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# TMS 2024

153<sup>rd</sup> Annual Meeting & Exhibition

MARCH 3–7, 2024

HYATT REGENCY ORLANDO | ORLANDO, FLORIDA, USA

#TMSAnnualMeeting | [www.tms.org/TMS2024](http://www.tms.org/TMS2024)



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## FINAL TECHNICAL PROGRAM

THE CONTENT IN THIS FINAL TECHNICAL PROGRAM WAS GENERATED ON FEBRUARY 19, 2024.

Please refer to the online session sheets for the most up-to-date information. All times listed in this final technical program are in Eastern Standard Time (EST-5:00).



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**THURSDAY AM**

**THURSDAY PM**

**POSTERS**

The Poster Sessions will be located in Regency R.  
Please refer to the conference guide for information about the venues.

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Additive Manufacturing of Refractory Metallic Materials	Rainbow Spring II	•			•	•		•	•		
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Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies	Regency O	•	•		•		•				
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Symposium Name	ROOM	MON AM	MON PM	POSTER	TUE AM	TUE PM	POSTER	WED AM	WED PM	THU AM	THU PM
		Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion	Bayhill 30					•		•	•
Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion	Windermere X-2		•								
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2D Materials – Preparation, Properties, Modeling & Applications	Orlando N		•								
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		Advances in Surface Engineering VI	Celebration 9			•				•	•
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Measurement and Control of High-temperature Processes	Celebration 5					•		•	•		
Phase Transformations and Microstructural Evolution	Celebration 7	•	•	•	•	•		•	•	•	•
Powder Materials Processing and Fundamental Understanding	Celebration 9	•	•	•	•	•		•			
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Solidification in External Fields	Celebration 6	•	•								
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Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling	Plaza Int'l E								•		
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Materials Informatics to Accelerate Nuclear Materials Investigation	Silver Spring I-II							•	•	•	
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Frontiers of Materials Award Symposium: Physics-Informed Machine Learning for Modeling and Design of Materials and Manufacturing Processes	Plaza Int'l E		•								
Nix Award and Lecture Symposium V	Regency O							•			
The Future of Work in Materials Science	Bayhill 24							•			

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## LIGHT METALS

### 2024 Light Metals Keynote Session — Decarbonization of Alumina and Primary Aluminum Production to be the Metal of Choice

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

**Program Organizer:** Stephan Broek, Kensington Technology Inc

**Monday AM | March 4, 2024**

Plaza Int'l IJK | Hyatt

**Session Chair:** Stephan Broek, Kensington Technology Inc

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**8:30 AM** Introductory Comments

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

**8:45 AM** Keynote

**Decarbonization of Alumina Production:** *Alessio Scarsella*<sup>1</sup>; <sup>1</sup>Almatis GmbH

**9:10 AM** Keynote

**Discussion of Low Carbon Reduction Technology within Conventional Operation:** *Abdalla Alzarooni*<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

**9:35 AM** Keynote

**Aluminium Smelters as Catalysts for the Energy Transition: Empowering Renewable Energy Transport and Advancing Grid Decarbonization:** *Martin Iffert*<sup>1</sup>; <sup>1</sup>Martin Iffert Consulting GmbH

**10:00 AM** Break

**10:15 AM** Keynote

**The Impact of Inert Anode Technology in Primary Aluminum Smelting:** *Donald Sadoway*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**10:40 AM** Keynote

**Reducing the Environmental Impact of Apple Aluminum: Our Journey:** *James Yurko*<sup>1</sup>; <sup>1</sup>Apple

**11:05 AM** Keynote

**Low-carbon Aluminum Pricing:** *Yasemin Esmen*<sup>1</sup>; <sup>1</sup>Fastmarkets

**11:30 AM** Panel Discussion

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## MECHANICS OF MATERIALS

### Accelerated Discovery and Insertion of Next Generation Structural Materials — Accelerated Insertion of Materials - Session I

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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

**Monday AM | March 4, 2024**

**8:30 AM**

**Accelerated Computational Insertion of Structural Materials:** Anupam Neogi<sup>1</sup>; Deepankar Pal<sup>1</sup>; Jimmy He<sup>1</sup>; Ali Najafi<sup>1</sup>; Grama Bhashyam<sup>1</sup>; <sup>1</sup>Ansys

**8:50 AM**

**Design of Alloys Resistant to Molten Salt Corrosion via Machine Learning and Optimization Algorithms:** *Rafael Herschberg*<sup>1</sup>; Franck Tancret<sup>1</sup>; <sup>1</sup>Institut des Matériaux de Nantes Jean Rouxel (IMN)

**9:10 AM**

**Interoperable Batch Bayesian Optimization Techniques for Efficient Property Discovery of Metals:** *Trevor Hastings*<sup>1</sup>; James Paramore<sup>1</sup>; Brady Butler<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Danial Khatamsaz<sup>1</sup>; Douglas Allaire<sup>1</sup>; <sup>1</sup>TAMU

**9:30 AM**

**Novel High-temperature Zirconium Alloys for Fusion Applications:** *Bradley Young*<sup>1</sup>; Junliang Liu<sup>1</sup>; Guanze He<sup>1</sup>; Thomas Kwok<sup>2</sup>; Samuel Rogers<sup>2</sup>; Yuanbo Tang<sup>1</sup>; Wenyu Zhang<sup>1</sup>; Megan Carter<sup>1</sup>; Zilin Gao<sup>1</sup>; David Dye<sup>2</sup>; David Armstrong<sup>1</sup>; Chris Grovenor<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>Imperial College London

**9:50 AM**

**Prevention of Strain Age Cracking in Additively Manufactured, High-temperature Superalloys:** *Krista Biggs*<sup>1</sup>; Florian Hengsbach<sup>2</sup>; Gregory Olson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Paderborn

**10:10 AM Break**

**10:25 AM**

**Navigating the BCC-B2 Refractory Alloy Space: Stability and Thermal Processing with Ru-B2 Precipitates:** *Sebastian Kube*<sup>1</sup>; Carolina Frey<sup>2</sup>; Chiyo McMullin<sup>2</sup>; Ben Neuman<sup>2</sup>; Kaitlyn Mullin<sup>2</sup>; Tresa Pollock<sup>2</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>University of Wisconsin - Madison; <sup>2</sup>University of California Santa Barbara

**10:45 AM**

**Physics-informed Creep Rupture Life Modeling of High Temperature Alloys for Energy Applications:** *Madison Wenzlick*<sup>1</sup>; William Trehern<sup>1</sup>; Anderson Soares Chinen<sup>1</sup>; Anjana Talapatra<sup>2</sup>; Michael Gao<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Los Alamos National Laboratory

**11:05 AM**

**Energy Absorption Properties of Filled and Unfiled Lattice Materials under Impact Loading:** *Sina Askarinejad*<sup>1</sup>; Faezeh Shalchy<sup>2</sup>; <sup>1</sup>University of Dundee; <sup>2</sup>Heriot-Watt University

**11:25 AM**

**Laser-scanning of Arc-melted Al Alloys: Are They Representative of Additively Manufactured Ones:** *Zhaoxuan Ge*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**11:45 AM**

**High-throughput Exploration of Nanotwin Synthesis Domains:** *Adie Alwen*<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California



# Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Advanced Materials and Manufacturing Technologies

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Monday AM | March 4, 2024**  
**Regency Q | Hyatt**

**Session Chairs:** Anne Campbell, Oak Ridge National Laboratory; Mark Messner, Argonne National Laboratory

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**8:30 AM Invited**

**Integrated Experimental and Computational Qualification of Nuclear Structural Materials:** *Meimei Li*<sup>1</sup>; David Andersson<sup>2</sup>; Ryan Dehoff<sup>3</sup>; Andrea Jokisaari<sup>4</sup>; Isabella Van Rooyen<sup>5</sup>; <sup>1</sup>ANL; <sup>2</sup>LANL; <sup>3</sup>ORNL; <sup>4</sup>INL; <sup>5</sup>PNNL

**9:00 AM**

**Ion Beams: Unique Tools Contributing to Accelerated Qualification of Nuclear Materials:** *Yanwen Zhang*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**9:20 AM**

**Physics-based Model Prediction of Microstructure and Creep Properties for As-built Additively Manufactured Stainless Steel 316-H:** *Gerry Knapp*<sup>1</sup>; Matt Rolchigo<sup>1</sup>; Sagar Bhatt<sup>2</sup>; John Coleman<sup>1</sup>; Mark Messner<sup>2</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Argonne National Laboratory

**9:40 AM**

**Development of Microscale In-situ Corrosion and Irradiation Experiment:** *Hyosim Kim*<sup>1</sup>; Franziska Schmidt<sup>1</sup>; Matthew Chancey<sup>1</sup>; Yongqiang Wang<sup>1</sup>; Blas Uberuaga<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:00 AM**

**Irradiation Effects on Mechanical Properties of PM-HIP Electron Beam Welded RPV Steels:** *Elliot Marrero*<sup>1</sup>; Grayson Nemets<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Maria Okuniewski<sup>1</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University

**10:20 AM Break**

**10:35 AM Invited**

**Accelerated Nuclear Materials Development through Additive Manufacturing and Accelerated Materials Testing:** *Rongjie Song*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**11:05 AM**

**Ion Irradiation and Examination of Additive Friction Stir Manufactured 316 Stainless Steel Component:** *Priyanka Agrawal*<sup>1</sup>; Ching-Heng Shiau<sup>2</sup>; Aishani Sharma<sup>1</sup>; Zhihan Hu<sup>3</sup>; Megha Dubey<sup>2</sup>; Yu Lu<sup>2</sup>; Lin Shao<sup>3</sup>; Ramprashad Prabhakaran<sup>4</sup>; Yaqiao Wu<sup>2</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Boise State University; <sup>3</sup>Texas A&M University, College Station; <sup>4</sup>Pacific Northwest National Laboratory

