. . . . . 31, 104, 240
- Chiu, L. . . . . 232
- Chiu, M. . . . . 68, 127, 233, 252
- Chiumenti, M. . . . . 245
- Chiu, W. . . . . 18, 48, 85, 121, 127, 152, 188, 267
- Chiu, Y. . . . . 138
- Chi, Y. . . . . 188
- Chmielewska, J. . . . . 13
- Chmielewski, M. . . . . 267
- Chmielowski, M. . . . . 85
- Chmielus, M. . . . . 8, 9, 77, 112, 113, 145, 180, 182, 214, 239, 259, 285, 286, 290
- Cho, A. . . . . 292
- Choe, J. . . . . 79, 297
- Cho, H. . . . . 161, 296
- Cho, I. . . . . 90
- Choi, A. . . . . 213, 217
- Choi, D. . . . . 8, 276, 277, 280, 281
- Choi, H. . . . . 17, 91, 266, 280, 282, 292
- Choi, I. . . . . 83, 280
- Choi, J. . . . . 12, 42, 43, 80, 116, 148, 168, 184, 263, 268, 279, 287
- Choi, M. . . . . 31, 99, 263, 267
- Choi, P. . . . . 11, 190, 239, 267, 280
- Choi, S. . . . . 51, 137, 163, 170, 201, 264, 274, 290, 299
- Choi, T. . . . . 267, 277
- Choi, W. . . . . 190, 279
- Choi, Y. . . . . 58, 69, 90, 136, 240, 266
- Cho, J. . . . . 10, 94, 116, 170, 277, 286
- Cho, K. . . . . 12, 245, 283
- Chokshi, A. . . . . 168
- Cho, L. . . . . 38, 72, 108, 142, 280
- Chollet, M. . . . . 21, 171
- Cho, M. . . . . 196
- Choma, T. . . . . 10, 208
- Chommaux, T. . . . . 233, 238
- Cho, N. . . . . 259
- Chong, L. . . . . 197, 218
- Chong, Y. . . . . 120
- Chopra, A. . . . . 86
- Choragwicki, B. . . . . 224
- Cho, S. . . . . 56, 280, 298
- Chotrattanapituk, A. . . . . 120, 257
- Choubey, R. . . . . 267
- Choudhari, A. . . . . 84, 234, 266, 290
- Choudhary, A. . . . . 261
- Choudhary, K. . . . . 17, 47, 84, 120, 151, 187, 217, 241, 291
- Choudhary, S. . . . . 197, 286
- Choudhuri, D. . . . . 283
- Choudhury, A. . . . . 235
- Choudhury, P. . . . . 295
- Choudhury, S. . . . . 17, 97, 184, 187, 193, 213, 226, 231, 287, 288
- Chou, J. . . . . 104
- Chou, P. . . . . 138, 286
- Chourasia, R. . . . . 49
- Chou, Y. . . . . 16
- Cho, W. . . . . 26
- Cho, Y. . . . . 219, 280, 281, 286
- Choy-Hernandez, K. . . . . 113
- Choy, J. . . . . 226, 275
- Christadore, S. . . . . 35, 83
- Christ, H. . . . . 224
- Christodoulou, P. . . . . 184
- Christofidou, K. . . . . 68, 173, 178, 212, 222, 230, 237, 281
- Christopher, A. . . . . 192
- Christopher, C. . . . . 146
- Christudasjustus, J. . . . . 83, 99, 141
- Chrominski, W. . . . . 47, 223, 248, 292
- Chrzan, D. . . . . 15, 144
- Chua, J. . . . . 134
- Chuang, C. . . . . 250
- Chuang, M. . . . . 23, 55
- Chuang, Y. . . . . 143, 152
- Chua, S. . . . . 203
- Chuirazzi, W. . . . . 13, 52, 82, 106, 197
- Chu, K. . . . . 243
- Chukwu, J. . . . . 271
- Chulist, R. . . . . 21, 22, 45, 119, 185, 265, 282
- Chu, M. . . . . 20
- Chung, B. . . . . 211
- Chung, D. . . . . 26
- Chung, G. . . . . 267
- Chung, H. . . . . 161, 291
- Chung, K. . . . . 60, 276
- Chung, M. . . . . 67
- Chung, S. . . . . 10, 286
- Chung, T. . . . . 138
- Chung, U. . . . . 252
- Chung, Y. . . . . 93, 127
- Chu, R. . . . . 236
- Church, B. . . . . 126, 224
- Church, N. . . . . 16, 52, 101
- Chu, S. . . . . 66, 71
- Chu, Y. . . . . 103, 138
- Chu, Z. . . . . 53, 60
- Ciccio, L. . . . . 241
- Cicek, Y. . . . . 128
- Cichocki, K. . . . . 130
- Cieślak, G. . . . . 292
- Ciftci, J. . . . . 10, 208, 257

- Cillessen, D ..... 215  
 Cinar Sahin, F ..... 128  
 Cinbiz, N ..... 223  
 Cinkilic, E ..... 292  
 Ciupiński, Ł ..... 223, 267  
 Civiero, R ..... 248  
 Claisse, A ..... 170  
 Clancy, P ..... 183  
 Clare, A ..... 79  
 Clark, A ..... 153  
 Clark, C ..... 20  
 Clark, E ..... 258  
 Clarke, A ..... 27, 47, 76, 114, 138, 176, 284, 288  
 Clarke, K ..... 22, 47, 138, 269  
 Clark, L ..... 287  
 Clark, M ..... 298  
 Clark, R ..... 62  
 Clark, S ..... 122, 180  
 Clark, T ..... 33, 66, 103, 137, 171, 206, 223  
 Clausen, B ..... 21, 68  
 Clausius, B ..... 61  
 Clausner, A ..... 31, 63  
 Clayton, R ..... 296  
 Cleek, C ..... 77  
 Clement, C ..... 33, 63, 66, 103, 137, 170, 177, 205, 211, 231, 236, 249, 275  
 Clement, E ..... 235  
 Clemmer, J ..... 221  
 Cleveland, M ..... 103  
 Cline, J ..... 238, 250  
 Clingerman, E ..... 260, 261  
 Cloetens, P ..... 90  
 Clouet, E ..... 187  
 Clowers, L ..... 102  
 Cloyd, A ..... 155, 243  
 Cluff, E ..... 193, 245  
 Clyne, B ..... 31, 209  
 Çınar Şahin, F ..... 131  
 Coates, C ..... 286, 288  
 Coatney, E ..... 38  
 Cobb, C ..... 129  
 Cobb, J ..... 245  
 Cobuci, B ..... 104, 276  
 Cocke, C ..... 80  
 Cockeram, B ..... 202  
 Cocks, A ..... 196  
 Codd, D ..... 146, 274  
 Coelho, A ..... 294  
 Coelho, D ..... 259  
 Coello Ramirez, I ..... 141  
 Coenen, J ..... 157  
 Coghlan, L ..... 62, 142  
 Cohendoz, S ..... 25  
 Cohen-Karni, I ..... 250  
 Cohen, M ..... 24, 150  
 Cohn, R ..... 89  
 Cole, H ..... 207  
 Coleman, J ..... 287, 297  
 Coleman, S ..... 50  
 Coles, J ..... 206  
 Colineau, E ..... 107  
 Colin, J ..... 247  
 Colldeweih, A ..... 202  
 Colligan, K ..... 225, 245  
 Collins, C ..... 84, 217  
 Collins, D ..... 78, 207, 230  
 Collins, P ..... 35, 121, 150, 182, 222, 289, 298  
 Colombo, G ..... 115  
 Colon, B ..... 209  
 Colon, F ..... 196  
 Colorado, H ..... 8, 19, 67, 77, 88, 104, 113, 145, 180, 275, 276, 285  
 Colorado L., H ..... 257  
 Colorado Lopera, H ..... 104, 275, 276, 286  
 Colvin, E ..... 182  
 Compton, B ..... 245  
 Compton, N ..... 259  
 Conceição, K ..... 46  
 Conдеми, E ..... 258  
 Conklin, D ..... 254  
 Connelly, S ..... 64  
 Connolly, D ..... 135  
 Connors, P ..... 15, 160, 197  
 Conrad, J ..... 140  
 Conry, B ..... 89, 205  
 Conway, P ..... 119  
 Cook, A ..... 140, 221  
 Cook, D ..... 15, 43, 83, 113, 114, 120, 124, 261  
 Cooper, D ..... 241  
 Cooper, J ..... 258  
 Cooper, K ..... 16, 34, 76, 99, 134  
 Cooper, M ..... 33, 66, 84, 94, 137, 170  
 Copeland Johnson, T ..... 196  
 Copeland-Johnson, T ..... 30, 62  
 Coppola, B ..... 147  
 Copp, S ..... 35, 83, 102  
 Cordero, Z ..... 32, 40, 44, 141, 255  
 Cordill, M ..... 26, 203, 216, 223  
 Corkhill, C ..... 108  
 Cormier, J ..... 44, 141, 147, 178, 212, 234  
 Cornet, L ..... 195  
 Corona, E ..... 167  
 Corona, J ..... 221  
 Corpus, J ..... 283  
 Correa, A ..... 117, 184  
 Correa, D ..... 147  
 Cortes, P ..... 259, 282  
 Costa, M ..... 109, 178, 211  
 Cote, D ..... 119, 208, 259, 260, 261  
 Côté, J ..... 55  
 Cote, P ..... 87  
 Cottura, M ..... 59  
 Couedel, V ..... 289  
 Couet, A ..... 24, 29, 30, 62, 99, 133, 135, 197, 201, 226, 227, 236, 237, 246, 272, 275  
 Courtney, J ..... 299  
 Courtright, Z ..... 12, 245  
 Coury, F ..... 165, 200, 279, 298  
 Coustier, F ..... 106  
 Coutinho, N ..... 276  
 Couzinie, J ..... 13, 14, 38, 81, 141, 161, 165, 209  
 Couzinié, J ..... 83, 187, 235, 272  
 Coverdale Rangel Velasco, D ..... 67, 104, 268, 276  
 Covin, P ..... 212  
 Cowley, I ..... 139, 239  
 Cox, C ..... 245  
 Cox, S ..... 155  
 Coyne, J ..... 162, 245  
 Crabbe, M ..... 249  
 Crabtree, E ..... 12  
 Cramer, B ..... 159  
 Crawford, G ..... 198, 254, 259, 283  
 Crawford, I ..... 115  
 Crawford, K ..... 139  
 Cremer, J ..... 250  
 Crespillo, M ..... 34, 101  
 Cresswell, Z ..... 107  
 Cretton, A ..... 38, 80  
 C. Riffel, K ..... 287  
 Crigger, J ..... 260  
 Cristofolini, I ..... 174  
 Crnkovich, N ..... 24, 135, 197, 236  
 Croell, A ..... 254  
 Croft, Z ..... 188  
 Crook, P ..... 70  
 Croom, B ..... 75  
 Crossman, B ..... 14, 57, 81, 165  
 Crozatti Rocha, L ..... 105  
 Cruchley, A ..... 72, 297  
 Crum, J ..... 71, 237  
 Cruz, E ..... 55  
 Cruz Junior, E ..... 294  
 Cruz, L ..... 295  
 Cruz Ramirez, A ..... 264  
 Cruz-Ramírez, A ..... 295, 296  
 Cucciniello, N ..... 185  
 Cui, B ..... 25, 57, 95, 118, 128, 149, 160, 161, 197, 223, 224, 230, 270  
 Cui, J ..... 8, 22, 49, 118, 149, 176, 269  
 Cui, W ..... 269  
 Cui, X ..... 293, 295  
 Cullinan, M ..... 106  
 Cullison, M ..... 66  
 Culter, I ..... 245  
 Cundiff, K ..... 133, 149  
 Cunningham, A ..... 134  
 Cunningham, C ..... 77  
 Cunningham, W ..... 105, 277  
 Cureton, W ..... 205, 243

- Curry, J. . . . . 143  
 Curtarolo, S. . . . . 46  
 Curtins, T. . . . . 208  
 Curtin, W. . . . . 50, 156  
 Curtis, N. . . . . 24, 135, 197, 246  
 Curtis, T. . . . . 198  
 Curtit, F. . . . . 128  
 Cusentino, M. . . . . 169  
 Custer, J. . . . . 143  
 Custodio, A. . . . . 266  
 Cygan, R. . . . . 277, 278  
 Cymerman, K. . . . . 267  
 Czajka, A. . . . . 21  
 Czech, A. . . . . 45, 115, 265, 286  
 Czerwinski, K. . . . . 133
- D**
- Dabaghi, M. . . . . 223  
 Dabhade, V. . . . . 261  
 Dabney, T. . . . . 15, 45, 71  
 Dabo, I. . . . . 53  
 Dacheux, N. . . . . 108  
 da Costa Cesar, G. . . . . 50  
 Da Costa Cesar, G. . . . . 50  
 da Cunha, B. . . . . 221  
 Dacus, B. . . . . 44  
 Dada, M. . . . . 228  
 Daehn, G. . . . . 129, 300  
 Daffron, M. . . . . 217  
 Daghbouj, N. . . . . 223, 275  
 Dag Herman, A. . . . . 55  
 Dahlbom, D. . . . . 206  
 Dahl, R. . . . . 192  
 Dahmani, M. . . . . 147  
 Dahotre, N. . . . . 10, 13, 17, 22, 115, 118,  
 146, 174, 222, 239, 240, 289  
 Daigle, S. . . . . 266  
 Dailey, N. . . . . 62, 206  
 Daira, R. . . . . 264  
 Dai, S. . . . . 201, 227, 272  
 Daisuke, A. . . . . 42  
 Dai, W. . . . . 90, 125  
 Dai, Y. . . . . 61  
 Dake, J. . . . . 97, 125, 193  
 Dalaker, H. . . . . 56, 169, 270  
 Dal Forno Chuahy, F. . . . . 205  
 Dalvi, G. . . . . 28  
 Daly, M. . . . . 165, 266  
 Dameron, A. . . . . 146, 285  
 Damjanovic, N. . . . . 133  
 Damm, D. . . . . 109  
 Dana, A. . . . . 53  
 Danard, Y. . . . . 16  
 Dancer, C. . . . . 252  
 Dang, J. . . . . 19  
 Dang, k. . . . . 125  
 Dang, K. . . . . 151, 157  
 Dang, R. . . . . 206
- Daniyan, A. . . . . 175, 221, 281  
 Dantin, M. . . . . 213  
 Dan, X. . . . . 244  
 Daraz, U. . . . . 293  
 Darji, M. . . . . 288  
 Darling, K. . . . . 208, 278  
 Darnbrough, E. . . . . 202  
 Darsell, J. . . . . 38, 157, 249  
 Darvishi Alamdari, H. . . . . 242  
 Darvishi Kamachali, R. . . . . 97, 186  
 Das, A. . . . . 80, 109, 180, 189  
 Dasari, S. . . . . 13, 37, 44, 60, 92, 117, 119,  
 132, 138, 165, 168, 173, 196,  
 200, 226, 246, 298  
 Dasch, K. . . . . 110  
 Das, D. . . . . 238  
 Dasgupta, A. . . . . 31  
 Dasgupta, D. . . . . 56, 230  
 Dasgupta, S. . . . . 283  
 Das Gupta, T. . . . . 45  
 Das, H. . . . . 37, 110, 162  
 Dash, S. . . . . 11, 180, 265  
 da Silva, C. . . . . 50, 223  
 da Silva Leal, J. . . . . 105  
 da Silva, R. . . . . 104  
 Das, K. . . . . 80, 83, 142, 263, 278, 281  
 Das, N. . . . . 238  
 Das, P. . . . . 258, 289  
 Das, R. . . . . 84, 86, 271  
 Das, S. . . . . 33, 42, 51, 80, 83, 153, 169,  
 179, 240, 263, 278, 281, 295  
 Daub, K. . . . . 275  
 Daut, N. . . . . 105  
 Daugela, A. . . . . 156  
 Daugela, J. . . . . 156  
 Daugela, M. . . . . 156  
 Daum, L. . . . . 193  
 Daut, L. . . . . 10  
 Davami, K. . . . . 11, 79, 115, 171, 181, 289  
 Davey, T. . . . . 73  
 David, R. . . . . 194  
 Davidson, J. . . . . 95  
 Davidson, L. . . . . 287  
 Davies, H. . . . . 261  
 Davies, M. . . . . 205  
 Davila Morales, R. . . . . 288  
 Daviou, M. . . . . 219  
 Davis, B. . . . . 44  
 Davis, C. . . . . 29, 61, 133, 269, 299  
 Davis, D. . . . . 71, 245, 282, 300  
 Davis, K. . . . . 36  
 Davis, M. . . . . 16  
 Davis, S. . . . . 44, 191  
 Daw, M. . . . . 21  
 Dawson, P. . . . . 79  
 Dayal, K. . . . . 125  
 Dayton, M. . . . . 21  
 De Almeida, M. . . . . 75  
 de Almeida, R. . . . . 106
- De Alwis Goonatilleke, M. . . . . 206  
 Dean, L. . . . . 225, 245  
 Dean, Q. . . . . 45  
 de Azevedo, A. . . . . 269, 276  
 De Baglion, L. . . . . 128  
 Deb, B. . . . . 258  
 Debéda, H. . . . . 252  
 Debeer-Schmitt, L. . . . . 188  
 DeBeer-Schmitt, L. . . . . 61  
 Debiak, N. . . . . 99  
 Deb, P. . . . . 164  
 Deb, S. . . . . 244  
 De Carlan, Y. . . . . 249, 272  
 De Caro, D. . . . . 30, 285  
 de Carvalho, E. . . . . 269  
 de Cassia Oliveira Carneiro, A. . . . . 294  
 Dechaine, C. . . . . 11  
 Dechent, M. . . . . 122  
 Deck, C. . . . . 44, 221  
 Decker, F. . . . . 21  
 Decker, P. . . . . 189  
 DeCost, B. . . . . 47, 209, 232, 246  
 Dedeci, O. . . . . 259  
 Dee, P. . . . . 47  
 Defer, M. . . . . 283  
 Deffrennes, G. . . . . 218  
 Defranco, T. . . . . 113  
 de Freitas, L. . . . . 104, 276  
 DeGarmo, K. . . . . 183  
 Degener, S. . . . . 257  
 De Gorostiza, A. . . . . 240  
 De Graef, M. . . . . 11, 42, 43  
 DeGraef, M. . . . . 52  
 Dehm, G. . . . . 79, 134  
 Dehoff, R. . . . . 78  
 Deisenroth, D. . . . . 69  
 Deitz, J. . . . . 173  
 Dejoie, C. . . . . 52, 207  
 deJong, A. . . . . 186  
 deJong, M. . . . . 78  
 de Kloe, R. . . . . 170  
 Delabrouille, F. . . . . 128  
 Delagnes, A. . . . . 272  
 De lamater-Brotherton, C. . . . . 62  
 De Lamater-Brotherton, C. . . . . 63  
 De Landtsheer, J. . . . . 252  
 Delaney, C. . . . . 105  
 Delannoy, S. . . . . 186, 187  
 Delaporte-Mathurin, R. . . . . 166  
 Delaqua, G. . . . . 276, 294  
 De La Torre, J. . . . . 100  
 De Leo, M. . . . . 58, 101, 204  
 De Leon, A. . . . . 272  
 Delfino De Campos Neto, N. . . . . 165, 254  
 della Ventura, N. . . . . 141  
 Delloro, F. . . . . 45  
 Delp, A. . . . . 57  
 Delrio, F. . . . . 111  
 DelRio, F. . . . . 11, 78, 143, 274



- de Luis, R. . . . .184  
Demchenko, P. . . . .270  
de Melo, E. . . . .104  
Demeneghi, G. . . . .178  
DeMeritt, J. . . . .69  
Demetriou, M. . . . .142  
DeMeyere, E. . . . .147, 204  
Domingos, P. . . . .206  
Demirci, K. . . . .10  
Demircivi, P. . . . .128  
Demkowicz, M. . . . .34, 248  
De Moor, E. . . . .68  
Demopoulos, G. . . . .28, 36  
Deng, B. . . . .295  
Deng, C. . . . .22, 126, 197  
Deng, X. . . . .86  
Deng, Y. . . . .128  
Deng, Z. . . . .69, 174, 293  
de Nicolas-Morillas, M. . . . .234  
Dennett, C. . . . .53, 102  
Denninger, P. . . . .183  
Denonno, O. . . . .214  
Densham, C. . . . .141  
Dentinger, B. . . . .88  
Deo, C. . . . .18, 298  
Deodhar, H. . . . .46, 190, 240  
de Oliveira, J. . . . .276  
de Oliveira, J. . . . .276  
de Oliveira, M. . . . .254  
DePond, P. . . . .157  
Depree, N. . . . .87  
Derby, B. . . . .29, 34, 58, 95, 99,  
101, 128, 237  
Dergaoui, A. . . . .207  
Derimow, N. . . . .11, 75, 78, 96, 130, 280  
Derlet, P. . . . .39, 73, 109, 142, 178,  
211, 237, 254, 281  
De, S. . . . .258, 289  
Desai, H. . . . .236  
Desai, J. . . . .261  
Desai, S. . . . .17, 47, 48, 84, 85, 120, 121,  
151, 187, 217, 218, 241, 291, 292  
Deshmukh, K. . . . .288  
Deshpande, A. . . . .189  
Desorcy, L. . . . .37  
de Stefano Cavazos, S. . . . .273  
Detisch, M. . . . .45, 255  
Detlefs, C. . . . .80  
Detroit, M. . . . .34, 58, 72, 178, 197,  
212, 237, 281  
Detsi, E. . . . .12, 43, 80, 116, 148, 184, 263  
Devanathan, R. . . . .153, 190, 219, 242, 293  
Devaraj, A. . . . .10, 17, 34, 71, 72, 92, 110,  
119, 120, 126, 134, 191, 193,  
196, 200, 232, 233, 275  
Devesa, I. . . . .294  
Devulapalli, V. . . . .22, 79, 229  
Dewanjee, P. . . . .202  
Dewitt, S. . . . .239  
Dey, A. . . . .111, 190  
Dey, K. . . . .65  
Deymier, P. . . . .251  
Dey, S. . . . .149  
Dhakal, T. . . . .258  
Dhal, A. . . . .79, 100, 190, 287  
Dhariwal, D. . . . .198  
Dhas, J. . . . .139  
Dhingra, S. . . . .16  
Dhoka, S. . . . .149  
Dholabhai, P. . . . .27  
Dhole, A. . . . .164  
Dhulipala, S. . . . .145, 206  
Diak, B. . . . .89  
Dialami, N. . . . .245  
Dial, L. . . . .78, 116, 209  
Diallo, A. . . . .65  
Diamond, J. . . . .64  
Diamond, M. . . . .207  
Diao, J. . . . .209, 262  
Diao, Y. . . . .35  
Dias, C. . . . .221  
Diatta, J. . . . .139  
Diaz, A. . . . .20, 51, 90  
Diaz Abreu, A. . . . .205  
Diaz, D. . . . .48, 121  
Diaz, F. . . . .210  
Dickel, D. . . . .219  
Dickens, T. . . . .278  
Dickerson, D. . . . .215  
Dickey, M. . . . .106, 129  
Dicus, A. . . . .115  
Diebold, T. . . . .149  
Di, G. . . . .278  
Digole, S. . . . .84, 234, 266, 290  
Dikra, B. . . . .268, 295  
Di Lemma, F. . . . .275  
Dillon, S. . . . .91, 94, 103  
DiMarco, B. . . . .250  
Di Mattia, R. . . . .115  
Dimiduk, D. . . . .136, 187  
Dimithe Aboumou, L. . . . .84  
Dinda, G. . . . .79  
Ding, D. . . . .236  
Ding, H. . . . .245  
Ding, K. . . . .64  
Ding, R. . . . .148, 203  
Dingreville, R. . . . .17, 18, 31, 48, 85, 91,  
103, 111, 121, 124, 151, 187,  
193, 218, 292, 296, 298  
Ding, W. . . . .213, 265  
Ding, Y. . . . .83  
Diniz, C. . . . .17  
Diop, M. . . . .87, 153  
Diplas, S. . . . .282  
Dirba, I. . . . .45  
Dissanayake, S. . . . .151, 300  
Ditter, A. . . . .211  
Divakaran, A. . . . .18  
Divinskyi, S. . . . .21, 91  
Dixit, S. . . . .183  
Dixit, T. . . . .47  
Dixon, C. . . . .62, 273  
Dixon Wilkins, M. . . . .262  
Di, Y. . . . .223  
Djafia, Z. . . . .263  
Djinigou, S. . . . .191  
Dlouhý, A. . . . .11  
Dmowski, W. . . . .150  
Doğan, Ö. . . . .15, 197  
Dobbin, F. . . . .126  
Dobkowska, A. . . . .142, 287  
Dobricic, M. . . . .147  
Doddapaneni, V. . . . .139  
Dodge, B. . . . .146  
Dogan, N. . . . .81  
Doiron, P. . . . .242  
Dokumaci Alkan, E. . . . .118, 128, 241  
Dolde, M. . . . .150, 222, 298  
Doles, R. . . . .182  
Dollmann, A. . . . .266  
Dolmetsch, T. . . . .13, 141, 288  
Do, M. . . . .89  
Domenech, D. . . . .77  
Dominguez, M. . . . .189  
Dominic, J. . . . .29, 212  
Donald, A. . . . .138  
Donald, S. . . . .211  
Donchev, A. . . . .142  
Donegan, S. . . . .170  
Dongare, A. . . . .50, 64, 88, 171,  
203, 216, 230  
Dong, C. . . . .213, 265  
Dong, F. . . . .14, 44, 81, 118, 149, 264  
Dong, J. . . . .34, 38, 216  
Dong, K. . . . .90, 125  
Dong, S. . . . .120, 229  
Dong, W. . . . .181, 223, 253  
Dong, X. . . . .19, 50, 133  
Donik, . . . . .283, 287  
Donik, C. . . . .142, 283  
Donkor, B. . . . .247  
Donnerbauer, K. . . . .162  
Donoghue, J. . . . .68  
Donohoe, B. . . . .218  
Doran, S. . . . .30, 134  
Dorari, E. . . . .41  
Doremus, L. . . . .128  
Dorin, T. . . . .177, 210  
Dorman, K. . . . .31  
Doroudi, A. . . . .171  
Dos Santos, A. . . . .172  
dos Santos, J. . . . .207  
Dos Santos, J. . . . .114, 162, 198  
Douglas, G. . . . .116  
Douglas, O. . . . .246  
Douglass, D. . . . .182  
Douin, J. . . . .186

- Doustkhah, E . . . . . 27, 59, 98, 131, 272  
Dowden, S . . . . . 115  
Dowding, I . . . . . 64  
Downard, S . . . . . 91  
Downey, C . . . . . 284  
Downs, W . . . . . 147  
Doyle, F . . . . . 60  
Doyle, J . . . . . 212  
Doyle, P . . . . . 33, 63  
Drabold, D . . . . . 199  
Draper, J . . . . . 268  
Draper, M . . . . . 130  
Draper, O . . . . . 229  
Drautz, R . . . . . 84, 157  
Dreisinger, D . . . . . 28  
Dresselhaus-Marais, L . . . . . 20, 21, 98, 171, 172  
Drewry, S . . . . . 125  
Driel, T . . . . . 171  
Driscoll, D . . . . . 43, 148  
Drnek, T . . . . . 54  
Drossel, W . . . . . 198  
Drouan, D . . . . . 250  
Dryepondt, S . . . . . 24, 56, 95, 114, 214, 239, 270  
Duan, M . . . . . 263  
Duan, T . . . . . 211  
Duan, X . . . . . 163  
Duan, Y . . . . . 109  
Duarte Lopes, F . . . . . 275, 276  
Dubey, A . . . . . 50, 219  
Dubey, M . . . . . 8, 42, 75, 111, 144, 179, 262  
Duch, J . . . . . 12  
Dudarev, S . . . . . 211  
Dudukovic, N . . . . . 206  
Duenas Gonzalez, L . . . . . 69, 250, 259  
Dufresne, E . . . . . 109  
Du, G . . . . . 269  
Dugger, M . . . . . 143  
Du, J . . . . . 50, 134, 157, 268  
Dujovic, M . . . . . 118  
Du, M . . . . . 20  
Dumas, J . . . . . 250  
Dunand, A . . . . . 135  
Dunand, D . . . . . 17, 36, 83, 103, 141, 177, 181, 218, 228  
Dunbar, C . . . . . 249  
Duncan, A . . . . . 109  
Dunkel, J . . . . . 163  
Dunn, A . . . . . 283  
Dunn, B . . . . . 117  
Dunn, E . . . . . 29  
Dunne, F . . . . . 225  
Duong, A . . . . . 15  
Duployer, B . . . . . 48, 78  
Dupuis, M . . . . . 87  
Dupuy, A . . . . . 14, 44, 81, 118, 149, 208, 264  
Durakiewicz, T . . . . . 210  
Durán, A . . . . . 14, 208  
Duran Duran, G . . . . . 193  
Durán González, M . . . . . 288  
Duran, J . . . . . 234  
Duran, S . . . . . 82  
Durnescu, A . . . . . 251  
Duscher, G . . . . . 194, 261  
Dussa, S . . . . . 118  
Düssel, R . . . . . 153, 189  
Dutra Júnior, S . . . . . 264  
Dutta, A . . . . . 180  
Duval, A . . . . . 24, 95  
Duval, C . . . . . 69  
Du, Y . . . . . 90, 126  
Du, Z . . . . . 139, 208, 260  
Dvaz, K . . . . . 49  
Dvivedi, A . . . . . 112  
Dwivedi, P . . . . . 135  
Dye, D . . . . . 84, 209  
Dyrøy, A . . . . . 153  
Dyrset, J . . . . . 153  
Dzepina, B . . . . . 129  
Dziedzic, D . . . . . 247  
Dziekan, M . . . . . 294  
Dziri, A . . . . . 290  
Dzugan, J . . . . . 286  
Dzulqornain, A . . . . . 60
- ## E
- E. Allison, J . . . . . 114  
Eapen, J . . . . . 275  
Earlam, M . . . . . 294  
Earthman, J . . . . . 124, 247, 272  
East, M . . . . . 244, 250  
Easton, M . . . . . 110, 293  
Ebeperi, D . . . . . 157  
Eberheim, R . . . . . 95  
Eberl, K . . . . . 117  
Ebert, J . . . . . 105  
Ebihara, K . . . . . 46  
Ebmeyer, W . . . . . 27  
Ebrahimi, A . . . . . 136  
Ebrahimi Kahou, S . . . . . 210  
Eccleston, E . . . . . 92  
Echeverry-Rendón, M . . . . . 147, 181, 233  
Echlin, M . . . . . 11, 43, 175, 184  
Eckert, J . . . . . 40, 73, 109, 142, 228, 254  
Eckes, K . . . . . 114  
Edionweme, S . . . . . 192  
Edmondson, P . . . . . 194  
Edmunson, J . . . . . 139  
Edwards, C . . . . . 143  
Edwards, D . . . . . 43  
Edwards, J . . . . . 25, 96, 130, 279  
Edwards, L . . . . . 49, 54, 65, 86, 87, 93, 122, 136, 152, 153, 159, 169, 177, 188, 189, 210, 218, 219, 223, 235, 241, 242, 253, 292, 299  
Edwards, T . . . . . 100, 101, 203, 229  
Efe, I . . . . . 161  
Efe, M . . . . . 37, 110  
Eff, M . . . . . 129  
Eftink, B . . . . . 30, 63, 71, 100, 127, 134, 167, 202, 207, 229, 248, 273  
Egami, T . . . . . 109, 150, 192  
Egan, A . . . . . 19, 173  
Egberts, P . . . . . 150  
Eger, Z . . . . . 84, 144  
Eggeler, G . . . . . 173, 193, 225, 253, 278  
Eggemeyer, J . . . . . 219  
Ehigie, C . . . . . 271  
Ehmann, K . . . . . 300  
Eidem, P . . . . . 56, 223  
Eiken, J . . . . . 110  
Einarsrud, K . . . . . 189, 242  
Eisenlohr, P . . . . . 184  
Ekaputra, C . . . . . 141  
Eka, S . . . . . 190, 291  
Eklof, N . . . . . 197  
Ekstrøm, K . . . . . 140  
Ekubaru, Y . . . . . 283  
Elahi, P . . . . . 184  
Elangovan, E . . . . . 43  
El-Atab, N . . . . . 163  
Elattar, A . . . . . 278  
El Atwani, O . . . . . 71, 192, 204  
El-Atwani, O . . . . . 157, 204, 229  
El Awady, J . . . . . 182, 289  
El-Awady, J . . . . . 43, 84, 120  
El-Azab, A . . . . . 17, 48, 80, 116, 124, 212, 248  
El-Badour, F . . . . . 162  
Elbakhshwan, M . . . . . 37, 70, 279  
Eldaly, O . . . . . 85  
El-Danaf, E . . . . . 113  
Eldeeb, A . . . . . 49  
Elder, K . . . . . 146, 265  
El-Garaihy, B . . . . . 116  
El Hachimi, M . . . . . 124  
El Hadad, Y . . . . . 224, 265, 266, 271  
Elhattab, K . . . . . 91  
El-Hiti, G . . . . . 147, 291, 295  
El-Husseiny, M . . . . . 113  
Eliasson, G . . . . . 109  
Eliaz, N . . . . . 76, 113, 282, 283, 284, 285  
Eliseeva, O . . . . . 105  
Elissalde, C . . . . . 252  
Elkaffas, R . . . . . 8  
Elleithy, M . . . . . 144  
Ellendt, N . . . . . 79  
Ellevseth, B . . . . . 65  
Ellingsen, M . . . . . 45  
Ellis, A . . . . . 98  
Ellis, D . . . . . 73  
Ellissalde, C . . . . . 252  
Ellyson, B . . . . . 38, 71, 222  
Elnunu, I . . . . . 50, 65, 124, 268  
Elsaadany, M . . . . . 147

- El Saadany, O .....116  
 Elsayed, A ..... 99, 152, 210  
 Elstad, K. ....153  
 Elton, E. ....208  
 Emad, B .....204  
 Emanet, S. ....245  
 Emerson, J. .... 100, 108, 160, 231  
 Emery, J .....173  
 Emile, P .....186  
 Emil Kaya, E .....106, 140  
 Emmanuel, M .....32  
 Endsley, M. ....197, 262  
 Ener, S .....45  
 Engelman, B .....220  
 Engel, N .....156, 270  
 Eng Granlund, H .....153  
 Engle, J .....30  
 Eng, P .....251  
 Engquist, M. ....259  
 Enikeev, N .....238  
 Ensari, T .....260  
 Enstrom, S .....159  
 Enzinger, N .....198  
 Episcopo, N .....238  
 Epler, M .....115  
 Erb, U .....171  
 Erdemir, A .....212  
 Erdeniz, D .....54  
 Eres-Castellanos, A ...26, 34, 58, 68, 97,  
 105, 130, 138, 164, 173, 207,  
 233, 251, 277, 284, 288, 298  
 Ericok, O .....126  
 Eriksen, A .....235  
 Eriksen, N .....159  
 Erikson, W .....234  
 Eriksson, O .....14  
 Erman, J .....87  
 Ermisyam, I. .... 49, 219, 242  
 Ersson, M .....239  
 Ertekin, E .....60  
 Esakoff, J .....148  
 Escamilla García, M .....268  
 Escarcega Herrera, K .....16  
 Escobar Atehortua, J .....199  
 Escobar, F .....238  
 Escobar, I .....216  
 Escobar, J ..... 43, 198, 207  
 Escobar-Moreno, I .....161  
 Escobedo-Díaz, J ...20, 52, 90, 100, 125,  
 156, 193, 221, 294, 295  
 Esfahani, M .....75  
 Esfandiarpour, A .....13  
 Eshelman, H .....299  
 Eshraghi, M. ....259, 260  
 Eskandari Sabzi, H .....97  
 Eskin, D ..... 49, 65, 122, 180, 239  
 Esola, S .....259  
 Espedal, T .....207  
 Espersen, J. ....63, 202  
 Espinosa, A .....106  
 Espinosa, D .....28  
 Espinosa-Marzal, R .....295  
 Estermann, S. ....211  
 Esteves, A. ....294  
 Esteves de Araújo, J .....82  
 Estournes, C .....252  
 Estrada, D ..... 35, 68, 106, 139, 174  
 Estrada, K .....289  
 Estrada Ospino, E. ....45  
 Estrin, Y. ...26, 58, 96, 129, 163, 199, 298  
 Eswarappa Prameela, S .....32  
 Etherington-Rivas, M .....175  
 Etienne, E. ....271  
 Euh, K .....49, 219  
 Evans, A. ....197, 214  
 Evans, W .....12  
 Evered, C .....30, 99  
 Everhart, B. ....212  
 Evirgen, A .....79  
 Ewing, R. ....108  
 Eyert, V .....89  
 Ezzat, A .....124
- F**
- Fabas, C .....45  
 Faber, K ..... 80, 101, 203  
 Faberman, S. ....132, 200  
 Fabijanec, D .....239  
 Fabris, M .....135  
 Fackler, P .....178  
 Faderin, E .....271  
 Fahrman, M ..... 41, 70, 74, 216  
 Faierson, E. ....174  
 Fajardo, S .....237  
 Falconer, C. ....30, 201  
 Faleschini, F .....106  
 Falini, G .....46  
 Falk, M. ....85, 89, 125, 165, 200,  
 224, 237, 296  
 Falkowski, A .....218  
 Fan, A. ....186, 271  
 Fancher, C .....72, 297  
 Fang, C. ....31, 86, 209  
 Fang, H. ....97  
 Fang, L .....21, 171  
 Fang, Y. ....124  
 Fang, Z. ....113, 187  
 Fan, H. ....19, 268  
 Fani, M. ....200, 229, 297  
 Fani, N. ....67, 183, 215, 262, 288, 299  
 Fan, J. ....280  
 Fantin, A .....186  
 Fan, X. ....15, 26, 46, 180, 186, 215,  
 266, 287, 297  
 Fan, Y. ...19, 33, 51, 66, 89, 103, 124, 137,  
 156, 171, 192, 206, 237, 281, 294  
 Fan, Z. ....91, 208, 222, 237  
 Faraj, M .....219  
 Farghly, M .....49  
 Farhi, E. ....65  
 Faridi, M .....83  
 Farimani, A .....288  
 Farkas, D ..... 18, 50, 154  
 Farkoosh, A. ....76, 113, 177, 282,  
 283, 284, 285  
 Farmer, K. ....242  
 Farndell, A. ....86, 285  
 Fatemi, A .....45  
 Fattahpour, S. ....158  
 Fatto Offidani, D. ....34  
 Faulkner, N .....66, 275  
 Faurie, D .....203, 238  
 Fayette, L .....250  
 Fayfar, S ..... 108, 194, 250  
 Fayomi, O .....281  
 Feaster, J. ....117  
 Feaugas, X .....25  
 Fedorov, A .....210  
 Fedyaev, T .....220  
 Feichtmayer, A .....211  
 Fei, Z. ....202  
 Feldhausen, T ..... 78, 107, 181  
 Felfer, P .....133  
 Felidj, N .....243  
 Fellah, M .....147, 263, 264, 266, 268,  
 291, 292, 295  
 Fellner, S. ....254  
 Feng, B. ....16  
 Feng, G. ....31, 64, 258  
 Feng, L ..... 19, 88, 173, 194, 248, 296  
 Feng, N. ....223  
 Feng, R. ....16, 50, 83, 161, 182,  
 226, 232, 239  
 Feng, T. ....206  
 Feng, Y. ....155  
 Feng, Z. ....57, 116, 139, 207, 214, 245  
 Fenocchio, L .....73  
 Fensin, S. ...16, 20, 51, 88, 90, 107, 125,  
 135, 157, 184, 204, 219, 220  
 Fenton, S .....260, 299  
 Ferblantier, G ...8, 42, 75, 111, 143, 144,  
 179, 212, 238, 255, 262, 281  
 Ferreira, S .....218  
 Fergus, J. ....35, 68  
 Ferguson, I. ....134  
 Ferguson, J. ....119  
 Ferk, F .....205  
 Fernandes, C. ....82, 147  
 Fernandes, V. ....50  
 Fernandes, W .....294  
 Fernández-Arteaga, J. ....51  
 Fernandez, F .....265  
 Fernandez, M .....296  
 Fernández Maestu, J. ....77  
 Fernández, N. ....77  
 Fernandez-Victorio, I. ....65

- Fernandez-Zelaia, P . . . 41, 115, 145, 239  
 Fernando, A . . . . .116  
 Ferraioli, A . . . . .55  
 Ferrè, F . . . . .30, 285  
 Ferreira, A . . . . .294  
 Ferreira, F . . . . .264, 294  
 Ferreira, J . . . . .264  
 Ferreiros, P . . . . .117  
 Ferreirós, P . . . . .81  
 Ferrigno, J . . . . .137  
 Ferry, S . . . . .44, 270, 272  
 Feygelson, B . . . . .258  
 Feygin, E . . . . .193  
 Pezzaa, K . . . . .284  
 Fiedler, K . . . . .127  
 Field, D . . . . .58, 130  
 Field, K . . . . .23, 63, 100, 102, 108, 113,  
     127, 151, 196, 207, 211  
 Field, R . . . . .165  
 Fields, B . . . . .244  
 Fields, S . . . . .16, 47, 254, 259  
 Fierro, G . . . . .290  
 Fieser, D . . . . .150  
 Figueiredo, R . . . . .199, 267  
 Figueroa Fierros, A . . . . .273  
 Figueroa, S . . . . .180  
 Fikar, J . . . . .179  
 Filho, V . . . . .50  
 Filleter, T . . . . .206  
 Fillingim, B . . . . .181  
 Fillingim, K . . . . .107  
 Finch, T . . . . .114  
 Findley, K . . . . .38, 259  
 Finel, A . . . . .17, 59  
 Finfrock, C . . . . .167, 224  
 Finkeldei, S . . . . .94, 103, 137  
 Finney, B . . . . .149  
 Fiona, S . . . . .79  
 Fiory, A . . . . .179  
 Firdaus, A . . . . .258  
 Firestone, B . . . . .148  
 Fischer, J . . . . .85  
 Fischer, M . . . . .235  
 Fishel, R . . . . .78  
 Fisher, C . . . . .145, 181, 182, 213, 214,  
     239, 287, 289  
 Fisher, G . . . . .46  
 Fisher, R . . . . .20, 238  
 Fitchorova, Y . . . . .82  
 Fitz-Gerald, J . . . . .10, 129  
 Fitzgerald, K . . . . .41, 203  
 Fitzpatrick, J . . . . .262  
 Fitzpatrick, M . . . . .113, 285  
 Fitzwater, L . . . . .135, 158  
 Fjær, H . . . . .242  
 Flaga, J . . . . .267  
 Flahaut, D . . . . .68  
 Flanagan, J . . . . .197  
 Flanagan, T . . . . .171  
 Fleischer, J . . . . .43  
 Fleming, A . . . . .21  
 Flewitt, P . . . . .142, 196  
 Flick, A . . . . .102  
 Flores, E . . . . .283  
 Flores-Guerrero, M . . . . .296  
 Flores, K . . . . .39, 73, 109, 142, 178, 211,  
     237, 240, 254, 281  
 Flores, M . . . . .271  
 Flores, N . . . . .238  
 Floro, J . . . . .208, 297  
 Flowers, J . . . . .261  
 Fluke, A . . . . .160  
 Flynn, D . . . . .62  
 Foder, J . . . . .74  
 Fohtung, E . . . . .51  
 Fokwa, B . . . . .257, 258  
 Foley, B . . . . .61, 140  
 Foley, D . . . . .141, 224  
 Fonseca, D . . . . .208  
 Fonseca, E . . . . .55, 223  
 Fons, P . . . . .42  
 Fontaine, B . . . . .121  
 Fontes Vieira, C . . . . .67, 104, 268, 269,  
     275, 276, 286  
 Foong, M . . . . .236  
 Forde, J . . . . .169  
 Ford, J . . . . .82  
 Ford, K . . . . .209  
 Ford, M . . . . .43  
 Forget, C . . . . .18  
 Forien, J . . . . .117  
 Forsberg, K . . . . .28, 60, 175, 208, 234  
 Forsik, S . . . . .41, 74, 115  
 Forsmark, J . . . . .49  
 Forsyth, M . . . . .184  
 Forti, M . . . . .84, 85  
 Fortunato de Freitas, L . . . . .67, 104, 276  
 Fortunato De Freitas, L . . . . .276  
 Fossan, I . . . . .153  
 Foster, A . . . . .229  
 Foster, M . . . . .31, 217  
 Foti, V . . . . .115  
 Fountain, J . . . . .232  
 Fourmann, J . . . . .210  
 Fournier, C . . . . .242  
 Fowler, H . . . . .23, 55, 61, 93, 127, 159,  
     160, 196, 269  
 Fox, E . . . . .139  
 Fradet, G . . . . .252  
 Fraile, A . . . . .135  
 Frame, L . . . . .247, 278  
 Frampton, C . . . . .156, 203  
 Francis, C . . . . .39  
 Franco de Carvalho, J . . . . .294  
 Francois, M . . . . .249  
 Francois-Saint-Cyr, H . . . . .251  
 Frankel, G . . . . .57, 160, 161, 194, 197,  
     224, 270  
 Franke, P . . . . .296  
 Frankus, F . . . . .80  
 Frappart, S . . . . .25  
 Fraser, H . . . . .13, 16, 17, 27, 35, 110, 120,  
     150, 175, 209, 235, 244  
 Fratto, E . . . . .184  
 Frazer, D . . . . .30, 44, 66, 101, 221, 223  
 Frederick, K . . . . .45, 290  
 Freed, E . . . . .277  
 Free, M . . . . .28, 60  
 Freitas, R . . . . .22, 51, 53, 60, 92, 126, 132,  
     158, 165, 192, 194, 200, 221,  
     226, 244, 246, 296, 298  
 French, A . . . . .56  
 French, J . . . . .296  
 French, G . . . . .257  
 French, J . . . . .244, 257  
 Frenkel, A . . . . .133, 227  
 Frenzel, J . . . . .173, 193, 225, 278  
 Freund, A . . . . .25, 96, 130, 279  
 Frey, C . . . . .13, 31, 236  
 Frey, M . . . . .109  
 Freyman, M . . . . .117  
 Freysoldt, C . . . . .179  
 Friday, M . . . . .246, 263  
 Frieden Templeton, W . . . . .239  
 Fripp, N . . . . .12  
 Frizzera, E . . . . .295  
 Frolov, T . . . . .21, 22, 52, 91, 121, 125, 157,  
     168, 193, 203, 295  
 Fronzi, M . . . . .27, 59, 98, 131, 272  
 Frosik, B . . . . .90  
 Frosta, O . . . . .159  
 Frost, R . . . . .137, 178, 261  
 Frye, A . . . . .84  
 Fu, B . . . . .295  
 Fu, C . . . . .18, 48, 60, 85, 121, 152, 188,  
     207, 267, 300  
 Fuchs-Lynch, N . . . . .58, 101, 204  
 Fudger, S . . . . .278  
 Fuerst, T . . . . .135  
 Fuierer, P . . . . .258  
 Fujii, H . . . . .129, 198, 230  
 Fujikawa, S . . . . .293  
 Fujimoto, K . . . . .174  
 Fujita, E . . . . .293  
 Fu, K . . . . .196  
 Fullwood, D . . . . .11, 41, 290, 291  
 Fultz, B . . . . .82, 172, 240, 244  
 Fulzele, D . . . . .189  
 Funase, S . . . . .138  
 Furat, O . . . . .193  
 Furrer, D . . . . .41, 75, 84, 175  
 Furuhashi, T . . . . .97, 164  
 Furu, O . . . . .87  
 Fu, S . . . . .17  
 Fu, Y . . . . .16, 148



- G**
- Gabb, T .....224
- Gachot, G.....25
- Gaddam, S..... 35, 38, 245, 262
- Gaddam, V .....111
- Gadioli, M .....295
- Gaertner, H.....223
- Gager, J.....78
- Gagey-Eilstein, N.....243
- Gagneur, V .....38
- Gaies, J.....214
- Gaikwad, H.....191
- Gaikwad, S.....261
- Gaipov, R.....259
- Gakhar, R.... 29, 37, 133, 140, 142, 196,  
227, 228, 247, 272
- Galanis, A .....269
- Gale, D.....245
- Galetz, M.....24, 81, 100, 103, 112,  
142, 178
- Galikova, M.....286
- Gálíková, M.....26
- Galindo-Nava, E....133, 166, 201, 228,  
247, 273
- Galinski, H .....192, 240
- Gallagher, J ..... 50, 65, 88, 268
- Gallagher, R.....166
- Gallant, N .....246
- Gallaway, G .....32, 260
- Gallego, M.....165
- Gallego, N .....194
- Gallino, I .....189
- Galliopoulou, E.....196
- Gallivan, R..... 100, 203, 208, 231
- Galodé, A.....18, 48, 78
- Galtier, E .....20
- Galvin, C .....33, 66
- Gamal, A .....295
- Gamboa, G .....10, 174
- Gammer, C ..... 40, 73, 203, 254
- Gan, C ..... 139, 208, 260
- Gandha, K .....14
- Gandhi, A ..... 14, 82, 216
- Gandin, C .....76, 113
- Gandolfo, C.....268
- Gandy, A .....32, 65, 102, 135, 169,  
204, 230, 249, 274
- Gandy, D .....108, 248
- Ganesan, N .....176
- Gangaraju, M .....265
- Ganguly, S ..... 8, 77, 214, 215, 300
- Gan, J .....205, 249
- Ganju, E.... 52, 80, 127, 153, 162, 190,  
192, 196, 219, 242, 251, 293
- Gannon, A.....239
- Gannon, W .....45
- Gan, Z .....245
- Gao, B.....269
- Gao, C .....268, 288
- Gao, F..... 37, 70, 211, 274, 279
- Gao, H ....26, 58, 96, 129, 163, 199, 298
- Gao, J .....242
- Gao, L..... 86, 114, 116, 158, 195
- Gao, M.... 15, 16, 46, 50, 83, 119, 150,  
153, 186, 197, 217, 218,  
240, 265, 266
- Gao, N .....212
- Gao, P.....226, 271
- Gao, S.....242, 274
- Gao, W .....129
- Gao, X ..... 244, 250, 298
- Gao, Y.... 20, 42, 87, 90, 181, 186, 194,  
200, 209, 231, 266
- Gao, Z.....79
- Garashchenko, O .....270
- Garber, K.....29
- Garces, G..... 61, 132, 227, 232, 266
- Garcia Alvarez, V .....257
- Garcia Caraveo, A.....63
- Garcia, D ..... 71, 114, 214
- Garcia de la Cruz, L .....174, 234
- García Díez, A.....77
- García, E .....157
- García-Hernández, M .....295
- Garcia-Hernandez, S .....288
- Garcia-Izquierdo, F .....278
- Garcia, J .....11, 147
- Garcia Jimenez, A.....40
- García, L .....271
- Garcia Magana, J .....269
- Garcia-Mendez, R.....184
- García Merino, J .....273
- Garcia Ortiz, H.....268
- Garcia-Ramirez, M.....264, 277
- Gardiner, Z .....62
- Gardner, H.....32
- Garel, E.....65
- Garger, M.....192
- Garg, M ..... 84, 260, 266, 281
- Garg, N.....176
- Garg, P..... 204, 217, 254
- Gariboldi, E.....212
- Gariety, D.....162
- Garitaonandia, J .....185
- Garland, A.....145
- Garlea, E .....21, 43
- Garmroudi, F .....18, 152
- Garner, F ..... 23, 56, 127, 202
- Garnett, J ..... 110, 130, 215
- Garrett, T.....53
- Garrison, L ....102, 126, 157, 159, 194,  
195, 221, 222, 223, 243
- Garrivier, N .....249
- Garza, E .....71
- Garza, H.....269
- Garza, K.....138
- Gasca, A.....252
- Gascoin, F .....18, 48, 78, 85, 121, 152,  
188, 267
- Gaskey, B .....146, 222
- Gaskins, J .....238
- Gatto, A .....216
- Gatto, M..... 115, 183, 213, 216, 288
- Gaudez, S..... 13, 141, 222
- Gaudio, A .....146, 259
- Gault, B .....150
- Gaur, A.....8
- Gaur, V..... 25, 197, 286, 287
- Gauspohl, J .....146, 285
- Gautam, P .....117
- Gauvin, G .....55
- Gavagnin, D .....45
- Gavalda-Diaz, O.....134
- Gaydos, L.....204, 261
- Gazeau, F .....243
- Gazenbiller, E .....122
- Gazza, J .....221
- Gbenebor, O .....148, 228
- Gbenebor, P.....228
- Gbur, J .....147
- Gebauer, J .....296
- Gebes, S .....89
- Gedsun, A .....85
- Geers, M .....58
- Gehmlich, N .....57, 269
- Gehrig, M .....63
- Geisler, B .....47
- Geith, M.....54
- Gelin, S.....53
- Gelmetti, M.....278
- Ge, M .....272
- Gencturk, M .....66, 275
- Gendich, M.....260
- Genée, J .....12
- Geng, L .....149
- Gengor, G .....121
- Geng, Y .....268
- Gentile, R.....247
- Gentry, R .....279
- Gentry, S .....35
- Georgarakis, K .....169
- George, E ..... 40, 57, 83, 200
- Georges, E .....187
- Georges, M .....57
- Gerczak, T..... 137, 205, 275
- Gerdes, L .....57
- Geri, M.....16, 130
- Geringer, J ..... 62, 102, 230
- German, J.....214, 215
- Germann, T.....219
- German, P.....145
- Gersch, S .....286
- Gerstl, S .....100
- Gesteland, C .....182, 195
- Gester, A .....152
- Gesualdi, J .....133

Getley, A . . . . .	113, 285	Girigisu, S . . . . .	175	Goncalves, V . . . . .	275, 276
Getto, E . . . . .	280	Giri, S . . . . .	52, 286	Gonçalves, V . . . . .	104, 276
Ge, Z . . . . .	113	Giuliani, F . . . . .	134	Gonderman, S . . . . .	44, 101, 221
Ghafarollahi, A . . . . .	124	Giuntini, D . . . . .	105, 139, 149, 174, 208, 229, 234, 252, 278	Gongi, W . . . . .	179
Ghanadi, N . . . . .	214, 215, 259	Gizer, G . . . . .	228	Gong, J . . . . .	162, 197, 202
Ghanbari, Z . . . . .	209, 234	Gladstein, A . . . . .	188	Gong, S . . . . .	52
Ghasemi, Z . . . . .	153	Glaessgen, E . . . . .	41, 48, 111, 181	Gong, W . . . . .	265, 266
Ghauri, H . . . . .	227	Glaser, B . . . . .	213, 291	Gong, X . . . . .	196, 270
Ghazinejad, M . . . . .	286	Glatzel, U . . . . .	103	Gong, Y . . . . .	161
Ghazisaeidi, M . . . . .	14, 19, 44, 88, 165	Glaubit, E . . . . .	78	Gonyaw, J . . . . .	134
Ghimire, A . . . . .	192	Glavin, N . . . . .	75, 212	Gonzales, A . . . . .	70, 117
Ghiorghiu, F . . . . .	135	Gleason, A . . . . .	20, 112	Gonzales, J . . . . .	214
Ghodsi, A . . . . .	227	Gleason, M . . . . .	208, 259	Gonzalez, A . . . . .	288
Gholizadeh, R . . . . .	206, 240	Gleeson, B . . . . .	77	González-Ángeles, I . . . . .	264
Ghomashchi, R . . . . .	182	Glerum, J . . . . .	38, 71, 141, 222	Gonzalez Garcia, A . . . . .	261
Ghorbani, M . . . . .	174	Gloag, R . . . . .	192	Gonzalez, L . . . . .	180
Ghosh, A . . . . .	64, 96, 120, 252	Gloriant, T . . . . .	47	Gonzalez Morales, D . . . . .	152
Ghosh, C . . . . .	31	Glover, A . . . . .	68	Goodall, R . . . . .	230
Ghosh, D . . . . .	14, 44, 81, 118, 149, 260, 264	Gluchowski, P . . . . .	152	Goodarzi, S . . . . .	282, 291
Ghosh, E . . . . .	12, 80	Gluck, A . . . . .	183	Goodelman, D . . . . .	50
Ghosh, S . . . . .	41, 75, 96, 129, 139, 181, 220, 277	Gludovatz, B . . . . .	9, 32, 40, 64, 65, 83, 101	Goodman, C . . . . .	31
Ghotbi, M . . . . .	292	Gnida, D . . . . .	14, 177, 257, 279	Goodson, M . . . . .	245
Ghule, B . . . . .	201, 275	Gobber, F . . . . .	113, 145	Goodwin, W . . . . .	147
Giallardo, J . . . . .	171	Gobert, C . . . . .	114	Goo, N . . . . .	22
Giamouridou, M . . . . .	66, 137, 178	Gockel, J . . . . .	11, 42, 183, 283	Gopalakrishnan, S . . . . .	212
Gianola, D . . . . .	11, 83, 105, 141, 168, 172, 277	Godard, P . . . . .	238	Gopalan, S . . . . .	12, 80, 148
Gibb, J . . . . .	129, 225, 245	Goddard, D . . . . .	205	Gopalan, V . . . . .	164
Gibbon, S . . . . .	79	Goddard, W . . . . .	51	Gorai, P . . . . .	27, 43, 86, 120, 121, 131, 297
Gibbs, P . . . . .	68	Godec, M . . . . .	142, 283, 287	Gorannsson, K . . . . .	249
Gibson, B . . . . .	214	Goedjen, J . . . . .	150	Gordon, B . . . . .	81
Gibson, C . . . . .	106	Goeke, R . . . . .	208	Gordon, E . . . . .	101, 199
Gibson, I . . . . .	76	Goettsch, J . . . . .	188, 218	Gordon, J . . . . .	176, 280, 289
Gibson, J . . . . .	47, 51, 120	Goff, J . . . . .	169, 219	Gordon, R . . . . .	29, 272
Gibson, M . . . . .	110	Gofryk, k . . . . .	36	Gorelik, M . . . . .	41
Gide, K . . . . .	288	Gofryk, K . . . . .	36, 70, 107, 140, 177, 210	Gorelik, R . . . . .	98
Giels, M . . . . .	123	Gogotsi, Y . . . . .	35, 42, 44, 163, 262	Goring, S . . . . .	82, 251
Gienger, E . . . . .	213, 217	Goh, Z . . . . .	93	Gor, M . . . . .	239
Gietl, H . . . . .	102, 135	Gokcekaya, O . . . . .	215	Gorman, A . . . . .	82, 106, 127, 243
Gigliotti, N . . . . .	183	Gokelma, M . . . . .	36, 69, 106, 140, 176, 189, 210, 235, 253, 279	Gorr, B . . . . .	160, 197, 224, 270
Gikunoo, E . . . . .	46	Gökelma, M . . . . .	106	Gorrey, R . . . . .	60
Gilani, N . . . . .	244, 250	Goken, M . . . . .	199	Gorske, S . . . . .	80, 101, 203
Gilankar, A . . . . .	238	Göken, M . . . . .	81, 117, 173, 178	Gorsse, S . . . . .	92, 119, 235
Gilbert, A . . . . .	236	Golden, P . . . . .	114, 162	Gosse, R . . . . .	296
Gilbert, D . . . . .	146	Goldman, R . . . . .	258	Goswami, A . . . . .	185
Gilbert, E . . . . .	251	Goles, N . . . . .	166	Goswami, R . . . . .	21, 148
Gilbert, M . . . . .	169	Goley, Q . . . . .	45	Gothe, P . . . . .	55, 196
Gil Coury, F . . . . .	218	Goller, G . . . . .	128	Goto, R . . . . .	67
Giles, A . . . . .	44	Gomes, N . . . . .	295	Gottschall, T . . . . .	82
Gilleland, C . . . . .	208, 278	Gomes, R . . . . .	276	Goudeau, P . . . . .	238
Gillet, S . . . . .	141	Gómez Cuyàs, J . . . . .	192	Goudeli, E . . . . .	98
Gillham, J . . . . .	146, 183	Gomez Marroquin, M . . . . .	91	Gould, J . . . . .	105
Gilliland, W . . . . .	11, 203	Gomez-Perez, A . . . . .	269	Gourlay, C . . . . .	23, 55, 61, 65, 93, 127, 159, 196, 269
Gillon, J . . . . .	208	Gomez, R . . . . .	61, 258	Govaere, A . . . . .	25
Gill, S . . . . .	108, 133, 196, 272	Gomond, A . . . . .	187	Govindarajan, M . . . . .	41
Gingl, E . . . . .	73	Gonçalves, C . . . . .	200	Grabowski, B . . . . .	190
Girardin, G . . . . .	25	Gonçalves, F . . . . .	268	Gradl, P . . . . .	178, 224
Giribaldi, A . . . . .	18	Gonçalves Pedroti, L . . . . .	294	Graefe, M . . . . .	154
				Graening Seibert, T . . . . .	230

- Graening, T . . . . . 102, 115, 157  
 Graeve, O . . . . . 82  
 Grafft, J . . . . . 226  
 Graf, G . . . . . 115  
 Graham, S . . . . . 146, 147  
 Grain, N . . . . . 15, 186, 266  
 Grandini, C . . . . . 147  
 Grant, B . . . . . 212  
 Grant, G . . . . . 37  
 Grasmø, G . . . . . 145  
 Grau, L . . . . . 178  
 Graves, A . . . . . 179  
 Graydon, K . . . . . 215, 282  
 Gray, G . . . . . 129, 184  
 Gray III, G . . . . . 16  
 Gray, S . . . . . 212  
 Graziano, M . . . . . 217  
 Grbavac, T . . . . . 86  
 Greaney, P . . . . . 82, 85  
 Greeley, D . . . . . 102  
 Greenberg, B . . . . . 258  
 Green, N . . . . . 229  
 Green, T . . . . . 23, 100  
 Green-Warren, R . . . . . 260  
 Greer, A . . . . . 39, 73, 109, 142, 178, 211,  
 237, 254, 281  
 Greer, J . . . . . 20, 205, 206, 289, 297  
 Greer, R . . . . . 36  
 Grégoire, B . . . . . 100  
 Gregori, N . . . . . 74  
 Gregurek, D . . . . . 54, 92, 125  
 Grejtak, T . . . . . 17, 97, 129, 143, 179, 212,  
 238, 255, 281  
 Grennan, H . . . . . 72  
 Grest, G . . . . . 221  
 Grey, Z . . . . . 301  
 Griebel, A . . . . . 61, 99, 165, 183  
 Griesbach, C . . . . . 275  
 Griffiths, J . . . . . 20  
 Griffiths, R . . . . . 71  
 Grillet, A . . . . . 222  
 Grilli, N . . . . . 196  
 Grima, G . . . . . 115, 213, 288  
 Grimes, T . . . . . 140  
 Grimme, C . . . . . 100  
 Grimm, J . . . . . 51, 191  
 Grippi, T . . . . . 105, 112, 174  
 Griveau, J . . . . . 107  
 Groetsch, A . . . . . 51, 206, 297  
 Grogan, J . . . . . 228  
 Groger, R . . . . . 179  
 Groom, A . . . . . 72, 297  
 Gross, A . . . . . 45, 297  
 Gross, G . . . . . 47  
 Gross, M . . . . . 209  
 Gross, O . . . . . 39  
 Gross, R . . . . . 268  
 Grovenor, C . . . . . 275  
 Groves, M . . . . . 185  
 Grubb, C . . . . . 260  
 Grubel, K . . . . . 237  
 Grumsen, F . . . . . 80  
 Gründer, S . . . . . 146, 280  
 Gruninger, M . . . . . 162  
 Grydin, O . . . . . 146, 200  
 Grygar, F . . . . . 158  
 G S, M . . . . . 188  
 Guamanga, L . . . . . 46  
 Guan, B . . . . . 117  
 Guan, D . . . . . 227  
 Guan, X . . . . . 116, 262, 270  
 Guarch Perez, C . . . . . 183  
 Guazzagaloppa, J . . . . . 48  
 Gucik, M . . . . . 16, 78  
 Gudac, L . . . . . 126  
 Guehairia, S . . . . . 206  
 Guenole, J . . . . . 209  
 Guerard, S . . . . . 189  
 Guerrero, D . . . . . 234  
 Guest, J . . . . . 238  
 Gu, G . . . . . 19, 50, 88, 124, 153, 155, 163,  
 182, 192, 213, 264, 268  
 Guillemot, G . . . . . 113  
 Guillen, D . . . . . 24, 27, 51, 56, 59, 94, 98,  
 108, 128, 131, 248, 270, 272  
 Guillon, O . . . . . 252  
 Guillory II, R . . . . . 147  
 Guillot, I . . . . . 187  
 Guillou, F . . . . . 82  
 Guillou, R . . . . . 187, 224, 233  
 Guilmeau, E . . . . . 59, 85  
 Gui, X . . . . . 246  
 Guizar-Sicairos, M . . . . . 20  
 Gu, J . . . . . 226, 257  
 Gulbrandsen, K . . . . . 159  
 Gulletutan, U . . . . . 213  
 Gülletutan, U . . . . . 297  
 Gülver, M . . . . . 219  
 Gumaste, A . . . . . 198, 245, 300  
 Gump, C . . . . . 146, 285  
 Gumussoy, A . . . . . 218  
 Gunasekaran, G . . . . . 259, 286, 290  
 Gunderson, C . . . . . 51, 297  
 Güneş, E . . . . . 193  
 Gunes, E . . . . . 261  
 Gunnarson, G . . . . . 189  
 Günther, J . . . . . 9  
 Gunther, S . . . . . 211  
 Gunzburger, M . . . . . 161  
 Guo, B . . . . . 223, 253  
 Guo, D . . . . . 49, 86, 239  
 Guo, H . . . . . 34  
 Guo, J . . . . . 201  
 Guo, S . . . . . 245, 259  
 Guo, X . . . . . 24, 56, 95, 108, 141, 152,  
 161, 164, 237, 262, 270  
 Guo, Y . . . . . 187  
 Guo, Z . . . . . 96  
 Gupta, A . . . . . 14, 148, 167, 176, 217  
 Gupta, K . . . . . 167  
 Gupta, N . . . . . 259, 290  
 Gupta, P . . . . . 118, 218  
 Gupta, R . . . . . 16, 46, 57, 83, 224, 234, 267  
 Gupta, S . . . . . 12, 37, 43, 71, 80, 116, 117,  
 148, 184, 210, 263, 280  
 Gupta, V . . . . . 74  
 Guraja, S . . . . . 159  
 Gurao, N . . . . . 265  
 Gurbuz Guner, S . . . . . 10  
 Gureyev, T . . . . . 20  
 Gurniak, E . . . . . 73, 293  
 Gursoy, D . . . . . 90, 207  
 Guruprasad, P . . . . . 96  
 Guruswamy, S . . . . . 118  
 Gu, S . . . . . 92  
 Gussev, M . . . . . 30, 211, 229  
 Gustafson, S . . . . . 79, 80, 102, 116  
 Gustinvil, R . . . . . 79  
 Gutbrod, K . . . . . 97  
 Gutfleisch, O . . . . . 15, 45, 150  
 Guthrie, R . . . . . 86, 122, 152  
 Gutierrez, E . . . . . 288  
 Gutiérrez, E . . . . . 288  
 Gutiérrez, J . . . . . 46  
 Gutierrez Moreno, J . . . . . 27, 59, 98,  
 131, 272  
 Gutierrez-Urrutia, I . . . . . 72  
 Gutnik, D . . . . . 238  
 Guven, A . . . . . 218  
 Guvenc, O . . . . . 37  
 Gu, W . . . . . 11, 79, 115, 171, 181, 205,  
 231, 250, 289, 300  
 Gu, Y . . . . . 59, 73, 84  
 Gu, Z . . . . . 184  
 Guziewski, M . . . . . 180  
 Guzman, A . . . . . 185  
 Guzman-Garfias, R . . . . . 278  
 Guzman, J . . . . . 129  
 Guzman, P . . . . . 172  
 Guzmán-Ríos, E . . . . . 277  
 Gwalani, B . . . . . 22, 34, 40, 68, 92, 105,  
 119, 138, 173, 180, 199, 207,  
 213, 233, 238, 251, 275, 277
- ## H
- Haag, J . . . . . 63, 102, 119, 127, 135, 204  
 Habeeb, M . . . . . 291  
 Haberl, B . . . . . 172  
 Habib, S . . . . . 251  
 Habibzadeh, A . . . . . 106  
 Habiyaemye, F . . . . . 150  
 Hache, M . . . . . 206  
 Hachtel, J . . . . . 217, 240  
 Hackel, L . . . . . 16  
 Hackett, M . . . . . 129  
 Hadadzadeh, A . . . . . 11

- Haddon-McMillan, T. . . . . 65  
 Hadibeik Neishaboori, S . . . . . 73  
 Hadibeik, S . . . . . 109  
 Haefelfinger, R. . . . . 221  
 Hafen, J . . . . . 97  
 Hafen, T. . . . . 43  
 Haftlang, F. . . . . 16, 266  
 Hagen, D . . . . . 160  
 Hagen, E. . . . . 223  
 Haghdadi, N . . . . . 195, 251  
 Haghshenas, M. . . 115, 182, 197, 214, 289  
 Hague, R . . . . . 244, 250, 297  
 Hahm, M. . . . . 294  
 Hahn, N. . . . . 153  
 Hain, C. . . . . 183  
 Ha, J . . . . . 286, 291  
 Hakonsen, A . . . . 65, 87, 136, 169, 189,  
 235, 253, 299  
 Halavanau, A. . . . . 21  
 Halder, R . . . . . 232  
 Halder, S. . . . . 83  
 Hale, C . . . . . 299  
 Hale, L . . . . . 151  
 Halet, J . . . . . 121  
 Haley, J. . . . . 230, 239, 249  
 Hall, B. . . . . 26, 63  
 Haller, H . . . . . 183  
 Hall, J . . . . . 143  
 Hall, M. . . . . 71, 226  
 Hall, S. . . . . 168  
 Halon, E. . . . . 277  
 Halstenberg, P. . . . . 201, 227, 272  
 Hamaguchi, D. . . . . 230  
 Hamana, K. . . . . 162  
 Hambli, N . . . . . 264  
 Ham, D. . . . . 90  
 Hamer, S. . . . . 87  
 Hamilton, B. . . . . 219  
 Hamilton, C. . . . . 85  
 Hamilton, S . . . . . 275  
 Hamlin, J . . . . . 138  
 Hammerschmidt, T . . . . 13, 44, 81, 84,  
 85, 117, 263  
 Hammi, S. . . . . 224, 265, 266, 271  
 Hamm, M . . . . . 8  
 Hamon, F. . . . . 84, 128, 209  
 Hamrani, A . . . . . 288  
 Ham, S . . . . . 273  
 Hanagan, J . . . . . 292  
 Han, C . . . . . 270, 277  
 Han, D . . . . . 152  
 Hands, T . . . . . 258  
 Handwerker, C . . . . . 23  
 Han, G . . . . . 53, 60, 90, 126  
 Han, H . . . . . 17, 26, 108, 204, 278, 280  
 Han, I . . . . . 196  
 Hanifi, K. . . . . 250  
 Han, J . . . . . 12, 38, 46, 72, 91, 108, 118,  
 142, 186, 190, 233, 270, 277,  
 280, 282, 286, 290, 298  
 Han, K . . . . . 100  
 Han, L. . . . . 15, 79, 80, 150  
 Hanning, F. . . . . 81, 182  
 Hannum, M. . . . . 235  
 Han, Q . . . . . 25  
 Han, S. . . . . 67, 72, 172, 196, 202,  
 230, 276, 285  
 Hansda, P. . . . . 189  
 Hansen, J . . . . . 225  
 Hansen, L. . . . . 122, 236  
 Hansen, M. . . . . 250  
 Hansen, R . . . . . 202  
 Hans, M . . . . . 101  
 Hanson, K . . . . . 78  
 Hanson, S. . . . . 285  
 Hansson, C . . . . . 112  
 Han, Y . . . . . 85, 132, 179, 269, 287  
 Hao, L. . . . . 176  
 Hao, S. . . . . 15, 153, 197  
 Hao, T. . . . . 101  
 Hao, X . . . . . 61, 65, 97  
 Haque, A . . . . . 134  
 Haque, M. . . . . 259  
 Haque, N . . . . . 24, 56, 69, 79, 94,  
 128, 270, 279  
 Haque, T . . . . . 266  
 Harada, H . . . . . 237  
 Harada, M . . . . . 158  
 Hara, T. . . . . 72  
 Harcuba, P. . . . . 286  
 Harder, B . . . . . 224  
 Harder, R . . . . . 20, 51, 59, 90, 170, 207  
 Harding, L. . . . . 107, 108  
 Hardy, A. . . . . 51  
 Hardy, M . . 173, 178, 212, 237, 261, 281  
 Hargather, C . . 18, 50, 88, 123, 154, 190,  
 217, 220, 260  
 Hargrove, C. . . . . 135  
 Hari, A . . . . . 172  
 Haridas, R . . . . 100, 159, 198, 217, 245,  
 283, 284, 300  
 Hariharan, K . . . . . 24, 57, 117, 194  
 Harilal, H. . . . . 10  
 Harjo, S . . . . . 265, 266  
 Harley, J . . . . . 89  
 Harma, E . . . . . 177  
 Harmaji, A. . . . . 123  
 Harmer, M. . . . . 208  
 Harper, D. . . . . 258, 260  
 Harp, J . . . . . 33, 63, 66, 103, 137, 170,  
 205, 231, 249, 275  
 Harpur, B. . . . . 192  
 Harris, A . . . . . 72, 297  
 Harris, B. . . . . 82  
 Harris, S. . . . . 222  
 Harris, W. . . . . 251  
 Harris, Z. . . . . 25, 29, 57, 80, 95, 161,  
 166, 214, 259  
 Harr, M . . . . . 225  
 Harrysson, O. . . . . 76  
 Hart, G. . . . . 52  
 Hartmann, J. . . . . 63, 275  
 Hartmann, T. . . . . 272  
 Hart, P . . . . . 21  
 Hartstein, D. . . . . 73, 208  
 Harvey, J. . . . . 74, 210  
 Ha, S. . . . . 51, 181, 293  
 Hasan, A . . . . . 54, 144, 231  
 Hasan, M . . . . . 199, 217, 242, 271, 283  
 Hasan, S. . . . . 75  
 Haseeb, A. . . . . 34, 67, 104, 138, 276  
 Hasegawa, G . . . . . 75  
 Hasegawa, M. . . . . 167  
 Haselhuhn, A . . . . . 25, 115, 215, 282  
 Hashemi Monfared, A . . . . 67, 183, 215,  
 262, 288, 299  
 Hashimoto, N . . . . . 167  
 Hasibuan, Y . . . . . 219  
 Hassan Ali, M . . . . . 86  
 Hassani, M. . . . . 171, 184, 205, 231,  
 250, 278, 300  
 Hassan, J . . . . . 8  
 Hassan, T. . . . . 260  
 Hass, D. . . . . 289  
 Hassel, M. . . . . 106  
 Hastings, J . . . . . 45  
 Hastings, N . . . . . 24  
 Hastings, T . . . . . 34, 238, 265  
 Hatano, Y. . . . . 62, 102  
 Hatayama, S. . . . . 42  
 Hatler, C. . . . . 24, 204  
 Hattar, K. . . . 23, 30, 33, 34, 66, 101, 103,  
 137, 171, 178, 206, 223, 269, 272  
 Hatton, P . . . . . 27  
 Hatrick Simpers, J. . . . . 209  
 Hatrick-Simpers, J. . . . . 232  
 Haugen, T . . . . . 169  
 Haugh, B . . . . . 30, 134  
 Hautier, G . . . . . 85  
 Havela, L . . . . . 36, 210  
 Hawary, M. . . . . 202, 248  
 Hawelek, L. . . . . 45, 185, 265  
 Hawk, C. . . . . 222  
 Hawkins, L. . . . . 205, 223, 247, 249  
 Hawk, J. . . . . 50  
 Hawthorne, K . . . . . 133  
 Hayashi, K. . . . . 43  
 Hayat, A. . . . . 45  
 Hayes, J. . . . . 290  
 Hayes, R. . . . . 99  
 Haynes, A . . . . . 113  
 Haynes, J . . . . . 17, 105, 110, 139, 164,  
 166, 214  
 Hayrikyan, D. . . . . 58, 208  
 Hazeli, K . . . . . 11, 75, 178, 181, 288



- Hazell, P. . . . . 156  
 Hearley, B. . . . . 188, 190  
 Hearn, W. . . . . 13, 141, 222  
 Hebble, D. . . . . 146  
 Hebert, R. . . . . 278, 284  
 Hébert, S. . . . . 121  
 He, C. . . . . 251  
 Heckman, E. . . . . 287  
 Hector Jr., L. . . . . 194  
 Heczko, M. . . . . 11, 34, 57, 253  
 Hedrick, E. . . . . 213  
 Hedström, P. . . . . 130, 239, 250, 261  
 He, G. . . . . 90  
 Hegedues, Z. . . . . 116  
 Hegedüs, Z. . . . . 222  
 He, H. . . . . 69, 279  
 Heidarneshad, S. . . . . 268  
 Heiden, M. . . . . 145  
 Heilmaier, M. . . . . 224  
 Heimbrook, A. . . . . 114, 283  
 Heinemann, J. . . . . 214  
 Heinrich, L. . . . . 181  
 Heish, P. . . . . 55  
 He, J. . . . . 96  
 He, L. . . . . 29, 33, 205, 223, 247  
 Heldt, R. . . . . 205  
 Helman, B. . . . . 135  
 Helmer, A. . . . . 57  
 Helmersson, B. . . . . 249  
 Helmreich, G. . . . . 205  
 Helwing, R. . . . . 57  
 He, M. . . . . 10, 71, 78, 176, 209, 283  
 Hemery, S. . . . . 84, 175, 209  
 Hémary, S. . . . . 18  
 Hemker, K. . . . . 10, 13, 31, 71, 78, 176, 186,  
 209, 217, 238, 254, 283  
 Hempel, J. . . . . 238  
 Henaff, G. . . . . 128  
 Hendeniya, N. . . . . 246  
 Henderson, H. . . . . 208  
 Hendrix, E. . . . . 62  
 Henein, H. . . . . 28, 60  
 Hengsbach, F. . . . . 146, 280  
 Hengst, A. . . . . 270  
 Heniken, N. . . . . 214, 261  
 Hennig, R. . . . . 19, 47, 51, 75, 97, 120,  
 179, 294  
 Henningsson, N. . . . . 168  
 Henrique Nalon, G. . . . . 294  
 Henry, C. . . . . 45, 139  
 Henry, J. . . . . 63  
 Heo, J. . . . . 202  
 Heon, E. . . . . 194, 261  
 Heo, S. . . . . 267  
 Heo, T. . . . . 88, 164, 228, 248  
 Heo, U. . . . . 269, 293  
 Heo, Y. . . . . 265, 266  
 He, P. . . . . 93  
 He, Q. . . . . 186  
 Herath, C. . . . . 41  
 Herberger, C. . . . . 239  
 Herbert, E. . . . . 34  
 Herbinet, R. . . . . 139, 149  
 Herbold, E. . . . . 64  
 Herbsommer, M. . . . . 220  
 Herisson de Beauvoir, T. . . . . 252  
 Herling, D. . . . . 37, 238  
 Herman, M. . . . . 192  
 Hermann, R. . . . . 172, 206, 224  
 Hermawan, D. . . . . 157  
 Hernandez, A. . . . . 70  
 Hernandez Bocanegra, C. . . . . 269, 273  
 Hernandez-Bocanegra, C. . . . . 273  
 Hernández Bocanegra, C. . . . . 273  
 Hernández-Bocanegra, C. . . . . 228, 273, 298  
 Hernandez, C. . . . . 273  
 Hernandez Duran, E. . . . . 130  
 Hernandez, E. . . . . 26  
 Hernandez, F. . . . . 112  
 Hernandez, K. . . . . 130  
 Hernandez McCloskey, J. . . . . 10  
 Hernández Negrete, O. . . . . 14  
 Hernandez, P. . . . . 92  
 Hernandez Paredes, J. . . . . 14  
 Hernández Pérez, N. . . . . 264  
 Hernandez, R. . . . . 81  
 Hernandez-Ramirez, A. . . . . 296  
 Hernández-Ramírez, A. . . . . 264  
 Hernandez, S. . . . . 70, 177  
 Hernando-Revenga, M. . . . . 106  
 Heron, J. . . . . 14  
 Herper, H. . . . . 14  
 Herrera, A. . . . . 90  
 Herrera, M. . . . . 273  
 Herrera-Ortega, M. . . . . 228  
 Herrmann, J. . . . . 12, 167, 289  
 Hertel, T. . . . . 123, 154, 191  
 He, S. . . . . 192, 196  
 Hess, G. . . . . 300  
 Hess, J. . . . . 260  
 Hessong, E. . . . . 107  
 Hester, C. . . . . 204  
 Hestroffer, J. . . . . 116  
 He, W. . . . . 128, 208  
 Hew, N. . . . . 194  
 He, X. . . . . 284  
 He, Y. . . . . 22, 23, 269, 287  
 Heydrich-Bodensieck, J. . . . . 122  
 Heyen, M. . . . . 110  
 Heywood, S. . . . . 43, 148  
 He, Z. . . . . 40  
 Hezil, N. . . . . 147, 263, 266, 291, 295  
 Hickel, T. . . . . 39, 74, 85, 91, 295  
 Hicks, A. . . . . 12, 263  
 Hicks, B. . . . . 147  
 Higginson, R. . . . . 122  
 Hightower, K. . . . . 198  
 Hijazi, F. . . . . 182, 289  
 Hilgers, B. . . . . 65  
 Hilla, C. . . . . 79  
 Hill, C. . . . . 139  
 Hillery, K. . . . . 246  
 Hilliard, B. . . . . 22  
 Hill, S. . . . . 283, 288  
 Hin, C. . . . . 260  
 Hinchliff, M. . . . . 218  
 Hinnebusch, S. . . . . 239  
 Hinojos, A. . . . . 31, 52, 91, 251  
 Hinoki, T. . . . . 65, 221, 249  
 Hino, M. . . . . 122  
 Hintsala, E. . . . . 103, 167, 168, 238, 274  
 Hintze, P. . . . . 139  
 Hire, A. . . . . 47, 51, 120  
 Hirsch, D. . . . . 243  
 Hirschfeld, P. . . . . 47  
 Hirschhorn, J. . . . . 205  
 Hirschmann, E. . . . . 141  
 Hirsh, T. . . . . 232  
 Hirst, C. . . . . 23, 63, 102, 108, 177, 211, 236  
 Hirt, C. . . . . 85  
 Hirth, J. . . . . 123  
 Hisle, E. . . . . 231  
 Hitchcock, D. . . . . 297  
 Hlova, I. . . . . 149  
 Hoang, M. . . . . 103, 167  
 Hoarston, J. . . . . 225  
 Hobbs, J. . . . . 11  
 Hobbs, T. . . . . 115, 209  
 Hobdari, M. . . . . 135, 158, 182  
 Ho, C. . . . . 48, 104, 233, 267, 277  
 Höche, D. . . . . 122  
 Hochhalter, J. . . . . 204, 289  
 Hocine, S. . . . . 9, 86, 113, 285  
 Hockaday, S. . . . . 24, 56, 94, 128, 270  
 Hodge, A. . . . . 18, 50, 58, 88, 107, 123,  
 137, 154, 190, 199, 213,  
 214, 220, 229, 232  
 Hodge, D. . . . . 20  
 Hodges, W. . . . . 89  
 Hodgir, R. . . . . 182  
 Hodille, E. . . . . 135  
 Ho, E. . . . . 64  
 Hoefnagels, J. . . . . 58, 230  
 Hoekstra, J. . . . . 245  
 Hoel-Bacle, A. . . . . 250  
 Hoelzer, D. . . . . 115  
 Hoffman, A. . . . . 40, 140, 159  
 Hoffman, N. . . . . 17  
 Hoffmann, P. . . . . 145  
 Hofmann, D. . . . . 73, 142  
 Hofmann, F. . . . . 20, 270  
 Hogg, J. . . . . 52, 207  
 Hogue, A. . . . . 17, 97  
 Hohenwarter, A. . . . . 73, 83, 119, 236  
 Ho, I. . . . . 251, 301  
 Hoidn, O. . . . . 90  
 Holberton, H. . . . . 73