**11:25 AM**

**Development of Radiometry-based Instruments for Rapid Thermal Property and Microstructure Characterization, and the Application on Advanced and**

**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>; Caleb Picklesimer<sup>1</sup>; Robert Schley<sup>1</sup>; Asa Monson<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

**11:45 AM**

**Effects of Neutron Irradiation on the Fracture Behavior of PM-HIP and Cast Grade 91 Steel:** *Saquib Bin Habib*<sup>1</sup>; David Frazer<sup>2</sup>; Donna Guillen<sup>2</sup>; Janelle Wharry<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Accelerated Testing to Understand the Long Term Performance of High Temperature Materials — Session I

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

**Program Organizers:** Jonah Klemm-Toole, Colorado School of Mines; Benjamin Adam, Oregon State University; Andrew Wessman, University of Arizona; Dinc Erdeniz, University of Cincinnati; Chantal Sudbrack, National Energy Technology Laboratory; Kinga Unocic, Oak Ridge National Laboratory

**Monday AM | March 4, 2024**

**Windermere X-3 | Hyatt**

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Andrew Wessman, University of Arizona

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**8:30 AM Invited**

**Progress and Future Concepts for Accelerated Creep Testing:** *Calvin Stewart*<sup>1</sup>; <sup>1</sup>The Ohio State University

**9:10 AM**

**Effect of Contaminant Localization on Stress Corrosion Cracking in Ni-Base Superalloys Single Crystals:** Mustafa Elsherkisi<sup>1</sup>; Fabian Duarte Martinez<sup>1</sup>; Simon Gray<sup>1</sup>; *Gustavo Castelluccio*<sup>1</sup>; <sup>1</sup>Cranfield University

**9:30 AM**

**High-throughput Creep Testing for Additively Manufactured 316H SS by Using Microstructurally-graded Specimen:** *John Snitzer*<sup>1</sup>; Xiaoyuan Lou<sup>1</sup>; <sup>1</sup>Purdue University

**9:50 AM**

**Surface-roughness Effects on Creep Performance in Ni-based Single-crystal Superalloys:** *Aidan O'Donnell*<sup>1</sup>; Jean Briac Le-Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

**10:10 AM Break**

**10:30 AM**

**Dynamic Twinning and its Contribution to Enhancing High-temperature Mechanical Properties of the Modified Ni-base Superalloy:** *Jae Bok Seol*<sup>1</sup>; Hyoju Bae<sup>1</sup>; Wonhui Jo<sup>1</sup>; Saurabh Tiwari<sup>1</sup>; Joong Eun Jung<sup>2</sup>; Won-Seok Ko<sup>3</sup>; Jae-Hoon Jang<sup>2</sup>; Jong Bae Jeon<sup>4</sup>; Bong-Ho Lee<sup>5</sup>; Jun-Seob Lee<sup>6</sup>; Hyun-Uk Hong<sup>6</sup>; Young-Kook Lee<sup>7</sup>; <sup>1</sup>Gyeongsang National University; <sup>2</sup>Korea Institute of Materials Science; <sup>3</sup>Inha University; <sup>4</sup>Dong-a University; <sup>5</sup>Daegu Gyeongbuk Institute of Science & Technology; <sup>6</sup>Changwon National University; <sup>7</sup>Yonsei University

**10:50 AM**

**Stress Relaxation as a High Throughput and Accelerated Test to Evaluate Creep Strength in Additively Manufactured Ni-alloys:** *Jonah Klemm-Toole*<sup>1</sup>; Dan McConville<sup>1</sup>; Amy Clarke<sup>1</sup>; Ben Rafferty<sup>2</sup>; Kevin Eckes<sup>2</sup>; Jeremy Iten<sup>2</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Elementum 3D

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## **ADDITIVE MANUFACTURING**

### **Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Lightweight Alloys**

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

**Monday AM | March 4, 2024**  
**Plaza Int'l D | Hyatt**

**Session Chair:** Kyle Johnson, Sandia National Laboratories

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**8:30 AM Invited**

**New Opportunities to Improve PBF-LB Processability and Performance of Materials by Functionalization of Powder Feedstock:** *Riccardo Casati*<sup>1</sup>; Giorgia Lupi<sup>1</sup>; <sup>1</sup>Politecnico Di Milano

**9:00 AM**

**Manufacturing of Embedded AlN Sensors for Structural Health Monitoring:** *Amrita Lall*<sup>1</sup>; Shawn Riechers<sup>1</sup>; Zachary Kennedy<sup>1</sup>; Michelle Fenn<sup>1</sup>; Saumyadeep Jana<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**9:20 AM**

**Effects of Various Blending Technologies of Hydroxyapatite and Mg alloy WE43 Mixed Powder on Additive Manufacturing Process:** *Mingshi Song*<sup>1</sup>; Ling Chen<sup>1</sup>; Robert Wilson<sup>1</sup>; Tim Hughes<sup>1</sup>; Helmut Thissen<sup>1</sup>; Kun Yang<sup>1</sup>; Xiaobo Chen<sup>2</sup>; <sup>1</sup>CSIRO; <sup>2</sup>Rmit University

**9:40 AM**

**Tribocorrosion performance of Wire Direct Energy Deposited Commercially Pure Titanium for Structural Applications:** *Blanca Palacios*<sup>1</sup>; Tanaji Paul<sup>1</sup>; Tony Tomas<sup>1</sup>; Abhijith K. Sukumaran<sup>1</sup>; Omar Blandon<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

**10:00 AM Break**

**10:20 AM**

**Panorama of Al alloys for Additive Manufacturing:** *Srdjan Milenkovic*<sup>1</sup>; <sup>1</sup>Madrid Inst for Advanced Studies of Matls

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## **ADDITIVE MANUFACTURING**

### **Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification — Session 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; Steve Daniewicz, University of Alabama

**Monday AM | March 4, 2024**  
**Plaza Int'l E | Hyatt**

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

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**8:30 AM Invited**

**Can the Retained Austenite in Nitrogen-Atomized Additively Manufactured 17-4PH Stainless Steel Improve the Environmental Crack Resistance?:** *Mark Stoudt*<sup>1</sup>; James Zuback<sup>1</sup>; Andrew Iams<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**8:50 AM**

**The Effect of Laser Surface Modification on the Corrosion and Fatigue Performance of AA5456-H116:** *Mohammed Shabana*<sup>1</sup>; Rajaguru Jeyamohan<sup>1</sup>; Ji Ma<sup>1</sup>; John Scully<sup>1</sup>; James Burns<sup>1</sup>; <sup>1</sup>University of Virginia

**9:10 AM**

**Effect of Build Orientation and Stress Ratio on the Fatigue Crack Growth Behavior of Laser Powder Bed Fused Ti-6Al-4V:** Mikyle Paul<sup>1</sup>; *Sajith Soman*<sup>1</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

**9:30 AM**

**Characteristics of Non-Spherical Ti-6Al-4V Powder in Laser Powder Bed Fusion: The Effect on Microstructure, Surface Finish and Fatigue Behavior:** Mohammadreza Asherloo<sup>1</sup>; Madhavan Ramadurai<sup>1</sup>; Mike Heim<sup>2</sup>; Dave Nelson<sup>2</sup>; Anthony Rollett<sup>3</sup>; Muktesh Paliwal<sup>4</sup>; *Amir Mostafaei*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology; <sup>2</sup>Nel Pretech Corporation; <sup>3</sup>Carnegie Mellon University; <sup>4</sup>Kymera International

**9:50 AM**

**Insights into the Effect of Underlying Microstructure on the Fatigue Performance of Fully Lamellar Ti-6Al-4V:** *Samuel Present*<sup>1</sup>; Mo-Rigen He<sup>1</sup>; Monica Soare<sup>2</sup>; Johan Reimann<sup>2</sup>; Laura Dial<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>GE Research

**10:10 AM Break**

**10:30 AM Invited**

**Influence of Post-build Treatments on the Hydrogen Embrittlement Susceptibility of Additively Manufactured 316L under Ambient and Cryogenic Temperatures:** *Zachary Harris*<sup>1</sup>; Guillermo Alvarez<sup>2</sup>; Kentaro Wada<sup>3</sup>; Cristina Rodriguez<sup>4</sup>; Emilio Martinez-Paneda<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Imperial College London; <sup>3</sup>National Institute of Materials Science; <sup>4</sup>University of Oviedo

**10:50 AM**

**Fatigue Behavior of Novel PBF-L Ti-6Al-4V High Pressure Heat Treatments:** *Nik Hrabe*<sup>1</sup>; Nicholas Derimow<sup>1</sup>; Jake Benzing<sup>1</sup>; Chad Beamer<sup>2</sup>; Ryan Fishel<sup>3</sup>; Chris Hadley<sup>4</sup>; Mahesh Waje<sup>4</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Quintus Technologies; <sup>3</sup>3D Systems - Healthcare; <sup>4</sup>Lynnntech

**11:10 AM**

**Modeling the Effects of Surface Treatment on the Fatigue Performance of AM Ti-6Al-4V Microlattice Struts:** *Kyle Jung*<sup>1</sup>; Kendall Yetter<sup>2</sup>; Andrew Chuang<sup>3</sup>; William LePage<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Tulsa; <sup>3</sup>Argonne National Laboratory

**11:30 AM Invited**

**On the Fatigue Behavior and Failure Analysis of L-PBF Ti6Al4V Strut-Like Specimens: The Role of the Building Orientation and Mean Stress:** *Simone Murchio*<sup>1</sup>; Anton Du Plessis<sup>2</sup>; Gianluca Zappini<sup>3</sup>; Devid Maniglio<sup>1</sup>; Filippo Berto<sup>4</sup>; Matteo Benedetti<sup>1</sup>; <sup>1</sup>University of Trento; <sup>2</sup>Object Research Systems & Stellenbosch University; <sup>3</sup>Lincotek Medical; <sup>4</sup> Sapienza University of Rome

**11:50 AM**

**Investigation of the Influence of Oxygen Distribution on the Processability and Fatigue Properties of the LPBF Processed Ti-6Al-4V:** *Mahdi Habibnejad*<sup>1</sup>; <sup>1</sup>Advanced Powder and Coating, A GE Additive Division

**ADDITIVE MANUFACTURING****Additive Manufacturing Modeling, Simulation and Machine Learning – ML/AI**

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**Monday AM | March 4, 2024**

**Orlando N | Hyatt**

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center; Jing Zhang, Indiana University-Purdue University Indianapolis; Brandon McWilliams, CCDC Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**8:30 AM**

**3D Deep Learning for Pore Stress Concentration Analysis in Additive Manufacturing:** *Daniel Diaz*<sup>1</sup>; Vahid Tari<sup>1</sup>; Xinyang Li<sup>1</sup>; Yuheng Nie<sup>1</sup>; Elizabeth Holm<sup>2</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>University of Michigan

**8:50 AM**

**Data Bridging: A Novel Pipeline for Efficient Statistical Exploitation Across Multiple Data Populations:** *Alex Gonzalez*<sup>1</sup>; Craig Brice<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**9:10 AM**

**Machine Learning Guided Prediction of Jetting Behavior during Electrohydrodynamic (EHD) Printing:** *Yizhou Lu*<sup>1</sup>; James Treadway<sup>1</sup>; Yiwei Han<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi

**9:30 AM**

**Deep Neural Network for Image Segmentation and Feature Quantification during Laser Powder Bed Fusion Additive Manufacturing:** *Wei Li*<sup>1</sup>; Rubén Lambert-García<sup>1</sup>; Anna Getley<sup>1</sup>; Kwan Kim<sup>1</sup>; Shishira Bhagavath<sup>1</sup>; Peter Lee<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; <sup>1</sup>University College London

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

**JIMM Young Leader International Scholar Award Lecture: Machine-learning Approaches to Control the Microstructure and Properties of Laser Powder Bed Fused Metallic Components:** *Asuka Suzuki*<sup>1</sup>; <sup>1</sup>Nagoya University

**10:40 AM**

**Planning and Adaptive Control of AM Processes via *In Situ* Characterization, Faster-than-real-time Simulations, and AI/ML Methods:** *Stephen DeWitt*<sup>1</sup>; Bruno Turcksin<sup>1</sup>; James Haley<sup>1</sup>; Ke An<sup>1</sup>; Yousub Lee<sup>1</sup>; Thomas Feldhausen<sup>1</sup>; Venkatakrishnan Singanallur<sup>1</sup>; Ayana Ghosh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**11:00 AM**

**Machine Learning-based Prediction of Evolution of Thermal Profiles During Additive Manufacturing:** Mani Krishna Karri<sup>1</sup>; *Aishwarya Manjunath*<sup>1</sup>; Shashank Sharma<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**11:20 AM**

**Hardness Predictions of Additively Manufactured Components Using Convolutional Neural Networks on Backscattered Electron Images:** *Dillon Watring*<sup>1</sup>; Patrick Callahan<sup>1</sup>; David Rowenhorst<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

**11:40 AM**

**Multiscale and Machine Learning Modeling for Texture Prediction during Additive Manufacturing:** *Sudipta Biswas*<sup>1</sup>; Som Dhulipala<sup>1</sup>; Peter German<sup>1</sup>; Alexander Lindsay<sup>1</sup>; Matthew Eklund<sup>1</sup>; Andrea Jokisaari<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Metallic Materials: Process Development

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

**Program Organizers:** Faramarz Zarandi, RTX Corporation; Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias

**Monday AM | March 4, 2024**

**Rainbow Spring II | Hyatt**

**Session Chairs:** Faramarz Zarandi, RTX Technology Research Center; Jeffrey Sowards, NASA Marshall Space Flight Center

**8:30 AM Invited**

**NASAREfractoryAlloyAdditiveManufactureBuildOptimization(RAAMBO)Project:** *Omar Mireles*<sup>1</sup>; Fernando Reyes<sup>1</sup>; Lauren Abbott<sup>2</sup>; Eric Brizes<sup>3</sup>; Brandon Colón<sup>4</sup>; Toren Hobbs<sup>1</sup>; Jarvis Caffrey<sup>1</sup>; Justin Milner<sup>3</sup>; Carly Romnes<sup>1</sup>; Jeffrey Sowards<sup>1</sup>; Kevin Wheeler<sup>2</sup>; <sup>1</sup>NASA Marshall Space Flight Center; <sup>2</sup>NASA Ames Research Center; <sup>3</sup>NASA Glenn Research Center; <sup>4</sup>NASA Marshall Space Flight Center; University of Texas El Paso

**9:10 AM**

**An Open-Source Numerical Model for Mitigating Refractory Alloy Hot Cracking Susceptibility:** Jeffrey Sowards<sup>1</sup>; *Andrew O'Connor*<sup>1</sup>; Fredrick Michael<sup>1</sup>; Carly Romnes<sup>1</sup>; Fernando Reyes Tirado<sup>1</sup>; Omar Mireles<sup>1</sup>; <sup>1</sup>NASA Marshall Space Flight Center

**9:30 AM**

**High-throughput Synthesis of Refractory High-entropy Alloys by Laser Metal Deposition and Structure-properties Relationships:** Henrik Dobbelstein<sup>1</sup>; Easo George<sup>2</sup>; Evgeny Gurevich<sup>3</sup>; Aleksander Kostka<sup>1</sup>; Andreas Ostendorf<sup>1</sup>; *Guillaume Laplanche*<sup>1</sup>; <sup>1</sup>Ruhr-University Bochum; <sup>2</sup>University of Tennessee; <sup>3</sup>Fachhochschule

Münster

**9:50 AM**

**Exploring Additive Manufacturing Processing Pathways for Refractory Carbides:** *Alexander Wilson-Heid*<sup>1</sup>; R. Joey Griffiths<sup>1</sup>; Aiden Martin<sup>1</sup>; Kiel Holliday<sup>1</sup>; Jason Jeffries<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**10:10 AM Break 10:10 - 10:30**

**10:30 AM**

**Implementation of Solidification Modeling Towards Tailorable Refractory Microstructures in Additive Manufacturing:** *Megan Le Corre*<sup>1</sup>; Kaitlyn Mullin<sup>2</sup>; Ruben Ochoa<sup>1</sup>; Adriana Eres Castellanos<sup>1</sup>; Tresa Pollock<sup>2</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>University of California, Santa Barbara

**10:50 AM**

**Testing Methodology Development for Ultra-high Temperature Refractory Alloys Made with Additive Manufacturing:** *Kelly Orsborn*<sup>1</sup>; Omar Mireles<sup>2</sup>; Eric Brizes<sup>3</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>NASA MSFC; <sup>3</sup>NASA GRC

**11:10 AM**

**Integrated Computational Material Engineering Approach in Additive Manufacturing of Ti/Zr/Mo/Al Light Weight Refractory Complex Concentrated Alloy:** *Jitesh Kumar*<sup>1</sup>; Shashank Sharma<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Mani Krishna Karri<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>CAAAM, Discovery park

**11:30 AM**

**Impact of Ceramic Nanoparticles on Additive Manufacture of Refractory Metals:** *Carly Romnes*<sup>1</sup>; Fernando Reyes Tirado<sup>1</sup>; Toren Hobbs<sup>1</sup>; Jeff Sowards<sup>1</sup>; Omar Mireles<sup>1</sup>; James Stubbins<sup>2</sup>; <sup>1</sup>NASA Marshall Space Flight Center; <sup>2</sup>University of Illinois, Urbana-Champaign

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — Invited Session I: Scientific Highlights**

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

**Monday AM | March 4, 2024**

**Orlando M | Hyatt**

**Session Chairs:** Fan Zhang, NIST; Andrew Chuang, Argonne National Laboratory

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**8:30 AM Introductory Comments Fan Zhang**

**8:40 AM Invited**

**Alloy Design for Additive Manufacturing:** *Matthew Kramer*<sup>1</sup>; Qiang Li<sup>1</sup>; Feng Zhang<sup>1</sup>; Micael Glazoff<sup>2</sup>; Andrew Chuang<sup>3</sup>; Emrah Simsek<sup>1</sup>; Wenjie Wang<sup>1</sup>; Iver Anderson<sup>1</sup>; Ryan Ott<sup>1</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Argonne National Laboratory

**9:05 AM Invited**

**In-situ Characterization of Phase Transformation Dynamics in Metal Additive Manufacturing Processes:** *Liany Chen*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**9:30 AM Invited**

**In-situ Laser Powder Bed Fusion of High Entropy Alloys Analyzed by Synchrotron X-ray Diffraction:** *Joao Oliveira*<sup>1</sup>; <sup>1</sup>Faculdade Ciencias Tecnologias

**9:55 AM Invited**

**An Update on High-Speed Visualization and Beam Control:** *Anthony Rollett*<sup>1</sup>; Ziheng Wu<sup>1</sup>; Guannan Tang<sup>1</sup>; Samuel Clark<sup>2</sup>; Andrey Meshkov<sup>3</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>General Electric