- Holbrook, E. . . . .120, 291  
 Holcombe, E. . . . . 77, 161, 209, 232  
 Holdeman, C. . . . .24, 210  
 Holden, I. . . . .262  
 Holdsworth, R. . . . .299  
 Holdsworth, S. . . . .198  
 Holgate, C. . . . . 78, 197, 262  
 Holländer, A. . . . .241  
 Hollenbach, J. . . . .232  
 Holler, M. . . . .20, 51  
 Holmbeck, G. . . . . 140, 228, 272  
 Holm, E. . . . . 18, 28, 48, 89, 102, 136, 162,  
 170, 190, 196, 204, 207, 242,  
 262, 299, 300  
 Holmes, B. . . . .246, 258  
 Holmes, R. . . . . 32, 65, 102, 135, 169, 204,  
 221, 230, 249, 274  
 Holmes, Z. . . . .228  
 Holt, E. . . . .250  
 Holt, M. . . . .20, 90  
 Holtzman, L. . . . .179  
 Homel, M. . . . .239  
 Homer, E. . . . .12, 19, 51, 52, 89, 98, 124,  
 125, 152, 156, 192, 193, 277, 294  
 Hommer, G. . . . .11  
 Hong, D. . . . .129  
 Hong, J. . . . . 43, 78, 161, 202, 290  
 Hong, M. . . . .257  
 Hongpo, W. . . . .122  
 Hong, Q. . . . .74  
 Hong, S. . . . .266, 286, 290, 291, 293, 299  
 Hong, W. . . . .196  
 Hong, Y. . . . . 127, 134, 247  
 Hono, K. . . . .227  
 Hood, Z. . . . .139  
 Hooks, D. . . . .20  
 Hoover, B. . . . .232  
 Hopkins, D. . . . .127  
 Hopkins, N. . . . .241  
 Hopkins, P. . . . .10, 261  
 Höppel, H. . . . .186, 199  
 Ho, R. . . . . 39, 72, 109  
 Hordley, T. . . . .235  
 Horezan, N. . . . .150  
 Horikawa, K. . . . .122  
 Hornbuckle, B. . . . .208, 278  
 Horne, A. . . . .149  
 Horner, J. . . . .222  
 Horn, T. . . . .42  
 Horsman, A. . . . .261  
 Horta Belo, J. . . . .82  
 Hort, N. . . . . 28, 143, 165, 200  
 Horton, D. . . . .56  
 Horvath, A. . . . .248  
 Ho, S. . . . . 32, 64, 101  
 Höschen, T. . . . .211  
 Hoseini Athar, S. . . . .239  
 Hosemann, P. . . . .15, 29, 30, 33, 62, 63,  
 66, 95, 99, 102, 141, 182,  
 224, 237, 248, 272, 274  
 Hoshino, M. . . . .122  
 Hosoda, H. . . . .152  
 Hosokawa, A. . . . .138  
 Hosono, F. . . . .293  
 Hossain, M. . . . . 94, 187, 197  
 Hossain, S. . . . .129, 149  
 Hossain, T. . . . .37, 167  
 Hosseini, S. . . . .205  
 Hosseinzadeh, H. . . . . 114, 284, 288  
 Hossfeld, M. . . . .225  
 Ho, T. . . . .139, 260  
 Houghton, O. . . . .178, 211  
 Hou, W. . . . .141  
 Hou, Z. . . . .68  
 Hovanski, R. . . . .198  
 Hovanski, Y. . . . .129, 162, 198,  
 225, 245, 271  
 Hovey, C. . . . .173  
 How, A. . . . .130, 166  
 Howard, C. . . . .223, 284  
 Howard, H. . . . .105  
 Howard, J. . . . .168, 254  
 Howard, L. . . . .263  
 Howard, R. . . . .177  
 Howard, T. . . . .92, 140  
 Howarter, J. . . . .24, 32, 210, 268, 269, 296  
 Howe, J. . . . .171, 206  
 Howland, W. . . . .275  
 Hoyer, K. . . . .200  
 Hoyos, D. . . . .15  
 Hoyt, N. . . . .29, 62, 99, 133, 166, 201,  
 227, 247, 272  
 Hrabe, N. . . . . 9, 11, 75, 77, 78, 114, 286  
 Hromiak, X. . . . .201  
 Hruszkewycz, S. . . . .90, 170  
 Hsieh, C. . . . .127  
 Hsieh, M. . . . .93  
 Hsu, C. . . . .186  
 Hsueh, C. . . . .186, 254, 265, 266, 277, 278  
 Hsu, K. . . . .69  
 Hsu, P. . . . .160  
 Hsu, T. . . . .163  
 Hsu, W. . . . .243  
 Hsu, Y. . . . .83  
 Hu, A. . . . . 98, 115, 150, 205  
 Huamán-Pérez, F. . . . .91  
 Huang, A. . . . . 16, 163, 171, 232  
 Huang, C. . . . .86, 93  
 Huang, E. . . . .15, 46, 83, 119, 150, 186,  
 217, 240, 241, 265, 266, 286  
 Huang, G. . . . .262  
 Huang, H. . . . . 46, 104, 143, 147, 152, 176,  
 204, 205, 226, 228, 261, 277, 289  
 Huang, I. . . . .299  
 Huang, J. . . . . 65, 67, 121, 223, 292  
 Huang, L. . . . .90  
 Huang Lu, Y. . . . . 86, 188, 267  
 Huang, S. . . . .39, 40, 74, 95, 114,  
 130, 166, 258  
 Huang, T. . . . . 34, 67, 228, 257  
 Huang, W. . . . . 55, 181, 192, 233  
 Huang, X. . . . .11  
 Huang, Y. . . . .37, 53, 60, 65, 90, 101,  
 126, 266, 275  
 Hua, X. . . . .48  
 Hua, Z. . . . .13, 21, 52, 53, 70, 135,  
 172, 177, 223  
 Hubbard, A. . . . .91  
 Huber, D. . . . .129  
 Hu, C. . . . . 12, 42, 168, 231, 250, 295  
 Hu, D. . . . .263  
 Hudson, L. . . . .64  
 Hufnagel, T. . . . . 105, 186, 232  
 Huft, N. . . . .15, 285  
 Hu, G. . . . .264  
 Hughes, D. . . . .26  
 Hughes, S. . . . .140  
 Hughes, Z. . . . .115  
 Hugh, S. . . . .150  
 Hu, H. . . . . 87, 189, 253, 298  
 Huh, J. . . . .267  
 Hu, J. . . . .19, 26, 27, 59, 75, 88,  
 97, 130, 164  
 Hu, K. . . . .138  
 Hu, L. . . . .125  
 Humeniuc, D. . . . .99  
 Hummel, M. . . . .251  
 Humphry-Baker, S. . . . .95, 158  
 Humrickhouse, P. . . . .63  
 Hunady, K. . . . .82, 240  
 Hung, C. . . . .34, 105  
 Hung, Y. . . . .93  
 Hunke, S. . . . .85  
 Hunt, B. . . . .86  
 Hunter, A. . . . . 18, 134, 192, 203  
 Hunt, J. . . . .129, 162  
 Hunt, M. . . . . 54, 159, 189  
 Hunyadi Murph, S. . . . .21, 53, 91, 126, 268  
 Huo, Y. . . . .49  
 Hupa, L. . . . .270  
 Hurel, V. . . . .210  
 Hurley, D. . . . .13, 21, 33, 52, 53, 70, 94,  
 137, 177, 211  
 Hurley, M. . . . .120, 138  
 Hurst, M. . . . .238, 250  
 Hurtado-Alonso, N. . . . .106  
 Hu, S. . . . .57, 153, 164, 197, 214, 224, 231  
 Husain, S. . . . .203  
 Husein, M. . . . .258  
 Husen, A. . . . .194  
 Huser, G. . . . .234  
 Hussain, S. . . . .219  
 Hussein, A. . . . .10  
 Hussein, N. . . . .219  
 Hussein, O. . . . . 21, 91, 123, 203

Hutchinson, C. . . . .9, 158  
 Hütter, A. . . . .198  
 Huvelin, Z. . . . .150  
 Huwald, E. . . . .20  
 Hu, X. . . . .36, 76, 190, 293  
 Hu, Y. . . . .63, 83, 91, 244, 248, 289  
 Huynh, T. . . . .182, 277, 282, 293  
 Hu, Z. . . . .56, 75, 99, 127, 141, 202, 223  
 Hwang, G. . . . .267  
 Hwang, J. . . . .20, 39, 52, 89, 90, 125, 156,  
 193, 221, 281, 290, 294, 295  
 Hwang, S. . . . .33, 66, 135, 281  
 Hwang, T. . . . .32  
 Hyer, H. . . . .114, 115, 284  
 Hyers, R. . . . .180, 202, 234, 260  
 Hyounseop, K. . . . .286  
 Hyun, S. . . . .196  
 Hyun, Y. . . . .138

## I

Iabadden, D. . . . .209  
 I. A. Jalali, S. . . . .13  
 Ialovega, M. . . . .135  
 Iams, A. . . . .57, 251  
 Iannitti, G. . . . .118, 184  
 Iantaffi, C. . . . .285  
 Iazurlo, R. . . . .113  
 Ibitoye, S. . . . .175  
 Ibrahim, A. . . . .175  
 Ibrahim, D. . . . .179, 192  
 Ibrahim, H. . . . .147  
 Ibrahim, M. . . . .146  
 Ichikawa, Y. . . . .171  
 Idczak, R. . . . .14, 177, 257, 279  
 Ifjen, I. . . . .179, 271  
 Igboanugo, J. . . . .271  
 Igunma, T. . . . .62  
 Igwemezie, V. . . . .300  
 Iida, K. . . . .18  
 Iio, M. . . . .102  
 Iizuka, M. . . . .278  
 Ijaz, M. . . . .192  
 Ikeda, K. . . . .288  
 Ikeda, R. . . . .129  
 Ikeda, Y. . . . .97, 190  
 Ikhmayies, S. . . . .20, 52, 90, 125, 156,  
 193, 221, 294, 295  
 Ikponwmonsa, A. . . . .271  
 Ilavsky, J. . . . .61, 207, 250, 251  
 Ilgen, A. . . . .274  
 Iloeje, C. . . . .24, 56, 94, 128, 167, 202,  
 228, 270, 273  
 Il, S. . . . .149  
 Ilyas, S. . . . .36, 234  
 Imen, R. . . . .291  
 Im, H. . . . .115  
 Immer, C. . . . .78, 209  
 Im, S. . . . .80, 133, 281

Im, T. . . . .159, 196  
 Im, W. . . . .159  
 Inamura, T. . . . .206  
 Ingale, T. . . . .10, 13, 16, 17, 119, 222, 259  
 Ingle, T. . . . .289  
 Ingvarsson, S. . . . .65, 169  
 Inman, S. . . . .29, 160, 270  
 Innerdal, V. . . . .65  
 Inoue, J. . . . .52, 190, 292, 293  
 Inoue, K. . . . .93  
 Intini, C. . . . .147  
 Intrater, J. . . . .86  
 Inubushi, Y. . . . .172  
 Inui, H. . . . .186  
 Iorkula, T. . . . .271  
 Iqbal, M. . . . .109  
 Irukuvarghula, S. . . . .230  
 Irvine, S. . . . .172  
 Isacco, S. . . . .57  
 Isac, M. . . . .49, 86, 122, 152, 188, 218,  
 241, 292  
 Isac, N. . . . .195  
 Isano, H. . . . .178  
 Isasti, N. . . . .97  
 Isgor, B. . . . .257  
 Isgor, O. . . . .10, 289  
 Ishak, J. . . . .116  
 Isheim, D. . . . .110, 285  
 Ishibashi, R. . . . .249  
 Ishida, F. . . . .198  
 Ishida, K. . . . .278  
 Ishikawa, N. . . . .134  
 Ishikawa, S. . . . .167  
 Ishitaka, K. . . . .138  
 Ishrak, F. . . . .22  
 Ishtiaq, M. . . . .138  
 Isiksacan, C. . . . .219  
 Islam, M. . . . .39, 60, 101, 106,  
 279, 281, 282  
 Islam, S. . . . .157  
 Isotta, E. . . . .59  
 Issaka, A. . . . .56  
 Issa, R. . . . .207, 215, 217, 241  
 Issariyapat, A. . . . .54  
 Iten, J. . . . .114, 285  
 Ito, A. . . . .258  
 Itoh, G. . . . .247, 258  
 Iurkovskiy, A. . . . .165, 299  
 Ivanisenko, J. . . . .171  
 Ivester, J. . . . .12  
 Iwamatsu, K. . . . .272  
 Iwaniec, U. . . . .64, 65  
 Iwata, T. . . . .198  
 Iyer, V. . . . .71  
 Iyinbor, I. . . . .199  
 Izadi Najafabadi, M. . . . .224  
 Izadpanah, S. . . . .41, 116, 290  
 Izumi, D. . . . .134

## J

Jaber, H. . . . .83  
 Jablonski, P. . . . .34, 58, 72, 197  
 Jackson, A. . . . .143  
 Jackson, C. . . . .212  
 Jackson, J. . . . .129, 225  
 Jackson, M. . . . .136  
 Jacob, K. . . . .30, 58, 108, 116, 147,  
 168, 229, 261  
 Jacobsen, G. . . . .30, 65  
 Jacobson, G. . . . .101  
 Jacobs, R. . . . .151  
 Jacobs, T. . . . .148, 203  
 Jadhav, Y. . . . .288  
 Jaebok, S. . . . .286  
 Jafari Ghalejooghi, K. . . . .261  
 Jafari, R. . . . .123  
 Jaffer, S. . . . .260  
 Jagadish, K. . . . .229  
 Jagatramka, R. . . . .165  
 Jagielski, J. . . . .13  
 Jäggle, E. . . . .79  
 Jahan, S. . . . .231, 250  
 Jahazi, M. . . . .210  
 Jahed, H. . . . .15  
 Jahns, K. . . . .24  
 Jahrsengene, G. . . . .106, 159  
 Jaime, R. . . . .235  
 Jain, A. . . . .53, 173  
 Jain, J. . . . .200, 286, 294  
 Jain, M. . . . .31, 231  
 Jain, R. . . . .35, 100, 259, 283, 300  
 Jaisawal, R. . . . .25  
 Jaiswal, M. . . . .189  
 Jaiswal, R. . . . .153  
 Jaiswal, S. . . . .139  
 Jakovljevic, K. . . . .176  
 Jalali, S. . . . .10, 31, 186, 238  
 Jalan, B. . . . .185  
 Jam, A. . . . .9  
 Jamal, S. . . . .276  
 Jambor, M. . . . .158  
 Jame, H. . . . .17  
 James, W. . . . .214, 215  
 Jamieson, T. . . . .189  
 Jana, P. . . . .14  
 Jana, S. . . . .204  
 Janczak-Rusch, J. . . . .154  
 Janeczek, M. . . . .233, 286  
 Jang, D. . . . .31, 64, 101, 135, 168,  
 203, 230, 274  
 Jang, G. . . . .255  
 Jang, H. . . . .94, 170, 296  
 Jang, J. . . . .72, 79, 83, 100, 172, 183,  
 200, 251, 258, 285, 293  
 Jang, T. . . . .266  
 Jang, Y. . . . .258  
 Jankowski, A. . . . .299

Jankowski, J	236	Jessee, S	239	Johnson, B	122
Jansen, H	101, 183	Jeter, I	262	Johnson, D	46, 158, 176, 204, 226, 261
Jansen, Y	187	Jeunon, J	264	Johnson, F	45
Janssen, J	218	Jeyamohan, R	161	Johnson, G	182, 289
Janus, K	21	Jha, A	87, 189	Johnson, H	31
Jaques, B	174	Jha, R	185	Johnson, J	249
Jared, B	300	Jha, S	114, 118, 148, 185, 198, 216, 240, 263	Johnson, K	116, 261
Jarek, R	208	Jhen, Y	105	Johnson, N	20, 212, 220
Jariwala, D	163	Jia, C	206	Johnson, O	20, 98, 125
Jarosinski, W	283	Jia, K	206	Johnson, S	227
Jarren, L	122	Jia, N	119, 164	Johnson, T	166
Jarry, P	65	Jiang, C	53, 70, 92, 94, 119, 137, 249	Johnston, B	166
Jarvis, D	32, 93, 187	Jiang, H	139	Jo, i	268
Jasien, C	146	Jiang, K	292	Jo, J	249, 273
Jasthi, B	16, 46, 83, 198, 267	Jiang, L	177, 210	Jokisaari, A	55, 145, 160
Jaswandkar, S	191, 220	Jiang, M	141, 194	Jokissari, A	160
Jaumouille, E	149	Jiang, P	55	Jolly, B	132
Javey, A	144	Jiang, R	105, 112	Jolly, M	136, 169
Javidani, M	122, 292	Jiang, T	156	Jomboh, K	221
Jawahery, S	153	Jiang, W	63, 66, 102, 165, 194, 288	Jonathan, C	25
Jawahir, I	45	Jiang, X	90	Jones, A	167, 194
Jayaraman Palanivel, A	136, 169	Jiang, Y	50, 67	Jones, C	244
Jayaraman, T	47, 190	Jiang, Z	20, 164	Jones, J	139, 261
Jayaram, S	279	Jian, P	164	Jones, K	98, 126, 159, 162, 195, 222
Jayaram, V	235	Jian, W	92	Jones, M	33, 137, 139, 215, 297
Jayasankar, D	99	Jiao, C	80	Jones, N	16, 77, 81, 86, 89, 101, 132, 173, 207, 237, 285
Jayathilaka, P	101	Jiao, M	14	Jones, S	235, 249
Jaynes, E	12	Jiao, Z	163	Joo, H	264
Jeffries, J	36, 107, 146, 169, 221, 222, 231	Jia, P	37	Joo, S	130, 200
Jegatheesan, V	279	Jia, Y	86	Jordan, J	94
Jelinek, A	58, 205, 254	Jia, Z	50	Jordan, M	205
Jena, A	36, 50	Ji, C	286, 293	Jordon, B	225, 232
Jenal, I	219, 242	Jie, L	149	Jordon, J	225
Jen, I	152, 188	Ji, K	27, 53	Jordon, P	225
Jenkins, H	198	Jin, H	24	Joreess, H	11, 209, 232, 246
Jenkins, W	289	Jin, J	113	Jo, S	250, 278, 286, 291
Jennings, D	105	Jin, L	293	Joseph, C	265
Jennings, R	147	Jin, M	23, 33, 55, 62, 66, 94, 103, 127, 137, 160, 170, 196, 205, 223, 231, 236, 239, 246, 249, 269, 275	Joshi, H	52
Jensen, B	11, 291	Jin, Q	284	Joshi, N	148, 179, 265
Jensen, C	21	Jinschek, J	156, 251	Joshi, P	35, 68, 106, 139, 174
Jensen, K	109	Jin, X	60	Joshi, S	22, 81, 115, 118, 174, 239
Jensen, Ø	242	Jin, Y	59, 97, 149, 169, 172, 185, 208, 264	Joshi, V	15, 16, 39, 80, 119, 238
Jen, T	212, 280	Jin, Z	23, 73, 142, 213, 264	Joslin, C	9, 72
Jentoftsen, T	49, 122	Ji, S	298	Josse, M	252
Jentz, I	37	Ji, Y	111, 130, 131, 274, 296	Jossou, E	103
Jeong, H	173, 265, 277	Jo, A	281	Jourdan, T	224
Jeong, J	100	Jobes, D	289	Jóźwik, I	13
Jeong, K	280	Jobit, N	47	Jo, Y	86
Jeong, M	281	Johannsen, J	222	Joy, J	41, 103, 126, 167
Jeong, N	290	Johansson, I	140	Jozwik, B	77
Jeong, S	116, 264	Joh, D	43	Juan, P	30, 134
Jeong, Y	199	John, D	82, 83, 257	Juarez Tapia, J	60, 268
Jeon, H	271	John, M	47, 254, 258, 261	Juárez Tapia, J	264
Jeon, J	22, 277, 298	John, R	114, 162	Juárez-Tapia, J	264, 277, 295
Jeon, M	286	Johnson, A	260	Ju, B	196
Jeon, S	91, 108, 292			Juchau, M	215
Jeppsson, J	288			Judd, K	119, 259
Jerez, O	92			Jugan, A	139



- Juhasz, M. . . . . 38, 71, 222  
 Juhre, D. . . . . 245  
 Jullien, M. . . . . 12, 128  
 Ju, M. . . . . 202  
 Jumaev, E. . . . . 259  
 Jump, N. . . . . 113  
 Jund, P. . . . 18, 48, 85, 121, 152, 188, 267  
 Juneja, R. . . . . 243  
 Jung, C. . . . . 134, 267  
 Jung, E. . . . . 267  
 Jung, I. . . . . 110  
 Jung, J. . . . . 153, 277, 290  
 Jung, K. . . . . 114  
 Jung, S. . . . . 51  
 Jung, W. . . . . 249, 275  
 Jung, Y. . . . . 145, 181, 213, 238, 239, 265, 266, 287, 293  
 Junior, B. . . . . 223  
 Júnior, E. . . . . 294  
 Júnior, R. . . . . 104  
 Jun, J. . . . . 62, 207, 255  
 Jun, M. . . . . 215  
 Jun, T. . . . . 285  
 Ju, S. . . . . 38  
 Justice, J. . . . . 206  
 Juul Jensen, D. . . . . 158, 283
- K**
- Kabakci, N. . . . . 155  
 Kabir, A. . . . . 282, 291  
 Kacher, J. . . . 31, 64, 101, 135, 157, 162, 168, 203, 211, 221, 230, 252, 274, 280  
 Kadambi, S. . . . . 17, 55, 168, 231  
 Kadirvel, K. . . . . 40, 73, 194  
 Kadkhodaei, S. . . . . 158  
 Kaehr, B. . . . . 261  
 Kafka, O. . . . . 20, 25, 57, 75, 78, 96, 114, 161, 197, 224, 271, 301  
 Kaggias, M. . . . . 20, 206  
 Kahanavitage Don, K. . . . . 279  
 Kahl, E. . . . . 27  
 Kaipainen, J. . . . . 146, 288  
 Kajihara, M. . . . . 279  
 Kajola, R. . . . . 271  
 Kakinuma, H. . . . . 72  
 Kalakonda, P. . . . . 148, 179  
 Kalapos, T. . . . . 117  
 Kalarickal, N. . . . . 238  
 Kalay, E. . . . . 261  
 Kalay, Y. . . . . 20, 52, 90, 125, 139, 156, 193, 221, 229, 261, 294, 295, 297  
 Kalidindi, S. . . . . 75, 187, 190, 241  
 Kalita, D. . . . . 13, 248  
 Kallal, J. . . . . 89  
 Kaloni, T. . . . . 243  
 Kalsar, R. . . . . 15, 16, 80, 119  
 Kam, A. . . . . 185  
 Kamado, S. . . . . 227  
 Kamai, M. . . . . 198  
 Kamal, G. . . . . 230  
 Kamal, M. . . . . 41  
 Kamath, R. . . 110, 173, 207, 232, 251, 301  
 Kamat, R. . . . . 52  
 Kamat, S. . . . . 217  
 Kamboj, A. . . . . 33, 53, 55, 94  
 Kam, D. . . . . 120  
 Kamerman, D. . . . . 202  
 Kammenzind, B. . . . . 23  
 Kamrava, S. . . . . 85  
 Kanagarajah, H. . . . . 162  
 Kandadai, N. . . . . 69, 144, 221  
 Kandasamy, K. . . . . 22, 71, 198, 245  
 Kandel, S. . . . . 90  
 Kang, C. . . . . 22, 77  
 Kang, D. . . . . 52, 57, 110  
 Kang, G. . . . . 277  
 Kang, H. . . . . 267, 285, 293  
 Kang, J. . . . . 112, 171, 228, 290  
 Kang, K. . . . . 274  
 Kang, L. . . . . 277, 286  
 Kang, M. . . . 52, 110, 241, 263, 280, 293  
 Kang, N. . . . . 138, 215, 260, 267, 281  
 Kang, S. . . . . 30, 39, 56, 160, 197, 211, 224, 270, 280  
 Kang, T. . . . . 239, 266  
 Kang, Y. . . . . 293  
 Kanki, S. . . . . 17, 241  
 Kannan, R. . . . 9, 81, 97, 146, 147, 191, 214, 239  
 Kan, S. . . . . 24, 56  
 Kansal, A. . . . . 112  
 Kanter, J. . . . . 32  
 Kantzos, C. . . . . 11, 78, 121, 224  
 Kao, A. . . . 53, 135, 180, 215, 229, 287, 297  
 Kao, C. . . . 23, 55, 93, 127, 159, 196, 269  
 Kao, H. . . . . 23, 277  
 Kaoumi, D. . . . . 237  
 Kaplan, D. . . . . 31  
 Kaplan, S. . . . . 175  
 Kapoor, M. . . . . 49, 188, 283  
 Kappagantula, K. . . . 129, 163, 199, 226, 246, 271  
 Kar, A. . . . . 198, 259  
 Kara, B. . . . . 292  
 Karaca, H. . . . . 100, 105  
 Karadayi, I. . . . . 128  
 Karade, S. . . . . 259, 286, 290  
 Karadimas, G. . . . . 235  
 Karagadde, S. . . . . 283  
 Karakanat, A. . . . . 128  
 Karakash, Y. . . . . 146  
 Karakaya, N. . . . . 133  
 Kara, L. . . . . 103  
 Karamalidis, A. . . . . 175, 208, 234  
 Karaman, I. . . . 26, 34, 47, 157, 172, 173, 176, 212, 238, 254, 265  
 Karamched, P. . . . . 11  
 Karan, B. . . . . 285  
 Karatas, M. . . . . 158  
 Karber, C. . . . . 274  
 Kardoulaki, E. . . . . 167, 243  
 Kareem, M. . . . . 116  
 Kariya, S. . . . . 54  
 Karki, S. . . . . 84, 234, 266, 290  
 Kar, M. . . . . 191  
 Karma, A. . . . . 27  
 Karmakar, A. . . . . 280  
 Karmakar, S. . . . . 245  
 Karmarkar, S. . . . . 220  
 Karna, S. . . . . 297  
 Karpinski, M. . . . . 77, 185  
 Karpov, D. . . . . 51  
 Karpovich, O. . . . . 146  
 Karpstein, N. . . . . 132, 173  
 Karra, A. . . . . 254  
 Karren, M. . . . . 215  
 Karrington, N. . . . . 90  
 Kar, S. . . . . 285  
 Karthikeyan, M. . . . . 68  
 Karube, S. . . . . 163  
 Karumuri, S. . . . . 197  
 Karunakaran, V. . . . . 194  
 Karunakar, D. . . . . 113  
 Karuna Nidhi, K. . . . . 277, 300  
 Karve, P. . . . . 17  
 Kasalo, M. . . . . 21  
 Kasemer, M. . . . . 17, 47, 84, 120, 144, 151, 187, 217, 241, 291  
 Kashyap, K. . . . . 188  
 Kaspar, T. . . . . 99, 141, 196, 237  
 Kassner, M. . . . . 214  
 Kastelic, S. . . . . 233  
 Katagiri, K. . . . . 172  
 Kataoka-Hamai, C. . . . . 233  
 Katariya, Y. . . . . 210  
 Katase, T. . . . . 18, 59  
 Kathayat, P. . . . . 38  
 Kato, H. . . . . 135  
 Katoh, Y. . . . . 65, 102, 108, 194, 204, 230, 249  
 Katona, R. . . . . 29, 57, 61, 187  
 Kato, T. . . . . 230  
 Kato, Y. . . . . 62, 157, 204  
 Katre, A. . . . . 70  
 Katsarelis, C. . . . . 10  
 Katsman, A. . . . . 46  
 Katsura, Y. . . . . 59, 293  
 Katta, A. . . . . 238  
 Kattelman, J. . . . . 184  
 Katti, D. . . . . 191, 220  
 Katti, K. . . . . 155, 191, 220, 243, 268  
 Kattner, U. . . . . 40, 74, 110, 143  
 Kauffmann, A. . . . . 224  
 Kaufman, J. . . . . 260, 262  
 Kaufman, M. . . . . 165, 200, 254  
 Kaul, A. . . . . 111

- Kaur, A. . . . . 239  
 Kaur, H. . . . . 125, 246  
 Kaushik, A. . . . . 301  
 Kautz, E. . . . . 63, 275  
 Kaveh, A. . . . . 162  
 Kavousi, S. . . . . 89, 131  
 Kawagishi, K. . . . . 237  
 Kawanishi, S. . . . . 81  
 Kawasaki, M. . . . . 80, 83, 150, 172, 199, 233  
 Kayaçetin, H. . . . . 219  
 Kaya, I. . . . . 218  
 Kayane, R. . . . . 228  
 Kayani, S. . . . . 219  
 Kayitmazbatir, M. . . . . 297  
 Kc, A. . . . . 30  
 Kc, S. . . . . 148, 185, 216, 240, 263  
 Ke, C. . . . . 264  
 Keenan, F. . . . . 20  
 Keffer, D. . . . . 260  
 Ke, H. . . . . 83, 109  
 Keilbart, N. . . . . 228  
 Keiser, J. . . . . 292  
 Ke, J. . . . . 29, 54, 55  
 Kelestemur, M. . . . . 260  
 Kelleher, J. . . . . 20, 141  
 Keller, P. . . . . 176  
 Keller, T. . . . . 58, 82, 208  
 Kelly, J. . . . . 99  
 Kelly, M. . . . . 9  
 Kelly, R. . . . . 95  
 Kelly, S. . . . . 20  
 Kemerling, B. . . . . 41  
 Kemmenoe, D. . . . . 61, 222  
 Kemmerly, G. . . . . 236  
 Kemmotsu, K. . . . . 278  
 Kendall, L. . . . . 144  
 Kendir, Y. . . . . 24  
 Kenesei, P. . . . . 52, 101, 116, 162  
 Keninger, N. . . . . 33, 66, 211  
 Kennedy, C. . . . . 26  
 Kennedy, M. . . . . 35, 68  
 Kenny, G. . . . . 92  
 Kerbstadt, M. . . . . 81, 103, 112, 178  
 Kerkhof, R. . . . . 58  
 Kermarrec, J. . . . . 100  
 Kernion, S. . . . . 246  
 Kero, I. . . . . 56  
 Kerr, J. . . . . 62  
 Keshavarz, S. . . . . 187  
 Keshri, A. . . . . 84  
 Keskar, N. . . . . 13, 16  
 Kesinkilic, E. . . . . 56  
 Kesler, M. . . . . 138, 188, 292  
 Kessel, B. . . . . 77  
 Kestur Gundapa, S. . . . . 126  
 Ketten, S. . . . . 124  
 Kettimuthu, R. . . . . 52  
 Kevorkian, V. . . . . 49, 165  
 Kgomo, H. . . . . 81  
 K. G., P. . . . . 266  
 Khademitab, M. . . . . 9  
 Khafizov, M. . . . . 33, 53, 70, 94, 137, 177, 211  
 Khaing, A. . . . . 259  
 Khair, M. . . . . 62, 156, 170, 205, 273  
 Khajezade, A. . . . . 164  
 Khaled, T. . . . . 291  
 Khalifa, H. . . . . 44  
 Khan, A. . . . . 173, 187, 267  
 Khanal, B. . . . . 29, 61, 129, 133, 163, 199, 226, 246, 271, 299  
 Khandelwal, P. . . . . 130, 160  
 Khane, P. . . . . 117  
 Khanfri, J. . . . . 48, 221  
 Khan, M. . . . . 83, 166, 227, 247, 299  
 Khanna, S. . . . . 235, 246  
 Khanolkar, A. . . . . 13, 52, 53, 70, 174, 177, 211  
 Khan, R. . . . . 111  
 Khanra, A. . . . . 210  
 Khan, S. . . . . 173  
 Khare, D. . . . . 192  
 Khatamsaz, D. . . . . 84, 153, 218, 238, 279  
 Khatlab, D. . . . . 139, 209  
 Khaykovich, B. . . . . 108, 194, 250  
 Kheirkhah, P. . . . . 235  
 Khennane, A. . . . . 100  
 Khodakarami, M. . . . . 279  
 Khomyakov, E. . . . . 37  
 Khonsari, M. . . . . 259  
 Khor, C. . . . . 93  
 Khoshghadam Pireyousefan, M. . . . . 122  
 Khosla, H. . . . . 31  
 Khosravani, A. . . . . 75  
 Khot, S. . . . . 189  
 Khraishi, T. . . . . 290  
 Khrenov, M. . . . . 135, 158, 182  
 Kiefe, R. . . . . 82  
 Kiefer, P. . . . . 206  
 Kiener, D. . . . . 58, 205, 228  
 Kihm, K. . . . . 199  
 Kilgore, J. . . . . 20  
 Kilian, K. . . . . 101  
 Kilic, G. . . . . 36  
 Killam, A. . . . . 198  
 Killgore, J. . . . . 143, 301  
 Kim, B. . . . . 94, 238, 293  
 Kim, C. . . . . 29, 55, 133, 144, 196, 277, 281, 286, 293  
 Kim, D. . . . . 72, 196, 244, 257, 263, 265, 267, 269, 273, 276, 277, 281, 286, 291, 293, 294, 296, 298  
 Kim, E. . . . . 15, 116, 201, 227, 272, 276  
 Kim, G. . . . . 77, 83, 262, 286, 291  
 Kim, H. . . . . 26, 30, 43, 44, 51, 58, 72, 77, 78, 79, 80, 86, 95, 96, 99, 116, 129, 130, 133, 137, 141, 163, 166, 168, 175, 188, 196, 199, 202, 208, 222, 234, 238, 240, 244, 246, 265, 266, 267, 270, 272, 277, 279, 286, 290, 291, 297, 298  
 Kim, J. . . . . 21, 22, 32, 72, 79, 99, 116, 133, 136, 139, 159, 166, 168, 183, 201, 204, 220, 228, 238, 247, 254, 262, 263, 264, 265, 266, 267, 273, 274, 275, 277, 278, 279, 280, 281, 290, 291, 293, 298  
 Kim, K. . . . . 9, 38, 43, 79, 88, 113, 186, 248, 267, 277, 293, 297  
 Kim, M. . . . . 32, 70, 150, 179, 183, 196, 257, 265, 269, 274, 277, 281, 293, 294  
 Kimmell, C. . . . . 214  
 Kim, N. . . . . 201, 272  
 Kim, R. . . . . 39, 60, 130, 266  
 Kim, S. . . . . 26, 28, 46, 60, 62, 120, 151, 190, 202, 234, 244, 246, 247, 250, 258, 269, 270, 273, 279, 281, 282, 290, 292, 293, 296  
 Kim, T. . . . . 12, 86, 138, 199, 264, 265, 267, 290  
 Kimura, T. . . . . 258, 295  
 Kimura, Y. . . . . 18, 48, 85, 121, 152, 188, 267  
 Kim, W. . . . . 59, 211, 254, 279, 281  
 Kim, Y. . . . . 17, 24, 55, 108, 109, 112, 116, 117, 132, 196, 201, 215, 227, 265, 266, 269, 278, 286, 290, 292, 293, 294, 299  
 Kindelmann, M. . . . . 252  
 Kinney, P. . . . . 12  
 Kinoshita, K. . . . . 162  
 Kinser, R. . . . . 232  
 Kinsey, B. . . . . 11, 291  
 Kiran, A. . . . . 235  
 Kiranbabu, S. . . . . 173  
 Kirchlechner, C. . . . . 11, 168  
 Kirka, M. . . . . 9, 24, 41, 56, 78, 95, 114, 115, 157, 239, 270, 287  
 Kirks, W. . . . . 79  
 Kirkwood, H. . . . . 20  
 Kisailus, D. . . . . 101, 155, 163, 191, 220, 243, 268  
 Kishida, K. . . . . 186  
 Kisiel, T. . . . . 139  
 Kiss, E. . . . . 41  
 Kistampally, S. . . . . 105  
 Kisub, C. . . . . 286  
 Kitahara, A. . . . . 181  
 Kitamura, A. . . . . 160  
 Kitt, A. . . . . 146, 183, 215, 283  
 Kjos, O. . . . . 106, 131, 153, 242  
 Klaus, D. . . . . 46  
 Kleindienst, J. . . . . 289  
 Klein, E. . . . . 260  
 Kleinke, H. . . . . 85  
 Klement, U. . . . . 205

- Klemm-Toole, J. . . . .26, 34, 58, 68, 97, 105,  
114, 130, 138, 146, 164, 173, 178, 180,  
182, 183, 207, 212, 213, 214, 215, 233,  
237, 238, 239, 251, 277, 281, 283, 288,  
289, 290, 298
- Klenam, D. . . . .46
- Klimczuk, T. . . . .107
- Kling, D. . . . .57
- Klinger, L. . . . .154
- Kloenne, Z. . . . .13, 16, 47, 84, 120, 150,  
186, 235, 291
- Kluck, W. . . . .243
- Klusemann, B. . . . .207
- Kırmış, V. . . . .56
- K, N . . . . .259, 286, 290
- Knapp, G. . . . .244, 287, 297
- K N, C . . . . .239
- KN, C. . . . .118
- Knezevic, M. . . . .11, 34, 41, 116, 151, 168,  
204, 261, 290, 291
- Knipling, K. . . . .26, 141
- Knol, S. . . . .205
- Knowles, A. . . . .13, 17, 38, 44, 81, 103,  
117, 178, 263
- Knowles, S. . . . .13, 117, 263
- Knox, K. . . . .299
- Knox, R. . . . .75
- Knudson, M. . . . .218
- Knutsen, R. . . . .11
- Kobayashi, E. . . . .104, 279
- Kobayashi, G. . . . .296
- Kobayashi, J. . . . .247, 258
- Kobayashi, K. . . . .72
- Kobayashi, M. . . . .96, 280
- Kobayashi, R. . . . .27
- Kobayashi, T. . . . .67
- Kober, E. . . . .52, 157
- Kocafe, D. . . . .55, 223
- Kocafe, Y. . . . .55, 223
- Koch, A. . . . .77, 101, 162, 253
- Kochmann, D. . . . .51, 91, 248
- Kockelmann, W. . . . .20
- Koc, U. . . . .292
- Kodama, R. . . . .172
- Ko, E. . . . .293, 299
- Koelmans, W. . . . .231
- Koenig, A. . . . .12
- Koenig, C. . . . .156, 251
- Koenig, T. . . . .12
- Koga, N. . . . .96
- Ko, H. . . . .263
- Kohara, S. . . . .39
- Kohlhorst, N. . . . .129
- Köhl, R. . . . .28
- Kohnert, A. . . . .31, 70, 141, 167, 196, 211
- Kohnert, C. . . . .194, 269
- Kohne, T. . . . .116
- Koizumi, Y. . . . .244
- Koju, R. . . . .123
- Kokkiral, S. . . . .205
- Koko, A. . . . .135
- Ko, L. . . . .133
- Kolano-Burian, A. . . . .77, 185, 265
- Kolanthai, E. . . . .148
- Kolasinski, R. . . . .143
- Koley, S. . . . .8, 77
- Kolle, M. . . . .163
- Komarasamy, M. . . . .71
- Kombaiah, B. . . . .23, 33, 37, 55, 71, 94,  
117, 127, 160, 168, 196,  
197, 223, 269, 280
- Konala, S. . . . .76
- Konda Gokuldoss, P. . . . .149
- Kondoh, K. . . . .54
- Kondo, M. . . . .62
- Kondo, S. . . . .65
- Koneru, S. . . . .27, 35, 110, 244
- Kong, F. . . . .57, 222
- Kong, J. . . . .206
- Kong, Y. . . . .35, 38, 42, 68, 106,  
129, 139, 174
- Konieczny, R. . . . .257
- König, D. . . . .230
- König, T. . . . .24
- Konishi, S. . . . .221
- Konrad, L. . . . .45
- Konstantinos, G. . . . .136
- Kontis, P. . . . .173
- Koo, C. . . . .44
- Koo, J. . . . .262, 264, 278
- Koren, E. . . . .94
- Korey, M. . . . .91, 106
- Körner, C. . . . .117
- Koroni, C. . . . .33, 66, 211
- Korsunsky, A. . . . .20
- Kosanam, K. . . . .194
- Kose, M. . . . .169, 274
- Kosiba, K. . . . .277
- Koslowski, M. . . . .109
- Kosmatka, J. . . . .101
- Kosmidou, M. . . . .103
- Kostka, A. . . . .193
- Kotan, H. . . . .147
- Kothakonda, M. . . . .120
- Kotha, S. . . . .41
- Kotiadis, S. . . . .99, 210
- Kotsios, N. . . . .260
- Kotze, S. . . . .156
- Koukolikova, M. . . . .286
- Koumpias, A. . . . .25, 115
- Kouraytem, N. . . . .288
- Koury, D. . . . .66, 177, 272
- Kout, J. . . . .286
- Koutny, D. . . . .158
- Kovar, D. . . . .171
- Kovnir, K. . . . .158
- Kovo, A. . . . .180
- Ko, W. . . . .181, 190, 220, 228, 254, 296
- Kowalczyk, D. . . . .179
- Kowalczyk, M. . . . .45, 185, 265
- Kowalik, M. . . . .111
- Kowlaczyk, M. . . . .282
- Ko, Y. . . . .159, 228
- Koyama, E. . . . .293
- Koyama, M. . . . .38, 72, 108, 142, 173, 280
- Koyanagi, T. . . . .63, 65, 102, 108, 194, 249
- Kozakevich, J. . . . .218, 219, 241
- Koziol, P. . . . .277
- Kozłowski, M. . . . .201
- Kozłowski, P. . . . .20
- Kozmel, T. . . . .130
- K.P., K. . . . .259, 286, 290
- Kracum, M. . . . .15, 79
- Krajewski, A. . . . .239
- Kramer, M. . . . .14, 22, 45, 82, 118, 149,  
176, 185, 264
- Kramer, P. . . . .21
- Krane, M. . . . .228
- Krass, H. . . . .51
- Krastins, I. . . . .180, 215, 229, 287, 297
- Krause, A. . . . .89, 193
- Kraus, L. . . . .286
- Krawczyk, M. . . . .257
- Kreiml, P. . . . .216
- Krentz, T. . . . .297
- Krick, B. . . . .143, 179, 212, 238, 255, 281
- Krieger, N. . . . .119
- Krienke, N. . . . .96, 130, 279
- Krill, C. . . . .97, 125, 193
- Krischanitz, R. . . . .54
- Krishna, K. . . . .22, 115
- Krishnamoorthi, S. . . . .41
- Krishnamurthy, R. . . . .74
- Krizan, R. . . . .260
- Kirli, K. . . . .24
- Krogstad, J. . . . .33, 66, 103, 137, 171, 206
- Krogstad, M. . . . .206
- Kroonblawd, M. . . . .39
- Krooss, P. . . . .9
- Kruck, E. . . . .249
- Krug, M. . . . .73, 114
- Kruizenga, A. . . . .166
- Kruska, K. . . . .63
- Kruszewski, M. . . . .267
- Krutz, N. . . . .74
- Kruzic, J. . . . .9, 14, 40, 65, 83, 101
- Krynicky, J. . . . .11
- Ksiazek, M. . . . .56
- Kuball, M. . . . .194
- Kubasek, J. . . . .142, 287
- Kübel, C. . . . .61
- Kubena, I. . . . .26
- Kube, S. . . . .13, 39, 73, 109, 142, 178,  
211, 237, 254, 281
- Kublik C, N. . . . .69
- Kublik, N. . . . .250, 259, 285
- Kuběna, I. . . . .286

- Ku, C. . . . . 121, 122, 267  
 Kuchi, R. . . . . 149  
 Kuebel, C. . . . . 39  
 Kuebel, E. . . . . 261  
 Kučerová, L. . . . . 259  
 Kuglarz, K. . . . . 180  
 Kugler, G. . . . . 74  
 Kuglstatter, M. . . . . 199  
 Kühne, T. . . . . 152  
 Kuhr, S. . . . . 134, 225  
 Kukofka, A. . . . . 115, 120, 286  
 Kuksenko, V. . . . . 94, 249  
 Kulathuvayal, A. . . . . 272, 292  
 Kulkarni, P. . . . . 22, 71, 245  
 Kulkarni, Y. . . . . 19  
 Ku, M. . . . . 68  
 Kumagai, M. . . . . 121, 291, 293  
 Kumah, D. . . . . 185  
 Kumar, A. . . . . 80, 82, 167, 182, 270  
 Kumara, C. . . . . 26, 143  
 Kumaran, S. . . . . 234  
 Kumar, B. . . . . 86  
 Kumar, C. . . . . 21, 253  
 Kumar, D. . . . . 16, 62, 218, 300  
 Kumari, A. . . . . 83  
 Kumari, G. . . . . 9, 31, 72, 100  
 Kumari, S. . . . . 179  
 Kumar, J. . . . . 115, 184  
 Kumar, K. . . . . 294  
 Kumar, M. . . . . 64, 159, 181, 205, 239  
 Kumar, N. . . . . 25, 57, 71, 110, 129, 151,  
 162, 176, 198, 210, 218, 225,  
 226, 242, 245, 271, 300  
 Kumar, P. . . . . 15, 23, 43, 55, 57, 83, 93,  
 112, 113, 114, 120, 127, 159, 172,  
 180, 196, 253, 269, 281, 286  
 Kumar Rao, K. . . . . 217, 241  
 Kumar, S. . . . . 13, 149, 278  
 Kumar Saha, A. . . . . 24, 56, 69  
 Kumar, V. . . . . 94, 154, 176  
 Kümmell, T. . . . . 179  
 Kumral, B. . . . . 206  
 Ku, N. . . . . 180  
 Kundu, A. . . . . 278  
 Kundu, H. . . . . 189  
 Kundu, J. . . . . 26  
 Kundu, S. . . . . 153  
 Kundu, T. . . . . 251  
 Kung, C. . . . . 121  
 Kunimine, T. . . . . 46, 206, 259  
 Kunjam, P. . . . . 51  
 Kunkel, W. . . . . 297  
 Kunneparambil Sukumaran, A. . . . . 257  
 Kunwar, S. . . . . 185  
 Künzler, M. . . . . 192  
 Kuo, P. . . . . 186  
 Kuo, Y. . . . . 233  
 Kuramoto, S. . . . . 247, 258  
 Kurfess, R. . . . . 107  
 Kuris, M. . . . . 150  
 Kurley, M. . . . . 243  
 Kurniawan, K. . . . . 28, 60, 234  
 Kuroda, P. . . . . 147  
 Kurosaki, K. . . . . 121, 291  
 Kurpaska, Ł. . . . . 13, 248  
 Kurtyka, P. . . . . 21, 22  
 Kurzer-Ogul, K. . . . . 20  
 Kusekar, S. . . . . 261, 290  
 Kushwaha, A. . . . . 258  
 Kusriantoko, P. . . . . 189  
 Kustas, A. . . . . 78, 167, 252, 289  
 Kusterer, E. . . . . 79, 245  
 Kutsal, M. . . . . 168  
 Kutukova, K. . . . . 63  
 Kuwata, N. . . . . 75  
 Ku, Y. . . . . 55  
 Kvande, H. . . . . 189  
 Kvit, A. . . . . 226, 275  
 Kvithyld, A. . . . . 69, 136, 169, 235, 253  
 Kwak, M. . . . . 254, 281  
 kwak, N. . . . . 293  
 Kwak, N. . . . . 204, 257, 293  
 Kwasniak, P. . . . . 186  
 Kweon, K. . . . . 70  
 Kwiatkowski da Silva, A. . . . . 79  
 Kwiecien, M. . . . . 130  
 Kwofie, S. . . . . 46  
 Kwon, H. . . . . 79, 117, 238, 265, 297  
 Kwon, J. . . . . 244, 266  
 Kwon, K. . . . . 228  
 Kwon, N. . . . . 257  
 Kwon, S. . . . . 17, 121, 164, 170, 195, 244  
 Kwon, T. . . . . 72  
 Kwon, Y. . . . . 277  
 Kynman, A. . . . . 140  
 Kyrilis, E. . . . . 45  
**L**  
 Labaj, G. . . . . 277  
 Labruyère, E. . . . . 186  
 Lach, T. . . . . 10, 100, 160, 177, 211,  
 229, 236, 274  
 Lacy, J. . . . . 16  
 Lacy Jr, T. . . . . 44  
 Ladani, L. . . . . 70, 112, 145, 216, 225, 288  
 Lados, D. . . . . 77  
 Ladygin, V. . . . . 244  
 Lafarge, B. . . . . 252  
 Lafferty, C. . . . . 217  
 Lagarda García, F. . . . . 268  
 Laghi, V. . . . . 140  
 Lago Chamero, E. . . . . 278, 286  
 Lagoudas, D. . . . . 96, 173, 180  
 Lagunes, K. . . . . 271  
 Laha, T. . . . . 82, 83, 265  
 Lahoda, E. . . . . 170  
 Lai, C. . . . . 228  
 Lai, J. . . . . 130, 286  
 Laikhtman, A. . . . . 201  
 Laing, J. . . . . 61, 224, 234  
 Lainhart, T. . . . . 162  
 Lai, S. . . . . 23  
 Laitinen, V. . . . . 9  
 Lai, W. . . . . 152  
 Lai, Y. . . . . 98, 188, 216, 267  
 Lakshmanan, A. . . . . 153  
 Laliberté-Riverin, S. . . . . 55, 242  
 Lama, A. . . . . 71, 82, 83, 257  
 LaMarca, C. . . . . 43  
 LaMascus, P. . . . . 143  
 Lambeets, S. . . . . 92, 196  
 Lamberson, L. . . . . 47  
 Lambert-Garcia, R. . . . . 86, 113, 285  
 Lambert, P. . . . . 26, 77  
 Lambert, R. . . . . 25  
 Lamb, J. . . . . 11, 43, 116, 184, 284  
 Lamb, K. . . . . 280  
 Lam, M. . . . . 29, 115  
 Lamm, B. . . . . 65  
 Lamouri, A. . . . . 243  
 Lamprinakos, N. . . . . 9, 13, 115  
 Lam, S. . . . . 63, 141  
 Lam, T. . . . . 150, 286  
 Lancelot, C. . . . . 44  
 Lance, M. . . . . 143  
 Lanceros Mendez, S. . . . . 184  
 Lanceros-Mendez, S. . . . . 77  
 Lander, G. . . . . 107  
 Landini, J. . . . . 188, 233  
 Landon, C. . . . . 242  
 Landry, M. . . . . 300  
 Lane, B. . . . . 29  
 Lane, J. . . . . 218  
 Lan, G. . . . . 206  
 Langan, D. . . . . 226  
 Langan, S. . . . . 182  
 Langan, T. . . . . 177, 210  
 Langdon, O. . . . . 84  
 Langdon, T. . . . . 172  
 Lang, E. . . . . 30, 63, 100, 134, 167, 178,  
 202, 229, 240, 248, 269, 272, 273  
 Langevin, J. . . . . 261  
 Langham, A. . . . . 213, 292  
 Langhout, J. . . . . 80  
 Lang, M. . . . . 86, 108, 141, 206, 236, 237  
 Lanka, S. . . . . 258  
 Lanzrath, A. . . . . 44  
 Lapington, M. . . . . 270  
 Laplanche, G. . . . . 216  
 Larios, A. . . . . 291  
 Lark, A. . . . . 71, 78, 213, 279  
 Larouche, D. . . . . 296  
 Larsen, S. . . . . 56  
 Larson, S. . . . . 143  
 Larsson, F. . . . . 73  
 Larsson, P. . . . . 130



- LaSalle, B . . . . .37  
 Lasheras, A . . . . .185  
 Lasne, C . . . . .25  
 Lass, E . . 10, 13, 44, 46, 78, 81, 115, 117,  
 146, 186, 245, 263, 265, 266, 289  
 Lasseter, J . . . . .239  
 Lassnig, A . . . . . 203, 216, 229  
 Lastovich, M . . . . .105  
 Latournerie, M . . . . .135  
 Latronico, G . . . . .18  
 Latypov, M . . . . .219  
 Lauber, L . . . . .193  
 Lau, D . . . . .155  
 Lauhoff, C . . . . .9, 222  
 Laukkanen, A . . . . . 146, 265, 288  
 Lau, W . . . . .290  
 Lauzon-Gauthier, J . . . . .55  
 La, V . . . . .292  
 Lavelle, A . . . . .295  
 Lavender, C . . . . .38  
 Lavender, K . . . . .157  
 Lavernia, E . . . . .76, 113, 120, 163, 171,  
 244, 282, 283, 284, 285, 299  
 Laverock, J . . . . .108  
 Lavery, N . . . . .249  
 Lavogiez, C . . . . .178, 209  
 Lavoie, P . . . . .122  
 LaVopa, A . . . . .258  
 Lawal, T . . . . .261  
 Law, J . . . . .120  
 Lawrence Bright, E . . . . .107, 108  
 Laws, K . . . 14, 34, 39, 119, 260, 261, 262  
 Lawson, J . . . 63, 126, 152, 154, 157, 190  
 Lawson, S . . . . .145  
 Layne, B . . . . . 140, 227, 272  
 Lazarenko, O . . . . .270  
 Lazarz, J . . . . .73  
 Lazou, A . . . . 36, 69, 106, 140, 167, 176,  
 202, 210, 228, 273, 279  
 Lazpita, P . . . . .77  
 Lear, C . . . . .88  
 Leary, A . . . . .246  
 Lebas, F . . . . .149  
 Lebeau, J . . . . .89  
 Lebedeva, M . . . . .184  
 Lebedkina, T . . . . .83  
 Lebensohnc, R . . . . .151  
 Lebensohn, R . . . . .102, 116, 126, 136,  
 170, 204, 205, 299, 300  
 Lebepe, T . . . . .271  
 Lebot, R . . . . .234  
 Le Bouar, Y . . . . .59  
 Le Brun, P . . . . .65  
 LeBrun, T . . . . .78  
 Lebyodkin, M . . . . .83, 266  
 Lechner, S . . . . .144  
 Lech, S . . . . . 38, 209, 213, 292  
 Le Clézio, H . . . . .51  
 Ledford, C . . . . .157  
 LeDou, G . . . . .191  
 Lee, A . . . . .15, 171  
 Lee, B . . . . .34, 64, 226, 265, 266,  
 274, 293, 299  
 Lee, C . . . . .16, 19, 43, 120, 131, 138,  
 265, 266, 286, 297  
 Lee, D . . . . 79, 83, 116, 199, 266, 280, 290  
 Lee, E . . . . . 42, 196, 257, 293  
 Lee, G . . . . .116, 170  
 Lee, H . . . . 20, 28, 37, 94, 108, 167, 215,  
 243, 257, 258, 263, 277, 279,  
 282, 285, 293, 296  
 Lee, I . . . . . 70, 199, 233, 250  
 Lee, J . . . . 12, 26, 28, 34, 49, 60, 65, 67, 77,  
 80, 90, 91, 104, 109, 116, 138, 173, 215,  
 219, 240, 251, 258, 264, 265, 266, 267,  
 270, 273, 276, 277, 281, 290, 293, 298  
 Lee, K . . . . . 67, 91, 120, 145, 263, 265,  
 266, 267, 286, 293  
 Lee, M . . . . . 70, 73, 120, 219, 270, 274,  
 277, 278, 290  
 Lee, P . . . . . 9, 49, 86, 98, 113, 122, 139,  
 152, 180, 215, 239, 285, 287, 297  
 Lee, R . . . . .93, 156  
 Lee, S . . . 10, 11, 20, 22, 26, 34, 38, 60, 90,  
 99, 102, 116, 134, 136, 168, 170, 171,  
 196, 201, 204, 215, 219, 228, 248, 251,  
 260, 266, 267, 269, 278, 280, 282, 286,  
 290, 293, 298, 299, 300  
 Lee, T . . . . 23, 55, 67, 93, 100, 127, 159,  
 160, 196, 269, 280, 290, 298  
 Lee, W . . . . .133, 150  
 Lee, Y . . . . 16, 86, 94, 146, 178, 181, 183,  
 196, 215, 219, 228, 239, 260,  
 264, 266, 267, 269, 271, 279  
 Lee, Z . . . . .137, 274  
 Le Ferrand, H . . . . 69, 104, 149, 155, 278  
 Leff, A . . . . .192  
 Leger, M . . . . .179  
 Legorreta García, F . . . . .60  
 le Graverend, J . . . . . 29, 61, 212  
 Le Graverend, J . . . . .96, 173  
 Legros, M . . . . .128, 290  
 Legut, D . . . . .36, 70  
 Le Harivel de Gonneville, A . . . . .170  
 Lehmusto, J . . . . .24  
 Lehr, K . . . . .213  
 Lei, B . . . . .207  
 Leibengood, T . . . . .97  
 Leide, A . . . . . 32, 65, 211, 221  
 Leigh, G . . . . . 213, 232, 246, 292  
 Leinenbach, C . . . . . 13, 145, 180  
 Lein, W . . . . .198  
 Lei, S . . . . .243  
 Lei, T . . . . .105  
 Lekoadi, P . . . . .81  
 Lemmen, K . . . . .100, 105  
 Lemoine, C . . . . .106  
 Le, N . . . . . 120, 213, 217, 241, 292  
 Lenau, A . . . . .188  
 Lencina Wendt, Y . . . . .172  
 Lenka, R . . . . .60  
 Lenling, B . . . . .252  
 Lennard, J . . . . .244  
 Lenthe, W . . . . . 11, 43, 170  
 Leonard, A . . . . . 61, 200, 258, 261  
 Leon Cazares, F . . . . .38  
 Leong, A . . . . . 20, 133, 201, 227, 232  
 Leong-Hau, K . . . . .61  
 Leon-Henao, H . . . . .287  
 Leon, V . . . . .213  
 Leopold Jean-Marie, G . . . . .128  
 Leosson, K . . . . .65, 169  
 Leósson, K . . . . .65  
 LePage, W . . . . .114, 280  
 Leparoux, M . . . . .145, 180  
 Lepluart, L . . . . .139  
 Le Pluart, L . . . . .149  
 Lepple, M . . . . .44  
 Leser, P . . . . .111, 181  
 Leshchev, D . . . . .227, 272  
 Lesko, J . . . . . 58, 82, 208  
 Lessmeier, M . . . . .43  
 Lester, B . . . . .149  
 Lester, M . . . . .280  
 Leszczewicz, J . . . . .49  
 L'Etoile, M . . . . .202  
 Letzig, D . . . . .132, 227  
 Leung, A . . . . . 49, 222, 292  
 Leung, C . . . . .9, 86, 107, 113, 122, 139,  
 180, 215, 239, 285, 297  
 Levario, D . . . . .62  
 Leveille, M . . . . .143  
 Lévesque, J . . . . .122  
 Levi, A . . . . .20  
 Levi, C . . . . .141, 197  
 Levine, L . . . . .250  
 Levine, S . . . . .230  
 Levitas, V . . . . .171  
 Levkulich, N . . . . .225  
 Lew, A . . . . .21, 171  
 Lewandowska, M . . . . .198, 292  
 Lewandowski, J . . . 9, 77, 95, 114, 286, 300  
 Lewis, A . . . . .182  
 Lewis, D . . . . . 64, 109, 238  
 Lewis, L . . . . .14, 45  
 Ley, B . . . . . 9, 95, 114, 300  
 Lhermitte, C . . . . .133  
 L'Hostis, G . . . . .290  
 Li, A . . . . .156, 172  
 Liang, A . . . . .50, 154  
 Liang, C . . . . 23, 68, 127, 233, 252, 277  
 Liang, D . . . . .165  
 Liang, J . . . . .8, 296  
 Liang, K . . . . .152  
 Liang, S . . . . .40  
 Liang, T . . . . .265  
 Liang, Z . . . . .63, 154

- Lian, J . . . 32, 66, 103, 167, 243, 272, 292  
 Liao, C . . . . . 55, 122, 152  
 Liao, J . . . . . 243  
 Liao, T . . . . . 27  
 Liao, X . . 87, 158, 163, 195, 222, 244, 297  
 Liao, Y . . . . . 16, 217, 259  
 Liaqat, U . . . . . 233, 252  
 Liautaud, F . . . . . 252  
 Liaw, P . . . . 15, 16, 46, 50, 83, 119, 150,  
 161, 186, 191, 217, 226, 240,  
 265, 266, 286  
 Li, B . . . 14, 20, 31, 35, 40, 44, 52, 73, 81,  
 90, 118, 125, 149, 156, 172, 193,  
 207, 221, 264, 283, 294, 295  
 Libby, M . . . . . 208  
 Libero-Cruzado, J . . . . . 66, 177  
 Li, C . . . . 34, 88, 97, 109, 151, 156, 172,  
 184, 196, 206, 232, 233, 250,  
 269, 270, 292, 300  
 Lichtenegger, H . . . . . 58  
 Lichtenstein, T . . . . . 133  
 Li, D . . . . . 16, 47, 243, 259  
 Li, E . . . . . 180, 213, 260  
 Lieberman, E . . . . . 205  
 Liebscher, C . . . . . 21, 22  
 Liedke, M . . . . . 141  
 Liedke, O . . . . . 141  
 Lienert, U . . . . . 116  
 Lien, H . . . . . 143, 221  
 Lieou, C . . . . . 33  
 Liewald, M . . . . . 189, 218  
 Li, F . . . . . 63, 135, 154, 190  
 Li, G . . . . . 85, 156  
 Li, H . . . . 23, 92, 127, 207, 209, 210,  
 262, 296  
 Li, J . . . . 14, 16, 20, 38, 44, 52, 65, 73, 81,  
 84, 87, 90, 106, 108, 118, 123, 125,  
 149, 154, 156, 184, 193, 216, 221,  
 235, 264, 269, 294, 295  
 Li, K . . . . . 55, 68, 139, 159, 269  
 Li, L . . . . 15, 19, 30, 37, 50, 66, 71, 88,  
 92, 124, 155, 156, 162, 184, 186, 192,  
 198, 207, 208, 238, 242, 245, 254, 268,  
 270, 278, 290  
 Lilensten, L . . . . . 16  
 Li, M . . . 30, 49, 92, 95, 97, 120, 178, 207,  
 222, 223, 246, 257, 268, 290, 300  
 Lima, D . . . . . 105  
 Lima, G . . . . . 294  
 Lima, T . . . . . 294  
 Li-Mayer, J . . . . . 109  
 Lim, B . . . . . 72, 81, 97, 147  
 Limback, M . . . . . 249  
 Lim, G . . . . . 161  
 Lim, H . . . . 17, 18, 41, 48, 85, 121, 151,  
 156, 187, 203, 218, 292, 293  
 Lim, J . . . . . 173, 277, 291  
 Lim, K . . . . 24, 109, 117, 168, 264, 266  
 Lim, M . . . . . 57  
 Limmer, K . . . . 26, 58, 97, 130, 164, 298  
 Lim, R . . . . . 102, 211  
 Lim, S . . . . . 183, 232  
 Lim, T . . . . . 43, 291, 293  
 Lim, Y . . . . . 207, 245, 255, 268  
 Li, N . . . . 16, 66, 71, 95, 100, 129, 135,  
 151, 211  
 Lin, A . . . . . 33, 244  
 Lin, C . . . . . 34, 192, 297  
 Lincoln, J . . . . . 69  
 Lin, D . . . . . 243  
 Lindblad, D . . . . . 146  
 Linde, C . . . . . 133  
 Linder, D . . . . . 41, 146  
 Lind, J . . . . . 64, 181, 205, 239  
 Lindsay, S . . . . . 242  
 Lindwall, G . . . . 40, 74, 110, 115, 143  
 Lingnau, L . . . . . 162  
 Lin, H . . . . . 127  
 Linhares Junior, J . . . . . 294  
 Lin, J . . . . . 31, 127, 130, 138, 174  
 Lin, K . . . . . 188  
 Lin, M . . . . 34, 67, 104, 138, 233, 276  
 Linne, M . . . . . 71  
 Lin, S . . . . 12, 34, 67, 104, 110, 127,  
 138, 257, 258, 276  
 Linseis, F . . . . . 156  
 Linsmeier, C . . . . . 157  
 Lin, T . . . . . 104  
 Linton, K . . . . . 63  
 Linton, N . . . . . 85, 158  
 Lin, W . . . . . 159, 269  
 Lin, Y . . . . 23, 55, 63, 74, 93, 108, 127,  
 160, 186, 194, 204, 229, 249, 292  
 Lin, Z . . . . . 67  
 Liotti, E . . . . . 301  
 Liou, Y . . . . . 97  
 Lipinska, M . . . . . 198, 292  
 Lipkin, D . . . . . 261  
 Lippmann, O . . . . . 180  
 Lipton, Z . . . . . 12  
 Li, Q . . . . 53, 61, 65, 68, 90, 91, 122, 271  
 Li, R . . . . . 126, 298, 299  
 Lirio, J . . . . . 269, 276  
 Li, S . . . . . 18, 175, 272, 298  
 Lisboa de Gouveia, G . . . . . 105  
 Lis, M . . . . . 115, 120, 286  
 Liss, K . . . . 52, 79, 80, 150, 199, 233  
 List, F . . . . . 139  
 List III, F . . . . . 9, 78  
 Li, T . . . . . 29, 60, 233, 263  
 Litos, L . . . . . 253  
 Littles, L . . . . . 12  
 Litynska-Dobrzynska, L . . . . . 148  
 Liu, B . . . . . 90, 149  
 Liu, C . . . . . 93, 138, 293  
 Liu, D . . . . 17, 29, 33, 47, 66, 84, 85, 103,  
 108, 120, 128, 137, 141, 151, 157,  
 170, 187, 194, 205, 217, 221, 231,  
 237, 241, 243, 249, 275, 286, 291  
 Liu, G . . . . . 134, 148  
 Liu, H . . . . . 66, 73, 88, 103, 197,  
 262, 275, 293  
 Liu, I . . . . . 225  
 Liu, J . . . . 51, 60, 108, 117, 142, 226, 237,  
 246, 258, 275, 282  
 Liu, L . . . . 79, 176, 237, 285, 298, 299  
 Liu, M . . . . . 93, 195, 253  
 Liu, N . . . . . 13, 190  
 Liu, P . . . . . 92  
 Liu, Q . . . . . 46, 110, 190  
 Liu, S . . . . 13, 27, 52, 60, 90, 159, 194,  
 263, 286  
 Liu, T . . . . 10, 38, 51, 92, 110, 148, 157,  
 196, 203, 214, 232, 233, 249  
 Liu, W . . 87, 92, 116, 189, 207, 283, 300  
 Liu, X . . 23, 31, 50, 57, 62, 64, 117, 118,  
 127, 149, 156, 160, 165, 214,  
 224, 236, 264  
 Liu, Y . . . 34, 64, 67, 104, 127, 138, 147,  
 189, 218, 225, 244, 258, 270, 276  
 Liu, Z . . . . 11, 34, 52, 67, 74, 104, 127,  
 130, 138, 153, 194, 239, 276  
 Li, W . . . . . 86, 113, 117, 233, 298  
 Li, X . . . . 37, 38, 48, 90, 117, 145, 153,  
 157, 188, 198, 207, 230, 253,  
 266, 269, 278, 283  
 Li, Y . . . 23, 26, 55, 56, 93, 103, 104, 117,  
 125, 126, 127, 131, 134, 159, 178, 196,  
 205, 207, 212, 249, 259, 261, 266, 269  
 Li, Z . . 14, 71, 72, 92, 101, 110, 120, 131,  
 200, 206, 214, 227, 249, 289, 296  
 Ljungblad, U . . . . . 115  
 Ljungquist, S . . . . . 136  
 Llanos Blancas, E . . . . . 60  
 Llorca, J . . . . 18, 27, 31, 102, 147, 161,  
 181, 194, 209, 216, 219  
 LLorca, J . . . . . 222  
 Lloyd, M . . . . . 38, 81  
 Llumiangua, B . . . . . 259  
 L. McDowell, D . . . . . 114  
 Lobato, F . . . . . 50  
 Lochun, K . . . . . 271  
 Lock, D . . . . . 139  
 Locke, J . . . . . 25, 57, 95, 128, 161  
 Locq, A . . . . . 150  
 Loeffler, J . . . . . 181  
 Loehde-Woolard, H . . . . . 254  
 Logman, C . . . . . 299  
 Lohaus, S . . . . . 172  
 Loh, H . . . . . 139  
 Lohser, J . . . . . 290  
 Loiacono, D . . . . . 30  
 Loiodice, L . . . . . 77  
 Lok, J . . . . . 98

- Lolov, G ..... 141  
 Lombardi, M ..... 285  
 Loncnar, M ..... 74  
 London, A ..... 135  
 Long, A ..... 232, 270  
 Long, F ..... 275  
 Long, K ..... 149  
 Long, L ..... 45  
 Long, X ..... 233, 252  
 Lopera, H ..... 269  
 Lopes, A ..... 185  
 Lopes, D ..... 261  
 Lopes, F ..... 104, 276  
 Lopes Ribeiro, J ..... 294  
 Lopez, C ..... 61  
 López-Cornejo, M ..... 278  
 Lopez de la Torre, M ..... 18  
 Lopez-Garcia, J ..... 77  
 Lopez Granados, N ..... 269  
 Lopez-Granados, N ..... 298  
 López Granados, N ..... 273  
 López-Granados, N ..... 228, 273  
 Lopez Honorato, E ..... 205  
 Lopez, I ..... 261  
 Lopez, L ..... 289  
 Lopez Morales, A ..... 237  
 López-Soria, J ..... 273  
 Lorentzon, M ..... 136  
 Lori, O ..... 94, 137  
 Losko, A ..... 232  
 Lossius, L ..... 159, 223  
 LoTempio, S ..... 237  
 Lotfpour, M ..... 120, 190, 216, 220, 233  
 Lott, D ..... 216, 288  
 Lotte, G ..... 25  
 Loukus, A ..... 225  
 Lou, L ..... 257  
 Loumidis, A ..... 119  
 Lou, R ..... 86  
 Lou, X. . 9, 10, 24, 38, 49, 56, 78, 95, 100,  
 114, 188, 270, 283, 285, 287, 290  
 Louzguine, D ..... 21, 211  
 Love, B ..... 261  
 Lovely, M ..... 271  
 Lowenstein, J ..... 89  
 Lowery, A ..... 136  
 Lowe, T ..... 155, 191, 220, 243,  
 260, 268, 292  
 Loyer Prost, M ..... 224  
 Lozano-Perez, S ..... 275  
 Lua, J ..... 145  
 Lublin, D ..... 101  
 Lucadamo, G ..... 275  
 Lucas, A ..... 19, 67  
 Lucas, N ..... 268  
 Lucon, E ..... 280  
 Lucon, J ..... 35  
 Lucon, P ..... 15, 35, 285  
 Ludwig, A ..... 208  
 Ludwig, W ..... 12, 97, 168  
 Lu, E ..... 246  
 Luebbe, M ..... 282  
 Luengas, O ..... 24, 117  
 Lu, H ..... 289  
 Luis Arrubla Agudelo, L ..... 276  
 Lu, J ..... 89  
 Lu, K. . . . 14, 26, 44, 58, 81, 96, 105, 118,  
 129, 139, 149, 163, 174, 199,  
 208, 234, 252, 264, 278, 298  
 Lukas, C ..... 15, 16  
 Lukasz, K ..... 71  
 Luktuke, A ..... 127  
 Lu, M ..... 186  
 Luna Falcon, P ..... 17  
 Lund, E ..... 100, 178  
 Luo, A ..... 20, 40, 54, 61, 74, 110,  
 143, 188, 200, 250  
 Luo, C ..... 67  
 Luo, D ..... 298  
 Luo, G ..... 92  
 Luo, J ..... 46, 84, 105  
 Luo, K ..... 51, 123, 208  
 Luo, M ..... 195, 286  
 Luo, X ..... 227  
 Luo, Y ..... 243, 278  
 Lu, P ..... 11, 15, 45, 82, 119, 222  
 Lupi, G ..... 113  
 Lupini, A ..... 139  
 Lu, S ..... 265  
 Luscher, W ..... 237  
 Lu, T ..... 153, 197  
 Luu, J ..... 262  
 Lu, Y. . . . . 100, 108, 160, 184, 193, 213,  
 223, 226, 231, 248  
 Luzin, V ..... 285  
 Lv, B ..... 86  
 Lv, W ..... 54  
 Lv, X ..... 14  
 Lv, Z ..... 272  
 Lynch, C ..... 160, 275  
 Lynch, M ..... 151  
 Lyon, A ..... 260  
 Lyons, J ..... 134  
 Lyon, Z ..... 174  
 Lyu, M ..... 18, 190, 262  
 Lyu, P ..... 299  
 Lyu, T ..... 180, 195, 213, 232  
 Lyu, Z ..... 108, 204, 261, 266  
**M**  
 Maass, R ..... 39, 97, 109, 186, 237  
 Maaß, R ..... 39  
 Maawad, E ..... 207  
 Maben, M ..... 258  
 Maccari, F ..... 15, 45, 150  
 MacDonald, B ..... 171, 244, 290  
 Macdonald, D ..... 142  
 MacDonald, E ..... 69, 282  
 Machado, C ..... 268  
 Machado, J ..... 50  
 Machado Ulsenheimer, A ..... 203  
 Macholz, J ..... 294  
 Macias, D ..... 227  
 MacIsaac, M ..... 19, 51  
 Mackosz, K ..... 64  
 Mackowiak, K ..... 54, 92  
 MacLeod, K ..... 99  
 Ma, D ..... 50  
 Madalena, J ..... 294, 295  
 Maddalena, R ..... 193  
 Madej, L ..... 130, 299  
 Madelain, M ..... 272  
 Madia, M ..... 197  
 Madigan, M ..... 207, 290  
 Madi, Y ..... 45, 72  
 Mädlow, M ..... 198  
 Madril, L ..... 172  
 Ma, E ..... 237  
 Maeda, K ..... 259  
 Maeda, M ..... 162  
 Maeder, X ..... 43, 51, 229, 231, 297  
 Maegawa, M ..... 43  
 Maestas, D ..... 29  
 Magallon, S ..... 18  
 Maghsoudi, M ..... 65, 169  
 Maglione, M ..... 252  
 Magnuessen, J ..... 81  
 Magnuson, D ..... 217, 254  
 Magnussen, J ..... 117  
 Magnusson, A ..... 81  
 Magnusson, J ..... 189  
 Ma, H. . . . . 53, 60, 70, 172, 282  
 Mahadevan, S ..... 17, 287  
 Mahajan, H ..... 247  
 Maharana, S ..... 265  
 Mahata, C ..... 266  
 Mahato, B ..... 15  
 Mahato, S ..... 263, 265  
 Mahat, R ..... 75, 187  
 Maheshwari, P ..... 160  
 Mahey, V ..... 258, 259, 289, 297  
 Mahfuz, M ..... 236  
 Mahjouri-Samani, M ..... 35, 68, 106,  
 139, 174  
 Mahmood, Y ..... 21, 98  
 Mahmud, A ..... 290  
 Maier, B ..... 15, 45, 71  
 Maier, P ..... 28, 61, 99, 147, 200  
 Maiga, D ..... 69  
 Mai, H ..... 295  
 Maiorov, B ..... 107, 131  
 Maisey, M ..... 109  
 Maity, A ..... 189  
 Ma, J. . . . . 57, 69, 113, 161, 222, 297  
 Majasan, J ..... 128, 131  
 Maji, A ..... 156

- Majkut, M ..... 86, 113, 285  
 Majta, J ..... 130  
 Majumdar, B ..... 283, 287  
 Majumder, S ..... 39, 72, 109, 231  
 Ma, K ..... 8, 11, 81, 103, 117, 178  
 Makowska, M ..... 249  
 Maksymenko, A ..... 105, 288  
 Makurunje, P ..... 282  
 Makwana, A ..... 235  
 Ma, L ..... 71, 145, 181, 213, 239, 287  
 Malacarne, R ..... 272  
 Malakar, A ..... 22  
 Malakkal, L .. 70, 177, 211, 223, 231, 272  
 Malaplate, J ..... 224  
 Malaspina-Rojas, V ..... 91  
 Maldonado, G ..... 62  
 Maldonado Otero, A ..... 107  
 Malej, S ..... 283  
 Malerba, L ..... 55  
 Malik, A ..... 288  
 Malkova, A ..... 259  
 Mallick, D ..... 75  
 Mallik, D ..... 189  
 Malmir, H ..... 126  
 Maloy, S ..... 30, 38, 71, 100, 157, 206,  
 229, 248, 249  
 Maltais, A ..... 122  
 Maltsev, D ..... 201  
 Mamivand, M ..... 187  
 Mamun, A ..... 266, 269  
 Mandal, A ..... 56  
 Mandal, D ..... 68, 69  
 Mandal, N ..... 293  
 Mandal, S ..... 118, 217, 300  
 Manda, S ..... 209  
 Mandolini, M ..... 213  
 Mandrus, D ..... 206  
 Manerbino, A ..... 285  
 Mang, E ..... 125, 165, 192, 224, 296  
 Mangeney, C ..... 243  
 Manger, E ..... 136, 189  
 Mangolini, F ..... 143, 221  
 Maniere, C ..... 105, 139, 174, 208, 234,  
 252, 278  
 Manière, C ..... 149  
 Manikanteswaran, N ..... 68  
 Maniruzzaman, M ..... 213, 288  
 Manley, M ..... 70, 172, 177, 206, 232,  
 250, 300  
 Manner, V ..... 39  
 Manness, S ..... 181  
 Mann, J ..... 33, 94  
 Mann, S ..... 177  
 Manns, R ..... 66, 177  
 Mann, T ..... 41, 70, 216, 238  
 Manso, J ..... 106  
 Manso-Morato, J ..... 106  
 Mansoor, B ..... 227  
 Mansoor, K ..... 61  
 Mansouri, A ..... 15  
 Mansouri Arani, M ..... 152  
 Mansouri, E ..... 170  
 Mansoz, B ..... 147  
 Mantilla-Matta, P ..... 91  
 Mantilla, N ..... 260  
 Mantovani, D ..... 183  
 Mantri, S ..... 16, 17, 47, 84, 114, 120,  
 150, 186, 195, 291  
 Manuel, M ..... 138, 188  
 Manu, K ..... 54  
 Manwatkar, S ..... 261  
 Manzoni, A ..... 186  
 Manzoor, A ..... 169  
 Mao, H ..... 44  
 Mao, Q ..... 111  
 Mao, Y ..... 157, 187  
 Mao, Z ..... 164, 231  
 Mara, N .... 31, 39, 58, 63, 72, 100, 101,  
 102, 103, 109, 134, 136, 167, 168,  
 170, 203, 204, 229, 248, 274, 299, 300  
 Marathe, M ..... 14  
 Marchebois, H ..... 45  
 Marcial, J ..... 237  
 Marcuson, S ..... 54  
 Margem, F ..... 276  
 Margousian, A ..... 257, 258  
 Maria della Ventura, N ..... 11  
 Maria, J ..... 14  
 Marianetti, C ..... 70, 137  
 Marian, J ..... 102, 125, 158, 165, 169,  
 192, 224, 296  
 Mari, N ..... 272  
 Marina, O ..... 43, 80  
 Marinel, S ..... 139, 149  
 Mariotti, L ..... 113  
 Markström, A ..... 288  
 Marmo, F ..... 101  
 Marom, N ..... 39  
 Marques, S ..... 268  
 Marquis, E ..... 34, 196, 223, 231, 253  
 Marrero, E ..... 100, 108, 160  
 Marrero Jackson, E ..... 108  
 Marrujo, I ..... 272  
 Marsden, E ..... 114  
 Marshall, A ..... 209  
 Marsico, C ..... 51  
 Marstrander, T ..... 235  
 Martin, A ..... 71  
 Martina, F ..... 140  
 Martin, B ..... 150, 298  
 Martin, C ..... 135  
 Martinez, A ..... 106  
 Martinez, C ..... 82  
 Martinez, E ..... 21, 53, 204, 222, 228,  
 231, 282  
 Martínez-García, K ..... 191  
 Martinez Henriquez, M ..... 254  
 Martinez, M ..... 289  
 Martinez-Paneda, E ..... 166  
 Martinez, R ..... 89  
 Martínez, R ..... 295  
 Martinez Saez, E ..... 169, 204  
 Martinez-Saez, E ..... 274  
 Martínez-Soto, J ..... 295  
 Martin, H ..... 259  
 Martini, A ..... 148, 203  
 Martin, J ..... 284  
 Martin, M ..... 38, 142  
 Martins Moreira, L ..... 25  
 Martins, P ..... 77  
 Martin, T ..... 43, 62, 142, 196  
 Maruhashi, A ..... 292  
 Marussi, S ..... 86, 113, 139, 180, 215,  
 285, 297  
 Maruyama, T ..... 35  
 Marvila, M ..... 264, 294  
 Marzbanrad, B ..... 15  
 Ma, S ..... 79, 92  
 Masaeng, A ..... 49  
 Masina, B ..... 81  
 Masina, S ..... 257  
 Mason-Flucke, J ..... 261  
 Mason, J ..... 17, 48, 85, 121, 126, 151,  
 187, 188, 218, 292  
 Mason, P ..... 44, 176  
 Mason, S ..... 187  
 Massardier, V ..... 210  
 Massey, C... 9, 10, 30, 63, 100, 108, 115,  
 116, 134, 167, 202, 229, 248, 273  
 Mastorakos, I... 21, 41, 53, 91, 126, 268  
 Mastromatteo, F ..... 212  
 Ma, T ..... 165, 252  
 Mata, J ..... 251  
 Matallana Guerrero, J ..... 83  
 Matejczyk, D ..... 10  
 Mathaudhu, S .. 25, 34, 96, 98, 126, 129,  
 130, 159, 195, 222, 223, 231, 254, 279  
 Mathesan, S ..... 220  
 Matheson, A ..... 176  
 Mathew, A ..... 19  
 Mathew, E ..... 207  
 Mathew, N... 52, 53, 134, 157, 203, 219  
 Mathew, T ..... 113  
 Mathis, A ..... 25  
 Mathis, K ..... 61, 132, 200  
 Matlock, C ..... 265  
 Mato, T ..... 293  
 Matsuda, M ..... 138  
 Matsunaga, H ..... 25, 72  
 Matsushita, M ..... 129, 162  
 Matsushita, Y ..... 121  
 Matthew Mann, J ..... 70  
 Matthews, A ..... 146  
 Matthews, B ..... 102, 196  
 Matthews, C ..... 170  
 Matthews, J ..... 236  
 Matthews, P ..... 91