**10:20 AM Break**

**10:35 AM Invited**

**Microstructural Evolution in Metallic Alloys under Additive Manufacturing Conditions:** *Amy Clarke*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**11:00 AM Invited**

**Open-AM: A Wire-Arc Deposition System for Operando Neutron Diffraction:** *Alex Plotkowski*<sup>1</sup>; Chris Fancher<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; James Haley<sup>1</sup>; Dean Pierce<sup>1</sup>; Jesse Heineman<sup>1</sup>; Joshua Vaughan<sup>1</sup>; Kyle Saleeby<sup>2</sup>; Ke An<sup>1</sup>; Guru Madireddy<sup>3</sup>; Yousub Lee<sup>1</sup>; Thomas Feldhausen<sup>1</sup>; Dunji Yu<sup>1</sup>; Suresh Babu<sup>4</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Georgia Institute of Technology; <sup>3</sup>Sentient Science; <sup>4</sup>University of Tennessee - Knoxville

**11:25 AM Invited**

**In-situ Monitoring of Particle Impact on Melt Pool Flow in Laser Directed Energy Deposition Additive Manufacturing:** *Sarah Wolff*<sup>1</sup>; Marwan Haddad<sup>1</sup>; Aslan Bafahm Alamdari<sup>1</sup>; Kristina May<sup>1</sup>; Wenda Tan<sup>2</sup>; Jun Fan<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>The University of Michigan

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Location-dependent Mechanical Behavior of Additively Manufactured Metals**

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Monday AM | March 4, 2024**

**Plaza Int'l F | Hyatt**

**Session Chairs:** Yu Zou, University of Toronto; Moataz Attallah, University of Birmingham

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**8:30 AM Invited**

**Application of Profilometry-based Indentation Plastometry (PIP), a Technique to Measure Stress-strain Curves from Indentation, to Additively Manufactured Metal Parts:** Jimmy Campbell<sup>1</sup>; Tom Southern<sup>1</sup>; Bill Clyne<sup>1</sup>; *Max Burley*<sup>1</sup>; <sup>1</sup>Plastometrex Limited



**9:00 AM**

**Laser Powder Bed Fusion: a Tool for Engineering Microstructures and Mechanical behavior:** *Christos Sofras*<sup>1</sup>; Jan apek<sup>1</sup>; Christian Leinenbach<sup>2</sup>; Roland Logé<sup>3</sup>; Markus Strobl<sup>1</sup>; Efthymios Polatidis<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>Empa, Swiss Federal Laboratories for Materials Science and Technology; <sup>3</sup>École Polytechnique Fédérale de Lausanne (EPFL)

**9:20 AM**

**Micro-Scale Mechanical Properties of Additively Manufactured Stainless Steel:** *Xiaolei Guo*<sup>1</sup>; Yachun Wang<sup>2</sup>; Gerald Frankel<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Idaho National Laboratory

**9:40 AM**

**Mechanical Characterisation of Nature-inspired Additive Manufactured Lattices Using X-ray Computed Tomography and Finite Element Analysis:** *David McArthur*<sup>1</sup>; Peter Lee<sup>1</sup>; PJ Tan<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; <sup>1</sup>University College London

**10:00 AM Break**

**10:20 AM Invited**

**Probing the Location-dependent Mechanical Behavior of Additively Manufactured Metals:** *Yinmin (Morris) Wang*<sup>1</sup>; <sup>1</sup>University of California - Los Angeles

**10:50 AM**

**Multiscale Deformation Behavior of Additively Manufactured Nanolamellar Eutectic High-entropy Alloys:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto

**11:10 AM**

**Modeling of Microscale Internal Stresses in Additively Manufactured Materials:** *Kunqing Ding*<sup>1</sup>; Yin Zhang<sup>2</sup>; Ting Zhu<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Peking university

**11:30 AM**

**Dislocation Evolution and Residual Stresses in FCC and BCC Alloys Produced by Laser Powder Bed Fusion:** *Sravya Tekumalla*<sup>1</sup>; Matteo Seita<sup>2</sup>; Stefan Zaefferer<sup>3</sup>; <sup>1</sup>University of Victoria; <sup>2</sup>University of Cambridge; <sup>3</sup>Max Planck Institute for Iron Research

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Materials Design and Alloy Development VI – Closed-Loop Alloy Design – Fundamentals

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

**Program Organizers:** Behrang Poorganji, University of Toledo; James Saal, Citrine Informatics; Hunter Martin, HRL Laboratories LLC; Orlando Rios, University of Tennessee; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC; S. Mohadeseh Taheri-Mousavi, Carnegie Mellon University

**Monday AM | March 4, 2024**

**Windermere W-1 | Hyatt**

**Session Chairs:** Behrang Poorganji, Morf3D; James Saal, Citrine Informatics

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**8:30 AM Introductory Comments****8:35 AM Invited**

**Closed-Loop Materials Design with Artificial Intelligence:** *James Saal*<sup>1</sup>; <sup>1</sup>Citrine Informatics

**9:05 AM Invited**

**ICME Framework Advancing Multi-material Additive Manufacturing:** *Ioannis Aristeidakis*<sup>1</sup>; Fuyao Yan<sup>1</sup>; Ida Berglund<sup>1</sup>; David Linder<sup>1</sup>; Savya Sachi<sup>1</sup>; <sup>1</sup>QuesTek Europe AB

**9:35 AM**

**Non-equilibrium Phase Transformations in Laser Powder Bed Fused Nickel-aluminum Bronze Using Atom-probe Tomography Analysis:** *Farzad Khodabakhshi*<sup>1</sup>; Mohsen Mohammadi<sup>2</sup>; <sup>1</sup>University of Tehran; <sup>2</sup>University of New Brunswick

**9:55 AM Break****10:15 AM Invited**

**Reverse Design: Alloys Tailored for Green Body Printing and Sintering:** *Yannick Naunheim*<sup>1</sup>; Christopher A Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**10:45 AM**

**Overcoming Challenges in Custom Powder Manufacturing - From Low-melting and Reactive Materials to Refractories:** *Lukasz Zrodowski*<sup>1</sup>; Tomasz Choma<sup>1</sup>; <sup>1</sup>Amazemet Sp. Z O. O.

**11:05 AM**

**A Closed-loop Computational Approach for the Design and Development of High-strength Al Alloys Tailored for Laser-based Powder Bed Fusion:** *Giuseppe Del Guercio*<sup>1</sup>; Federico Bosio<sup>1</sup>; Chinmay Phutela<sup>1</sup>; Nesma Aboulkhair<sup>1</sup>; <sup>1</sup>Technology Innovation Institute

**11:25 AM Invited**

**High-resolution Composition Grading in Additive Manufacturing by Combining Inkjet Deposition with Laser Powder Bed Fusion:** *A. John Hart*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

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**ADDITIVE MANUFACTURING****Additive Manufacturing: Process-induced Microstructures and Defects – Cracking, Porosity, and Other Defects**

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

**Monday AM | March 4, 2024**

**Florida C | Hyatt**

**Session Chair:** Shenyang Hu, Pacific Northwest National Laboratory

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**8:30 AM**

**Scanning Strategies: A Tool to Control Cracking in Crack Susceptible Ni-based Superalloy CM247LC:** *Abdulrahman Alqarni*<sup>1</sup>; Talal Al-Shammari<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham

**8:50 AM**

**Elimination of Solidification and Strain-Age Cracking Through Inoculation-Induced Grain Refinement in IN738:** *Daniel McConville*<sup>1</sup>; Ben Rafferty<sup>2</sup>; Jeremy Iten<sup>2</sup>; Kevin Eckes<sup>2</sup>; Stan Baldwin<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

**9:10 AM**

**Critical Comparison of Advanced Non-destructive Evaluation Technologies Identifying Cracking in Laser Powder Bed Fusion Components:** *Jacque Berkson*<sup>1</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>The Ohio State University

**9:30 AM Invited**

**Correlations of Porosity, Spatter, and Process Metrics for Powder Bed Fusion Laser Beam Metallic Additive Manufacturing:** *Samuel Hocker*<sup>1</sup>; Andrew Kitahara<sup>2</sup>; Brodan Richter<sup>1</sup>; Sang-hyon Chu<sup>1</sup>; Peter Spaeth<sup>1</sup>; Joseph Zalameda<sup>1</sup>; Edward Glaessgen<sup>1</sup>; <sup>1</sup>NASA; <sup>2</sup>Analytical Mechanics Associates

**10:00 AM Break**

**10:20 AM**

**Observations of Keyhole Porosity and Comparisons to Analytical Models for Ti-6Al-4V Powder Bed Fusion:** *Brodan Richter*<sup>1</sup>; Samuel Hocker<sup>1</sup>; <sup>1</sup>NASA Langley Research Center

**10:40 AM**

**Volumetric Tailoring of Porosity and Grain Structure in Binder Jetting:** Amanda Wei<sup>1</sup>; Kazi Rahman<sup>1</sup>; *Christopher Williams*<sup>1</sup>; <sup>1</sup>Virginia Tech

**11:00 AM**

**Analysis of Porosity Defects and Their Impact on Tensile Behavior in LPBF Stainless Steel 316L Utilizing X-ray Computed Tomography:** Tasrif Ul Anwar<sup>1</sup>; Patrick Merighe<sup>1</sup>; Rahul Reddy Kancharla<sup>2</sup>; Boopathy Kombaiyah<sup>2</sup>; *Nadia Kouraytem*<sup>1</sup>; <sup>1</sup>Utah State University; <sup>2</sup>Idaho National Laboratory