- Matlat, D. . . . . 134  
 Mattos, M . . . . . 142  
 Matt, S . . . . . 29  
 Matz, N . . . . . 157  
 Mauget, F. . . . . 44, 178  
 Maun, I. . . . . 151, 176, 210, 218  
 Maurya, P . . . . . 146, 259  
 Mauseth, T. . . . . 142  
 Ma, X . . . . . 84  
 Maximenko, A . . . . . 105, 112  
 Ma, Y . . . . . 100, 125, 132, 161, 227  
 Maya-Visuet, E . . . . . 243  
 May, B. . . . . 53, 107  
 Mayer, J . . . . . 13, 140, 252  
 Mayeur, J . . . . . 75, 78, 145, 239, 288  
 Mayo, U . . . . . 97  
 May, S. . . . . 24  
 Mazanova, V . . . . . 214, 261  
 Mazánová, V . . . . . 57  
 Maziarz, W . . . . . 21, 22, 45, 185, 265, 282  
 Mazor, A . . . . . 181  
 Mazumder, S. . . . . 155, 160, 248  
 Mazur, J . . . . . 120, 286  
 Mazza, A . . . . . 185  
 Mazzer, E. . . . . 200, 298  
 McArthur, B . . . . . 134  
 McArthur, D . . . . . 107, 222  
 McArthur Sehar, D. . . . . 299  
 McCabe, R . . . . . 216  
 McCabe, R. . . . . 43, 101, 116, 199  
 McCall, S . . . . . 176, 265  
 McCarry, R . . . . . 64  
 McCarthy, M. . . . . 60, 132, 165, 169, 200, 226, 246, 298  
 McCarthy, S. . . . . 29  
 McCarthy, T . . . . . 288  
 McClelland, Z . . . . . 198  
 McClellan, K . . . . . 243  
 McClintock, D . . . . . 211, 236  
 McCloy, J . . . . . 262  
 McConville, D. . . . . 114  
 McCormack, S . . . . . 73  
 McCrink, J. . . . . 146, 274  
 Mccue, I. . . . . 10, 32, 38, 54, 65, 71, 78, 102, 107, 115, 135, 141, 146, 169, 204, 230, 246, 249, 274, 280, 289  
 McCue, I . . . . . 38, 45, 70, 115, 206, 226, 296  
 Mcdannald, A . . . . . 173, 207, 232, 251, 301  
 McDannald, A. . . . . 232  
 McDearis, S. . . . . 262  
 Mcdermott, E . . . . . 24, 38, 100, 287  
 McDonald, S . . . . . 23, 34, 55  
 McDonnell, M. . . . . 129  
 Mcdonnell, S. . . . . 144, 185  
 McDonnell, S . . . . . 240  
 McDougal, A. . . . . 163  
 McDougal, E . . . . . 258  
 McDowell, D. . . . . 151  
 McElroy, T. . . . . 274  
 McGaughey, A. . . . . 76  
 McGill, J. . . . . 92  
 McGuire, M. . . . . 139  
 Mcilwain, L . . . . . 201, 227  
 McIntyre, J. . . . . 283  
 Mckeown, J . . . . . 224  
 McKeown, J. . . . . 15, 146, 288  
 McKeown, P . . . . . 31, 86, 209  
 McKinney, C. . . . . 137  
 McKinstry, M . . . . . 22  
 McKnight, T . . . . . 179  
 McMahan, W . . . . . 101  
 McMaster, A . . . . . 222  
 McMullin, C . . . . . 197  
 McMurray, J . . . . . 166  
 Mcmurtrey, M. . . . . 174  
 McMurtrey, M. . . . . 13, 29, 37, 52, 247  
 McNamara, R . . . . . 113  
 McNutt, P . . . . . 13  
 McQueen, T . . . . . 141, 161, 209, 213, 217, 246, 254  
 McRobie, C . . . . . 275  
 McRobie, R . . . . . 63  
 McWilliams, B . . . . . 145, 181, 213, 239, 245, 283, 287  
 Mead, P . . . . . 44  
 Meddour, A . . . . . 45  
 Medellin, S. . . . . 62  
 Mederos, M. . . . . 139  
 Mediha, Z . . . . . 268  
 Medina, F. . . . . 290  
 Medina, J . . . . . 132, 227, 266  
 Medjahdi, G. . . . . 271  
 Medlin, D. . . . . 31, 52, 91, 251  
 Meem, A . . . . . 268  
 Meermeier, A . . . . . 186  
 Meesa, M. . . . . 17, 204  
 Mehan, J. . . . . 139  
 Mehdi, M. . . . . 22  
 Meher, S. . . . . 9, 78, 114, 287, 290  
 Mehrotra, S . . . . . 260  
 Mehta, A . . . . . 90, 212  
 Mehta, R. . . . . 150, 213  
 Meier, J. . . . . 61, 110  
 Meindlhummer, M. . . . . 203  
 Mei, R. . . . . 43  
 Meir, M . . . . . 242  
 Meisami Azad, M. . . . . 182  
 Meisel, M. . . . . 138  
 Meistad, L . . . . . 140  
 Mei, Z. . . . . 127, 231  
 Mejia Diaz, B. . . . . 141  
 Melcher, C. . . . . 258  
 Mele, P . . . . . 18, 27, 59, 98, 131, 272  
 Melfi, M . . . . . 166  
 Meli, A . . . . . 30  
 Melia, M. . . . . 16, 29, 61, 78, 133, 299  
 Mellor, R . . . . . 32, 81, 93, 187  
 Melville, J. . . . . 89  
 Mena, A . . . . . 132, 258  
 Menchaca, L . . . . . 282  
 Menchaca, R . . . . . 225  
 Mendelev, M . . . . . 63, 154, 157, 190  
 Mendes, B . . . . . 264, 294  
 Mendes, M. . . . . 264, 294  
 Menet, P. . . . . 65, 235  
 Mengucci, P. . . . . 183, 216  
 Meng, W . . . . . 63, 69, 162  
 Menon, V. . . . . 51, 157  
 Mensah, A . . . . . 17, 233  
 Mensah-Darkwa, K . . . . . 46  
 Men, X . . . . . 272  
 Menze, R . . . . . 147  
 Merah, N . . . . . 162, 292, 295  
 Mercado, C . . . . . 182  
 Mercier, D . . . . . 272  
 Merickel, J . . . . . 30  
 Merighe, P. . . . . 13  
 Merino, N . . . . . 299  
 Merle, B . . . . . 171  
 Merlin, P . . . . . 93  
 Merrell, J . . . . . 204  
 Merrell, M . . . . . 225  
 Merritt, S . . . . . 129  
 Merwin, G. . . . . 166  
 Mery, S. . . . . 252  
 Meshram, A. . . . . 210  
 Meskers, C. . . . . 28, 36, 60, 69, 106, 123, 140, 154, 176, 191, 210, 279  
 Messer, O. . . . . 118  
 Messner, M . . . . . 70, 116, 166, 187, 247  
 Mester, K . . . . . 177  
 Mettke, L . . . . . 36  
 Metzger, K. . . . . 170  
 Metzger, L . . . . . 166  
 Meyer, A. . . . . 162  
 Meyer, H . . . . . 26  
 Meyer, M . . . . . 71  
 Meyers, M . . . . . 16, 19, 67, 83, 88, 101, 104, 112, 156, 171, 180, 275, 276  
 Meyer, T. . . . . 186  
 Meza, A . . . . . 234  
 Meziere, J. . . . . 51  
 Mezyk, S. . . . . 140  
 Mhadeshwar, A. . . . . 47  
 Mhatre, P . . . . . 146  
 Mian, A . . . . . 287  
 Mianjy, A . . . . . 286  
 Miao, J . . . . . 54, 61, 200, 214, 253, 261  
 Miao, Y. . . . . 247  
 Miceli, A . . . . . 52  
 Michael, F . . . . . 79  
 Michalik, S. . . . . 239  
 Michler, J . . . . . 43, 51, 64, 101, 183, 229, 231, 297  
 Middendorf, J . . . . . 250  
 Middleburgh, S. . . . . 66  
 Mignanelli, P. . . . . 173

- Mignerot, F .....141  
 Mi, J ..... 13, 43, 80, 179, 246, 291  
 Mika, M ..... 137, 142, 205  
 Mikhliiev, O .....259  
 Mikolajczak, M .....58, 262  
 Milani, V .....65  
 Miles, A .....94  
 Miles, M ..... 11, 41, 225, 245, 290, 291  
 Miley, D .....69, 188  
 Milita, S .....46  
 Miltzer, M ..... 130, 164, 233  
 Miller, B ..... 116, 234, 238, 250  
 Miller, C .....165, 225  
 Milleret, A .....9  
 Miller, J ..... 31, 81, 86, 90, 209  
 Miller, K .....259  
 Miller, M .....79, 116  
 Miller, Q .....237  
 Miller, R .....230  
 Miller, V .....12, 28, 61, 120, 138, 153,  
 161, 178, 190, 219, 242, 293  
 Millot, T .....25  
 Mills, L ..... 31, 186, 225, 236  
 Mills, M .....11, 14, 19, 34, 57, 81, 132,  
 165, 173, 175, 253  
 Mills, S ..... 29, 99, 128, 272  
 Milne, C .....296  
 Milner, J .....10  
 Minaruzzaman, M ..... 33, 94, 177  
 Miner, J .....77  
 Mings, A .....143  
 Min, H .....277  
 Minheon, K .....295  
 Minh Quoc Le, C .....212  
 Minisandram, R .....41  
 Minissale, M .....135  
 Min, K .....278  
 Minobe, R .....258  
 Minor, A .....15, 29, 30, 43, 60, 83, 99,  
 120, 128, 150, 165, 186,  
 203, 217, 261, 272  
 Minster, J .....160  
 Mintoff, A .....39  
 Mion, T .....77  
 Miracle, D ..... 13, 44, 81, 186, 200, 235  
 Miran, W .....233, 252  
 Mireles, O ..... 10, 78, 115, 146, 209, 289  
 Mirsabeigi, N .....283  
 Mirshams, R .....37  
 Mirtaleb, A .....81  
 Mirzaee, H .....85  
 Mishchenko, Y .....143  
 Mishin, Y ..... 21, 91, 123, 125  
 Mishra, A .....90, 153, 157, 190, 212,  
 219, 242, 293  
 Mishra, B .....24, 49, 123, 154, 169,  
 175, 176, 191, 275  
 Mishra, D .....180, 265  
 Mishra, G .....23  
 Mishra, H .....70, 211  
 Mishra, R ..... 15, 24, 35, 38, 79, 100, 159,  
 190, 198, 209, 217, 225, 240, 245,  
 262, 265, 282, 283, 284, 287, 300  
 Mishra, S .....197, 283  
 Misiak, M .....292  
 Misra, A ..... 31, 43, 64, 89, 96, 154, 163,  
 194, 223, 252, 280, 289, 297  
 Misra, D .....57, 259  
 Misra, M .....258, 279  
 Misra, S .....285  
 Mistry, D .....96  
 Mistry, S .....135  
 Misture, S .....17, 193  
 Mitchell, D .....255  
 Mitchell, I .....30  
 Mitchell, J .....177  
 Mitra, I .....243  
 Mitsuishi, K .....39  
 Mittel, K .....53  
 Mitterer, C .....216  
 Mittig, W .....223  
 Miura, H .....96, 280  
 Miyamoto, G .....97, 164  
 Miyanishi, K .....172  
 Miyasaka, F .....138  
 Miyashita, A .....28  
 Mizak, M .....161  
 Mizukami, R .....35  
 Mizzi, C .....98  
 M Keleshteri, M .....75, 288  
 M. Keleshteri, M .....288  
 Mock, C .....283  
 Moffat, W .....151  
 Mofo, E .....159  
 Mofrad, A .....62, 273  
 Mogbojuri, G .....246  
 Mogeritsch, J .....208  
 Mohale, N .....168  
 Mohamed, H .....116  
 Mohammad, I .....145  
 Mohammadi, M ..... 182, 214, 218, 289  
 Mohammed, A .....119  
 Mohammed, S ..... 13, 71, 141, 182  
 Mohan, A .....216  
 Mohan, S .....73  
 Mohanty, A .....227, 272  
 Mohanty, C .....210  
 Mohanty, G .....161  
 Mohanty, I .....153, 285  
 Mohanty, T ..... 47, 210, 241  
 Mohnani, L .....47  
 Mohotti, D .....156  
 Mohr, G .....214  
 Mohsin, A .....233  
 Mohun, R .....66  
 Mo, K .....66  
 Mokhtari, B .....131  
 Mokso, R .....90  
 Mola, J .....244  
 Moldovan, D .....63  
 Molina-Aldareguía, J .....181  
 Molina, J .....222  
 Molinari, A .....174  
 Moling, B .....51  
 Mollaei, N .....181  
 Mollae, N .....233  
 Moll, P .....281  
 Molnar, K ..... 167, 202, 228, 273  
 Molstad, E .....111  
 Molvik, K .....106, 131  
 Momen, G .....242  
 Momeni, K .....8, 97  
 Momotenko, D .....231  
 Monaco, G .....178  
 Monchoux, J .....150  
 Monclus, M .....209  
 Monclús, M .....18, 31  
 Mondal, S ..... 33, 108, 128, 248, 270  
 Monismith, S .....18, 298  
 Monreal, M .....133  
 Monserrat, B .....94  
 Monson, A .....13  
 Montagne, A .....291, 295  
 Montagnino, E .....32, 268  
 Montanaro, L .....147  
 Montanelli, L .....152  
 Monteiro, N .....223  
 Monteiro, S .....20, 52, 67, 88, 90, 104,  
 125, 156, 193, 221, 275, 276, 294, 295  
 Montelione, A .....9  
 Montes de Oca Zapiain, D .....29, 61,  
 156, 187, 218  
 Montes De Oca Zapiain, D .....29  
 Montgomery, D .....20  
 Montiel, D ..... 28, 62, 85, 105, 233  
 Montiel, G .....128  
 Monti, J .....234, 296  
 Montoya, K .....205  
 Montoya, R .....47  
 Montoya, T .....95  
 Monu, M .....288  
 Moody, M .....135  
 Moon, B .....165  
 Moon, G .....49  
 Moon, H ..... 277, 278, 293  
 Moon, J ..... 184, 227, 293  
 Moon, Y .....165  
 Mooraj, S .....208  
 Moore, A .....44  
 Moore, C .....166, 230  
 Moore, D .....21, 22, 42, 52, 91, 98, 125,  
 157, 193, 295  
 Moore, E .....70, 265  
 Moorehead, M ..... 157, 197, 247, 248  
 Moore, K .....11  
 Moore, R .....98  
 Moore, S .....43

- Moosavi, E. . . . . 54, 92, 210  
 Moosavi-Khoonsari, E. . . . . 195  
 Morales Ferreira, S. . . . . 246  
 Morales, L. . . . . 117  
 Morankar, S. . . . . 197, 284  
 Moran, S. . . . . 61  
 Moran, T. . . . . 156  
 Mordehai, D. . . . . 215, 220  
 Moreira da Silva, A. . . . . 105  
 Moreira, P. . . . . 200  
 Moreno, D. . . . . 217  
 Moreno, J. . . . . 64  
 Moreno, R. . . . . 191  
 Moreno-Ulloa, A. . . . . 191  
 Morgan, D. . . . . 46, 151, 190, 197, 243  
 Morgan, N. . . . . 205  
 Morgan, R. . . . . 16  
 Moriarty, M. . . . . 143  
 Moridi, A. . . . . 42  
 Mori, H. . . . . 138  
 Morimitsu, M. . . . . 80  
 Morin, J. . . . . 69  
 Morisada, Y. . . . . 129, 198  
 Mori, T. . . . . 18, 48, 85, 121, 152, 188, 257, 267  
 Morita, K. . . . . 167  
 Mornout, C. . . . . 58, 230  
 Morończyk, B. . . . . 10, 208, 282  
 Moronaga, T. . . . . 72  
 Moroz, M. . . . . 270  
 Morrall, D. . . . . 297  
 Morris, J. . . . . 22, 53, 92, 126, 158, 194, 221, 244, 296  
 Morrison, P. . . . . 119  
 Mortagne Coderch, A. . . . . 48, 78  
 Mort, P. . . . . 139, 209  
 Moschetti, M. . . . . 83  
 Moscoso, Z. . . . . 261  
 Moseley, D. . . . . 206  
 Moser, A. . . . . 21  
 Moser, N. . . . . 11, 20, 75, 301  
 Moses-DeBusk, M. . . . . 292  
 Mossadeghian, S. . . . . 166  
 Mostaan, M. . . . . 257  
 Mostafa, A. . . . . 135, 154, 190  
 Mostafaei, A. . . . . 9  
 Moszczyńska, D. . . . . 267  
 Mota, J. . . . . 279  
 Motallebi, R. . . . . 61, 132, 216, 281  
 Mote, A. . . . . 44  
 Mothetha, M. . . . . 69  
 Motta, A. . . . . 23, 160  
 Motta, C. . . . . 212  
 Mougin, K. . . . . 143, 179, 212, 238, 252, 255, 281  
 Mou, M. . . . . 266  
 Mourou, C. . . . . 106  
 Mousa, E. . . . . 36, 54  
 Mow, H. . . . . 260  
 Mo, X. . . . . 68  
 Mrabet, D. . . . . 242  
 Mroczka, K. . . . . 85  
 Mrvar, P. . . . . 233, 252  
 Mrzljak, S. . . . . 57  
 M., S. . . . . 266  
 Msagati, T. . . . . 69  
 Mubassira, S. . . . . 85, 191, 200  
 Mu, D. . . . . 93  
 Mudryk, Y. . . . . 14, 45, 82, 118, 149, 185, 264  
 Mudzanani, K. . . . . 69  
 Mueller, B. . . . . 217  
 Mueller, M. . . . . 36  
 Mueller, R. . . . . 78  
 Mueller, S. . . . . 122  
 Muftu, S. . . . . 15, 78, 82  
 Mugale, M. . . . . 84, 234, 266, 290  
 Mugiono, E. . . . . 49  
 Mujahid, S. . . . . 68, 139, 164, 230  
 Mujumdar, S. . . . . 182  
 Mukherjee, D. . . . . 239, 293  
 Mukherjee, M. . . . . 293  
 Mukherjee, P. . . . . 12, 43, 80, 116, 148, 184, 263  
 Mukherjee, S. . . . . 34, 127, 167, 204, 208, 217, 258, 300  
 Mukhopadhyay, A. . . . . 198, 207, 253  
 Mukhopadhyay, N. . . . . 234  
 Mukhopadhyay, S. . . . . 37, 92, 134, 196, 233  
 Mu, L. . . . . 53  
 Mula, D. . . . . 172  
 Mula, S. . . . . 198, 261  
 Mulewska, K. . . . . 13, 248  
 Müller, A. . . . . 240  
 Muller, E. . . . . 20  
 Müller, M. . . . . 207  
 Müller, S. . . . . 144, 149  
 Mulligan, J. . . . . 12  
 Mullin, K. . . . . 13, 31, 78, 116, 184, 236, 254, 284  
 Mullurkara, S. . . . . 69  
 Mulukutla, M. . . . . 34, 238, 265, 279  
 Mumm, D. . . . . 236  
 Munday, L. . . . . 284  
 Mundra, R. . . . . 118  
 Munguia, J. . . . . 273  
 Munizaga, V. . . . . 85  
 Muñoz Hernandez, E. . . . . 60  
 Munoz, J. . . . . 194  
 Munro, T. . . . . 98, 198, 245  
 Muntaha, M. . . . . 33, 66, 211, 270  
 Murakami, K. . . . . 162  
 Murakami, Y. . . . . 118  
 Muralidharan, G. . . . . 41, 74, 247  
 Muralidharan, K. . . . . 251  
 Muralikrishnan, V. . . . . 193  
 Murayama, M. . . . . 230  
 Murgas Portilla, B. . . . . 134  
 Murialdo, M. . . . . 61  
 Murphy, H. . . . . 153  
 Murphy-Leonard, A. . . . . 28, 61, 99, 132, 165, 200, 214, 227, 258, 261, 298  
 Murray, D. . . . . 197  
 Murray, T. . . . . 52  
 Murtagh, D. . . . . 61  
 Murty, K. . . . . 202, 229, 248  
 Murty, S. . . . . 261  
 Muruganandam, A. . . . . 288  
 Murugan, S. . . . . 25  
 Musa, Z. . . . . 300  
 Musinski, W. . . . . 41, 75, 161, 224  
 Muszka, K. . . . . 130  
 Muta, H. . . . . 121  
 Mutswatiwa, L. . . . . 260  
 Mu, W. . . . . 13, 43, 80, 81, 291  
 Mu, X. . . . . 39  
 Muzquiz, D. . . . . 194  
 Myeong, S. . . . . 201  
 Myers, K. . . . . 290  
 Myers, L. . . . . 194  
 Myhill, L. . . . . 228  
 Myint, P. . . . . 20  
 Myja, H. . . . . 179  
 Myrvold, E. . . . . 223
- ## N
- Naab, F. . . . . 102  
 Nabahat, M. . . . . 109  
 Nabeel, M. . . . . 81  
 Nabil, S. . . . . 290  
 Nadeau, A. . . . . 65  
 Naeem, M. . . . . 81, 117, 163  
 Nafisi, S. . . . . 182  
 Nagaraja, N. . . . . 251, 282  
 Nagarajan, R. . . . . 184  
 Naghibzadeh, K. . . . . 125  
 Nagler, B. . . . . 20  
 Nag, S. . . . . 78, 107, 146, 147, 180, 183, 213, 214, 215, 238, 272  
 Naguib, M. . . . . 44  
 Nagy, G. . . . . 178  
 Na, H. . . . . 64  
 Nahavandian, M. . . . . 228  
 Nahian, M. . . . . 60  
 Nahin, A. . . . . 69  
 Nahm, S. . . . . 286  
 Naidu, J. . . . . 282, 291  
 Naik, A. . . . . 82  
 Nair, A. . . . . 18, 50, 88, 123, 154, 190, 220  
 Nair, K. . . . . 41  
 Naish, J. . . . . 230  
 Nait-Ali, A. . . . . 25, 209, 247  
 Na, J. . . . . 196  
 Najafi, A. . . . . 96  
 Najjuuko, V. . . . . 246  
 Nakagawa, E. . . . . 142

Nakajima, M . . . . .	230	Nath, P . . . . .	287	Neu, R . . . . .	78, 96, 157, 211
Nakamura, A . . . . .	72	Natsition, F . . . . .	119	Neves, M . . . . .	294
Nakamura, H . . . . .	172	Nault, I . . . . .	15, 45	Neves Monteiro, S . . . . .	104, 276
Nakamura, Y . . . . .	59, 98	Naumov, A . . . . .	129, 162, 198, 225, 245, 271	Neves, S . . . . .	67
Nakanishi, Y . . . . .	172	Naumov, P . . . . .	72	Neville, T . . . . .	11, 291
Nakano, J . . . . .	13, 43, 80, 291	Naunheim, Y . . . . .	174	New, A . . . . .	120, 213, 217, 241
Nakano, S . . . . .	32	Nautiyal, P . . . . .	13, 43, 80, 143, 291	Newman, J . . . . .	262
Nakano, T . . . . .	215	Navarro Naranjo, J . . . . .	259	Nezdyur, M . . . . .	284
Nakata, T . . . . .	227	Navarro, P . . . . .	189	Ngo, A . . . . .	114
Nakatsugawa, I . . . . .	227	Navas, M . . . . .	81	Ngo, N . . . . .	26, 261
Nakayama, K . . . . .	93	Naveen Kumar, N . . . . .	225	Ng, T . . . . .	226
Nakazato, S . . . . .	16	Nawaz, K . . . . .	139, 292	Nguyen, A . . . . .	101
Nakazawa, A . . . . .	278	Na, Y . . . . .	24, 108, 109, 117, 265	Nguyen, B . . . . .	94, 197, 275
Nakazawa, K . . . . .	39	Nayak, A . . . . .	252	Nguyen, D . . . . .	169, 204
Nakrani, J . . . . .	190	Nayak, K . . . . .	91	Nguyen-Manh, D . . . . .	65, 296
Nalajala, D . . . . .	235	Nayak, S . . . . .	83	Nguyen, N . . . . .	71
Naleway, S . . . . .	19, 32, 50, 64, 65, 88, 101, 124, 155, 192, 268	Nayak, U . . . . .	49	Nguyen, T . . . . .	24, 27, 56, 59, 94, 98, 128, 131, 207, 270, 272
Namakian, R . . . . .	63	Nayir, N . . . . .	111	Nian, H . . . . .	264
Namazi, B . . . . .	242	Nayir, S . . . . .	9, 24, 214	Ni, B . . . . .	153, 291
Nam, C . . . . .	226, 246	Nazir, A . . . . .	215	Nice, T . . . . .	283
Namilae, S . . . . .	67, 218	Ndiaye, O . . . . .	287	Nicholson, C . . . . .	279
Nam, J . . . . .	281	Ndjom, B . . . . .	55, 223	Nickerson, W . . . . .	70
Namola, K . . . . .	162, 245	Nduwa, M . . . . .	286, 288	Nicolaides, D . . . . .	53
Nam, S . . . . .	161	Neal, C . . . . .	148	Nicolopoulos, S . . . . .	269
Namvari, M . . . . .	9	Neal, T . . . . .	54	Nicol, S . . . . .	54, 92
Nam, W . . . . .	263	Nebgen, B . . . . .	219	Niculescu, G . . . . .	14
Nanath, R . . . . .	55	Neçar, M . . . . .	264, 295	Niedziela, J . . . . .	172, 206, 232, 250, 300
Nanda, F . . . . .	145	Necas, D . . . . .	142	Niehoff, T . . . . .	82
Nandakumar, A . . . . .	250	Necheporenko, I . . . . .	189	Nie, J . . . . .	27, 110
Nandi, I . . . . .	77, 96	Neding, B . . . . .	250	Niemelä, J . . . . .	51, 297
Nandipati, S . . . . .	74	Needleman, A . . . . .	151	Niendorf, T . . . . .	9, 222, 244, 257
Nandwana, P . . . . .	9, 10, 24, 38, 72, 78, 81, 97, 108, 142, 146, 147, 183, 191, 214, 215, 251, 280	Neelakandan, D . . . . .	16	Nieto-Valeiras, E . . . . .	161, 216
Naorem, R . . . . .	46, 108, 147, 204, 226, 252, 289	Neelameggham, N . . . . .	24, 28, 56, 61, 94, 99, 128, 131, 132, 165, 175, 200, 208, 227, 234, 270, 298	Nie, Y . . . . .	58, 68, 195, 262
Napolitano, R . . . . .	49, 159	Negendank, M . . . . .	122	Niezgoda, S . . . . .	136, 187, 188, 253, 266
Naragani, D . . . . .	41, 75, 111, 144, 187, 301	Nehl, T . . . . .	45	Nikitin, P . . . . .	134
Naraghi, R . . . . .	44	Neils, A . . . . .	58, 82, 208	Nikitin, V . . . . .	51, 90
Narayanan, T . . . . .	265	Neilson, W . . . . .	33	Nikolai, D . . . . .	122
Narayan, J . . . . .	12, 111, 144, 148, 179, 246, 263	Neiner, D . . . . .	208	Nimer, S . . . . .	213
Narayan, R . . . . .	12, 111, 148, 179, 199, 246, 263	Nelaturu, P . . . . .	79, 176, 197	Nino, J . . . . .	98, 294
Nardi, A . . . . .	15, 45, 82, 119	Nellessen, P . . . . .	107	Nipa, L . . . . .	37
Nardin, C . . . . .	65	Nelson, A . . . . .	243	Niraula, S . . . . .	146, 183
Narra, S . . . . .	32, 65, 76, 77, 102, 135, 146, 158, 169, 182, 183, 204, 214, 215, 230, 239, 249, 274, 290	Nelson, B . . . . .	174	Nisar, A . . . . .	82, 300
Nartu, M . . . . .	9, 71, 78, 114, 287	Nemani, S . . . . .	44	Nisbet, G . . . . .	51
Nascimento, A . . . . .	116	Nematollahi, M . . . . .	213	Nishijima, M . . . . .	93
Nascimento Junior, E . . . . .	294	Nemets, G . . . . .	100, 108, 160	Nishikawa, H . . . . .	23, 34, 55, 67, 93, 104, 127, 138, 159, 196, 269, 276
Nasir Tak, T . . . . .	96	Nemoto, Y . . . . .	249	Nishikawa, N . . . . .	206, 259
Nastasi, M . . . . .	202, 230	Nene, S . . . . .	180, 265	Nitol, M . . . . .	219
Natalli, J . . . . .	294	Neogi, A . . . . .	96	Nittala, A . . . . .	199, 226
Natan, A . . . . .	285	Nepal, K . . . . .	199	Niu, T . . . . .	103
Nathan, G . . . . .	49	Neto, N . . . . .	279	Niverty, S . . . . .	15, 16, 80, 119
Nathaniel, J . . . . .	192	Neuba, L . . . . .	88	Nizard, P . . . . .	243
		Neubert, L . . . . .	209	Nizolek, T . . . . .	63, 101, 199
		Neuefeind, J . . . . .	16, 108	Nlebedim, I . . . . .	118, 149, 264
		Neugebauer, J . . . . .	39, 74, 91, 194, 295	Nln, G . . . . .	297
		Neumann, B . . . . .	13	N, N . . . . .	247
		Neumeier, S . . . . .	81, 117, 132, 173, 178, 207	Noal Alves, S . . . . .	105
		Neupane, M . . . . .	85	Nobuhiro, T . . . . .	240



O

- Omi, I. . . . .37, 167  
 Onaifo, J. . . . .179  
 Onaiwu, G. . . . .179  
 Onal, M. . . . .175, 191  
 On, C. . . . .62  
 Onukwuli, C. . . . .124  
 Onyinyechi, O. . . . .271  
 Oommen, V. . . . .187  
 Ophus, C. . . . .117  
 Opila, E. . . . 149, 160, 161, 197, 209, 224,  
 236, 261, 270, 275  
 Opoku, E. . . . .175  
 Oppelstrup, T. . . . . 121, 168, 203  
 Oppermann, P. . . . .21  
 O'Quinn, E. . . . .108, 206  
 Orikasa, K. . . . .71, 144  
 Oriola, T. . . . .130  
 Orlov, D. . . . .26  
 Ornelas, A. . . . .101  
 Ornelas-Rascon, C. . . . .232  
 Oros, T. . . . .214  
 Orozco-Caballero, A. . . . .216  
 Orrostieta, R. . . . .173  
 Orsborn, K. . . . .115  
 Ortega-Lopez, V. . . . .106  
 Orth, R. . . . .289  
 Ortiz, J. . . . .89, 262  
 Orzel, M. . . . .277  
 Osadnik, M. . . . .286  
 Osayawe, O. . . . .124  
 Osborne, M. . . 10, 78, 115, 146, 176, 209,  
 236, 254, 279, 289  
 Osborn, K. . . . .37  
 Osborn, R. . . . .206  
 Osei-Owusu, N. . . . .183  
 Osen, K. . . . .106  
 Oses, C. . . . .14  
 Osholm, H. . . . .168  
 Osinsky, A. . . . .238  
 Oskay, C. . . . .100, 112  
 Osmond, P. . . . .25  
 Ossowski, T. . . . .177, 279  
 Ostendorp, S. . . . .193  
 Ostroverkhov, V. . . . .78, 209  
 Oswald, S. . . . .101  
 Ota, M. . . . .172  
 Ott, C. . . . .45, 206  
 Otten, R. . . . .193  
 Otto, J. . . . .162  
 Ottomano, F. . . . .207, 241  
 Ottoni Negrao, P. . . . .199  
 Ott, R. . . . . 46, 147, 149, 204, 226, 261  
 Ouchen, F. . . . .287  
 Ouchi, T. . . . . 175, 208, 234  
 Oudriss, A. . . . .25  
 Ou, Y. . . . .80  
 Ouyang, B. . . . . 40, 73, 110  
 Ouyang, F. . . . 23, 55, 93, 127, 159, 160,  
 196, 257, 269  
 OuYang, F. . . . .55  
 Ouyang, G. . . . 22, 46, 49, 176, 204, 226  
 Ouyang, L. . . . . 46, 50, 266  
 Ouyang, M. . . . .108, 229  
 Ouzilleau, P. . . . .194  
 Overstreet, C. . . . .206  
 Ovi, M. . . . .37, 167  
 Øvrelid, E. . . . .176  
 Owen, C. . . . .137  
 Owen, L. . . . . 132, 173, 261  
 Owens, B. . . . .52  
 Oyegoke, J. . . . .179  
 Ozaki, N. . . . .172  
 Ozalp, A. . . . .229, 261  
 Ozaltun, H. . . . .37  
 Özbek, P. . . . .56  
 Ozcan, S. . . . .91  
 Ozcelik, G. . . . .281  
 Ozdemir, O. . . . .82  
 Ozdoganlar, B. . . . . 42, 118, 144  
 Ozdogru, E. . . . .218  
 Ozen, Z. . . . .281  
 Ozerinc, S. . . . . 11, 79, 115, 181, 289  
 Ozherelkov, D. . . . .241  
 Ozkan, C. . . 12, 43, 80, 116, 148, 184, 263  
 Özmen, L. . . . .131  
 Ozornio, J. . . . .271  
 Özsoy, A. . . . . 13, 141, 222  
 Ozturk, A. . . . .66  
 Öztürk, B. . . . .24  
 Ozturk, D. . . . .41  
 Öztürk, T. . . . .139
- P**
- Pabich, B. . . . .130  
 Pace, K. . . . .177  
 Pachauri, Y. . . . .31  
 Packard, C. . . . . 31, 112, 274  
 Padilla, K. . . . .240  
 Padilla, R. . . . .92  
 Padinhare Manissery, A. . . . .62, 227  
 Padin-Monroig, R. . . . .138  
 Padua, M. . . . .276  
 Paff, C. . . . .89  
 Pagan, D. . . . . 17, 47, 75, 84, 102, 120,  
 151, 187, 217, 241, 291  
 Paganin, D. . . . .20  
 Pagan, M. . . . .82, 251  
 Pagano, A. . . . .118, 184  
 Page, K. . . . .125  
 Pagone, E. . . . . 106, 140, 235  
 Paguaga, S. . . . .88  
 Pai, N. . . . .217  
 Paisner, S. . . . .103  
 Pajerowski, D. . . . .206  
 Pakanati, A. . . . .65, 136  
 Pak, P. . . . . 145, 213, 288  
 Palacios, B. . . . . 13, 141, 182  
 Palacios, E. . . . .271  
 Palacz, T. . . . .115  
 Palaniappan, S. . . . .240  
 Palanisamy, B. . . . .50, 219  
 Palasyuk, A. . . . .45, 265  
 Palasyuk, O. . . . . 45, 149, 265  
 Palau, A. . . . .131  
 Palavar, P. . . . .55  
 Pal, D. . . . .96  
 Palermo, M. . . . .140  
 Palitzsch, W. . . . .106  
 Paliwal, M. . . . .54, 295  
 Palkowski, H. . . . . 212, 233, 252  
 Palmero, P. . . . .147  
 Palmer, S. . . . .52  
 Palmer, T. . . . .57  
 Palmert, F. . . . .134  
 Palmieri, M. . . . .288  
 Pal, S. . . . .198, 245  
 Pal, U. . . . .12, 43, 80  
 Palumbo, A. . . . .28, 61, 99, 132, 165,  
 200, 227, 298  
 Panat, R. . . . . 12, 42, 106, 118, 144, 215,  
 231, 250  
 Pan, C. . . . . 8, 139, 149  
 Pandapas, C. . . . .43  
 Pandey, A. . . 12, 31, 43, 64, 80, 101, 116,  
 135, 148, 168, 184, 203, 216,  
 230, 263, 274, 287  
 Pandey, C. . . . .167  
 Pandey, K. . . . .168  
 Pandey, S. . . . .89, 167  
 Pandolfi, S. . . . .20  
 Panella, F. . . . .25  
 Pan, F. . . . .262  
 Pan, G. . . . .249  
 Pang, E. . . . .190  
 Pang, H. . . . .237  
 Pang, X. . . . .30, 134  
 Pannier, Y. . . . .44  
 Panova, V. . . . .82  
 Pan, Q. . . . . 49, 188, 283  
 Pan, S. . . . . 54, 79, 105  
 Pant, D. . . . .266  
 Pant, K. . . . .49  
 Pantleon, W. . . 11, 42, 79, 116, 147, 157,  
 184, 216, 290  
 Pantoja Salgado, G. . . . .90  
 Panton, B. . . . .129  
 Pan, W. . . . .282  
 Panwar, A. . . . .209  
 Pan, X. . . . . 59, 157, 226  
 Papadakis, L. . . . .53  
 Papham, T. . . . .246  
 Pappas, D. . . . .255  
 Paradise, P. . . . .29  
 Paradowska, A. . . . .218  
 Paramanathan, M. . . . .78  
 Paramore, J. . . . . 64, 238, 250

- Paramsothy, M . . . . . 21, 53, 91, 126, 268  
 Paranthaman, M. . . . . 118  
 Paranthaman, P . . . . . 12, 68  
 Pardal, G . . . . . 214, 215  
 Parham, J . . . . . 49  
 Parish, C. . . . . 137  
 Park, B . . . . . 278  
 Park, C . . . . . 66, 71, 241, 273, 298  
 Park, D . . . . . 285  
 Park, E . . . . . 73, 150, 211, 226, 228, 254,  
 264, 265, 266, 274, 277, 281,  
 291, 293  
 Parker, D . . . . . 126, 265  
 Parker, E. . . . . 280  
 Parker, G . . . . . 204  
 Parker, M . . . . . 56  
 Parker, S . . . . . 170  
 Parker, T. . . . . 16  
 Parkes, N . . . . . 81  
 Park, G . . . . . 231  
 Park, H. . . . . 79, 112, 116, 138, 186, 196,  
 202, 263, 266, 267, 277, 278,  
 290, 293, 298  
 Parkinson, D . . . . . 20, 51, 64  
 Park, J. . . . . 34, 52, 77, 79, 101, 110, 116,  
 133, 137, 152, 162, 186, 190, 201, 220,  
 244, 260, 263, 267, 277, 281, 290, 293,  
 294, 297  
 Park, K . . . . . 117, 153, 175, 257, 264, 265,  
 266, 268, 273, 298, 299  
 Park, M. . . . . 108, 135, 230  
 Park, N . . . . . 267  
 Park, S . . . . . 10, 25, 31, 43, 132, 145, 176,  
 186, 200, 227, 258, 264, 273,  
 286, 292, 298  
 Park, Y . . . . . 55, 67, 160, 190, 196, 201,  
 263, 278, 281, 293  
 Parnaik, A . . . . . 25, 130, 283  
 Parraga, H . . . . . 207  
 Parson, N . . . . . 152  
 Parsons, S. . . . . 172  
 Partezana, J . . . . . 249  
 Parzer, M . . . . . 18, 152  
 Pascall, A . . . . . 146, 208  
 Pasco, J . . . . . 22, 182, 240, 266, 288  
 Pasebani, S. . . . . 114, 139, 145, 214, 215, 259  
 Passeraub, P. . . . . 257, 258  
 P. A. Subramanyam, A . . . . . 51  
 Pataky, G . . . . . 25, 57, 96, 161, 197, 224, 271  
 Patel, A. . . . . 139  
 Patel, I. . . . . 148  
 Patel, J. . . . . 243  
 Patel, M . . . . . 15, 82  
 Patel, R. . . . . 216, 281, 298  
 Patenaude, H. . . . . 133, 170  
 Pateras, A. . . . . 51  
 Paternoster, C . . . . . 183  
 Pathak, S . . . . . 30, 58, 108, 116, 159, 168,  
 229, 261, 268  
 Pathapati, S . . . . . 118  
 Pati, D. . . . . 295  
 Patil, C . . . . . 28, 85, 105, 260  
 Patil, P . . . . . 181  
 Patil, R . . . . . 252  
 Patil, S. . . . . 115, 198  
 Patinet, S . . . . . 237  
 Patiño-Cardona, F . . . . . 295, 296  
 Pati, R. . . . . 149  
 Patki, P. . . . . 128  
 Patnaik, S. . . . . 52, 249  
 Patouillet, K. . . . . 153  
 Patra, A . . . . . 116, 217, 297  
 Patra, N . . . . . 133, 196, 272  
 Patra, P. . . . . 264  
 Patriarca, L . . . . . 113  
 Patrick, M . . . . . 193  
 Patrinos, P . . . . . 123  
 Patsavellas, J . . . . . 118  
 Pattel, R . . . . . 156  
 Patterson, M . . . . . 37  
 Patterson, R. . . . . 245  
 Patterson, T . . . . . 37, 70, 279  
 Pattnaik, K. . . . . 189  
 Patullo, M . . . . . 10, 13, 31, 176, 186  
 Paturaud, J. . . . . 178  
 Paudel, Y . . . . . 68  
 Paul, A . . . . . 69, 297  
 Paul, B . . . . . 139  
 Paul, D . . . . . 107  
 Paulin, I . . . . . 142, 283, 287  
 Paul, M. . . . . 9, 83  
 Paul, P . . . . . 222  
 Paul, S. . . . . 35  
 Paulsen, K . . . . . 119  
 Paul, T . . . . . 13, 15, 45, 82, 83, 119, 141, 182  
 Paul, V . . . . . 23  
 Pauly, V . . . . . 63, 102, 270  
 Pavel, M . . . . . 278  
 Pavlov, T. . . . . 231  
 Pawlikowski, K . . . . . 299  
 Payne, E. . . . . 102, 236  
 Payne, M . . . . . 15, 43, 83, 120, 261  
 Payton, E . . . . . 73, 75, 182, 207, 214,  
 239, 290  
 Payton, O. . . . . 43  
 Payzant, A . . . . . 129  
 Paz Salas, L . . . . . 251  
 Paz Soldan Palma, J . . . . . 273  
 Paz Soldan Pinto, J . . . . . 62  
 Paz y Puente, A . . . . . 34, 68, 105, 126, 138,  
 159, 173, 195, 207, 222, 233, 251, 277  
 Pearson, J. . . . . 142  
 Pearson, M. . . . . 257  
 Pecak, K. . . . . 45, 265  
 Peccavet, T. . . . . 106  
 Peddeti, C . . . . . 141, 272  
 Pedraza, F . . . . . 24, 95, 212  
 Pedroti, L . . . . . 264, 294  
 Peerlings, R . . . . . 58  
 Pegritz, M . . . . . 236  
 Pegues, J. . . . . 9, 78  
 Pei, G . . . . . 14  
 Pei, Z. . . . . 50  
 Pejman, R. . . . . 260  
 Pekala, M. . . . . 120, 213, 217, 292  
 Pekarskaya, E. . . . . 142  
 Pek, E. . . . . 53, 70, 177  
 Peker, A . . . . . 142  
 Pekguleryuz, M. . . . . 84  
 Pek, M . . . . . 207  
 Pekoba, B. . . . . 49  
 Pekol, C . . . . . 258  
 Pelapur, R. . . . . 251  
 Pelchen, L . . . . . 44  
 Pellemoine, F. . . . . 141, 197, 223, 236  
 Pelton, A . . . . . 40, 74, 110, 143  
 Pelz, J . . . . . 180  
 Pena, M . . . . . 50  
 Pena, R. . . . . 269  
 Penders, A . . . . . 102  
 Peng, H. . . . . 24, 56, 86, 94, 128, 175,  
 208, 234, 270  
 Peng, J . . . . . 223, 274  
 Peng, Q. . . . . 221  
 Peng, X. . . . . 270  
 Peng, Y. . . . . 62, 95, 227, 272  
 Peng, Z. . . . . 20, 52, 90, 125, 156, 193,  
 221, 294, 295  
 Pennacchio, A . . . . . 113, 145  
 Pennell, S. . . . . 228  
 Pełowska, K. . . . . 120  
 Peralta, T . . . . . 259  
 Perbix, C . . . . . 183  
 Perea, D . . . . . 211  
 Pereira, A. . . . . 184  
 Pereira dos Santos, J. . . . . 222  
 Pereira, I. . . . . 294  
 Perepezko, J. . . . . 79, 176, 211  
 Perera, J . . . . . 57  
 Perez Coronado, J. . . . . 188  
 Perez, D . . . . . 51, 218  
 Pérez, E. . . . . 271  
 Pérez Labra, M . . . . . 264  
 Pérez-Labra, M . . . . . 264, 295, 296  
 Perez Larios, A . . . . . 147, 295  
 Perez, M. . . . . 210  
 Pérez, P. . . . . 227  
 Pérez Prado, M . . . . . 215  
 Perez, T . . . . . 295  
 Pérez Zubiaur, P . . . . . 132, 266  
 Pericleous, K . . . . . 135, 287  
 Perisse Duarte Lopes, F . . . . . 67, 104, 268,  
 275, 276  
 Perissé Duarte Lopes, F . . . . . 67, 104, 276  
 Pero, R . . . . . 30  
 Perricone, V . . . . . 101  
 Perriere, L . . . . . 14, 141, 161, 209, 246