**11:20 AM**

**Microstructural and Mechanical Analysis of As-Built and Heat-Treated Maraging Steel 300 Fabricated via Laser Powder Bed Fusion:** *Gabriel Cotrim de Cesare Peinado*<sup>1</sup>; Cauê Pettermann Carvalho<sup>2</sup>; Edurado Netto de Souza<sup>3</sup>; André Luiz Jardini Munhoz<sup>3</sup>; Julián Arnaldo Ávila Diaz<sup>4</sup>; Carlos Antonio Reis Pereira Baptista<sup>2</sup>; Antonio Ramirez<sup>5</sup>; <sup>1</sup>Ohio State University / University of São Paulo; <sup>2</sup>University of São Paulo; <sup>3</sup>State University of Campinas; <sup>4</sup>Universitat Politècnica de Catalunya / São Paulo State University; <sup>5</sup>Ohio State University

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## BIOMATERIALS

**Advanced Biomaterials for Biomedical Implants — Biomaterial for Chronic Diseases**

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

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Pennsylvania State University Harrisburg; Vinoy Thomas, University of Alabama at Birmingham

**Monday AM | March 4, 2024**  
**Celebration 12 | Hyatt**

**Session Chair:** Fariborz Tavangarian, Pennsylvania State University Harrisburg

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**10:00 AM Invited**

**Tailored Nanofiber Microspheres with Tunable Morphology for Accelerated Diabetic Wound Healing:** *Johnson V. John*<sup>1</sup>; <sup>1</sup>Terasaki Institute for Biomedical Innovation

**10:30 AM**

**Bioinspired and Electrospun Helically Structured Nanofibers for Cardiac Patch Application:** *Anamika Prasad*<sup>1</sup>; Alexi Switz<sup>1</sup>; <sup>1</sup>Florida International University

**10:50 AM**

**Design and Application of Porous PDMS Membrane Devices in Nude Mice for Localized Treatment of Triple Negative Breast Cancer:** *Yiporo Danyuo*<sup>1</sup>; Azeko Salifu<sup>2</sup>; John Obayemi<sup>3</sup>; Stanley Eluu<sup>4</sup>; Toyin Aina<sup>5</sup>; Josephine Oparah<sup>5</sup>; Precious Etinaso<sup>3</sup>; Fred McBagonluri<sup>6</sup>; Wole Soboyejo<sup>3</sup>; <sup>1</sup>Ashesi University; <sup>2</sup>Boston College; <sup>3</sup>Worcester Polytechnic Institute; <sup>4</sup>Nnamdi Azikiwe University; <sup>5</sup>African University of Science and Technology; <sup>6</sup>Academic City University College

**11:10 AM**

**Development of Antibacterial Neural Interfacing Electrodes via Hierarchical Surface Restructuring and Atomic Layer Deposition:** *Shahram Amini*<sup>1</sup>; <sup>1</sup>Pulse Technologies Inc.

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**ADVANCED CHARACTERIZATION METHODS**

**Advanced Characterization Techniques for Quantifying and Modeling Deformation – In-situ Diffraction I**

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

**Monday AM | March 4, 2024**

**Celebration 1 | Hyatt**

**Session Chairs:** Wolfgang Pantleon, Technical University of Denmark; Matthew Kasemer, University of Alabama

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**8:30 AM Invited**

**Imaging Real-time Plasticity Onset and Single Twinning Events within a Bulk Polycrystalline Magnesium Alloy:** *Matthew Barnett*<sup>1</sup>; Jun Wang<sup>1</sup>; Sitarama Kada<sup>1</sup>; Andrew Stevenson<sup>2</sup>; Chris Hall<sup>2</sup>; Peter Lynch<sup>1</sup>; <sup>1</sup>Deakin University; <sup>2</sup>Australian Synchrotron, ANSTO

**9:00 AM**

**3D In situ Characterization of Twinning Inside Individual Mg4Al Grains Using Dark-field X-ray Microscopy:** *Sangwon Lee*<sup>1</sup>; Can Yildirim<sup>2</sup>; Carsten Detlefs<sup>2</sup>; John Allison<sup>1</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University Of Michigan; <sup>2</sup>European Synchrotron Radiation Facility

**9:20 AM**

**Characterization of the Impact of Neighboring Twin Activity on Grain-Resolved Deformation in a Mg-Al Alloy Using High Energy X-Ray Diffraction Microscopy:** *Duncan Greeley*<sup>1</sup>; Mohammadreza Yaghoobi<sup>2</sup>; Katherine Shanks<sup>3</sup>; John Allison<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Michigan; <sup>3</sup>Cornell High Energy Synchrotron Source

**9:40 AM****In-situ Strain Partitioning Response of Cyclic Loaded NiTi Shape Memory Alloy:** *Himanshu Vashishtha*<sup>1</sup>; Mohammed Said<sup>1</sup>; James Ball<sup>1</sup>; David Collins<sup>1</sup>; <sup>1</sup>University of Birmingham**10:00 AM Break****10:20 AM****In Situ Deformation Experiment at the Swedish Materials Science Beamline at PETRA III:** *Zoltan Hegedues*<sup>1</sup>; Ulrich Lienert<sup>1</sup>; <sup>1</sup>Deutsches Elektronen-Synchrotron**10:40 AM****Internal Stress Evolution During Cyclic Deformation of Aluminum Observed by High-resolution Reciprocal Space Mapping:** *Thomas Kohne*<sup>1</sup>; Zoltan Hegedues<sup>2</sup>; Matteo Villa<sup>1</sup>; Jun-Sang Park<sup>3</sup>; Ulrich Lienert<sup>2</sup>; Wolfgang Pantleon<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>Deutsches Elektronensynchrotron; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory**11:00 AM****In-situ 3D High-energy X-ray Diffraction Study on Deformation Behavior of Neutron-irradiated Fe-9%Cr:** *Dominic Piedmont*<sup>1</sup>; *James Stubbins*<sup>1</sup>; Xuan Zhang<sup>2</sup>; Ezra Mengiste<sup>3</sup>; Matthew Kasemer<sup>3</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>University of Alabama**11:20 AM Poster Pitches**

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS****Advanced Functional and Structural Thin Films and Coatings — Multifunctional Biomaterials, Coating Technologies and Surface Structuring****Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee**Program Organizers:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Karine Mougine, Cnrs, Is2m; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology**Monday AM | March 4, 2024****Bayhill 26 | Hyatt****Session Chairs:** Adele Carrado, University of Strasbourg; Heinz Palkowski, Clausthal University of Technology / Institute of Metallurgy

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**8:30 AM Introductory Comments****8:35 AM Keynote****Ti-mesh Reinforced PMMA for Customized Implant Applications:** *Gargi Shankar Nayak*<sup>1</sup>; Heinz Palkowski<sup>2</sup>; Adele Carrado<sup>3</sup>; <sup>1</sup>Saarland University; <sup>2</sup>Clausthal University of Technology; <sup>3</sup>Université de Strasbourg**9:15 AM****Forming of Open Structured Zn1.5Mg Coated with Polymers for Absorbable Tissues:** *Heinz Palkowski*<sup>1</sup>; Primoz Mrvar<sup>2</sup>; Gargi Nayak<sup>3</sup>; Adele Carrado<sup>4</sup>; <sup>1</sup>Clausthal University of Technology; <sup>2</sup>University of Ljubljana; <sup>3</sup>University of Saarland; <sup>4</sup>Université de Strasbourg

9:35 AM

**Covering Open ZnMg Structures by Polymers for Adapting the Corrosion Rate in Absorbable Tissues:** Heinz Palkowski<sup>1</sup>; Adele Carradó<sup>2</sup>; Primož Mrvar<sup>3</sup>; Stephane Mery<sup>2</sup>; <sup>1</sup>Clausthal University of Technology; <sup>2</sup>Université de Strasbourg; <sup>3</sup>University of Ljubljana

9:55 AM Break

10:15 AM

**An Investigation of Chromium Oxide Growth with Ru as a Diffusion Barrier:** *Awaiz Akhtar*<sup>1</sup>; Haihui Ruan<sup>1</sup>; <sup>1</sup>The Hong Kong Polytechnic University

10:35 AM

**Characterization of Additive Manufactured AlCoCrFeNiCu and AlCoCrFeNiTi High Entropy Alloys by Cyclic Voltammetry:** *Modupeola Dada*<sup>1</sup>; Patricia Popoola<sup>1</sup>; <sup>1</sup>Tshwane University of Technology

10:55 AM Concluding Comments

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging — Additive Manufacturing

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials 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; Pranjali Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

Monday AM | March 4, 2024

Blue Spring II | Hyatt

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

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8:30 AM Invited

**Correlating Laser Process Conditions to Balling Severity with Time-resolved Synchrotron X-ray Visualization:** *Anthony Rollett*<sup>1</sup>; Runbo Jiang<sup>1</sup>; John Smith<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

8:50 AM Invited

**Interfacial Strength in Microparticle Impact-induced Bonding:** Qi Tang<sup>1</sup>; *Mostafa Hassani*<sup>1</sup>; <sup>1</sup>Sibley School of Mechanical and Aerospace Engineering, Cornell University,

9:10 AM

**Seeing Inside Additive Manufacturing with the Extremely Brilliant Source:** *Chu Lun Alex Leung*<sup>1</sup>; Samy Hocine<sup>1</sup>; Rubén Lambert-García<sup>1</sup>; Anna Getley<sup>1</sup>; Kwan Kim<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>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>ESRF - The European Synchrotron

9:30 AM

**Using an Additively Printed Microsensor with Bluetooth Capability to Detect Corrosion:** *Holly Martin*<sup>1</sup>; Stephen Appiah<sup>1</sup>; Brendan Kuzior<sup>1</sup>; Vamsi Borra<sup>1</sup>; Frank Li<sup>1</sup>; Pedro Cortes<sup>1</sup>; <sup>1</sup>Youngstown State University