- Perrière, L ..... 38  
 Perrin, A ..... 34, 105, 113  
 Perrin Toinin, J ..... 272  
 Perriot, R ..... 33  
 Perron, A ..... 38, 126, 222, 265  
 Perry, J ..... 153  
 Perry, M ..... 214  
 Persaud, S ..... 30, 62, 275  
 Person, N ..... 64, 238  
 Perumal, S ..... 188  
 Perzynski, K ..... 299  
 Peterkin, A ..... 201  
 Peterlechner, M ..... 193  
 Peter, N ..... 15, 79, 107, 150  
 Peter, S ..... 159  
 Petersen, C ..... 247  
 Petersen, P ..... 117, 196, 202  
 Peterson, N ..... 21  
 Peterson, R ..... 136  
 Peterson, V ..... 14, 170, 261  
 Peterson, W ..... 63, 108, 211  
 Peters, S ..... 38, 146, 222  
 Pethö, L ..... 238  
 Petram, R ..... 9  
 Petranikova, M ..... 175  
 Petrich, L ..... 193  
 Petric, M ..... 233  
 Petrie, C ..... 243, 284  
 Petrič, M ..... 233, 252  
 Pettersen, T ..... 270  
 Pettinari-Sturm, F ..... 147, 186  
 Pettitt, F ..... 95  
 Pfitzing-Micklich, J ..... 193  
 Phadi, T ..... 69  
 Phalen, H ..... 213  
 Pham, A ..... 81, 195  
 Pham, B ..... 29  
 Pham, M ..... 31, 64, 101, 135, 168, 203, 230, 274, 299  
 Phan, M ..... 222  
 Phan, N ..... 145, 161  
 Phan, T ..... 26, 95, 203, 217  
 Pharr, G ..... 64, 156, 238  
 Pharr, M ..... 148, 156  
 Phatak, C ..... 90  
 Philippsen, B ..... 56  
 Philips, N ..... 10, 78, 236  
 Phillion, A ..... 81, 168  
 Phillippe Cousin, J ..... 246  
 Phillips, N ..... 20, 206  
 Phillpot, S ..... 56, 80, 161, 275, 280, 296  
 Phounglamcheik, A ..... 159  
 Phung, B ..... 114  
 Pibulchinda, P ..... 80  
 Picard, Y ..... 117  
 Picco, L ..... 43  
 Piccone, D ..... 167  
 Pickering, E ..... 81  
 Pickett, C ..... 89  
 Picklesimer, C ..... 21  
 Pickles, J ..... 63, 230  
 Picu, C ..... 49, 109  
 Pielacha, B ..... 181  
 Pienta, D ..... 26  
 Pierce, D ..... 26, 138, 166, 289  
 Pierott Cabral, J ..... 104, 276  
 Pierron, O ..... 31, 64  
 Piersol, A ..... 149  
 Pike, J ..... 43  
 Pikul, A ..... 14, 177, 257, 279  
 Pikula, T ..... 177  
 Pilania, G ..... 153, 190, 219, 242, 293  
 Pilchak, A ..... 41, 84, 175, 209, 225, 235, 253  
 Pilipchuk, M ..... 28, 43, 105, 260  
 Pillado, B ..... 232  
 Pilla, G ..... 123, 154  
 Pillai, D ..... 16, 47, 209, 254, 258, 259, 261  
 Pillai, R ..... 63, 72, 99, 107, 166, 260, 272  
 Pillari, L ..... 82  
 Piloseno, B ..... 292  
 Pilosino, B ..... 213  
 Pilvelait, T ..... 73  
 Pimblott, S ..... 140  
 Pimenta, S ..... 109  
 Pimentel, A ..... 73  
 Pineda, E ..... 41, 109  
 Pinion, L ..... 146  
 Pinomaa, T ..... 103, 146, 265, 288  
 Pinson, J ..... 243  
 Pint, B ..... 29, 62, 63, 99, 102, 272  
 Pipala, J ..... 277  
 Pippan, R ..... 119, 236  
 Piquard, L ..... 235  
 Pirnar, B ..... 74  
 Pisani, A ..... 167, 289  
 Pistidda, C ..... 228  
 Pistorius, P ..... 26, 92, 135, 146, 158, 239, 259, 261  
 Pitike, K ..... 169, 238  
 Pittman, C ..... 44  
 Pitts, S ..... 82, 157, 248  
 Pixner, F ..... 198  
 Pizano, L ..... 182  
 Planck, J ..... 170  
 Playford, H ..... 132  
 Plotkowski, A ..... 105, 113, 121, 214, 244, 287  
 Plotnikov, Y ..... 289  
 Ploux, L ..... 252  
 Plummer, G ..... 63, 157, 190  
 Plummer, J ..... 220  
 Pocquette, N ..... 15, 16, 45  
 Podgornij, B ..... 283  
 Podgornik, B ..... 283  
 Podsiadła, D ..... 257  
 Po, G ..... 21  
 Poghosyan, E ..... 20  
 Pogue, E ..... 213, 217, 292  
 Pohl, N ..... 28  
 Poirier, D ..... 171  
 Pokharel, R ..... 136, 151, 188  
 Pokhrel, G ..... 269  
 Pokroy, B ..... 46, 88, 162  
 Polák, J ..... 57  
 Polak, M ..... 46, 190  
 Polasik, A ..... 35, 68  
 Polatidis, E ..... 37, 71, 280  
 Polcar, T ..... 135, 223, 248, 275  
 Pole, M ..... 37, 134, 214, 238  
 Polishchuk, I ..... 46  
 Pollard, B ..... 245  
 Pollock, T ..... 11, 13, 31, 43, 50, 78, 116, 141, 175, 184, 186, 197, 225, 236, 254, 262, 284  
 Polonsky, A ..... 173, 251  
 Pomo, A ..... 21  
 Ponge, D ..... 133  
 Ponis, J ..... 156  
 Pontikes, Y ..... 123, 154, 191  
 Poole, L ..... 280  
 Poole, W ..... 130, 152, 188  
 Pooley, S ..... 33, 66, 211  
 Poon, J ..... 15  
 Poplawsky, J ..... 16, 17, 31, 46, 50, 58, 72, 110, 113, 127, 193, 214, 226, 239  
 Popoola, A ..... 148, 228  
 Popoola, O ..... 148  
 Popoola, P ..... 90, 228  
 Popov, V ..... 113, 285  
 Poręba, N ..... 22  
 Porenta, N ..... 100, 231  
 Porro, J ..... 77  
 Porsch, K ..... 254  
 Portal, L ..... 46  
 Portela, C ..... 206  
 Porter, D ..... 19, 50, 51, 88, 124, 155, 192, 268  
 Porter, I ..... 103  
 Porter, J ..... 90  
 Portilla, B ..... 203  
 Poselli, E ..... 23  
 Post, A ..... 70  
 Post, B ..... 146, 147, 214  
 Post, N ..... 58  
 Potter, J ..... 214  
 Pouchon, M ..... 249  
 Poudel, A ..... 9  
 Poudel, N ..... 231  
 Poudel, T ..... 199  
 Poulain, R ..... 187  
 Poulsen, H ..... 80, 151, 168  
 Pourjam, M ..... 11, 75, 178, 181  
 Powell, A ..... 24, 43, 56, 94, 128, 165, 175, 270, 299  
 Powell, C ..... 207  
 Pozzi, A ..... 106



- Pozzi, M . . . . . 240  
 Prabhakaran, R . . . 38, 100, 157, 229, 248  
 Prabhakaran, V . . . . . 80  
 Prabhakar, J . . . . . 66  
 Prabhune, B . . . . . 181  
 Pradeep, K . . . . . 138  
 Pradhan, A . . . . . 142, 275  
 Pradhan, D . . . . . 13  
 Pradhan, S . . . . . 265  
 Prado-Lázaro, J . . . . . 147  
 Prahin, E . . . . . 86  
 Pramanick, A . . . . . 84  
 Pramanik, B . . . . . 279, 281  
 Prasad, A . . . . . 148, 203, 215, 276  
 Prasad, D . . . . . 265  
 Prasad Murugan, S . . . . . 25  
 Prasad, N . . . . . 265  
 Prasad, P . . . . . 83  
 Prasad R, A . . . . . 260  
 Pratama, K . . . . . 64, 183, 231  
 Pratyush Behera, R . . . . . 149  
 Preis, J . . . . . 145, 214  
 Prenzlöw, E . . . . . 224  
 Presley, M . . . . . 75  
 Presmanes, L . . . . . 48, 78  
 Prestemon, S . . . . . 102  
 Preston, A . . . . . 13, 37, 82, 106, 247  
 Preuss, M . . . . . 120  
 Pribe, J . . . . . 41, 48, 75, 111, 144, 181, 301  
 Pribram-Jones, A . . . . . 34, 260, 262  
 Price, S . . . . . 38, 54, 70, 208, 259, 296  
 Prichard, P . . . . . 76, 105, 112, 139, 174, 208, 234, 252, 278, 282  
 Priebe, D . . . . . 28  
 Priedeman, J . . . . . 41, 74, 116  
 Prié, M . . . . . 25  
 Priesen Reis, E . . . . . 82, 240  
 Prieto, A . . . . . 193  
 Prima, F . . . . . 16, 17, 47, 84, 186, 187, 216  
 Primetzhofér, D . . . . . 178  
 Primig, S . . . . . 34, 68, 105, 138, 173, 195, 207, 233, 251, 277, 284  
 Prince, L . . . . . 84  
 Prince, M . . . . . 207  
 Pritchard, M . . . . . 243  
 Privat, K . . . . . 119  
 Priyadarshi, A . . . . . 180  
 Priyadarshini, M . . . . . 183  
 Probert, A . . . . . 231  
 Proctor, J . . . . . 94, 103, 137  
 Proehl, E . . . . . 160  
 Prokhorenko, M . . . . . 270  
 Prokhorenko, S . . . . . 270  
 Prokic, M . . . . . 235  
 Prost, T . . . . . 112  
 Proudhon, H . . . . . 12, 290  
 Provatas, N . . . . . 259, 288  
 Provines, J . . . . . 129  
 Pryga, K . . . . . 152  
 Puchala, B . . . . . 85, 233  
 Puente-Orench, I . . . . . 232  
 Puentes Cantor, H . . . . . 228  
 Puga, H . . . . . 235  
 Pukenas, A . . . . . 119  
 Pulido, H . . . . . 200  
 Pulipaka, A . . . . . 283  
 Pullen, L . . . . . 11  
 Puma, J . . . . . 106  
 Pung, K . . . . . 139  
 Punyafu, J . . . . . 230  
 Purdy, L . . . . . 207, 241  
 Puri, S . . . . . 31, 64, 101, 135, 168, 203, 230, 274  
 Pürstl, J . . . . . 141  
 Purwanto, A . . . . . 219  
 Pushpa, V . . . . . 259  
 Putra, G . . . . . 49  
 Putz, B . . . . . 31, 63, 100, 101, 134, 168, 203, 229, 238, 248, 274  
 Puybras, M . . . . . 210
- Q**
- Qadri, S . . . . . 148  
 Qaisar, M . . . . . 42  
 Qazi, Z . . . . . 136  
 Qian, B . . . . . 47, 216  
 Qian, H . . . . . 57, 214  
 Qian, M . . . . . 105, 110, 139, 174, 208, 234, 252, 278  
 Qian, S . . . . . 135  
 Qiao, J . . . . . 253  
 Qi, J . . . . . 15, 17, 103, 189, 218, 270  
 Qi, L . . . . . 19, 51, 89, 124, 156, 157, 192, 194, 254, 258, 261, 289, 294, 296  
 Qin, F . . . . . 90  
 Qin, H . . . . . 262  
 Qin, L . . . . . 13, 179  
 Qin, X . . . . . 86  
 Qi, R . . . . . 287  
 Qiu, D . . . . . 293  
 Qiu, R . . . . . 29  
 Qiu, S . . . . . 29  
 Qi, Y . . . . . 92, 164  
 Qi, Z . . . . . 56, 102  
 Quadros, F . . . . . 147  
 Quang, M . . . . . 288  
 Quarshie, J . . . . . 208  
 Queylat, B . . . . . 197  
 Qu, H . . . . . 57, 269  
 Quincey, J . . . . . 166  
 Quinonero-Galindo, J . . . . . 65  
 Quinta da Fonseca, J . . . . . 120  
 Quintana, i . . . . . 185  
 Quintana, M . . . . . 150, 182, 222, 298  
 Quirinale, D . . . . . 125  
 Qu, J . . . . . 26, 143  
 Quraishy, M . . . . . 291  
 Qureshi, M . . . . . 161, 271  
 Qureshi, W . . . . . 134  
 Qu, S . . . . . 158  
 Qu, W . . . . . 90  
 Qu, X . . . . . 114
- R**
- Raabe, D . . . . . 15, 80, 133, 150, 161  
 Rabe, C . . . . . 258  
 Rabello Neves, P . . . . . 268  
 Rabello, R . . . . . 104, 276  
 Rabelo da Silva, C . . . . . 50  
 Rabiei, A . . . . . 142, 274, 279, 301  
 Rabin, A . . . . . 75  
 Rabkin, E . . . . . 63, 135, 154, 190, 205, 220  
 Race, C . . . . . 132, 230  
 Racharla, J . . . . . 293  
 Rack, A . . . . . 9, 13, 86, 113, 122, 141, 180, 222, 285  
 Rackley, C . . . . . 169  
 Rack, P . . . . . 148, 231, 239, 240  
 Rackwitz, J . . . . . 73, 298  
 Rademacher, M . . . . . 278, 286  
 Radhakrishnan, M . . . . . 10, 22, 115, 118, 240  
 Radon, A . . . . . 77  
 Radovic, M . . . . . 118  
 Rae Eon, K . . . . . 58  
 Raeker, E . . . . . 116, 284  
 Rae, M . . . . . 44  
 Rafferty, B . . . . . 114  
 Rafiei, B . . . . . 57  
 Rafiq, S . . . . . 271  
 Rafique, M . . . . . 246  
 Raguraman, S . . . . . 183, 200  
 Rahadian, F . . . . . 219, 242  
 Rahbar, N . . . . . 46, 124, 220, 243, 268  
 Rahimi, S . . . . . 135  
 Rahman, F . . . . . 219, 242  
 Rahman, K . . . . . 107  
 Rahman, R . . . . . 279  
 Rahman, T . . . . . 72, 260  
 Rahman, Z . . . . . 224, 255  
 Rahul, F . . . . . 114  
 Rahul, R . . . . . 292  
 Rai, B . . . . . 36  
 Raigosa, D . . . . . 119  
 Raiman, S . . . . . 29, 37, 62, 99, 128, 133, 140, 166, 194, 201, 202, 227, 247, 272, 278  
 Raj, A . . . . . 100, 191, 200, 216, 217, 229  
 Raja, A . . . . . 45, 265  
 Rajagopalan, J . . . . . 31, 64, 101, 135, 168, 199, 203, 230, 255, 274  
 Rajagopal, J . . . . . 50  
 Rajamudili, K . . . . . 300  
 Rajan, G . . . . . 198  
 Rajanna, R . . . . . 200, 294

Rajapakse, Y	156	Randolph, S	239	Reed, P	212
Rajendran, H	240	Rane, K	105	Reese, C	188
Rajgire, S	189	Rangari, V	155	Reese, S	52
Rajib, S	35	Rangel Velasco, D	275, 276	Rees, J	184
Raji, H	260	Ranger, M	170	Reeve, S	17, 48, 85, 121, 151, 187, 218, 292
Raji, M	128	Rani, P	192	Regidor, H	182
Rajput, S	50, 219	Rankouhi, B	79	Regmi, S	36, 107, 210
Raj, R	240	Rao, B	138	Rehman, K	84
Raj, S	183	Rao, E	262	Rehmer, B	197, 214
Raju Natarajan, A	19, 158	Rao, M	92, 221	Reichelson, D	223
Rakhmonov, J	103, 113, 214	Rao, P	288	Reichelson, J	223
Rakita, Y	246	Rao, Y	292	Reid, A	187
Rakoczy, L	277, 278	Rapetti, A	141	Reid, M	218
Rakovan, J	232	Rashidi, R	237	Reidy, J	290
Ralph, T	180	Rasmussen, P	255	Reifsnnyder Hickey, D	111
Ramabathiran, A	96	Rasooli, N	165	Reikher, A	208
Ramachandramoorthy, R	231	Rasouli, N	266	Reilly, D	211
Ramachandran, S	82	Rath, D	214, 259	Reis, C	102, 248
Ramadhani, M	40, 104	Rath, L	207	Reiser, A	45, 119, 158, 171, 195, 205, 222, 231, 244, 250, 297, 300
Ramakrishna, G	55, 160, 196	Ratnala, D	81	Reis, M	269
Ramalingam, M	174, 239	Raturi, A	285	Reiss, R	243
Ramamurty, U	9, 79, 114	Raturi, D	158	Reiss, T	155
Ramana, C	8, 42, 75, 111, 144, 179, 238, 262	Ratvik, A	159	Remington, B	112
Ramanuj, V	17, 48, 85, 121, 151, 187, 218, 292	Ratzker, B	118	Remonato, F	153
Ramar, M	277	Rauf, A	284	Renault, P	203, 238
Ramasamy, P	73, 142, 254	Raut, K	18	Rendón Giraldo, J	257
Ramasamy, V	9, 95, 300	Ravel, B	29, 232	Renfro, M	66
Ramasubramanian, L	25, 37, 71, 130, 148, 280, 283	Ravikumar, S	247, 251	Renfrow, R	23
Rame, J	178, 212, 237, 281	Ravi Narayanan, V	225	Renganayagalu, R	188
Ramesh, K	64, 232	Ravindra, N	8, 42, 75, 111, 144, 179, 218, 262	Rengifo, S	66
Ramesh, M	101, 203	Ravindran, S	39	Ren, H	149
Ramgopal, T	57	Ravi, P	191, 220	Ren, J	172, 212, 280
Ramirez, A	10, 37, 78, 115, 129, 146, 180, 213, 238, 287, 289	Ravi, S	168	Ren, M	87, 153, 189
Ramirez, I	103	Ravi, V	160, 197, 224, 270	Renner, D	75
Ramirez-Martinez, E	264	Rawding, J	169	Renner, P	290
Ramírez, P	271	Rawlings, A	56, 209	Ren, Q	72, 102, 107
Ram, K	15, 224	Rayaprolu, S	17	Renteria, C	51, 191
Ramos Ballesteros, A	196, 228	Ray, J	222	Rentz, R	38
Ramos-Ballesteros, A	272	Ray, N	179	Ren, X	73, 87, 125, 293
Ramos Bandeeras, J	273	Ray, P	226	Ren, Y	16, 50, 199, 233
Ramos Banderas, J	269, 273	Razavi, M	124	Ren, Z	103, 146, 193
Ramos-Banderas, J	228, 273, 298	Razmi, J	112	Ren Zulian, Q	183
Ramos, J	273	Ready, J	257, 258	Repp, O	129
Ramos, K	20, 73	Ready, W	279	Reshetnyak, O	270
Ramos Moreira Afonso, C	177	Rebak, R	25, 57, 95, 128, 161	Restum, J	262
Ramprakash, S	110, 244	Rebrin, M	198	Reufsteck, T	188
Ramsey, C	269	Recal Onal, M	36	Revelo Huertas, C	286
Ramulu, M	9	Redarce, T	72	Revil-Baudard, B	109, 170, 181, 241
Rana, H	207	Reddy, R	60	Revilla-Cuesta, V	106
Ranasingha, O	287	Reddy, S	175	Reyes, F	209
Ranaweera, C	101	Reddy, T	21, 171, 172	Reyes Holguin, J	261
Randall, N	30	Redemann, B	141, 161, 209, 246, 254, 275	Reyes, I	271
Randall, S	78	Redford, J	180	Reyes, L	137
Randhavan, R	146	Redmond, J	50, 65, 88, 124, 268	Reyes Pérez, M	60, 264
Randhaven, R	115	Redwing, J	179	Reyes-Pérez, M	264, 277, 295, 296
		Redwing, N	179	Reyes Pulido, H	85
		Reece, M	234		

- Reyes Ramos, W. . . . . 258  
 Reyes Tirado, F. . . . . 10, 78, 115, 146, 289  
 Reyes-Valderrama, M. . . . . 264, 277  
 Reyes-Zacarias, J. . . . . 178  
 Reynolds, J. . . . . 297  
 Rezac, J. . . . . 301  
 Rezaei, A. . . . . 181  
 Reza-E-Rabby, M. . . . . 199  
 Reza, F. . . . . 236  
 Rezazadeh, V. . . . . 58  
 Rezwani, A. . . . . 18  
 Rhee, H. . . . . 68, 139, 164, 230  
 Rheinheimer, W. . . . . 105  
 Rhoads, B. . . . . 17, 97, 187  
 Rhodes, D. . . . . 144  
 Rhodes, M. . . . . 38, 157  
 Rial Tubio, C. . . . . 77  
 Ribeiro, J. . . . . 276, 294  
 Ribeiro Oliveira, H. . . . . 294  
 Ribic, B. . . . . 42  
 Ricci, S. . . . . 118, 184  
 Richardson, S. . . . . 29  
 Riche, H. . . . . 54  
 Richeton, T. . . . . 290  
 Richter, A. . . . . 239  
 Richter, B. . . . . 48, 111, 181  
 Richter, J. . . . . 244  
 Richter, N. . . . . 63, 103, 105, 137, 214  
 Richter, R. . . . . 180  
 Rickert, K. . . . . 94  
 Rickman, J. . . . . 97, 102, 193  
 Ricks, T. . . . . 41, 188  
 Ridgeway, C. . . . . 234  
 Ridley, M. . . . . 63  
 Ridwan, O. . . . . 121  
 Riechers, B. . . . . 39, 109, 237  
 Riedemann, T. . . . . 112  
 Riedmüller, K. . . . . 189, 218  
 Rielley, Z. . . . . 197  
 Riemann, J. . . . . 71, 86  
 Riensche, A. . . . . 288  
 Riesch, J. . . . . 157, 194, 211, 221, 243  
 Rietema, C. . . . . 195, 224  
 Riffel, K. . . . . 37, 115, 129  
 Riffe, W. . . . . 10  
 Rigby-Bell, M. . . . . 32  
 Righi, G. . . . . 112, 172  
 Rijal, B. . . . . 179, 258  
 Rijckaert, H. . . . . 18  
 Rim, I. . . . . 263, 266, 295  
 Ringer, S. . . . . 40, 76, 132, 244, 260, 282, 293, 295  
 Rio-Lopez, N. . . . . 77  
 Rios, M. . . . . 77  
 Riot, C. . . . . 150  
 Risbet, M. . . . . 25  
 Riss, A. . . . . 152  
 Ritchie, R. . . . . 15, 18, 43, 57, 83, 113, 114, 120, 165, 186, 194, 217, 261  
 Ritchie, S. . . . . 12  
 Rittenhouse, J. . . . . 30, 142, 223  
 Ritter, C. . . . . 225  
 Ritzo, M. . . . . 200  
 Rivera-Diaz-Del-Castillo, P. . . . . 97, 126  
 Rivera, J. . . . . 208  
 Rivers, K. . . . . 135  
 Rivers, M. . . . . 251  
 Rizk, J. . . . . 33  
 R, M. . . . . 31  
 Roach, D. . . . . 69  
 Roach, M. . . . . 9  
 Robbe, P. . . . . 66, 170  
 Robert, N. . . . . 250  
 Robert, P. . . . . 53  
 Robertson, A. . . . . 187, 241  
 Robertson, E. . . . . 246  
 Roberts, S. . . . . 222  
 Robin, I. . . . . 157, 204  
 Robinson, A. . . . . 12  
 Robinson, D. . . . . 143  
 Robinson, I. . . . . 51  
 Robinson, J. . . . . 179  
 Robinson, R. . . . . 255, 279  
 Robič, R. . . . . 74  
 Roccapiore, K. . . . . 239  
 Rock, C. . . . . 76  
 Rodelas, J. . . . . 12, 129, 167, 224  
 Rodgers, M. . . . . 260  
 Rodgers, T. . . . . 17  
 Rodrigues, S. . . . . 22  
 Rodriguez-Crespo, B. . . . . 77  
 Rodriguez de Vecchis, P. . . . . 77  
 Rodriguez De Vecchis, P. . . . . 9, 77, 145, 290  
 Rodriguez De Vecchis, R. . . . . 77  
 Rodriguez, J. . . . . 204  
 Rodriguez, K. . . . . 300  
 Rodriguez, L. . . . . 265  
 Rodriguez Laguna, M. . . . . 227  
 Rodriguez, M. . . . . 143, 218  
 Rodriguez Perez, N. . . . . 249, 275  
 Rodriguez, R. . . . . 260  
 Rodriguez-Velamazán, J. . . . . 77  
 Roeder, G. . . . . 37  
 Roehling, J. . . . . 195  
 Roemer, F. . . . . 228  
 Roesler, J. . . . . 176  
 Rogers, A. . . . . 274  
 Rogers, J. . . . . 44, 129, 274  
 Rogers, M. . . . . 129  
 Roggeline, J. . . . . 200  
 Roginski, A. . . . . 70, 216  
 Rogoff, E. . . . . 47  
 Rohatgi, P. . . . . 105, 126  
 Rohrer, G. . . . . 125, 170, 190, 193, 213  
 Rojas, G. . . . . 39, 146  
 Rojas, V. . . . . 225  
 Rokkam, S. . . . . 19, 25, 27, 51, 57, 59, 89, 95, 98, 124, 128, 131, 156, 160, 161, 192, 197, 224, 270, 272, 294  
 Rolark, F. . . . . 71  
 Rolchigo, M. . . . . 48, 75, 287, 297  
 Rolinska, M. . . . . 261  
 Rollett, A. . . . . 9, 13, 48, 75, 90, 102, 103, 114, 115, 121, 145, 162, 213, 232  
 Rolseth, S. . . . . 242  
 Romanovskaia, E. . . . . 29, 57, 99, 141, 272, 273  
 Romanovski, V. . . . . 29, 57, 99, 141, 272  
 Romedenne, M. . . . . 62, 63, 102, 166  
 Rome, J. . . . . 114  
 Romero Resendiz, L. . . . . 163  
 Romero, S. . . . . 251  
 Romero Serrano, J. . . . . 264  
 Romero-Serrano, J. . . . . 264, 296  
 Rometsch, P. . . . . 152, 177, 210  
 Rommel, S. . . . . 95, 105, 173, 207, 232, 251, 301  
 Romnes, C. . . . . 10, 115, 209  
 Rondinelli, J. . . . . 141, 161, 209, 226, 246  
 Ronevich, J. . . . . 25  
 Ronnebro, E. . . . . 134  
 Ronning, F. . . . . 206  
 Roop, M. . . . . 29, 61  
 Roper, B. . . . . 167, 289  
 Roper, C. . . . . 15, 79  
 Roper, R. . . . . 142  
 Roques, A. . . . . 93  
 Rørvik, S. . . . . 56, 106, 131  
 Rosales, J. . . . . 243, 254  
 Rosalie, J. . . . . 186  
 Roschli, A. . . . . 146  
 Rosenberg, S. . . . . 154  
 Rosenberg, W. . . . . 73  
 Rosenkranz, S. . . . . 206  
 Rose, S. . . . . 225, 245  
 Rösner, H. . . . . 39  
 Ross, A. . . . . 164  
 Rosseinsky, M. . . . . 217  
 Rossi, E. . . . . 147  
 Rossini, A. . . . . 246  
 Ross, K. . . . . 71, 129, 214, 249  
 Rostamian, A. . . . . 86, 94, 136  
 Rost, C. . . . . 14  
 Rotermond, B. . . . . 140  
 Roth, A. . . . . 35  
 Rothchild, E. . . . . 156, 221, 222  
 Roth, J. . . . . 24  
 Roth, P. . . . . 178  
 Rottmann, P. . . . . 45, 105, 176, 209, 224, 236, 254, 279  
 Roubier, N. . . . . 155  
 Roucoules, V. . . . . 212  
 Rouf, A. . . . . 260  
 Rouhani, A. . . . . 179  
 Roure, I. . . . . 250

- Rouse, J .....79  
 Rousselle, M .....252  
 Rout, B .....37  
 Röver, I .....106  
 Rovinelli, a .....126  
 Rovinelli, A ..... 41, 66, 167, 216  
 Rowenhorst, D .....26, 58, 173, 182,  
 204, 289  
 Rowthu, S .....267  
 Ro, Y .....106, 151  
 Roy, A ..... 226, 246, 283  
 Roy, H .....293  
 Roy, P .....61  
 Roy, R .....123, 248  
 Roy, S ..... 14, 21, 82, 130, 133, 146, 182,  
 183, 215, 258, 259, 261, 275,  
 289, 297, 300  
 Roy, T .....117  
 Rozak, G .....236, 254  
 Rozman, K .....58, 197  
 Roza Vasquez, J .....162  
 Ruano, S .....16  
 Rubio-Ejchel, D .....280, 289  
 Rucker, B .....225  
 Ruckh, E ..... 86, 113, 285  
 Rudchenko, S .....157  
 Rudd, R .....22, 112  
 Rudyk, B .....270  
 Ruediger, A .....149  
 Ruestes, C .....112, 171  
 Ruffley, J .....182  
 Rufner, J ..... 13, 37, 82, 106, 157  
 Ruggiero, A ..... 111, 118, 184  
 Ruggiero, M .....72  
 Ruggles, T ..... 11, 41, 203  
 Ruiz Sánchez, A .....60  
 Rundensteiner, E .....259  
 Runnels, B ..... 52, 91, 121, 220, 248  
 Rupert, T ..... 105, 125, 137, 157, 226  
 Rupp, B .....12  
 Rupp, M .....51  
 Rusin, B ..... 14, 257, 279  
 Russell, K .....137, 213  
 Russell, N .....62  
 Russell, O .....271  
 Russell, R .....258  
 Russel, R .....246  
 Ruybalid, A .....85  
 Rvindra, N .....179  
 Ryan, D .....41  
 Ryan, P ..... 39, 72, 109  
 Rycroft, C .....89  
 Rydberg, J .....136  
 Rye, K .....223  
 Ryou, K .....280  
 Ryu, C ..... 150, 226, 281  
 Ryu, D .....267, 286  
 Ryu, H .....168, 274  
 Ryu, I .....123  
 Ryu, S .....206, 269  
 Ryu, W .....73, 178, 211, 226, 254,  
 264, 265, 281  
**S**  
 Saal, J .....53  
 Sá, B .....294  
 Sabatani, E .....285  
 Sabathier, C .....250  
 Sabatini, C .....88, 216  
 Sabat, M .....265  
 Sabau, A ..... 167, 202, 228, 273  
 S. Abdel-Khalik, H .....137  
 Saberi, L .....299  
 Sabirov, I .....216, 259  
 Sable, P .....181  
 Sabuj, M .....111  
 Saccone, D .....248  
 Sachan, A .....111  
 Sachan, R .....8, 42, 75, 111, 144, 148,  
 179, 185, 216, 217, 240, 262, 263  
 Sachi, S .....41, 146  
 Sadaf, M .....179  
 Sadeghzade, S ..... 67, 183, 262, 299  
 Sadler, B .....54, 159  
 Sadowski, J .....179  
 Sadriji, B .....178  
 Saedi, S .....260  
 Saefan, A .....135  
 Saeki, M .....162  
 Saevarsdottir, G .....189  
 Saez, E .....296  
 Sagahaian, S .....9  
 Saggi, A .....89  
 SaGong, M .....116  
 Saha, G .....266  
 Saha, M .....88  
 Saha, P .....285  
 Saha, R .....65  
 Saha, U .....296  
 Sahin, F .....131  
 Sahin, S .....292  
 Sahoo, S .....12, 75, 111, 147, 215, 263, 288  
 Sahu, B ..... 34, 212, 238, 265  
 Sahul, R .....172  
 Sahu, P .....189  
 Sai Behara, S .....85  
 Said, A .....172  
 Saida, J .....178  
 Saida, S .....36  
 Saidi, W .....218, 246  
 Sainju, R .....206  
 Saitoh, H .....173  
 Saito, K .....165, 167  
 Saito, N ..... 13, 43, 80, 291, 293  
 Saito, Y .....42  
 Saiz, N .....182  
 Saji, S .....222  
 Sajjadifar, S .....9  
 Saji, S .....8  
 Sakaguchi, S .....48  
 Sakamoto, Y .....293  
 Sakane, S .....17, 241, 278, 288,  
 292, 293, 296  
 Sakano, M .....296  
 Sakib, N .....8, 179  
 Sakurai, T .....18  
 Salado, M .....184  
 Salas, D .....34, 265  
 Salas, E .....169  
 Salas Mula, D .....238  
 Salata-Barnett, M .....275  
 Salazar, D .....8, 9, 14, 45, 67, 77, 82,  
 104, 113, 118, 145, 149,  
 180, 185, 264, 275, 285  
 Salazar Mejia, C .....82  
 Salazar-Yantas, K .....91  
 Salehi, D .....178, 181  
 Salehi, S .....11  
 Salehnasab, B .....151  
 Saleh, T .....89  
 Salem, A .....225  
 Salem, H ..... 113, 116, 290  
 Sales, B .....172  
 Salinas, J .....233  
 Salleh, M .....127  
 Sallot, P .....150, 234  
 Salloum-Abou-Jaoude, G .....65  
 Salman, S .....49  
 Salomon, E .....135  
 Salonitis, K ..... 118, 136, 169, 253  
 Salvato, D ..... 137, 211, 275  
 Salvini, M .....196  
 Salvucci, R .....86  
 Saly, E .....234  
 Samaei, A .....113  
 Samajdar, I .....209  
 Samanta, A .....46  
 Samanta, K .....260  
 S. Amaral, J .....82  
 Samaras, D .....109  
 Samarov, V .....37, 38  
 Samin, A .....134, 135  
 Samolyuk, G .....265  
 Sanchez, C .....100, 105  
 Sánchez Mendoza, A .....268  
 Sanchez-Poncela, M .....284  
 Sandberg, R ..... 20, 51, 90, 170  
 Sanders, D .....9  
 Sanderson, S .....41, 290  
 Sanders, P .....177  
 Sandhage, K .....197, 270  
 Sandquist, J .....56  
 Sangid, M .....25, 77, 80, 111, 114, 116,  
 119, 162, 166, 181, 204, 212  
 Sanjay, K .....210  
 Sanjurjo-Rodriguez, C .....213, 217



- Sankaranarayanan, V. . . . . 219  
 Sankaran, S. . . . . 31  
 Sankare, S. . . . . 79  
 Sankar, V. . . . . 219  
 San Marchi, C. . . . . 38  
 Sannes, S. . . . . 136  
 Sanniboina, S. . . . . 153  
 Sanni, O. . . . . 212, 280  
 San, S. . . . . 153, 197  
 Sansoz, F. . . . . 134, 190  
 Santala, M. . . . . 258  
 Santamaria, A. . . . . 106  
 Santa Maria, F. . . . . 254  
 Santangelo, M. . . . . 71  
 Santeccchia, E. . . . . 115, 213, 288  
 Santiago, C. . . . . 250  
 Santoni, A. . . . . 115, 213, 288  
 Santos, J. . . . . 294, 295  
 Santos, M. . . . . 294  
 Santos Macias, J. . . . . 113, 195  
 Santos Paixao, A. . . . . 134, 202  
 Santra, S. . . . . 260  
 Sarac, A. . . . . 28  
 Sarangi, S. . . . . 8  
 Saravanan, H. . . . . 146, 259  
 Sarebanzadeh, M. . . . . 216  
 Sargin, I. . . . . 47  
 Sargin, I. . . . . 213  
 Sarhan, A. . . . . 8, 219  
 Sari, I. . . . . 281  
 Sariturk, D. . . . . 19, 282  
 Sari, Y. . . . . 84  
 Sarkar, S. . . . . 13, 21, 160, 292  
 Sarkar, Z. . . . . 291  
 Sarker, S. . . . . 186, 279  
 Sarmiento, E. . . . . 101, 243  
 Sarswat, P. . . . . 28  
 Sarvesha, R. . . . . 45, 71  
 S. A., S. . . . . 265  
 Sasaki, M. . . . . 249  
 Sasaki, T. . . . . 132, 200, 227  
 Sasidhar, F. . . . . 38, 72, 108, 142, 280  
 Sasidhar, K. . . . . 16, 37, 45, 71, 171, 272  
 Sathiyamoorthi, P. . . . . 265  
 Satilmiş, U. . . . . 165  
 Sato, G. . . . . 200  
 Sato, N. . . . . 247  
 Sato, T. . . . . 244  
 Sato, Y. . . . . 129, 162, 198, 225, 245, 259, 271  
 Satpathy, B. . . . . 83  
 Sau, A. . . . . 80, 263  
 Sauber, M. . . . . 175  
 Saucedo, D. . . . . 19  
 Sauer, L. . . . . 162  
 Saunders, E. . . . . 212  
 Saunders, H. . . . . 222  
 Saunders, N. . . . . 33, 160  
 Saurabh, T. . . . . 138  
 Sa, V. . . . . 235  
 Savage, C. . . . . 146  
 Savage, D. . . . . 21, 43, 160, 232  
 Savage, G. . . . . 172  
 Savarkar, S. . . . . 294  
 Saville, A. . . . . 78  
 Savinov, R. . . . . 258, 289  
 Savovici, A. . . . . 208  
 Saw, W. . . . . 49  
 Sayeed, H. . . . . 155, 207, 210, 217, 241  
 Scarlate, S. . . . . 124, 243  
 Scarpellini, A. . . . . 251  
 Scarponi, J. . . . . 77  
 Schaefer, B. . . . . 224  
 Schaefer, J. . . . . 145  
 Schaefer, R. . . . . 118  
 Schaeffer, B. . . . . 10, 182  
 Schaeperkoetter, J. . . . . 243  
 Schäfer, R. . . . . 150  
 Schaffer, J. . . . . 61  
 Schaller, R. . . . . 29, 61, 269  
 Schantl, P. . . . . 45  
 Schaper, M. . . . . 146, 200, 280  
 Schappel, D. . . . . 63  
 Scharf, T. . . . . 46, 204  
 Scheffield, J. . . . . 162  
 Scheideler, W. . . . . 35  
 Scheie, A. . . . . 206  
 Scheinker, A. . . . . 151, 188  
 Schellert, S. . . . . 224  
 Schell, N. . . . . 132, 185, 266  
 Schenck, C. . . . . 275  
 Scherbring, S. . . . . 244  
 Scheu, C. . . . . 59, 134  
 Schiavone, A. . . . . 213, 288  
 Schiavone, M. . . . . 175  
 Schill, W. . . . . 239  
 Schindelholz, E. . . . . 57, 194  
 Schirck, J. . . . . 228  
 Schlagel, D. . . . . 45, 149  
 Schlagel, J. . . . . 149  
 Schlereth, C. . . . . 24, 112  
 Schley, R. . . . . 21  
 Schmalbach, K. . . . . 31, 63, 100, 103, 134, 167, 168, 203, 229, 238, 248, 274  
 Schmid-Petzer, R. . . . . 40  
 Schmidt, C. . . . . 8  
 Schmidt, F. . . . . 95, 141  
 Schmidt, J. . . . . 248  
 Schmidt, V. . . . . 193  
 Schmitz, M. . . . . 50  
 Schmitz, T. . . . . 245  
 Schneider, A. . . . . 33, 34, 49, 87, 122, 153, 170, 189, 219, 235, 242, 253  
 Schneider, J. . . . . 101  
 Schneider, K. . . . . 253  
 Schneiderlochner, E. . . . . 133  
 Schneider, M. . . . . 43, 211  
 Schneider, S. . . . . 52  
 Schnelle, J. . . . . 87  
 Schniepp, H. . . . . 19, 67, 155, 191, 220, 243, 268  
 Schnitzer, R. . . . . 173  
 Schoedel, A. . . . . 170  
 Schoekel, A. . . . . 228  
 Schoenung, J. . . . . 14, 69, 208, 244, 279  
 Scholz, R. . . . . 57  
 Schonfeld, H. . . . . 261  
 Schooler, C. . . . . 165  
 Schorne-Pinto, J. . . . . 62, 227, 273  
 Schott, T. . . . . 252  
 Schrad, C. . . . . 228  
 Schrandt, S. . . . . 226  
 Schreiber, B. . . . . 284  
 Schreiber, D. . . . . 63, 99, 141, 196, 204, 237  
 Schreiber, M. . . . . 11  
 Schreiner, N. . . . . 132  
 Schretter, L. . . . . 73  
 Schriever, S. . . . . 214  
 Schroers, J. . . . . 100, 142, 178  
 Schuessler, B. . . . . 16, 238, 249  
 Schuette, R. . . . . 226  
 Schuh, C. . . . . 18, 21, 22, 50, 52, 64, 82, 88, 91, 119, 123, 125, 154, 157, 174, 190, 193, 220, 295  
 Schuler, B. . . . . 179  
 Schuler, G. . . . . 57  
 Schuler, T. . . . . 56  
 Schulte, J. . . . . 116  
 Schulthess, J. . . . . 231  
 Schulz-Harder, A. . . . . 97  
 Schulz, P. . . . . 247  
 Schürch, P. . . . . 231  
 Schuster, B. . . . . 64, 218  
 Schutz, F. . . . . 79  
 Schwaiger, R. . . . . 15, 79, 107, 199  
 Schwalbe, C. . . . . 178, 212, 237, 281  
 Schwam, D. . . . . 260, 261  
 Schwartz, J. . . . . 133  
 Schwarz, F. . . . . 208  
 Schwarz, N. . . . . 173  
 Schwarz-Selinger, T. . . . . 211  
 Schweiger, L. . . . . 228  
 Schweinhart, B. . . . . 188  
 Schweizer, P. . . . . 51, 297  
 Schwen, D. . . . . 17  
 Schwenk, G. . . . . 271  
 Schwetter, A. . . . . 279  
 Schwiedrzik, J. . . . . 51, 64, 101, 183, 231  
 Scott, J. . . . . 176  
 Scott, L. . . . . 261  
 Scott, S. . . . . 140  
 Scott, T. . . . . 43, 108, 228  
 Scott, W. . . . . 66  
 Scroggins, J. . . . . 257  
 Scully, J. . . . . 15, 29, 57, 95, 99, 141, 160, 161, 197, 209, 222, 270, 272, 273, 275  
 Scuseria, T. . . . . 138