9:50 AM Invited

**Rapid Solidification of Non-Dilute Binary Alloys: Theory and In Situ Diagnosis:** *Jianrong Gao*<sup>1</sup>; Dandan Zhao<sup>1</sup>; <sup>1</sup>Northeastern University, China

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco — Novel Magnetocaloric Materials with High Performance**

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

**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center

**Monday AM | March 4, 2024**  
**Bayhill 22 | Hyatt**

**Session Chair:** Daniel Salazar, BCMaterials

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8:30 AM Invited

**Tuning Magnetic Materials with Stress and Electric Field:** *Xavier Moya*<sup>1</sup>; <sup>1</sup>University of Cambridge

9:00 AM Invited

**A Bright Future for Magnetocaloric High-entropy Alloys:** *Jia Yan Law*<sup>1</sup>; Álvaro Díaz-García<sup>1</sup>; Luis Moreno-Ramírez<sup>1</sup>; Victorino Franco<sup>1</sup>; <sup>1</sup>University of Seville

9:30 AM Invited

**Machine Learning Assisted Development of Magnetocaloric Materials:** *Hossein Sepehri Amin*<sup>1</sup>; E. Dengina<sup>1</sup>; Z. Wang<sup>1</sup>; A. Bolyachkin<sup>1</sup>; X. Tang<sup>1</sup>; T. Ohkubo<sup>1</sup>; K. Hono<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

10:00 AM Break

10:20 AM Invited

**Magnetic and Magnetocaloric Properties of R<sub>2</sub>In Intermetallic Compounds with Reversible First-order Transformations:** Anis Biswas<sup>1</sup>; Rajiv Chouhan<sup>1</sup>; *Yaroslav Mudryk*<sup>1</sup>; <sup>1</sup>Ames National Laboratory/Iowa State University

10:50 AM Invited

**Essential Perspective on Magnetic and Thermodynamical States of Fe-based Magnetocaloric Compounds Inside the AMR-type Module:** *Asaya Fujita*<sup>1</sup>; <sup>1</sup>AIST

11:20 AM Invited

**Magnetocaloric Effect in Amorphous and Nanocomposite Alloys:** *Matthew Willard*<sup>1</sup>; <sup>1</sup>Case Western Reserve University

11:50 AM

**Nanoscale Phase Separation in Rare-earth Containing Magnetocaloric Compounds:** *Jianrong Gao*<sup>1</sup>; Dan Huang<sup>1</sup>; Ronghui Kou<sup>1</sup>; Yang Ren<sup>2</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>City University of Hongkong

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## BIOMATERIALS

**Advances in Biomaterials for 3D Printing of Scaffolds and Tissues — Advances in Biomaterials for 3D Printing of Scaffolds and Tissues I**

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

**Program Organizers:** Changxue Xu, Texas Tech University; Zhengyi Zhang, Huazhong University of Science and Technology; Yifei Jin, University of Nevada Reno; Jun Yin, Zhejiang University

**Monday AM | March 4, 2024**  
**Celebration 16 | Hyatt**

**Session Chairs:** Changxue Xu, Texas Tech University; Yifei Jin, University of Nevada, Reno

**8:30 AM**

**Bioink Formulations for 3D Printing of Tissue Scaffolds: A Review of Materials and Printability:** Faithfulness Osazee<sup>1</sup>; Andrew Ohifuemen<sup>1</sup>; Jeffery Omoruyi<sup>2</sup>; Ikhazuagbe Ifijen<sup>1</sup>; Godfrey Otabor<sup>3</sup>; <sup>1</sup>Rubber Research Institute of Nigeria; <sup>2</sup> Rubber Research Institute of Nigeria; <sup>3</sup>Ambrose Ali University, Ekpoma

**8:50 AM**

**Bioabsorbable PLDL/Mg-wire Composites Manufactured by Fused Filament Fabrication for Tissue Engineering:** Cillian Thompson<sup>1</sup>; Carlos González<sup>2</sup>; Javier Llorca<sup>2</sup>; <sup>1</sup>IMDEA Materials Institute; <sup>2</sup>IMDEA Materials Institute & Technical University of Madrid

**9:10 AM**

**3D Printing of Multiscale Human Tissue and Organ Equivalents:** Yifei Jin<sup>1</sup>; <sup>1</sup>University of Nevada Reno

**9:30 AM**

**Engineering Polymeric Bioinks for 3D Printing:** Ashwin Velraj<sup>1</sup>; Jeffrey Bates<sup>1</sup>; <sup>1</sup>University of Utah

**9:50 AM Break**

**10:10 AM**

**Graphene and MXene Nanomaterial Bioinks for Improvement of 3D Bioprinted Tissue Engineering:** Miranda Nelson<sup>1</sup>; Hailey Burgoyne<sup>1</sup>; Annaka Tibbits<sup>2</sup>; Fereshteh Rajabi-Kouchi<sup>1</sup>; Tony Valayil Varghese<sup>1</sup>; Raquel Montenegro-Brown<sup>1</sup>; Josh Eixenberger<sup>1</sup>; David Estrada<sup>1</sup>; <sup>1</sup>Boise State University; <sup>2</sup>Grand Canyon University

**10:30 AM**

**Biodegradable Polymers for 3D Printing of Tissue Engineering Scaffolds: Challenges and Future Directions:** Eribe Jonathan<sup>1</sup>; Oghama Osarumen<sup>2</sup>; Ikhazuagbe Ifijen<sup>2</sup>; Gregory Onaiwu<sup>3</sup>; <sup>1</sup>Benson Idaho University, Edo State, Nigeria; <sup>2</sup>Rubber Research Institute of Nigeria; <sup>3</sup>Benson Idahosa Idahosa University

**10:50 AM**

**Effects of Post-printing Cell Distribution on Cell Viability and Proliferation in Inkjet-based Bioprinting of Vascular Structures:** Jiachen Liu<sup>1</sup>; Changxue Xu<sup>1</sup>; <sup>1</sup>Texas Tech University

**MATERIALS SYNTHESIS AND PROCESSING**

**Advances in Ceramic Materials and Processing — Advances in All Solid Battery Materials**



**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

**Monday AM | March 4, 2024**  
**Celebration 10 | Hyatt**

**Session Chairs:** Ruigang Wang, University of Alabama ; Bowen Li, Michigan Tech

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**8:30 AM Introductory Comments**

**8:35 AM Invited**

**Synthesis and Fabrication of Li-glass Electrolytes ( $\text{Li}_{2.99}\text{Ba}_{0.005}\text{OCl}$ ) for All-solid-state Batteries:** *Leon Shaw*<sup>1</sup>; *Junquan Ou*<sup>1</sup>; *Vigniyatha Tatagari*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

**8:55 AM Invited**

**Understanding Ion Transport in Ceramic Fast Ion Conductors:** *Yan-Yan Hu*<sup>1</sup>; <sup>1</sup>Florida State University

**9:15 AM**

**Ce<sub>2</sub>S<sub>3</sub>-Li<sub>2</sub>S-P<sub>2</sub>S<sub>5</sub> Glass-ceramic Electrolytes for All-solid-state Li-S Battery:** *Ruigang Wang*<sup>1</sup>; *Amirhossein Mirtaleb*<sup>1</sup>; <sup>1</sup>The University of Alabama

**9:35 AM**

**Cotton Templated 3D Interconnected Chain LLZO Structure as PVDF/LLZO Composite Polymer Electrolyte with Superior Ionic Conductivity for Solid-state Lithium-ion Batteries:** *Sakibul Azam*<sup>1</sup>; *Ruigang Wang*<sup>1</sup>; <sup>1</sup>The University of Alabama

**9:55 AM Break**

**10:10 AM Invited**

**Cation Mobility Enhancing Strategies in Organic-inorganic Hybrid Materials for Solid Electrolytes:** *John Kieffer*<sup>1</sup>; <sup>1</sup>University of Michigan

**10:30 AM Invited**

**Computational Study of Ionic Transport in Lithium Garnet Oxides with Machine-learning Interatomic Potentials:** *Wei Lai*<sup>1</sup>; <sup>1</sup>Michigan State University

**10:50 AM Invited**

**Synthesis and Processing of Sulfide-based Alkali Superionic Conductors:** *Selim Halacoglua*<sup>1</sup>; *Xiaolin Guo*<sup>1</sup>; *Hui Wang*<sup>1</sup>; <sup>1</sup>University of Louisville

**11:10 AM**

**Structural and Microstructural Behavior of PLT:ER Ferroelectric System:** *Luisa Fernanda Dávila Espinosa*<sup>1</sup>; *Fernando Londoño Badillo*<sup>1</sup>; *Alvaro Herrera Carrillo*<sup>1</sup>; <sup>1</sup>University of Antioquia

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**MECHANICS OF MATERIALS**

**Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Monday AM | March 4, 2024**  
**Barrel Spring II | Hyatt**

**Session Chairs:** Peter Liaw, The University of Tennessee; Enrique Lavernia, University of California Irvine

### 8:30 AM Keynote

**Design of BCC – B2 Refractory Multi-principal Element Alloys:** Carolina Frey<sup>1</sup>; Sebastian Kube<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

### 9:00 AM Keynote

**On the Fracture Toughness of High-entropy Alloys: bcc vs. fcc:** Robert Ritchie<sup>1</sup>; Andrew Minor<sup>1</sup>; Mark Asta<sup>1</sup>; Punit Kumar<sup>2</sup>; David Cook<sup>1</sup>; Flynn Walsh<sup>1</sup>; Madelyn Payne<sup>1</sup>; Wenqing Wang<sup>1</sup>; Mingwei Zhang<sup>2</sup>; Pedro Borges<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Berkeley National Laboratory

### 9:30 AM Keynote

**Diffusion in High Entropy Alloys:** Vivek Verma<sup>1</sup>; Calvin Belcher<sup>1</sup>; Sakshi Bajpai<sup>1</sup>; Diran Apelian<sup>1</sup>; Enrique Lavernia<sup>1</sup>; <sup>1</sup>Department of Materials Science and Engineering, University of California Irvine

### 10:00 AM Invited

**High Entropy Alloys and NSF:** Jonathan Madison<sup>1</sup>; <sup>1</sup>National Science Foundation

### 10:20 AM Break

### 10:40 AM Invited

**Metastability High Entropy Alloy Design:** Dierk Raabe<sup>1</sup>; <sup>1</sup>Max-Planck Institute

### 11:00 AM Invited

**Development of Hierarchical ODS High Entropy Alloys Guided by ICME:** William Trehern<sup>1</sup>; Yi Wang<sup>1</sup>; Saro San<sup>1</sup>; Prashant Singh<sup>2</sup>; Fred Lia<sup>3</sup>; Jackie Garofano<sup>3</sup>; Dongsheng Li<sup>4</sup>; Michael Gao<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Ames National Laboratory; <sup>3</sup>Connecticut Center for Advanced Technology; <sup>4</sup>Advanced Manufacturing LLC

### 11:20 AM Invited

**Light-weight Low-cost Compositionally Complex Alloys – Design and Discovery:** Joseph Poon<sup>1</sup>; Diego Ibarra<sup>1</sup>; Jie Qi<sup>1</sup>; Jishnu Bhattacharyya<sup>1</sup>; Samuel Inman<sup>1</sup>; Peter Connors<sup>1</sup>; Sean Agnew<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

### 11:40 AM

**Enhancing Fatigue Life by Ductile-transformable Multicomponent B2 Precipitates in a High-entropy Alloy:** Peter Liaw<sup>1</sup>; Rui Feng<sup>2</sup>; You Rao<sup>3</sup>; Chuhao Liu<sup>4</sup>; Xie Xie<sup>1</sup>; Dunji Yu<sup>5</sup>; Yan Chen<sup>5</sup>; Maryam Ghazisaeidi<sup>3</sup>; Ungar Tamas<sup>6</sup>; Huamiao Wang<sup>4</sup>; Ke An<sup>5</sup>; <sup>1</sup>The University of Tennessee, Knoxville; <sup>2</sup>National Energy Technology Laboratory; <sup>3</sup>The Ohio State University; <sup>4</sup>Shanghai Jiao Tong University; <sup>5</sup>Oak Ridge National Laboratory; <sup>6</sup>Eötvös University Budapest

## Advances in Pyrometallurgy: Furnace Containment — Furnace Design and Operations

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, TMS: Industrial Advisory Committee

**Program Organizers:** Gerardo Alvear Flores, CaEng Associates; Camille Fleuriault, Eramet Norway; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Hugo Joubert, Tenova Pyromet; Stuart Nicol, Glencore Technology; Phillip Mackey, P.J. Mackey Technology, Inc.; Jesse White, Kanthal AB; Isabelle Nolet, Hatch

**Monday AM | March 4, 2024**  
**Celebration 5 | Hyatt**

**Session Chairs:** Phillip Mackey, P J Mackey; Jesse White, Kanthal

### 8:30 AM Introductory Comments

#### 8:35 AM Keynote

**Considerations for Robust Containment of Operating Furnaces:** *Lloyd Nelson*<sup>1</sup>; Isabelle Nolet<sup>2</sup>; <sup>1</sup>PYRO ONE (Pty Ltd); <sup>2</sup>Hatch

#### 9:05 AM Keynote

**Sustainability in the Production of Refractory Products - Ensuring an Optimal Circular Economy:** *Thomas Priett*<sup>1</sup>; Thomas Drnek<sup>1</sup>; <sup>1</sup>RHI Magnesita GmbH

#### 9:35 AM Keynote

**Designing Smelting Furnaces to Meet Process Requirements:** *Allan MacRae*<sup>1</sup>; <sup>1</sup>Macrae Technologies, Inc.

### 10:05 AM Break

#### 10:20 AM Invited

**The Importance of Understanding Mechanisms in Open-bath (DC) Processes Related to Furnace Containment:** *Harmen Oterdoom*<sup>1</sup>; Markus Reuter<sup>2</sup>; Johan Zietsman<sup>3</sup>; <sup>1</sup>Butter Bridge / OTI-LS; <sup>2</sup>Curtin University; <sup>3</sup>University of Pretoria - Ex Mente

#### 10:40 AM

**The Optimisation of ISASMELT™ Furnace Linings and Cooling Elements to Achieve Low Annualised Costs:** *Stuart Nicol*<sup>1</sup>; Ben Hogg<sup>1</sup>; <sup>1</sup>Glencore Technology

#### 11:00 AM

**Freeport-McMoRan Miami - Waste Heat Boiler Availability Improvements:** *Avi Nanda*<sup>1</sup>; Kurt Westerlund<sup>2</sup>; Bradley Fox<sup>1</sup>; <sup>1</sup>Freeport-Mcmoran; <sup>2</sup>Kamwest Oy

#### 11:20 AM

**Composite Copper-graphite Cooler for PGM Furnace Sidewall:** *Hugo Joubert*<sup>1</sup>; Gerrit de Villiers<sup>1</sup>; Pfariso Mbedzi<sup>2</sup>; John Davis<sup>2</sup>; <sup>1</sup>Tenova Pyromet; <sup>2</sup>Sibanye-Stillwater

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

**Advances in the State-of-the-Art of High Temperature Alloys — Microstructural Evolution**

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

**Program Organizers:** Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Michael Kirka, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Juan Carlos Madeni, Johns Manville Technical Center; Govindarajan Muralidharan, Oak Ridge National Laboratory

**Monday AM | March 4, 2024**  
**Bayhill 17 | Hyatt**

**Session Chair:** Dinc Erdeniz, University of Cincinnati

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**8:30 AM Invited**

**New Strengthening Mechanisms in Ni-base Superalloys:** *Michael Mills*<sup>1</sup>; Ashton Egan<sup>1</sup>; Timothy Smith<sup>2</sup>; Longsheng Feng<sup>3</sup>; Milan Heczko<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Emmanuelle Marquis<sup>4</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>University of Michigan

**9:00 AM Invited**

**Processing and Microstructure Development in Advanced Engineering Alloys for Extreme Environments:** *Amy Clarke*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**9:30 AM**

**Variant Selection of Intragranular Ni<sub>2</sub>(Mo,Cr) Precipitates in the Poly- and Single-Crystalline Ni-Mo-Cr-W Alloy:** Jie Song<sup>1</sup>; Yao Fu<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**9:50 AM**

**Quantification and Characterization of Solute Segregation in Binary Ni-Co for Alloy Design:** *Victoria Tucker*<sup>1</sup>; Michael Titus<sup>1</sup>; <sup>1</sup>Purdue University

**10:10 AM Break**

**10:25 AM Invited**

**Property-microstructure Evaluation of L-PBF Ni-based Superalloy Candidates for Industrial Gas Turbine (IGT) Fuel Injectors:** *Chantal Sudbrack*<sup>1</sup>; Kyle Rozman<sup>1</sup>; Rui Feng<sup>1</sup>; Lucas Teeter<sup>1</sup>; Yoosuf Picard<sup>1</sup>; Martin Detrois<sup>1</sup>; Anand Kulkarni<sup>2</sup>; Ramesh Subramanian<sup>3</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Siemens Corporation, Technology; <sup>3</sup>Siemens Energy USA

**10:55 AM Invited**

**Grain Structure Control Through Site Selective Exploitation of Recrystallisation Mechanisms in LPBF Ni-based Superalloys:** *Katerina Christofidou*<sup>1</sup>; Elaine Livera<sup>1</sup>; M Maguire<sup>1</sup>; W. Philpott<sup>1</sup>; G. Maddison<sup>1</sup>; M. Luan Phan<sup>1</sup>; Alexander Sloane<sup>1</sup>; H Saunders<sup>1</sup>; C. Atkinson<sup>1</sup>; Iain Todd<sup>1</sup>; <sup>1</sup>University of Sheffield

**11:25 AM**

**Occurrence of Heteroepitaxial Recrystallization and Following Microstructure Evolution in Polycrystalline Ni-base Superalloy Under Static Annealing:** *Yonguk Lee*<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

**11:45 AM**

**Influence of Strain and Heating Rate on Grain Growth of Super Solvus Processed Powder Metallurgy Ni-based Superalloys:** *Luis Arciniaga*<sup>1</sup>; Pascal Thome<sup>1</sup>; I-Ting Ho<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona

**12:05 PM**

**Rafting Behavior of Single Crystal Ni-based Superalloys After Laser Peening: Insights and Implications:** *Noah Holtham*<sup>1</sup>; Keivan Davami<sup>1</sup>; <sup>1</sup>University of Alabama

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## LIGHT METALS

### Advances in Titanium Technology – Session I

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

**Monday AM | March 4, 2024**  
**Windermere X-1 | Hyatt**

**Session Chairs:** Yufeng Zheng, University of North Texas; Zachary Kloenne, The Ohio State University

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#### 8:30 AM Invited

**Understanding Low Temperature Creep in the Alpha Phase of Titanium:** Atasi Ghosh<sup>1</sup>; Girish Bojjawar<sup>1</sup>; Shreya Mukherjee<sup>2</sup>; S Sreya<sup>1</sup>; Tejanath Sureddy<sup>1</sup>; Akshat Godha<sup>1</sup>; Surendra Makineni<sup>1</sup>; *Dipankar Banerjee*<sup>1</sup>; <sup>1</sup>Indian Institute of Science; <sup>2</sup>University of North Texas