- Seaberg, M. . . . . 21, 90, 171  
 Seal, S. . . . . 66, 148  
 Seaton, N. . . . . 39  
 Sebastiani, M. . . . . 147  
 Sebastian-Olazabal, B. . . . . 258  
 Sebastian, R. . . . . 203  
 Secor, E. . . . . 35, 68, 106, 139, 174  
 Sediako, D. . . . . 188, 218, 219, 241  
 Seede, R. . . . . 38, 71, 222  
 Seepersad, C. . . . . 284  
 Sehar, D. . . . . 165  
 Sehitoğlu, H. . . . . 119, 121, 154, 168  
 Seiboth, F. . . . . 21  
 Seidman, D. . . . . 16, 76, 113, 177, 180,  
 282, 283, 284, 285  
 Seifert, H. . . . . 296  
 Seifi, M. . . . . 9, 77, 114, 286  
 Seif, M. . . . . 134  
 Seiler, M. . . . . 56  
 Seita, M. . . . . 71, 158, 195, 222, 244, 297  
 Seixas Quintanilha Gomes, R. . . 104, 268,  
 276  
 Sekida, S. . . . . 164  
 Sekula, A. . . . . 286  
 Selby, M. . . . . 71  
 Seleson, P. . . . . 121  
 Selim, F. . . . . 23, 53, 55, 94, 108, 127, 141,  
 160, 196, 223, 237, 269  
 Sellam, M. . . . . 264, 268, 292  
 Selleby, M. . . . . 73, 143  
 Selmi, T. . . . . 166, 201, 227  
 Semiatin, L. . . . . 41, 76, 113, 282, 283,  
 284, 285  
 Semple, J. . . . . 214  
 Senanu, S. . . . . 56, 93, 94, 223, 242  
 Sen-Britain, S. . . . . 56  
 Sen, D. . . . . 160  
 Sen, F. . . . . 153  
 Sen, I. . . . . 21, 300  
 Senkov, O. . . . . 13, 44, 81, 117, 134, 263  
 Seno, R. . . . . 86, 191  
 Senor, D. . . . . 275  
 Sen, R. . . . . 281  
 Sen, S. . . . . 39  
 Senthilnathan, A. . . . . 17, 287  
 Seoane, A. . . . . 18  
 Seo, B. . . . . 175  
 Seo, J. . . . . 115, 145, 202, 267  
 Seo, K. . . . . 277, 291, 293  
 Seol, J. . . . . 138, 181, 266  
 Seo, M. . . . . 199, 236  
 Seo, S. . . . . 186  
 Sepehrband, P. . . . . 295  
 Serhienko, I. . . . . 18  
 Serizawa, H. . . . . 138  
 Serles, P. . . . . 206  
 Serrano, M. . . . . 81  
 Serrano, R. . . . . 106  
 Seto, Y. . . . . 172  
 Setyawan, W. . . . . 63, 102, 169, 249  
 Severt, M. . . . . 137  
 Sevinsky, A. . . . . 82  
 Seward, G. . . . . 78  
 Seyed Mahmoud, S. . . . . 75  
 Seyoum, J. . . . . 89  
 Seyyedhosseinzadeh, H. . . . . 283  
 Shabana, M. . . . . 161  
 Shabnam, S. . . . . 282, 291  
 Shachar, M. . . . . 239  
 Shade, P. . . . . 144, 162, 187  
 Shadle, D. . . . . 116  
 Shadvar, N. . . . . 55  
 Shafae, M. . . . . 146  
 Shaffer, M. . . . . 53, 61, 91  
 Shafieizad, A. . . . . 255  
 Shafique, S. . . . . 279  
 Shahab, S. . . . . 97  
 Shahan, D. . . . . 47  
 Shahani, A. . . . . 188, 218, 283, 297  
 Shahbazmohamadi, S. . . . . 191  
 Shaheen, N. . . . . 201  
 Shah, H. . . . . 69  
 Shah, I. . . . . 260  
 Shahid, M. . . . . 50, 219  
 Shahini, M. . . . . 162  
 Shah, J. . . . . 41  
 Shah, M. . . . . 187, 218  
 Shahnazari, A. . . . . 151  
 Shah, S. . . . . 127, 223, 246  
 Shah, Z. . . . . 249  
 Shaikh, S. . . . . 71, 242  
 Shaik, M. . . . . 149  
 Shakeel, Y. . . . . 85  
 Shakibi, A. . . . . 259  
 Shakouri, A. . . . . 152  
 Shamberger, C. . . . . 202  
 Shamroukh, A. . . . . 49  
 Shamsaei, N. . . . . 9, 77, 96, 112, 114,  
 151, 286  
 Shamsujjoha, M. . . . . 16  
 Shanbhag, S. . . . . 161  
 Shang, A. . . . . 19, 63, 130, 274, 283  
 Shang, B. . . . . 83, 109  
 Shang, J. . . . . 20  
 Shang, S. . . . . 194  
 Shang, X. . . . . 180, 213  
 Shang, Z. . . . . 63, 160  
 Shankar, K. . . . . 144  
 Shankar, S. . . . . 49, 253, 292  
 Shanks, K. . . . . 75  
 Shanmukha Kiran, A. . . . . 188  
 Shao, J. . . . . 103, 146  
 Shao, L. . . . . 16, 23, 30, 33, 34, 56, 66, 75,  
 94, 99, 127, 134, 137, 141, 202, 247  
 Shao, S. . . . . 9, 77, 96, 112, 114, 151  
 Shao, W. . . . . 18, 27, 194  
 Shao, Y. . . . . 229  
 Shapiro, D. . . . . 90  
 SharafEldin, K. . . . . 116, 124  
 Sharda, A. . . . . 37, 95  
 Shargh, A. . . . . 120  
 Sharma, A. . . . . 10, 13, 16, 17, 43, 44, 47,  
 64, 84, 92, 101, 119, 120, 129, 150,  
 175, 186, 209, 217, 229, 235, 247,  
 253, 284, 291, 300  
 Sharma, B. . . . . 176  
 Sharma, D. . . . . 104  
 Sharma, H. . . . . 52, 101, 162  
 Sharma, K. . . . . 280  
 Sharma, M. . . . . 37  
 Sharma, P. . . . . 75, 198, 287  
 Sharma, R. . . . . 187, 275  
 Sharma, S. . . . . 14, 32, 103, 115, 146, 174,  
 208, 239, 240, 272, 275  
 Sharma, V. . . . . 82, 285  
 Sharon, J. . . . . 238  
 Sharp, S. . . . . 129  
 Shashaani, A. . . . . 295  
 Shata, S. . . . . 279  
 Shauf, E. . . . . 140  
 Shaw, B. . . . . 169  
 Shaw, T. . . . . 164  
 Sheets, C. . . . . 124  
 Sheffield, J. . . . . 225  
 Sheikh, S. . . . . 213  
 Shekhar, R. . . . . 68, 94, 210  
 Shelton, J. . . . . 37, 71, 280  
 Shelton, W. . . . . 158  
 Shen, C. . . . . 19, 74, 243, 274  
 Sheng, X. . . . . 19, 63, 103, 107  
 Shen, J. . . . . 124  
 Shen, S. . . . . 192  
 Shen, T. . . . . 102  
 Shen, X. . . . . 79, 93, 127, 139, 209  
 Shen, Y. . . . . 14, 23, 34, 51, 55, 67, 93, 104,  
 105, 119, 127, 138, 159, 161, 164,  
 196, 269, 276, 277, 290  
 Sherburne, M. . . . . 8  
 Sheriff, K. . . . . 60, 92, 192  
 Sherif, Z. . . . . 118  
 Sheu, E. . . . . 248  
 Sheyfer, D. . . . . 207, 300  
 Shibata, A. . . . . 72, 142  
 Shibata, H. . . . . 13, 43, 80, 81, 291  
 Shibata, M. . . . . 249  
 Shields, M. . . . . 89  
 Shih, P. . . . . 93  
 Shi, L. . . . . 188, 274, 296  
 Shim, A. . . . . 195  
 Shimada, M. . . . . 135  
 Shimak, E. . . . . 58  
 Shimizu, L. . . . . 114  
 Shimokawa, T. . . . . 26, 96, 230  
 Shim, S. . . . . 24, 108, 117, 266  
 Shin, A. . . . . 62, 142  
 Shin, D. . . . . 17, 72, 110, 164, 260  
 Shinde, D. . . . . 160

- Shinde, R ..... 219  
Shin, G ..... 290  
Shingledecker, J. .... 10  
Shin, J. .... 257, 293  
Shin, K ..... 27  
Shin, M. .... 65  
Shinoda, F ..... 65  
Shin, S ..... 81, 183, 199, 217, 298  
Shin, W ..... 164, 294  
Shin, Y. .... 12, 202, 215, 239, 251, 274, 293  
Shiotsu, R. .... 162  
Shi, Q ..... 28, 61  
Shi, R ..... 40, 47  
Shiramizu, K ..... 162  
Shirato, N. .... 217  
Shirinian, R. .... 259  
Shittu, J. .... 70, 224  
Shiue, J. .... 186  
Shivaraman, R. .... 239  
Shivprasad, A ..... 194, 269  
Shi, Z ..... 153  
Shohji, I ..... 67  
Shokri, N ..... 9, 183  
Shokuhfar, T ..... 147, 183, 215, 262  
Shooshtari, A. .... 215  
Shornikov, S. .... 264  
Short, M. .... 21, 29, 30, 44, 62, 99, 102, 133, 137, 166, 196, 201, 227, 247, 261, 270, 272  
Shortridge, A. .... 230  
Shortt, H ..... 266  
Shoulders, T ..... 180  
Shousha, S ..... 168, 249, 275  
Shree, J. .... 279  
Shreshthpalov, M ..... 24  
Shrivastava, A ..... 190  
Shuai, S. .... 293  
Shuang, Y. .... 42  
Shuh, D ..... 211  
Shuhei, Y ..... 240  
Shui, Y ..... 161  
Shukla, A ..... 299  
Shukla, N ..... 144  
Shukla, P ..... 189  
Shukla, S. .... 37, 71, 110, 162, 253, 280  
Shultz-Johnson, L. .... 140  
Shunmugasamy, V ..... 227  
Shu, S ..... 229, 231  
Shutthanandan, V. .... 72, 275  
Shuvo, M ..... 46, 190, 266  
Shu, Y. .... 295  
Shyam, A ..... 103, 105, 110, 113, 214  
Sibali, L ..... 69  
Sibley, T ..... 196  
Siddall, J. .... 176  
Siddharth, S. .... 14  
Siegmund, T ..... 32, 260, 268  
Sieradzki, K. .... 161, 226, 246  
Sierros, K. .... 35, 68, 106, 139, 174  
Sigamani, A ..... 219  
Signor, L. .... 128  
Sikander, S. .... 219  
Sikan, F ..... 150, 222, 298  
Silaen, A. .... 74, 228  
Silberstein, M ..... 101  
Sillekens, W ..... 52, 200  
Siller, H ..... 37  
Silligman, C. .... 261, 275  
Sills, R. .... 52, 124, 266  
Silomon, J ..... 63  
Silva, B ..... 294, 295  
Silva, C ..... 50  
Silva, D. .... 82  
Silva, E ..... 295  
Silva, M ..... 295  
Silva, S ..... 295  
Silverstein, J. .... 134, 237  
Silverstein, R. .... 141  
Silvestro, L ..... 294  
Si, M ..... 201  
Simard, G. .... 123  
Simco, M ..... 234  
Sim, G. .... 34, 123, 137, 168, 219, 274, 281  
Sim, H ..... 257  
Sim, J ..... 257  
Simmonds, P. .... 53, 148  
Simmons, G. .... 15  
Simmons, J. .... 187, 218  
Simões, I ..... 294, 295  
Simonassi, N ..... 104, 276  
Simonelli, M ..... 72, 79, 244, 250, 297  
Simon II., W ..... 16  
Simonnin, P. .... 196  
Simon, P. .... 33, 97, 157, 205  
Simonsen, T. .... 106, 153  
Simpson, G ..... 107  
Simpson, W ..... 247, 272  
Simsek, E ..... 147  
Sims, H. .... 78, 215, 224  
Sims, Z. .... 10, 78, 115, 146, 289  
Simunovic, S ..... 181  
Sinclair, D ..... 147  
Singer, A. .... 20  
Singer, J ..... 35, 259, 260  
Singer, L ..... 95  
Singh, A. .... 35, 75, 79, 84, 98, 99, 148, 262, 284, 296  
Singh, C ..... 206, 290  
Singh, D. .... 73, 110, 142, 166, 207, 254  
Singh, G ..... 49  
Singh, H. .... 29, 99, 272  
Singh, I. .... 275  
Singh, J. .... 265  
Singh, M. .... 220  
Singh, P. .... 14, 18, 22, 46, 53, 68, 92, 126, 158, 176, 194, 204, 221, 226, 233, 244, 261, 296, 298  
Singh, R ..... 118, 148, 182, 190  
Singh, S ..... 138, 153, 277, 278, 286, 296, 299, 300  
Singh, V ..... 146, 147, 278, 283  
Singh, Y ..... 262  
Sinha, M. .... 169  
Sinha, S. .... 84  
Sinnott, S ..... 53  
Sions, J ..... 289  
Siregar, A ..... 219  
Siriviboon, P ..... 300  
Sirvin, Q. .... 290  
Sirvinski, C ..... 240  
Sisco, K. .... 244, 251  
Sisson, M ..... 149  
Sitko, M ..... 299  
Sivarupan, T ..... 136, 169  
Sivaswamy, G. .... 135  
Siyah, I ..... 281  
Skaf, M. .... 106  
Skailand, K. .... 281  
Sket, F. .... 181  
Skinner, T ..... 236  
Skjermo, J. .... 56  
Skobir Balantić, D. .... 283  
Skokov, K. .... 45  
Skrotzki, B. .... 85, 197, 214  
Skrotzki, W ..... 119  
Skybakmoen, E. .... 54, 93, 153, 159, 223, 242  
Slade, J ..... 245  
Slater, C ..... 22  
Sleem, K. .... 213, 285, 288  
Slezak, A ..... 29  
Slifka, A ..... 38  
Sload, E ..... 234  
Sloane, A ..... 222  
Slokker, G ..... 230  
Slone, C ..... 57  
Sloop, T ..... 280  
Smaha, R ..... 45  
Smailagic, A. .... 146, 259  
Smallwood, W. .... 207, 215  
Smid, M ..... 158  
Smidt, T ..... 192  
Smirnov, A. .... 158  
Smitch, I. .... 15  
Smith, A. .... 68, 180, 260  
Smith, C. .... 214  
Smith, D. .... 45, 183  
Smith, E ..... 167  
Smith, H. .... 41, 172, 206, 232, 250, 300  
Smith-Hanssen, N ..... 136  
Smith, J. .... 65, 132, 258  
Smith, L ..... 214  
Smith, M ..... 275  
Smith, N. .... 21, 126, 133, 141, 161, 209, 246  
Smith, R. .... 23, 160, 298

- Smith, T . . . . .11, 19, 63, 78, 154, 184,  
190, 224, 245, 253
- Smith, W . . . . .195
- Smolentsev, S. . . . .62
- Smyth, C . . . . .240
- Snead, L . . . . .65, 102, 108, 229
- Snitzer, J. . . . .10, 100, 287, 290
- Snow, B. . . . .222
- Snure, M . . . . .236
- Snyder, G . . . . .59
- Snyder, J. . . . .134
- Snyder, K . . . . .15, 289
- Soare, M. . . . .49
- Soares Barreto, E. . . . .79
- Soares De Lima, G . . . . .294
- Soares, H . . . . .276
- Soar, P . . . . .135, 229, 287
- Sobczak, N. . . . .148
- Sobhani, S . . . . .271
- Sobota, P . . . . .14, 177, 257, 279
- Sobotka, J. . . . .202
- Soboyejo, W . . . . .46
- Soderhjelm, C. . . . .253
- Soffa, W . . . . .208
- Sofie, S . . . . .43, 148
- Soghrati, S . . . . .188
- So, H. . . . .108
- Sohn, H . . . . .200
- Sohn, I . . . . .13, 43, 80, 291
- Sohn, M. . . . .290
- Sohn, S. . . . .72, 79, 100, 161, 178, 266, 273
- Sohn, Y. . . . .182, 215, 277, 282, 293
- Sokol, M. . . . .118
- Sokolov, M. . . . .230, 273
- Solanki, K . . . . .131
- Solano, J. . . . .116, 162
- Soldatov, I . . . . .150
- Solem, C. . . . .36, 106, 131
- Solheim, A. . . . .153, 242
- Solheim, I. . . . .56
- Solhtalab, A . . . . .124
- Soliman, S . . . . .290
- Solomon, A . . . . .108
- Solomon, P . . . . .8
- Solorio Diaz, G . . . . .273
- Solorio Díaz, G . . . . .273
- Solorio-Díaz, G. . . . .273
- Solovyev, M. . . . .294
- Soltanmohammadi, R . . . . .85
- Soltan Mohammadlou, B. . . . .262
- Soltero, S . . . . .105
- Somakumar, A . . . . .265
- Soman, R. . . . .20, 52, 90, 125, 156, 193,  
221, 294, 295
- Soman, S . . . . .96
- Somarouthu, V . . . . .186
- Som, D . . . . .123
- Somidin, F. . . . .127
- Sommerseth, C. . . . .106, 131, 189, 223
- Soncini, R . . . . .242
- Song, C. . . . .139
- Song, E. . . . .43
- Song, G. . . . .16, 117, 265, 266, 277, 293
- Song, H . . . . .144, 153, 285
- Song, J . . . . .25, 72, 100, 206, 247, 249,  
251, 272
- Song, K. . . . .37
- Song, L. . . . .296
- Song, R. . . . .29, 30, 43, 95, 156, 160
- Song, S. . . . .12
- Song, W . . . . .133, 166, 201, 228, 247, 273
- Song, X. . . . .22, 158
- Song, Y. . . . .12, 14, 152, 228, 250, 291
- Son, H . . . . .49, 293, 299
- Soni, V . . . . .13, 44, 46, 81, 225, 247,  
259, 282
- Son, J . . . . .86
- Son, K. . . . .114, 214, 215, 277, 293
- Sonmez, M. . . . .175
- Son, Q. . . . .62
- Son, S . . . . .267, 293
- Sonzogni, O. . . . .272
- Sooby, E . . . . .62, 156, 170, 205,  
261, 270, 273
- So, P . . . . .163
- Sopu, D . . . . .39, 73, 109, 142, 178, 211,  
237, 254, 281
- Soren, C. . . . .185
- Sorensen, C. . . . .272
- Sørhuus, A. . . . .153, 223
- Sotniczuk, A . . . . .47
- Soto, C . . . . .89
- Soto-Medina, S . . . . .181
- Soulacroix, J . . . . .249
- Soulami, A. . . . .15, 32, 37, 71, 207,  
238, 242, 245
- Souza, C. . . . .294
- Souza, D. . . . .269, 276
- Souza, I. . . . .295
- Souza, J. . . . .276
- Sowards, J . . . . .10, 78, 115, 146, 289
- Soykan, B. . . . .168
- Soylu, E . . . . .140, 176
- Spadaccini, C. . . . .250
- Spaepen, F. . . . .109
- Spangenberger, A . . . . .77
- Sparks, T . . . . .20, 46, 47, 53, 94, 124, 155,  
190, 207, 210, 217, 218, 241
- Spear, A . . . . .17, 47, 84, 98, 102, 114,  
120, 151, 187, 217, 241, 291
- Spearot, D . . . . .17, 19, 48, 50, 51, 85, 121,  
151, 156, 161, 187, 188, 203,  
218, 229, 248, 292, 296
- Specht, P . . . . .172
- Speer, J . . . . .38, 68
- Speltz, J. . . . .12, 263
- Spencer, B . . . . .194
- Spencer, M. . . . .81, 236
- Spencer, P . . . . .155
- Spencer, T . . . . .169
- Speth, M. . . . .189
- Spiecker, E. . . . .132, 173
- Spieckermann, F. . . . .73, 109, 228
- Spigarelli, S . . . . .115, 213, 288
- Spinelli, J . . . . .105, 177
- Spolenak, R . . . . .8, 100, 168, 192, 203,  
208, 231, 240, 281
- Spontak, R. . . . .112
- Sprengel, S. . . . .231
- Sprigode, T . . . . .198
- Springell, R . . . . .107, 108
- Sprouster, D. . . . .54, 65, 108, 194, 229
- Spyromilios, A. . . . .66
- Sratong-On, P. . . . .152
- Srejdak, M. . . . .56
- Sridharan, K . . . . .9, 15, 16, 29, 37, 45, 62,  
71, 78, 99, 114, 133, 166, 171,  
201, 227, 247, 249, 272, 286, 287
- Sridharan, N . . . . .100
- Sridhar, M . . . . .165
- Sridhar, N . . . . .57, 194
- Srinivasan, P . . . . .169
- Srinivasan Tirunilai, A. . . . .216
- Sriram, H. . . . .58, 96, 296
- Srivastava, A . . . . .118, 151, 153
- Srivastava, N . . . . .49, 251, 267, 288
- Srivastava, R . . . . .36, 234
- Srivastava, S. . . . .141
- Srivastava, V . . . . .126
- Srivatsan, T . . . . .15, 46, 83, 119, 150, 186,  
217, 240, 265, 266
- Srivilliputhur, S. . . . .13, 17, 60, 92, 119,  
132, 165, 200, 204, 226, 246, 298
- S, S . . . . .188
- S. Stopka, K . . . . .114
- Stacey, B. . . . .11, 291
- Stack, I . . . . .149
- Stammkötter, S . . . . .77
- Stampfl, C . . . . .98
- Stan, C . . . . .112
- Stand, L . . . . .258
- Stansby, J . . . . .156, 170, 270
- Stark, A . . . . .132, 266
- Starkey, K. . . . .89
- Staron, P. . . . .207
- Starr, D. . . . .277
- Stasik, M . . . . .52
- Stauffer, D . . . . .103, 137, 167, 168, 238, 274
- Stavitski, E. . . . .272
- Stebner, A. . . . .21, 48, 73, 82, 190, 221,  
232, 251, 284
- Steel, R . . . . .162, 245
- Stefanescu, C. . . . .35
- Stefanov, M . . . . .12
- Stegman, B. . . . .283
- Stegmann, J . . . . .147
- Stehle, Y. . . . .246, 258, 262, 263



- Steigerwald, I. . . . . 23  
Steiner, M. . . . . 54, 180, 213, 238, 247, 251  
Stein, F. . . . . 110  
Steinlechner, S. . . . . 92, 140  
Stenzel, M. . . . . 222  
Stephen, O. . . . . 91  
Stephens, C. . . . . 236  
Stevens, A. . . . . 146, 147, 191  
Stewart, B. . . . . 139  
Stewart, C. . . . . 26, 183, 203, 253  
Stewart, J. . . . . 109  
Stewart, T. . . . . 47  
Stiff-Roberts, A. . . . . 148  
Stiles, C. . . . . 17, 47, 84, 120, 151, 187,  
213, 217, 241, 291, 292  
Stinville, J. . . . . 12, 25, 38, 48, 50, 57, 71,  
96, 107, 128, 141, 161, 175, 197,  
216, 224, 225, 232, 271, 280  
StJohn, D. . . . . 110  
Stockwell, J. . . . . 202  
Stoco, C. . . . . 298  
Stožek, Z. . . . . 107  
Stoetzel, N. . . . . 225, 260  
Stofanak, R. . . . . 160  
Stokes, D. . . . . 144, 185  
Stollberg, D. . . . . 286, 288  
Stone, H. . . . . 13, 44, 52, 81, 117, 173,  
207, 237, 260, 263  
Stone, J. . . . . 156  
Stopka, K. . . . . 25, 57, 77, 96, 116, 119, 161,  
162, 166, 181, 197, 204, 224, 271  
Storck, S. . . . . 213, 217  
Storms, A. . . . . 260  
Stotzka, R. . . . . 85  
Stoudt, M. . . . . 24, 56, 95, 251, 270  
Strachan, A. . . . . 18, 50, 88, 109, 120, 123,  
154, 190, 197, 220, 291  
Strain, J. . . . . 232, 278  
Stranberg, N. . . . . 106  
Strande, M. . . . . 235  
Strange, L. . . . . 80  
Stransky, P. . . . . 223  
Straska, J. . . . . 227  
Strasky, J. . . . . 286  
Strassheim, M. . . . . 82  
Strauch, M. . . . . 148  
Strauss, A. . . . . 148, 198  
Strayer, S. . . . . 239  
Strifas, A. . . . . 130  
Strobl, M. . . . . 249  
Strodick, S. . . . . 162  
Ström, P. . . . . 178  
Strong, K. . . . . 149  
Strother, J. . . . . 217  
Stubbers, A. . . . . 149, 255  
Stubbins, J. . . . . 37, 115, 167, 287  
Stuckner, J. . . . . 188  
Stump, B. . . . . 48, 121  
Stumpf, G. . . . . 200, 298  
Stutsman, Z. . . . . 148  
Suárez, O. . . . . 258  
Suarez, S. . . . . 21  
Subbaraman, H. . . . . 75, 262  
Subbarayan, G. . . . . 23  
Subedi, K. . . . . 199  
Subhash, G. . . . . 19, 51, 248  
Subramanian, K. . . . . 150  
Sudabattula, S. . . . . 50, 219  
Sudarshan, M. . . . . 220  
Sudbrack, C. . . . . 182, 239  
Suder, W. . . . . 300  
Sudhakar, K. . . . . 220  
Suero, K. . . . . 246  
Suganuma, K. . . . . 93  
Sugar, J. . . . . 209  
Sugimoto, Y. . . . . 32  
Sugiyama, T. . . . . 32, 65, 221  
Suharmon, R. . . . . 219  
Suh, B. . . . . 99, 132, 227  
Suh, D. . . . . 38  
Suh, J. . . . . 72, 99  
Suhonen, T. . . . . 265  
Suhuddin, U. . . . . 207  
Sujith, B. . . . . 113  
Sukenaga, S. . . . . 81  
Sukhotskiy, V. . . . . 146, 208  
Sukumaran, A. . . . . 66  
Su, L. . . . . 92  
Šulák, I. . . . . 26, 286  
Suleiman, R. . . . . 162  
Sullivan, A. . . . . 200  
Sultana, N. . . . . 75  
Sultonov, O. . . . . 259  
Sun, B. . . . . 133, 166, 201, 204, 228,  
247, 273, 296  
Sun, C. . . . . 30, 39, 62, 127, 156,  
219, 283, 297  
Sun, D. . . . . 54  
Sundar, A. . . . . 153, 197  
Sundaram, H. . . . . 61  
Sundaran, S. . . . . 288  
Sundararaghavan, V. . . . . 28, 43, 71, 85,  
105, 260, 297  
Sundararaman, M. . . . . 31  
Sundburg, R. . . . . 280  
Sundermann, T. . . . . 47  
Sun, F. . . . . 16, 17, 47, 84, 120, 125, 149,  
150, 186, 216, 243, 258, 291  
Sung, C. . . . . 101  
Sung, H. . . . . 70, 79, 91, 181  
Sun, H. . . . . 90  
Sun, J. . . . . 125  
Sun, P. . . . . 113, 187  
Sun, R. . . . . 83  
Sun, S. . . . . 282  
Sun, T. . . . . 57, 69, 103, 146, 153, 158,  
193, 214, 224  
Sun, W. . . . . 17, 19, 98, 284, 293  
Sun, X. . . . . 12, 201  
Sun, Y. . . . . 14, 39, 73, 109, 121, 122, 130,  
132, 142, 178, 211, 237,  
254, 269, 281, 291  
Sun, Z. . . . . 208  
Supakul, S. . . . . 229  
Su, Q. . . . . 172  
Su, R. . . . . 103  
Surafiel, F. . . . . 162  
Sur, D. . . . . 160, 161, 209, 270, 275  
Sure, J. . . . . 29, 30  
Suresh, K. . . . . 68  
Suresh, S. . . . . 157  
Suriseti, Y. . . . . 120, 175  
Surowiec, R. . . . . 268  
Suryolaksono Pujilaksono, L. . . . . 162  
Susan, D. . . . . 167, 224, 234  
Sushko, M. . . . . 92  
Šušarič, P. . . . . 74  
Šuštar, T. . . . . 74  
Su, T. . . . . 60, 152, 228  
Suter, R. . . . . 136  
Sutou, Y. . . . . 42, 278, 292  
Sutton, B. . . . . 10, 108, 248  
Sutton, H. . . . . 101  
Suwardi, A. . . . . 188  
Suwas, S. . . . . 175  
Su, Y. . . . . 62, 107, 162, 172, 197, 207,  
249, 255, 266, 269, 272, 292  
Su, Z. . . . . 192  
Suzana, A. . . . . 51  
Suzuki, S. . . . . 237  
Suzumura, T. . . . . 274  
Svanidze, E. . . . . 36, 107  
Svård, M. . . . . 234  
Svensson, A. . . . . 159  
Swab, J. . . . . 180  
Swallow, R. . . . . 88  
Swaminathan, K. . . . . 182  
Swamy, A. . . . . 295  
Swan, J. . . . . 130  
Swarnkar, R. . . . . 198  
Sweatman, K. . . . . 34  
Sweeney, D. . . . . 63, 284  
Sweet, R. . . . . 85  
Sweidan, F. . . . . 100  
Swenson, M. . . . . 280  
Swinney, R. . . . . 225  
Swisher, M. . . . . 205  
Switz, A. . . . . 215  
Syed, M. . . . . 228  
Synnott, F. . . . . 173  
Syvertsen, M. . . . . 136, 169  
Szakacs, G. . . . . 143  
Szczech, T. . . . . 277  
Szecówka, P. . . . . 56  
Szewczyk, A. . . . . 22, 185, 282  
Szezynger, M. . . . . 22

Szlufarska, I . . . . .	134, 169, 190, 197, 236, 243	Tanato, H . . . . .	19, 268	Tebib, M . . . . .	45
Szpunar, B . . . . .	70	Tandoc, C . . . . .	244, 289	Tedjasukmana, R . . . . .	226
Szpunar, J . . . . .	70	Tang, C . . . . .	38, 126, 213, 285, 287	Teferra, K . . . . .	41, 75, 111, 144, 301
<b>T</b>		Tang, G . . . . .	13	Tegtmeier, T . . . . .	61
Ta, A . . . . .	161	Tang, H . . . . .	221, 235, 270	Tehranchi, A . . . . .	39, 91, 133
Taşan, C . . . . .	84	Tang, J . . . . .	17, 47, 216	Teka, M . . . . .	224
Taba, A . . . . .	139	Tang, K . . . . .	32, 136, 191	Tekmanli, F . . . . .	279
Tabaru, K . . . . .	178	Tang, M . . . . .	164	Telgerafchi, A . . . . .	165
Tabata, C . . . . .	237	Tang, P . . . . .	68	Tello Cabrera, E . . . . .	288
Tache, O . . . . .	249	Tang, Q . . . . .	171, 184	Tello, E . . . . .	288
Taché, O . . . . .	272	Tang, W . . . . .	10, 34, 102, 122, 149	Teng, F . . . . .	63, 66, 94, 246, 275
Taghavi, S . . . . .	242	Tang, X . . . . .	50, 168	Teng, T . . . . .	288
Taghizadeh, M . . . . .	125	Tang, Y . . . . .	25, 30, 50, 76, 81, 195, 268	Tenório, J . . . . .	28
Tahara, M . . . . .	152	Tanigawa, H . . . . .	32, 230	Teramae, T . . . . .	54
Taheri Andani, M . . . . .	297	Taniguchi, K . . . . .	129	Tercelj, M . . . . .	74
Taheri, M . . . . .	18, 38, 60, 125, 132, 141, 161, 165, 170, 183, 186, 192, 200, 209, 213, 224, 226, 232, 246, 292, 296, 298	Tan, M . . . . .	135, 158, 182	Terdik, J . . . . .	109
Taheri-Mousavi, S . . . . .	17, 38, 113, 145, 153, 166, 213, 291	Tanoto, H . . . . .	19, 268	Tereshina-Chitrova, E . . . . .	70, 107
Tahmasebi, P . . . . .	85	Tan, P . . . . .	107	Terricabras, A . . . . .	71, 103, 137
Takada, Y . . . . .	293	Tan, Q . . . . .	285	Terry, M . . . . .	114
Takagi, S . . . . .	172	Tan, S . . . . .	17, 284	Teschke, M . . . . .	77
Takahashi, J . . . . .	81	Tanusilp, S . . . . .	121	Tesfaye, F . . . . .	24, 56, 94, 128, 270
Takahashi, Y . . . . .	288	Tanvar, H . . . . .	154, 176	Testa, G . . . . .	118, 184
Takaki, T . . . . .	17, 241, 278, 288, 292, 293, 296	Tan, W . . . . .	102, 280	Tetlie, P . . . . .	176, 223
Takaloo, A . . . . .	209	Tan, X . . . . .	23, 34, 55, 57, 114, 153, 157, 158, 197, 224, 264, 287	Tewari, R . . . . .	160
Takamura, Y . . . . .	185	Tan, Y . . . . .	155	Tewksbury, G . . . . .	182
Takao, R . . . . .	97	Tan, Z . . . . .	118	Texier, D . . . . .	12, 64, 128, 290
Takeuchi, N . . . . .	278	Tao, S . . . . .	189	Tezbir, D . . . . .	182
Takeuchi, T . . . . .	18	Tarifa, A . . . . .	179	Thadhani, N . . . . .	280
Tak, T . . . . .	41, 96	Tari, V . . . . .	121	Thakur, A . . . . .	144
Takuya, N . . . . .	283	Tarman, O . . . . .	47	Thalagani, V . . . . .	87
Talapatra, A . . . . .	41, 126, 167	Tarpeh, W . . . . .	28	Thangaraj, B . . . . .	8
Talbot, A . . . . .	213	Tasaki, W . . . . .	119	Thapliyal, S . . . . .	10, 72, 107, 166
Talbot, C . . . . .	101	Tasan, C . . . . .	11, 15, 16, 23, 25, 26, 37, 38, 42, 58, 79, 95, 97, 116, 130, 147, 148, 150, 160, 164, 166, 168, 184, 216, 290, 298	Thaseen, A . . . . .	55
Taleff, E . . . . .	122, 209, 254, 289	Taskin, K . . . . .	76	Theisen, E . . . . .	14, 45, 82, 118, 149, 185, 264
Talibi, M . . . . .	247	Tasneem, M . . . . .	49	Thekkepat, K . . . . .	228
Talignani, A . . . . .	157	Tassone, C . . . . .	13, 21, 52	Theodosiou, A . . . . .	194
Taller, S . . . . .	10, 63, 100, 146, 160, 177, 178, 211, 236	Tate, S . . . . .	214	Thevamaran, R . . . . .	275
Tallman, A . . . . .	50, 111	Tatman, J . . . . .	16	Thiaudière, D . . . . .	187, 224, 238
Talukder, N . . . . .	42	Tatsumi, H . . . . .	23, 67	Thie, H . . . . .	87
Tamaoka, T . . . . .	118	Taub, A . . . . .	188, 218, 257, 284	Thier, R . . . . .	29, 272
Tamerler, C . . . . .	155, 191, 220, 243, 268	Tavakoli, R . . . . .	222	Thies, D . . . . .	278
Tamirisakandala, S . . . . .	235	Tavangarian, F . . . . .	67, 147, 183, 215, 262, 288, 299	Thiessen, A . . . . .	34, 260
Tam, J . . . . .	171	Tavares, S . . . . .	19, 83, 88	Thimont, Y . . . . .	48, 78
Tamura, A . . . . .	162	Tavener, J . . . . .	52, 63, 190	Thodla, R . . . . .	261
Tamura, N . . . . .	64, 233	Tawfik, Y . . . . .	116	Thoma, D . . . . .	24, 76, 79, 176, 184, 197, 204, 297
Tan, A . . . . .	179	Taylor, B . . . . .	243	Thomas, B . . . . .	74
Tanaka, A . . . . .	293	Taylor, C . . . . .	32, 57, 102, 135, 157, 299	Thomas, E . . . . .	44
Tanaka, F . . . . .	167	Taylor, M . . . . .	87, 212	Thomas, G . . . . .	26, 130
Tanaka, H . . . . .	208	Taylor, P . . . . .	221	Thomas, J . . . . .	141
Tanaka, M . . . . .	186	Taylor, S . . . . .	32, 44, 71, 141, 191, 196	Thomas, M . . . . .	34, 150, 231
Tanaka, R . . . . .	291	Taylor, Z . . . . .	21, 171	Thomas Murickan, R . . . . .	257
		Tchasse, P . . . . .	218	Thomas, N . . . . .	247
		Teasly, T . . . . .	10	Thomas, P . . . . .	142
		Tebbe, N . . . . .	87	Thomas, S . . . . .	21, 53, 169
				Thomas, T . . . . .	300
				Thomas, V . . . . .	147, 183, 215, 262
				Thome, P . . . . .	207, 301

- Thompson, A. . . . . 57, 78, 161, 169, 224  
 Thompson, C. . . . . 23, 202  
 Thompson, F. . . . . 254  
 Thompson, G. . . . . 11, 12, 14, 44, 50, 81,  
     98, 118, 125, 134, 149, 168,  
     208, 255, 264, 278  
 Thompson, M. . . . . 188  
 Thoopul Anantharanga, A. . . 91, 121, 220  
 Thornton, K. . . . . 17, 19, 28, 51, 59, 62, 85,  
     89, 105, 124, 156, 188, 192,  
     218, 233, 294, 296  
 Thotta Jayachandran, A. . . . . 259  
 Thurston, B. . . . . 129  
 Thurston, M. . . . . 16  
 Tiamiyu, A. . . . . 15, 45, 82, 119, 150, 244  
 Tian, C. . . . . 64, 229, 231  
 Tian, H. . . . . 117  
 Tian, W. . . . . 206  
 Tian, Y. . . . . 165  
 Tiarks, J. . . . . 30, 108, 112, 204, 252  
 Tichy, S. . . . . 258  
 Tien, J. . . . . 23  
 Tile, A. . . . . 250  
 Tile, J. . . . . 29, 129, 272  
 Tillman, M. . . . . 209  
 Timbers, J. . . . . 69  
 Tinajero Alvarez, R. . . . . 273  
 Tin, S. . . . . 115, 207, 251, 290, 301  
 Tippey, K. . . . . 239  
 Tirado, F. . . . . 115  
 Tischler, J. . . . . 116, 207, 300  
 Tisdale, H. . . . . 227, 273  
 Titus, M. . . . . 18, 31, 41, 74, 139, 161, 197,  
     209, 216, 217, 238  
 Titz, K. . . . . 117  
 Tiwari, A. . . . . 148, 185, 216, 240, 263  
 Tiwari, R. . . . . 122  
 Tiwari, S. . . . . 286  
 Tiwary, C. . . . . 161, 271  
 Tiwary, J. . . . . 283  
 To, A. . . . . 146, 183, 215, 239  
 Tobah, M. . . . . 297  
 Toda-Caraballo, I. . . . . 215  
 Todd, I. . . . . 222  
 Todorova, M. . . . . 74, 194  
 Togashi, T. . . . . 172  
 Tokita, S. . . . . 162  
 Tokunaga, N. . . . . 104  
 Tolentino, M. . . . . 266  
 Tolman, K. . . . . 227  
 Tolnai, D. . . . . 28, 61, 99, 132, 143, 165,  
     200, 227, 298  
 Toloczko, M. . . . . 57, 196, 248, 269  
 Tom, A. . . . . 230  
 Toman, J. . . . . 284  
 Tomar, V. . . . . 153, 190, 219, 220, 242, 293  
 Tome, C. . . . . 116  
 Tomida, T. . . . . 160  
 Tomita, Y. . . . . 118  
 Tomizawa, A. . . . . 138  
 Tomkins, A. . . . . 147  
 Tomkute, V. . . . . 54, 159  
 Tompson, A. . . . . 61  
 Tonani-Penha, L. . . . . 260  
 Toncich, N. . . . . 208, 281  
 Tong, A. . . . . 78, 209, 226, 238  
 Tong, W. . . . . 14  
 Tong, X. . . . . 83, 109  
 Tong, Y. . . . . 275  
 Tonini Simonassi, N. . . . . 67, 104, 276  
 Tonks, M. . . . . 33, 56, 62, 66, 89, 97, 99,  
     103, 137, 161, 170, 205, 231, 249, 270,  
     275, 280, 296  
 Tonni, F. . . . . 152  
 Tonry, C. . . . . 53, 180, 215, 287, 297  
 Topo, B. . . . . 84  
 Topolnicki, R. . . . . 177, 279  
 Topsakal, M. . . . . 108, 196, 231  
 Torbet, C. . . . . 225  
 Toriyama, M. . . . . 121  
 Torralba, J. . . . . 234  
 Torresani, E. . . . . 105, 112, 139, 174, 208,  
     234, 252, 278  
 Torres, E. . . . . 243  
 Torres, J. . . . . 250  
 Tostes Linhares Júnior, J. . . . . 269  
 Toth, K. . . . . 74  
 Totz, J. . . . . 163  
 Touraivane, S. . . . . 155  
 Turret, D. . . . . 222, 259  
 Townsend, R. . . . . 129  
 Toyama, T. . . . . 102  
 Tozman, P. . . . . 45  
 Trainor, N. . . . . 179  
 Tran, A. . . . . 17, 47, 84, 120, 151, 187,  
     217, 241, 291  
 Tranell, G. . . . . 106, 140, 176  
 Tran, M. . . . . 57, 99  
 Tran, N. . . . . 12  
 Tran, T. . . . . 206, 297  
 Trautmann, C. . . . . 108  
 Trehern, W. . . . . 153, 197, 218  
 Trelewicz, J. . . . . 21, 32, 53, 65, 102, 108,  
     115, 135, 137, 154, 169, 177, 204,  
     211, 213, 229, 230, 236, 249, 274  
 Tremblay, S. . . . . 152  
 Trembly, J. . . . . 147  
 Tremsin, A. . . . . 20  
 Treuherz, D. . . . . 51  
 Trexler, M. . . . . 75  
 Trieu, O. . . . . 65  
 Trigg, D. . . . . 213, 292  
 Trinh, H. . . . . 147  
 Trinh, L. . . . . 223  
 Trinkle, D. . . . . 40, 97, 194  
 Tripathi, A. . . . . 20, 263  
 Tripathy, B. . . . . 119  
 Tripathy, M. . . . . 16  
 Trojan, A. . . . . 277  
 Tromas, C. . . . . 209  
 Trombetta, M. . . . . 62  
 Troost, N. . . . . 129  
 Trost, C. . . . . 26, 203, 216  
 Trostorff, S. . . . . 28  
 Trouba, J. . . . . 228  
 Truby, R. . . . . 88  
 Truhart, E. . . . . 240  
 Trujillo, A. . . . . 262  
 Trzcinski, O. . . . . 269  
 Tsai, A. . . . . 241  
 Tsai, C. . . . . 104, 152, 228, 267, 278  
 Tsai, F. . . . . 275  
 Tsai, H. . . . . 160  
 Tsai, K. . . . . 138, 278  
 Tsai, M. . . . . 127, 163, 186  
 Tsai, W. . . . . 42, 98  
 Tsai, Y. . . . . 104, 122, 143, 152, 267, 277  
 Tsaknopoulos, K. . . . . 119, 208, 259,  
     260, 261  
 Tsang, D. . . . . 71  
 Tschirhart, J. . . . . 110  
 Tse, M. . . . . 68  
 Tseng, C. . . . . 152  
 Tseng, J. . . . . 266  
 Tseng, M. . . . . 130  
 Tseng, S. . . . . 86  
 Tseng, W. . . . . 159, 269  
 Tseng, Y. . . . . 152  
 Tsianikas, S. . . . . 229  
 Tsoutsouva, M. . . . . 150  
 Tso, W. . . . . 180  
 Tsuchiya, K. . . . . 39, 119  
 Tsuji, N. . . . . 120, 135, 186, 206,  
     230, 274, 290  
 Tsukamoto, K. . . . . 295  
 Tsukamoto, M. . . . . 259  
 Tsurkan, P. . . . . 50, 88, 216  
 Tsuruoka, R. . . . . 293  
 Tsuruta, H. . . . . 121, 291  
 Tsuzaki, K. . . . . 142  
 Tuchinda, N. . . . . 91  
 Tuck, C. . . . . 72, 79, 297  
 Tucker, G. . . . . 52, 229  
 Tucker, J. . . . . 10, 54, 108, 289  
 Tucker, M. . . . . 261  
 Tucker, V. . . . . 18, 31, 161, 216, 217, 238  
 Tulshibagwale, N. . . . . 284  
 Tunes, M. . . . . 204  
 Tung, S. . . . . 163  
 Tuomisto, F. . . . . 246  
 Turan, A. . . . . 24, 165  
 Turcksin, B. . . . . 239  
 Turconi, A. . . . . 106  
 Turgeon, K. . . . . 242  
 Turlo, V. . . . . 31  
 Turner, G. . . . . 248  
 Turner, J. . . . . 157, 170, 243

Turner, R	64, 65
Turpin, R	182
Tu, S	207
Tutar, O	291
Tveito, K	136
Twum Donkor, B	251
Tyagi, K	151, 176, 210, 218, 242
Tzanakis, I	49, 180, 239
Tzelepi, N	205
Tzini, M	110

## U

Uberuaga, B	27, 52, 53, 62, 95, 141, 193, 196
Ubic, R	157, 194, 221, 243
Uchiyama, T	296
Uddin, M	22
Ueda, T	138
Uedono, A	18
Ueshima, M	93
Uesugi, K	122
Ulbricht, A	214
Ulfig, R	171
Ullah, R	169
Ullakko, K	9
Ullberg, R	80, 161, 275, 280
Ulrich, A	24, 44, 103
Ulucan, T	52
Ulugun, B	183
Umeda, J	54
Umeda, Y	172
Umer, M	45
Umezawa, O	295
Umoru, L	281
Ungar, T	225
Ungár, T	123
Ung, G	210
Unocic, K	24, 56, 95, 239, 270
Unocic, R	42
Unterberg, B	157
Upadhyay, M	113, 195
Upadhyay, P	80, 110, 129, 162, 198, 225, 245, 271
Upmanyu, M	21, 299
Upreti, P	172, 177, 206
Uranga, P	26, 58, 97, 130, 164, 298
Urbano-Reyes, G	264
Urias, C	204
Ury, N	38, 70, 222
Ushioda, K	129
Utada, S	237
Utke, I	51, 297
Utsumi, R	173
Uygun, B	131
Uysalel, C	286
Uysal Komurlu, M	212
Uysal, Z	139

## V

Vadiraja, S	285
Vaerst, O	39
Vaghela, A	268
Vagliani, F	106
Vaidya, M	35
Vaidya, U	219
Vailhe, M	175, 225
Vakanski, A	30
Valdevit, L	158, 206, 244, 250, 288
Valdez, J	261
Valentine, E	146
Valentino, G	38, 71, 78, 107, 141, 176, 209, 213, 236, 239, 254, 279, 280
Valenzuela Carrillo, M	264
Valenzuela-Carrillo, M	264
Valenzuela, T	280
Valiant, P	75
Valiente Bermejo, M	182
Valilla, J	259
Vallejo, K	53, 107
Vallely, S	66
Vallet, M	195
Valle, V	84, 209
Vallot, S	12
Valurouthu, G	42
Van Bastian, L	215
Van Buuren, A	29, 61, 133, 299
Vandadi, M	46
van den Blik-Jarvis, R	32, 93
Van der Eijk, C	154, 176
Van Der Eijk, C	123, 154, 191
Van der Ven, A	19, 27, 85, 233
Van Der Ven, A	141
van de Werken, N	221
van Driel, T	21
van Duin, A	111
Vang, K	252
Van Haaren, A	153
Van Iderstine, D	68, 139, 164, 230
VanLieshout, R	176
Van Petegem, S	13, 141, 222, 232, 249
van Rooyen, I	71, 290
Van Rooyen, I	9, 78, 114, 287
Van Swygenhoven, H	158
van Veelen, A	108, 141, 237
van Wees, L	144
Varahabhatla, S	77
Varanasi, R	72, 173
Varga, R	185
Vargas Giraldo, S	151
Vargas, P	179, 294
Varga, T	275
Varghese, E	166
Varghese P J, G	88
Varley, Z	218
Varma P R, H	265
Varma, S	126, 159, 195, 222, 268

Varma, Y	149
Varnell, K	80, 272
Vasdev, A	45
Vasoya, M	180
Vasquez, M	153
Vassilev-Galindo, V	102
Vasudeva, K	270, 272
Vasudevan, V	56, 204, 225, 247, 251, 282, 289
Vaubois, T	150
Vaughan, J	86
Vázquez-Gómez, O	278
Vazquez Prudencio, A	169
Vazquez Tovar, G	19
Vecchio, K	38, 71
Vega-Montoto, L	218
Vela, B	84, 176, 213, 279, 292
Velasco, D	104, 276
Veloso, M	191
Vemparala, B	188
Venghaus, H	245
Venkatesan, P	36, 175
Venkatesh, V	41, 84, 175
Venkatraman, A	29, 61, 187
Vennat, E	155
Ventura, J	82
Verduzco Gastelum, J	120
Verduzco, J	291
Verduzco-Martínez, J	147
Vergara-Hernández, H	278
Verma, A	33, 86, 296
Vermaak, N	98
Verma, K	115, 118, 289
Verma, S	69
Vermaut, P	47, 186, 216
Vermeij, T	43, 58, 229, 230
Versteeg, G	189
Verstijnen, J	58
Vesely, J	233
Vessi, V	62
Vettergren, E	73
Veveřková, A	233
Veyssset, D	171
Viardin, A	122, 265
Victoria Hernandez, J	227
Vidrio, R	226, 275
Vieira, C	104, 269, 276, 294, 295
Vieira, R	14
Vieira Rielli, V	138
Vietz, L	11
Vigil, M	204
Vijayan, S	34, 68, 105, 129, 138, 173, 207, 232, 233, 251, 252, 277, 297, 301
Vikraman Pillai, D	283
Vilas, J	185
Villalobos, J	278
Villapun Puzas, V	155
Villechaise, P	84, 128, 178, 209, 234
Villata, E	268



- Vilupanur, R .....247  
Vimalathithan, P .....25  
Vira, D .....286  
Virgili, N .....30  
Virgillito, E .....30, 285  
Virtanen, S .....24, 117  
Visarada, T .....175  
Vishal, S .....226  
Vishina, A .....14  
Vishnu Prakash, P .....162  
Vispute, R .....148  
Vistoso, V .....233, 252  
Viswanathan, G. ....16, 35, 110, 120, 150, 175, 235, 266  
Viswanathan, V .....16  
Vivekanandan, V .....167  
Vizoso, D .....31, 91  
Vogel, H .....153  
Vogel, S .....160, 232  
Vogl, L .....60  
Vo, H .....101, 199, 211, 216  
Vohra, Y .....172  
Voisin, T .....11, 56, 150, 181, 288  
Volkova, O .....22, 193, 209, 244  
Vollan, F .....154  
Vollhuter, J .....117  
Vollhüter, J .....81, 132, 173, 207  
Vollmer, M .....257  
Volpp, J .....180  
Von Grapp, M .....50  
von Pavel, M .....162  
Von Tiedemann, S .....117  
Voorhees, P .....16, 19, 51, 89, 97, 101, 113, 124, 156, 192, 203, 294  
Vorontsov, V .....135  
Vos, M .....235  
Voyer, P .....189  
Voyles, P .....39  
Vreeling, A .....205  
Vukkum, V .....10, 72, 92, 232  
Vu, L .....190  
Vu, N .....279
- W**
- Wacker, J .....140  
Wade, K .....171, 278  
Wade-Zhu, J .....32, 157, 194, 221, 243  
Wadle, L .....223  
Wadley, H .....106, 151  
Waegaert, A .....23, 160  
Wagers, S .....134  
Waghu, R .....223  
Wagih, M .....91  
Wagle, G .....189  
Wagner, A .....141, 170, 205  
Wagner, G .....113, 152, 198, 217, 241  
Wagner, H .....198  
Wagner, M .....147  
Wagstaff, S .....8, 87, 89, 136  
Wahlmann, B .....117  
Waite, C .....152  
Walallawita, R .....218  
Walderhaug, M .....159  
Walker, C .....64, 113, 156  
Walker, M .....257  
Wallace, E .....78, 279  
Wallace, G .....261  
Wallace, R .....10  
Walla, N .....228  
Walle, S .....136  
Wallin, M .....176  
Wallis, D .....42  
Wall, M .....105, 232  
Walraven, C .....262  
Walsh, F .....21, 120, 157, 168, 186  
Walsh, J .....215  
Walter, A .....271  
Walter, O .....107  
Walters, C .....43  
Walters, J .....71  
Walther, F .....57, 77, 101, 162, 253  
Wanchoo, P .....232  
Wang, A .....16, 23  
Wang, B .....27, 83, 88, 164, 202, 248  
Wang, C .....34, 55, 67, 104, 138, 159, 202, 269, 276  
Wang, D .....39, 209, 282  
Wang, F .....11, 152, 223, 230  
Wang, G .....15, 46, 81, 83, 119, 150, 186, 217, 240, 265, 266  
Wang, H .....19, 21, 63, 100, 103, 122, 130, 137, 143, 156, 219, 249, 274, 283, 297  
Wang, J .....14, 15, 20, 30, 44, 64, 66, 79, 84, 89, 96, 100, 149, 156, 165, 167, 199, 200, 252, 262, 265  
Wang, K .....32, 194, 230, 271  
Wang, L .....40, 149, 165  
Wang, M .....21, 55, 119, 129, 157, 163, 199, 226, 246, 271  
Wang, P .....34, 37, 67, 70, 79, 104, 106, 138, 202, 269, 276, 278, 279  
Wang, Q .....264  
Wang, R .....14, 19, 42, 44, 70, 81, 94, 118, 149, 264  
Wang, S .....30, 124, 127, 134, 172, 243, 296  
Wang, T .....37, 71, 114, 115, 210, 214, 231, 245, 253, 280  
Wang, W .....15, 18, 26, 43, 53, 60, 80, 83, 109, 120, 160, 167, 202, 264, 298, 299  
Wang, X .....14, 23, 33, 38, 66, 103, 127, 131, 135, 137, 152, 157, 160, 163, 170, 171, 188, 204, 205, 207, 210, 213, 226, 231, 236, 244, 249, 250, 264, 275  
Wang, Y .....19, 26, 27, 29, 30, 34, 35, 56, 58, 59, 64, 74, 84, 86, 88, 89, 92, 94, 95, 97, 99, 102, 104, 110, 128, 130, 141, 147, 150, 153, 159, 164, 173, 174, 175, 193, 194, 197, 205, 207, 209, 223, 231, 235, 244, 245, 246, 248, 250, 253, 266, 275, 281, 296  
Wang, Z .....27, 64, 87, 106, 109, 114, 131, 153, 202, 215, 228, 257, 264, 266  
Wan, L .....88, 248  
Wanni, J .....184  
Ward, L .....127  
Ward, R .....107  
Ward, W .....37, 272  
Ward, Z .....216  
Warner, J .....251, 297  
Warren, P .....170, 205  
Warrier, S .....223  
Warski, T .....45, 265  
Wartenta, S .....198  
Warwick, M .....63, 108, 211  
Wasbø, S .....153  
Waseem, O .....69  
Was, G .....23, 95, 102, 202, 270  
Wasik, J .....103, 228  
Wassermann, N .....76  
Watanabe, C .....96, 280  
Watanabe, Y .....162, 230  
Waters, M .....141, 161, 209, 246  
Watkins, E .....192  
Watkins, J .....33, 66, 103, 137, 170, 205, 231, 249, 275  
Watkins, T .....182  
Watroba, M .....64, 183  
Watrous, M .....36, 70, 107, 140, 177, 210  
Watson, M .....209  
Watts, B .....61  
Wayne, D .....177  
Wazeer, A .....274  
Wdowik, U .....70  
Weaver, J .....268  
Weaver, M .....160, 197, 224, 270  
Webb, A .....41, 83  
Webb, M .....14  
Webb, S .....64  
Weber, G .....41, 48, 75, 111, 144, 181, 301  
Weber, J .....251  
Weber, R .....221  
Weber, W .....13  
Webler, B .....13, 26, 43, 80, 145, 254, 261, 291  
Webster, S .....195  
Weeks, J .....190  
Weeks, T .....280  
Weeks, W .....237  
Wegener, M .....206  
Wegener, T .....9  
Wegner, N .....101  
Wehrenberg, C .....112

- Wei, B. . . . . 66  
 Weibel, A. . . . . 252  
 Weible, N. . . . . 54  
 Wei, C. . . . . 121, 156  
 Wei, D. . . . . 219, 246  
 Wei, G. . . . . 132  
 Weihs, T. . . . . 105, 150, 183, 200, 213, 232  
 Wei, J. . . . . 61  
 Weimer, A. . . . . 254  
 Weinberger, C. . . . . 50, 149, 160, 168,  
 197, 224, 248, 255, 270  
 Weinmann, M. . . . . 222  
 Wei, Q. . . . . 14  
 Wei, S. . . . . 84, 134  
 Weiss, D. . . . . 105, 182, 188, 218, 219,  
 225, 234, 241, 282, 292  
 Weissitsch, L. . . . . 96  
 Wei, T. . . . . 12  
 Weitekamp, R. . . . . 37  
 Weitz, S. . . . . 63  
 Wei, Y. . . . . 26  
 Welk, B. . . . . 16, 35, 110, 120, 150, 235  
 Wellons, M. . . . . 140  
 Wells, S. . . . . 56  
 Wenbin, J. . . . . 122  
 Wendorf, J. . . . . 175  
 Wen, G. . . . . 68  
 Weng, J. . . . . 188, 267  
 Weng, Y. . . . . 199  
 Wen, H. . . . . 33, 66, 103, 137, 142, 171, 180,  
 206, 207, 213, 223, 237, 246, 282  
 Wenheng, G. . . . . 46  
 Wen, L. . . . . 296  
 Wen, Y. . . . . 57, 153, 164, 214, 224, 283  
 Wenzlick, M. . . . . 197, 218  
 Werden, J. . . . . 137  
 Werner, F. . . . . 193  
 Werner, G. . . . . 269  
 Werner, T. . . . . 197  
 Wessman, A. . . . . 115, 146  
 Wessman, S. . . . . 218  
 West, E. . . . . 160  
 West, H. . . . . 76  
 Westraadt, J. . . . . 11  
 Wewer, L. . . . . 246  
 Wharry, J. . . . . 20, 23, 33, 55, 57, 66, 94,  
 100, 108, 127, 128, 160, 177, 180,  
 196, 211, 213, 223, 236, 238, 248,  
 269, 270, 275  
 Wheaeton, B. . . . . 110  
 Wheatley, C. . . . . 65  
 Wheeler, J. . . . . 101, 171, 181  
 Wheeler, M. . . . . 103  
 Wheeler, R. . . . . 31, 64, 101, 135, 168,  
 203, 230, 274  
 Whelan, G. . . . . 76, 96  
 Whisler, J. . . . . 134  
 White, B. . . . . 61, 182, 215  
 White, D. . . . . 126, 159, 195, 222, 229  
 White, E. . . . . 24, 56, 95, 112, 178, 182,  
 214, 239, 252, 270, 290  
 White, J. . . . . 42, 54, 71, 92, 94, 103, 108,  
 137, 170, 243, 287  
 Whitenton, E. . . . . 180  
 White, R. . . . . 50, 225  
 White, S. . . . . 287, 288  
 Whitfield, T. . . . . 81  
 Whitham, G. . . . . 65  
 Whitlow, J. . . . . 186  
 Whitt, A. . . . . 78, 224, 254  
 Whittaker, M. . . . . 91, 222, 261  
 Wiacek, R. . . . . 143  
 Wickemeyer, B. . . . . 61  
 Wicker, R. . . . . 290  
 Wicks, S. . . . . 94  
 Widgeon Paisner, S. . . . . 103, 108, 141,  
 170, 237, 243  
 Widom, M. . . . . 15, 16, 50, 92, 200  
 Wiendlocha, B. . . . . 152  
 Wiese, B. . . . . 28, 143  
 Wiesner, S. . . . . 253  
 Wijesinghe, K. . . . . 287  
 Wijnen, J. . . . . 58  
 Wikström, N. . . . . 178  
 Wilczopolska, M. . . . . 248  
 Wilde, G. . . . . 39, 54, 109, 193  
 Wilding, M. . . . . 174  
 Wilfong, B. . . . . 213, 217  
 Wilhelm, T. . . . . 193  
 Wilkerson, J. . . . . 41, 44, 88, 274  
 Wilkinson, A. . . . . 11, 162, 197, 202  
 Wilkinson, H. . . . . 283  
 Wilkins, R. . . . . 89  
 Willenbrink, S. . . . . 290  
 Williams, A. . . . . 52, 142  
 Williams, B. . . . . 147  
 Williams, C. . . . . 288  
 Williams, E. . . . . 20, 87  
 Williams, G. . . . . 90  
 Williams, J. . . . . 20, 175  
 Williams, K. . . . . 16, 99, 247  
 Williamson, C. . . . . 83  
 Williamson, D. . . . . 109  
 Willing, E. . . . . 15, 16, 37, 45, 71  
 Willis, P. . . . . 20  
 Willoughby, A. . . . . 63  
 Willumeit-Römer, R. . . . . 28  
 Willwerth, J. . . . . 17, 284  
 Wilson, C. . . . . 230  
 Wilson-Heid, A. . . . . 15, 71  
 Wilson, J. . . . . 62, 273  
 Wilson, P. . . . . 213, 259  
 Wilts, B. . . . . 163  
 Wimmer, A. . . . . 24, 80, 128  
 Wimmer, E. . . . . 89  
 Windes, W. . . . . 134  
 Windfeldt, M. . . . . 56  
 Wines, D. . . . . 47  
 Winfrey, A. . . . . 236  
 Wing, B. . . . . 245  
 Winiarski, B. . . . . 80, 251  
 Winkler, C. . . . . 237  
 Winn, B. . . . . 206  
 Winter, I. . . . . 21, 22, 42, 52, 168, 222  
 Winterscheidt, E. . . . . 252, 280  
 Winther, G. . . . . 79, 80, 151, 168  
 Wipf, O. . . . . 240  
 Wirsing, C. . . . . 299  
 Wirth, B. . . . . 33, 56, 66, 102, 103,  
 169, 178, 230  
 Wirth, L. . . . . 97  
 Wischhusen, M. . . . . 46  
 Wisdom, C. . . . . 9  
 Wise, G. . . . . 173, 207, 237  
 Wise, I. . . . . 18  
 Wishart, J. . . . . 133, 227, 272  
 Wisner, B. . . . . 21, 25, 53, 57, 91, 96, 126,  
 161, 197, 224, 268, 271  
 Wiss, T. . . . . 94  
 Wissuchek, F. . . . . 31  
 Wittgens, B. . . . . 270  
 Witt, K. . . . . 92, 140  
 Witzen, W. . . . . 11, 184  
 Wojcicka, A. . . . . 85  
 Wojcieszynski, A. . . . . 57  
 Wojcik, A. . . . . 45, 185, 265, 282  
 Wójcik, A. . . . . 22  
 Wojcik, M. . . . . 207  
 Wojewoda-Budka, J. . . . . 148  
 Wolfram, B. . . . . 200  
 Woller, K. . . . . 30, 44, 166, 196,  
 230, 270, 272  
 Wollmershauser, J. . . . . 258  
 Wolverton, C. . . . . 59, 141, 161, 209, 246  
 Womack, D. . . . . 258  
 Wong, C. . . . . 64  
 Wong, G. . . . . 213  
 Wong, Y. . . . . 93, 206  
 Wonhui, J. . . . . 286  
 Won Hui, J. . . . . 138  
 Won-Kyeong, K. . . . . 86  
 Wood, B. . . . . 56, 88, 228, 248  
 Wood, L. . . . . 176  
 Wood, M. . . . . 109, 169  
 Woods, M. . . . . 247  
 Woolrich, J. . . . . 212  
 Worku, M. . . . . 197  
 Worsley, M. . . . . 117  
 Woryk, L. . . . . 70  
 Wosnitza, J. . . . . 82  
 Wright, A. . . . . 71, 129, 225  
 Wright, J. . . . . 14, 168  
 Wright, S. . . . . 43, 170  
 Wróbel, J. . . . . 296  
 Wroblewski, R. . . . . 282  
 Wrona, A. . . . . 115, 120, 286  
 Wu, A. . . . . 25, 55, 121, 122, 159, 267, 269

- Wu, C . . . . 16, 68, 152, 161, 219, 233, 296  
Wudy, K . . . . . 283  
Wu, H . . . . . 18, 48, 85, 86, 121, 152, 188, 194, 203, 267  
Wu, J . . . . . 127  
Wu, L . . . . . 51  
Wu, P . . . . . 23, 55, 206  
Wu, R . . . . . 34  
Wurster, S . . . . . 236  
Wu, S . . . . . 257  
Wu, W . . . . . 64, 96, 129, 163, 188, 199, 226, 231, 246, 252, 267, 271  
Wu, X . . . . . 26, 58, 96, 104, 129, 163, 199, 298  
Wu, Y . . . . . 34, 67, 108, 125, 157, 248, 258  
Wu, Z . . . . . 13, 84, 89, 126, 149, 152, 190  
Wyatt, B . . . . . 44, 144  
Wyatt, N . . . . . 133  
Wylie, A . . . . . 44  
Wyrobek, D . . . . . 277, 278
- ## X
- Xavier, G . . . . . 295  
Xavier, L . . . . . 294  
Xiang, B . . . . . 184  
Xiang, C . . . . . 221  
Xiang, K . . . . . 13  
Xiang, T . . . . . 39  
Xian, H . . . . . 83  
Xiao, E . . . . . 70, 137  
Xiao, X . . . . . 20, 51, 90, 108, 218, 272, 283  
Xia, Y . . . . . 138  
Xie, B . . . . . 171, 209, 262  
Xie, D . . . . . 16, 135  
Xie, K . . . . . 20, 34, 52, 61, 90, 125, 132, 156, 193, 216, 221, 248, 250, 281, 294, 295  
Xie, L . . . . . 23  
Xie, S . . . . . 51, 260  
Xie, W . . . . . 300  
Xie, X . . . . . 15, 46, 83, 119, 150, 186, 217, 240, 265, 266  
Xie, Y . . . . . 9, 33, 66, 78, 103, 114, 137, 141, 170, 205, 231, 237, 249, 275, 287  
Xi, J . . . . . 62, 206  
Xing, B . . . . . 226  
Xiong, C . . . . . 66, 211  
Xiong, D . . . . . 117, 252  
Xiong, H . . . . . 33, 221  
Xiong, L . . . . . 26, 95, 203  
Xiong, W . . . . . 27, 59, 74, 97, 130, 131, 164, 182, 260  
Xi, Z . . . . . 194  
Xu . . . . . 164  
Xu, A . . . . . 83  
Xu, B . . . . . 89, 165  
Xu, C . . . . . 65, 151, 264, 266, 300  
Xu, D . . . . . 114, 215  
Xue, B . . . . . 90  
Xue, D . . . . . 50  
Xue, F . . . . . 49, 164  
Xue, L . . . . . 19  
Xue, M . . . . . 242  
Xue, W . . . . . 164  
Xue, X . . . . . 117  
Xu, F . . . . . 30, 137, 275  
Xu, H . . . . . 16, 46, 93, 124, 265  
Xu, J . . . . . 298  
Xu, K . . . . . 19, 107, 274  
Xu, M . . . . . 16  
Xu, P . . . . . 157, 194, 221, 243  
Xu, S . . . . . 85, 101, 134, 158, 191, 200, 204, 217, 229, 288, 297  
Xu, W . . . . . 34, 105, 126, 139, 153, 174, 190, 208, 219, 234, 238, 242, 252, 265, 278, 293  
Xu, X . . . . . 127, 207  
Xu, Y . . . . . 120, 225  
Xu, Z . . . . . 53, 61, 65, 91, 125, 190, 193, 300
- ## Y
- Yabansu, Y . . . . . 47  
Yabashi, M . . . . . 172  
Yabuuchi, T . . . . . 172  
Yacout, A . . . . . 229, 247  
Yadav, D . . . . . 34, 248, 281  
Yadav, N . . . . . 297  
Yadav, S . . . . . 281  
Yadav, V . . . . . 89  
Yadon, S . . . . . 225  
Yaghmazadeh, M . . . . . 55  
Yaghoobi, M . . . . . 85, 114  
Yagmurlu, B . . . . . 36, 175, 191, 279  
Yagnik, S . . . . . 187  
Yahata, B . . . . . 45  
Yakovenko, A . . . . . 108  
Yalisove, S . . . . . 35, 68  
Yamada, R . . . . . 178  
Yamada, S . . . . . 162  
Yamagishi, D . . . . . 129  
Yamaguchi, S . . . . . 206  
Yamaji, F . . . . . 191  
Yamamoto, K . . . . . 162  
Yamamoto, T . . . . . 248  
Yamamoto, Y . . . . . 10, 72, 115, 164, 166, 230  
Yamamura, A . . . . . 17, 241, 292, 293  
Yamanaka, N . . . . . 296  
Yamashita, T . . . . . 198  
Yamashita, Y . . . . . 46  
Yana, D . . . . . 293  
Yanagimoto, J . . . . . 138  
Yanamandra, K . . . . . 220  
Yan, D . . . . . 93, 139  
Yan, F . . . . . 41, 146, 148, 254, 261  
Yang, B . . . . . 18, 31, 161, 165, 209, 216  
Yang, D . . . . . 51  
Yang, F . . . . . 150, 199, 278  
Yang, G . . . . . 243  
Yang, H . . . . . 34, 90, 159, 182, 216, 269, 293  
Yang, J . . . . . 24, 29, 74, 100, 132, 147, 180, 194, 246, 262, 285, 286, 287, 290, 297  
Yang, K . . . . . 34, 186  
Yang, L . . . . . 89, 233  
Yang, M . . . . . 64, 278, 293  
Yang, P . . . . . 55  
Yang, Q . . . . . 29, 37, 120, 170, 227, 247  
Yang, S . . . . . 114, 138, 148, 159, 199, 206, 214, 215, 293  
Yang, T . . . . . 138  
Yang, W . . . . . 159, 172, 250, 285  
Yang, X . . . . . 100, 137  
Yang, Y . . . . . 29, 30, 31, 60, 64, 99, 100, 102, 105, 108, 110, 121, 132, 157, 165, 179, 188, 200, 217, 226, 242, 244, 246, 269, 298  
Yang, Z . . . . . 67, 106, 151, 239, 270, 292  
Yan, H . . . . . 58  
Yan, J . . . . . 145  
Yan, K . . . . . 32, 103, 167, 272, 292  
Yanmaz, L . . . . . 131  
Yano, H . . . . . 293  
Yano, K . . . . . 30, 38, 63, 99, 100, 134, 141, 157, 167, 196, 202, 229, 248, 249, 273  
Yan, Y . . . . . 33, 63, 83  
Yao, J . . . . . 270  
Yao, K . . . . . 226  
Yao, T . . . . . 137, 142, 170, 211, 223, 231, 246, 249, 275  
Yao, X . . . . . 170  
Yao, Y . . . . . 92, 156, 278  
Yao, Z . . . . . 275  
Yapo, J . . . . . 258  
Yaqoob, K . . . . . 233, 252  
Yarasi, S . . . . . 145  
Yasinskiy, A . . . . . 189  
Yasuda, H . . . . . 17, 241  
Yasuda, K . . . . . 23, 249  
Yasuhara, A . . . . . 258  
Yavas, B . . . . . 84, 105  
Yaw, N . . . . . 262  
Yazawa, K . . . . . 131, 152  
Yazdani, M . . . . . 50, 154  
Yeager, J . . . . . 72, 192  
Ye, B . . . . . 231  
Ye, D . . . . . 36  
Yee, J . . . . . 299  
Yee, N . . . . . 145  
Yeh, A . . . . . 92, 119, 286  
Yehorov, A . . . . . 22  
Ye, J . . . . . 157  
Yen, H . . . . . 233  
Yen, J . . . . . 277

- Yenusah, C. . . . . 205  
 Yen, W . . . . . 188, 267  
 Yen, Y . . . . . 34, 40, 67, 74, 104, 105,  
 138, 258, 276  
 Yeo, J. . . . . 206  
 Yeo, L . . . . . 244  
 Yeom, H. . . . . 10, 15, 16, 37, 45, 249,  
 273, 286, 287  
 Yeom, J. . . . . 154  
 Yeon, K. . . . . 123  
 Yeon, S . . . . . 285  
 Yeo, S . . . . . 281  
 Yeratapally, S . . . . . 41, 75, 111, 144,  
 181, 301  
 Yetter, K . . . . . 114  
 Ye, X . . . . . 23, 55  
 Ye, Y . . . . . 34  
 Ye, Z . . . . . 161, 167, 216  
 Yibole, H . . . . . 82  
 Yi, C . . . . . 205  
 Yi, H . . . . . 82  
 Yi, L . . . . . 83, 295  
 Yildirim, E. . . . . 230  
 Yildiz, B . . . . . 38  
 Yildiz, S . . . . . 84  
 Yin, D. . . . . 213, 217, 280  
 Yin, G. . . . . 86, 152  
 Yingling, J . . . . . 227  
 Yin, J. . . . . 264  
 Yin, K . . . . . 150  
 Yin, Z . . . . . 246, 278  
 Yi Pei, T . . . . . 127  
 Yip, P . . . . . 39  
 Yi, Y . . . . . 9, 115  
 Yıldırım, C. . . . . 80  
 Yıldız, B . . . . . 56  
 Yoder, J. . . . . 15  
 Yoder, T . . . . . 157  
 Yokokawa, T . . . . . 237  
 Yokomizo, T . . . . . 291  
 Yoo, B . . . . . 72  
 Yoo, G. . . . . 73, 226, 274  
 Yoo, H. . . . . 293, 299  
 Yoo, J . . . . . 77, 281  
 Yoon, H . . . . . 60  
 Yoon, J . . . . . 298  
 Yoon, K . . . . . 33, 43, 102, 150, 248, 274, 277  
 Yoon, M . . . . . 228  
 Yoon, T. . . . . 191  
 Yoon, Y. . . . . 228, 293  
 Yoo, S . . . . . 22, 34, 67, 104, 138, 276  
 Yoo, T . . . . . 227, 272  
 Yoo, Y . . . . . 230  
 York, W . . . . . 29  
 Yoshida, S. . . . . 186, 274, 290  
 Yoshikawa, T. . . . . 178  
 You, D. . . . . 119, 154  
 You, I . . . . . 259  
 You, J . . . . . 120, 254, 294  
 Younes Araghi, M. . . . . 158, 164, 288, 297  
 Young, B. . . . . 153  
 Youngblood, J . . . . . 139, 209  
 Youngblood, S. . . . . 52, 208, 234  
 Young, J . . . . . 8, 42, 75, 111, 144, 179, 262  
 Young, M . . . . . 10, 174, 225  
 Young, N . . . . . 215  
 Youn, S. . . . . 24  
 Yousefian, C. . . . . 44  
 Yousefpour, A . . . . . 144  
 Youssef, G . . . . . 67, 104, 275  
 Yuan, B. . . . . 42, 144, 231, 250  
 Yuan, H . . . . . 202  
 Yuan, L. . . . . 41, 146, 183, 215, 283, 297  
 Yuan, R. . . . . 268  
 Yuan, S. . . . . 73, 88, 248, 293  
 Yuan, X. . . . . 73  
 Yuan, Z. . . . . 153  
 Yu, B. . . . . 171  
 Yubuta, K. . . . . 258  
 Yu, C. . . . . 138  
 Yücedağ, E. . . . . 56  
 Yuce, E. . . . . 73  
 Yucel, O . . . . . 24, 28, 56, 94, 128,  
 131, 165, 270  
 Yücel, O . . . . . 56, 131  
 Yu, D. . . . . 46, 83, 186, 239, 269, 286  
 Yuda, H . . . . . 247  
 Yue, C. . . . . 50, 268  
 Yue, S . . . . . 84  
 Yu, H. . . . . 37, 48, 71, 115, 129, 130, 158,  
 173, 183, 195, 196, 222, 244, 280, 297  
 Yu, J . . . . . 79, 297  
 Yu, K. . . . . 99  
 Yu, L . . . . . 33, 94  
 Yu, M . . . . . 269  
 Yumnam, G. . . . . 172, 206  
 Yun, M . . . . . 110, 148, 298  
 Yunqing, T. . . . . 295  
 Yu, Q. . . . . 57, 217  
 Yu, R. . . . . 165  
 Yurtışık, K . . . . . 297  
 Yürük, A. . . . . 31  
 Yu, S . . . . . 132, 227  
 YuShu, D . . . . . 288  
 Yusuf, M. . . . . 180  
 Yu, T. . . . . 58, 93  
 Yu, W . . . . . 122  
 Yu, X. . . . . 52, 110, 160, 197, 204, 224, 270  
 Yu, Y . . . . . 56, 246  
 Yu, Z. . . . . 231  
 Yvinec, T . . . . . 84  
**Z**  
 Zacharie-Aubrun, I . . . . . 250  
 Zackiewicz, P . . . . . 77, 185, 265  
 Zafra, A . . . . . 166  
 Zago, M . . . . . 174  
 Zagraran, A . . . . . 238  
 Zagyva, T. . . . . 158  
 Zahedian, M . . . . . 226, 275  
 Zahiri, A . . . . . 120, 190, 216, 233  
 Zahler, P. . . . . 105  
 Zak, A. . . . . 201  
 Zakia, T . . . . . 69  
 Zak, S . . . . . 31, 63, 100, 134, 168, 203,  
 229, 248, 274  
 Žák, S . . . . . 26  
 Zaldivar, R. . . . . 290  
 Zamani Khalajabadi, S. . . . . 139  
 Zaman, L . . . . . 154  
 Zaman, W . . . . . 252  
 Zambolin, M. . . . . 80, 166  
 Zamperini, S . . . . . 65  
 Zamudio-García, I . . . . . 264  
 Zanelato, E. . . . . 264, 294  
 Zang, A . . . . . 152  
 Zangari, G . . . . . 144  
 Zang, C. . . . . 227  
 Zanjani Foumani, S . . . . . 144  
 Zanjani Foumani, Z . . . . . 158, 288  
 Zarandi, F . . . . . 10, 78, 115, 146, 289  
 Zare, S . . . . . 261  
 Zargarán, A . . . . . 265, 266  
 Zarkadoula, E . . . . . 126, 159, 195, 222  
 Zarzycki, P. . . . . 91, 222  
 Zaugg, J . . . . . 121, 150  
 Zavanelli, D . . . . . 134  
 Zavarin, M. . . . . 36, 70, 107, 140, 177, 210  
 Zavari, S. . . . . 245  
 Zavdoveev, A. . . . . 282  
 Zawodzki, M. . . . . 96  
 Zaza, M . . . . . 254  
 Zebarjadi, M . . . . . 152  
 Zecevic, M. . . . . 39, 73, 101, 102, 116,  
 151, 199, 205  
 Zee, B . . . . . 289  
 Zelenika, A . . . . . 80  
 Zelickman, Y. . . . . 238  
 Zeller-Plumhoff, B . . . . . 28, 99, 147  
 Zeng, G . . . . . 293  
 Zeng, J . . . . . 202  
 Zeng, Q . . . . . 73, 240  
 Zeng, X. . . . . 49, 208  
 Zeng, Z. . . . . 30  
 Zenk, C . . . . . 13, 24, 44, 81, 117, 173, 263  
 Zentz, L . . . . . 198  
 Zerouali, M . . . . . 264, 292  
 Zevalkink, A . . . . . 85  
 Zhai, Z . . . . . 63, 80, 196  
 Zhang, A . . . . . 69  
 Zhang, B. . . . . 83, 109, 162, 280, 283  
 Zhang, C . . . . . 16, 27, 40, 46, 50, 59, 73, 88,  
 97, 110, 130, 142, 148, 164  
 Zhang, D . . . . . 13, 24, 38, 56, 71, 83, 94,  
 128, 157, 191, 203, 249, 270



- Zhang, F. . . . .40, 50, 73, 79, 173, 207,  
232, 250, 251, 283, 301
- Zhang, G. . . . .145
- Zhang, H. . .32, 87, 90, 202, 228, 275, 295
- Zhang, J. . . . .29, 40, 62, 65, 74, 99, 133,  
145, 156, 166, 181, 200, 201, 213,  
219, 227, 239, 247, 272, 287
- Zhang, K. . . . .49, 97, 139, 180, 215,  
239, 297
- Zhang, L. . . . .24, 34, 56, 67, 94, 104,  
128, 138, 167, 269, 270, 276
- Zhang, M. . . .20, 43, 52, 83, 90, 120, 125,  
156, 186, 190, 193, 216, 221,  
270, 285, 293, 294, 295
- Zhang, N. . .19, 50, 88, 124, 145, 155, 192,  
265, 268
- Zhang, P. . . . .188
- zhang, Q. . . . .87
- Zhang, Q. . . . .38, 41, 74, 153, 189, 190,  
219, 242, 293
- Zhang, R. . . . .251
- Zhang, S. . . . .12, 20, 50, 84, 213, 265
- Zhang, T. . . . .21, 199, 221, 297
- Zhang, W. . . . .172, 176, 205, 289
- Zhang, X. . . .9, 19, 29, 30, 37, 63, 70, 103,  
107, 114, 116, 125, 127, 129, 130, 137,  
149, 151, 156, 162, 171, 195, 210, 221,  
226, 230, 247, 270, 274, 279, 283, 292
- Zhang, Y. . . . .13, 19, 33, 34, 37, 56, 66,  
90, 93, 94, 101, 103, 113, 137, 153, 174,  
179, 194, 199, 201, 202, 214, 224, 226,  
231, 243, 249, 250, 263, 270, 274, 275,  
282, 283, 288, 293, 295
- Zhang, Z. . . . .13, 30, 41, 43, 80, 96, 102,  
109, 119, 126, 141, 151, 156, 179,  
254, 264, 270, 283, 291, 297
- Zhan, H. . . . .90, 200
- Zhao, A. . . . .61, 293
- Zhao, B. . . . .54, 79
- Zhao, D. . . . .12, 32, 56, 103, 149, 243,  
272, 292
- Zhao, H. . . . .83, 161
- Zhao, J. . . . .40, 56, 73, 74, 84, 110, 117,  
130, 143, 156, 215, 263
- Zhao, K. . . . .88
- Zhao, L. . . . .64, 176
- Zhao, M. . . . .42, 111, 144
- Zhao, N. . . . .198
- Zhao, Q. . . . .124
- Zhao, S. . . . .156, 230
- Zhao, T. . . . .69
- Zhao, Y. . . . .35, 63, 72, 79, 83, 102, 109,  
116, 131, 217, 249, 264, 265
- Zhao, Z. . . . .34, 87, 189, 282
- Zha, R. . . . .71
- Zheludkevich, M. . . . .122
- Zheng, B. . . . .213, 244
- Zheng, C. . . . .69, 93
- Zheng, D. . . . .264
- Zheng, G. . . . .166, 272
- Zheng, J. . . . .287
- Zheng, K. . . . .227, 272
- Zheng, L. . . . .171
- Zheng, R. . . . .88, 289
- Zheng, T. . . . .283
- Zheng, W. . . . .52
- Zheng, Y. . . . .16, 47, 175, 209, 216, 235,  
246, 253, 254, 258, 259, 261, 283
- Zheng, Z. . . . .225
- Zhong, J. . . . .298
- Zhong, M. . . . .27
- Zhong, Q. . . . .221
- Zhong, W. . . . .32, 65, 72, 102, 135, 160,  
166, 169, 204, 230, 249, 274
- Zhong, Y. . . .43, 129, 148, 163, 171, 199,  
226, 246, 271
- Zhong, Z. . . . .206
- Zhou, B. . . . .60, 194, 200
- Zhou, C. . . . .74, 96, 228, 229
- Zhou, D. . . . .269
- Zhou, F. . . . .153, 193
- Zhou, J. . . . .83
- Zhou, K. . . . .242
- Zhou, L. . . .34, 54, 68, 105, 117, 138, 173,  
182, 202, 207, 233, 251, 277, 293, 299
- Zhou, N. . . . .115
- Zhou, R. . . . .298
- Zhou, S. . . .70, 87, 107, 137, 177, 211, 296
- Zhou, T. . . . .20, 90
- Zhou, W. . . . .21, 29, 30, 62, 99, 133, 166,  
196, 201, 227, 247, 270, 272, 282
- Zhou, X. . . . .38, 52, 102, 192
- Zhou, Y. . . . .19, 50, 88, 93, 124, 155,  
192, 268, 298
- Zhou, Z. . . . .90, 151, 282
- Zhuang, Q. . . . .93
- Zhuang, S. . . . .164
- Zhu, C. . . . .49, 239, 242
- Zhu, G. . . . .250
- Zhu, H. . . . .193
- Zhu, J. . . . .40
- Zhu, L. . . . .74
- Zhu, M. . . . .151, 270, 292
- Zhu, N. . . . .16, 46, 83, 232, 267
- Zhu, P. . . . .63
- Zhu, Q. . . . .67, 76, 121
- Zhu, R. . . . .90, 125
- Zhuravleva, M. . . . .258
- Zhu, S. . . . .293
- Zhu, T. . . . .58, 64, 128, 165
- Zhu, X. . . . .163
- Zhu, Y. . . . .26, 58, 96, 129, 142, 158, 163,  
164, 172, 195, 199, 206, 222,  
244, 297, 298
- Zhu, Z. . . . .219
- Ziabari, A. . . . .114, 145
- Zibrov, M. . . . .223
- Ziebarth, R. . . . .16
- Ziehmer, M. . . . .97
- Zikry, M. . . . .85, 135
- Zilberberg, R. . . . .46
- Zilifian, D. . . . .292
- Zillhardt, T. . . . .108
- Zimina, M. . . . .62, 142
- Ziminsky, K. . . . .156
- Zimmerman, B. . . . .64, 181, 205, 239
- Zimmerman, J. . . . .102, 136, 154, 170,  
204, 205, 299, 300
- Zimmermann, E. . . . .32, 64, 101
- Zinkle, S. . . .29, 35, 63, 83, 102, 122, 127,  
158, 160, 178, 236, 247, 272
- Zipitis, G. . . . .300
- Zirps, M. . . . .165
- Zisis, L. . . . .25, 80, 111, 166
- Zizong, Z. . . . .122
- Zlotnikov, I. . . . .155, 163
- Zok, F. . . . .280
- Zorn, J. . . . .59
- Zou, C. . . . .213, 265
- Zou, M. . . . .149
- Zou, N. . . . .153
- Zou, Q. . . . .246
- Zou, W. . . . .157
- Zou, Y. . . .11, 15, 45, 79, 82, 84, 115, 119,  
123, 171, 180, 181, 195, 205, 206,  
213, 222, 231, 232, 250, 265, 289, 300
- Zrodowski, L. . . . .180, 187, 282
- Zuanetti, B. . . . .73
- Zuback, J. . . . .57, 195, 251
- Zughbi, M. . . . .258
- Zukas, B. . . . .122, 189, 242
- Zummo, W. . . . .88, 120
- Zuo, J. . . . .150, 226
- Zuo, S. . . . .221
- Zuo, Y. . . . .12
- zur Loye, H. . . . .227, 262, 273
- Zur Loye, H. . . . .36, 140
- Žužek, B. . . . .283
- Zwacknagl, G. . . . .36