#### 8:55 AM

**Cold Dwell Fatigue Response of Titanium Alloys: Influence of Hold Time and Peak Stress:** *Jianke Qiu*<sup>1</sup>; Mengmeng Zhang<sup>1</sup>; Chao Fang<sup>1</sup>; Jiafeng Lei<sup>1</sup>; Rui Yang<sup>1</sup>; <sup>1</sup>Institute of Metal Research, Chinese Academy of Sciences

#### 9:15 AM Invited

**Pushing the Limits of Strength-ductility Combinations in + Titanium Alloys:** *C. Tasan*<sup>1</sup>; John Foltz<sup>1</sup>; Shaolou Wei<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

#### 9:40 AM

**Influence of Materials State on Elastic Wave Propagation in Ti-5553:** Ruth Sunderman<sup>1</sup>; Maria Quintana<sup>1</sup>; Sid Pathak<sup>1</sup>; Ron Roberts<sup>1</sup>; Dan Barnard<sup>1</sup>; *Peter Collins*<sup>1</sup>; <sup>1</sup>Iowa State University

#### 10:00 AM Break

#### 10:20 AM

**Dislocation Micromechanisms in Titanium Micropillar Compression:** Zhaoxuan Wu<sup>1</sup>; Zhaoran Liu<sup>1</sup>; Rayan Ameen<sup>1</sup>; Yu-Lung Chiu<sup>1</sup>; *Ian Jones*<sup>1</sup>; <sup>1</sup>University of Birmingham

#### 10:40 AM

**Effect of Macrozone-notch Interaction on High Cycle Fatigue in Bimodal Ti-6Al-4V:** *Yan Gao*<sup>1</sup>; Nigel Martin<sup>2</sup>; Jamie Moschini<sup>2</sup>; David Dye<sup>1</sup>; <sup>1</sup>Imperial College; <sup>2</sup>Rolls-Royce plc

#### 11:00 AM

**Reduction in Macrozones by Thermomechanical Processing:** *Samuel Rogers*<sup>1</sup>; Mohamed Hilmi<sup>1</sup>; Xibo Xin<sup>1</sup>; David Dye<sup>1</sup>; <sup>1</sup>Imperial College London

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## ADDITIVE MANUFACTURING

### Agile Additive Manufacturing by Employing Breakthrough Functionalities – Agile AM - Processing, Prediction and Performance

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; John Carpenter, Los Alamos National Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Alex Kitt, Edison Welding Institute; Sougata Roy, Iowa State University; Sneha Prabha Narra, Carnegie Mellon University; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC

**Monday AM | March 4, 2024**  
**Atlantic | Hyatt**

**Session Chairs:** Yousub Lee, ORNL; Yashwanth Bandari, FasTech; Lang Yuan, University of South Carolina; Andrzej Nycz, ORNL

**8:30 AM Invited**

**In-situ 3D Scanning to Enable Agile Hybrid Wire Arc Additive Manufacturing With Adaptive Toolpathing:** Tadek Kosmal<sup>1</sup>; Samuel Pratt<sup>1</sup>; Bemnet Molla<sup>1</sup>; *Christopher Williams*<sup>1</sup>; <sup>1</sup>Virginia Tech

**8:50 AM Invited**

**Effects of Process Parameters on Fatigue Life of Inconel 718 Fabricated by Wire Laser Metal Deposition (w-LMD) and Wire Arc Additive Manufacturing (WAAM):** *Mehdi Amiri*<sup>1</sup>; Samuel Alfred<sup>1</sup>; Yash Bandari<sup>2</sup>; <sup>1</sup>George Mason University; <sup>2</sup>FasTech LLC

**9:10 AM**

**SolidStir® Additive Manufacturing: A Novel Solid-state Additive Manufacturing Technique Applied to Al-Ce Alloys:** *Ravi Sankar Haridas*<sup>1</sup>; Devin Davis<sup>1</sup>; Kumar Kandasamy<sup>2</sup>; David Weiss<sup>3</sup>; Vijay Vasudevan<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Enabled Engineering; <sup>3</sup>Luokus Technologies

**9:30 AM**

**Microstructure-deformation Mechanism Relationships in an Additive Friction Stir Deposition Fe-Cr-Ni Alloy:** *Shreya Mukherjee*<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Ravi Haridas<sup>1</sup>; Abhijeet Dhal<sup>1</sup>; Roopam Jain<sup>1</sup>; Aishani Sharma<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

**9:50 AM**

**Depositing Porous Rafts for Self-releasing WAAM Parts:** *Bemnet Molla*<sup>1</sup>; Christopher Williams<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**10:10 AM Break**

**10:30 AM**

**Distortion Mitigation Strategy in Single and Multi-agent Wire-arc Additive Manufacturing:** *Yousub Lee*<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Srdjan Simunovic<sup>1</sup>; Luke Meyer<sup>1</sup>; Chris Masuo<sup>1</sup>; William Carter<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; Joshua Vaughan<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:50 AM**

**A Distortion Compensation Workflow Accounting for the Effects of Post-processing in Metal Additive Manufacturing:** *Varun Gudibanda*<sup>1</sup>; Matthew Balcer<sup>2</sup>; Ezekiel Granillo<sup>3</sup>; Kyle Johnson<sup>4</sup>; Carl Herriott<sup>4</sup>; Michael Stender<sup>4</sup>; Ellen Wagman<sup>4</sup>; Sannmit Shinde<sup>4</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of Texas at San Antonio; <sup>3</sup>New Mexico State University; <sup>4</sup>Sandia National Laboratories

**11:10 AM**

**Thermal Management in High Heat Flux Environments: A Metal Additive Manufacturing Approach:** *Alexander Lark*<sup>1</sup>; Gehn Ferguson<sup>1</sup>; Ryan Carter<sup>1</sup>; Gianna Valentino<sup>2</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>University of Maryland

**11:30 AM**

**Design and Fabrication of High Dielectric GRIN Lens for a Directive Antenna Using Filled Voxel Additive Manufacturing Technique:** Qianfang Zheng<sup>1</sup>; Dmitry Isakov<sup>2</sup>; Anna Radkovskaya<sup>1</sup>; Kailun Xu<sup>1</sup>; Ekaterina Shamonina<sup>1</sup>; Sam-Baker Jones<sup>1</sup>; *Patrick Grant*<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>University of Warwick

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session I

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Monday AM | March 4, 2024**  
**Bayhill 32 | Hyatt**

**Session Chair:** Ashley Spear, University of Utah

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**8:30 AM**

**Mapping Anisotropic Yield Surface Models to Surrogate Isotropic Models Using Strongly Typed Interpretable Machine Learning:** David Randall<sup>1</sup>; Karl Garbrecht<sup>2</sup>; *Brian Phung*<sup>1</sup>; Joshua Robbins<sup>3</sup>; Jacob Hochhalter<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Sandia National Laboratory

**8:50 AM**

**Modeling the Microstructure Evolution of a 3D Polycrystal Using a Recurrent Neural Network With Physics Informed Loss Functions:** *Ashley Lenau*<sup>1</sup>; Reeru Pokharel<sup>2</sup>; Alexander Scheinker<sup>2</sup>; Stephen Niezgoda<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Los Alamos National Laboratory

**9:10 AM**

**A Data-driven Approach for Predicting the Stress-strain Curves of FCC Polycrystalline Metals:** *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

**9:30 AM**

**High Performance Data-base Crystal Plasticity Approach:** *Shahriyar Keshavarz*<sup>1</sup>; Yuwei Mao<sup>2</sup>; Andrew Reid<sup>1</sup>; Ankit Agrawal<sup>2</sup>; Wei-keng Liao<sup>2</sup>; Alok Choudhary<sup>2</sup>; <sup>1</sup>Nist; <sup>2</sup>Northwestern University

**9:50 AM**

**Physics-constrained Bayesian Neural Networks to Predict Grain Evolution:** Luka Malashkhia<sup>1</sup>; Dehao Liu<sup>2</sup>; Anh Tran<sup>3</sup>; *Yan Wang*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology;

<sup>2</sup>Binghamton University; <sup>3</sup>Sandia National Laboratories

### 10:10 AM Break

### 10:20 AM

**Physics-informed Machine Learning Model for Plasticity-mediated Void Growth in FCC Single Crystals:** *Karl Garbrecht*<sup>1</sup>; Andrea Rovinelli<sup>1</sup>; Jacob Hochhalter<sup>2</sup>; Paul Christodoulou<sup>3</sup>; Ricardo Lebensohn<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Utah; <sup>3</sup>University of California Santa Barbara

### 10:40 AM

**Physics-Informed Machine Learning Prediction of Fe-C Solidification:** *Benjamin Rhoads*<sup>1</sup>; Samrat Choudhury<sup>1</sup>; Yulan Li<sup>2</sup>; Shenyang Hu<sup>2</sup>; <sup>1</sup>University of Mississippi; <sup>2</sup>Pacific Northwest National Laboratory

### 11:00 AM

**Calibration of RAFM Steel Micro Mechanical Model for Creep Using Bayesian Optimization and Design of Experiments:** *Timothy Truster*<sup>1</sup>; Chaofan Huang<sup>2</sup>; Roshan Joseph<sup>2</sup>; Sunday Aduloju<sup>3</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Georgia Institute of Technology; <sup>3</sup>Oak Ridge National Laboratory

### 11:20 AM

**Physics-Informed Convolutional Neural Networks for Modeling Structure-property Relationships of Fiber-reinforced Composite Materials:** Guangfa Li<sup>1</sup>; Poorya Chavoshnejad<sup>1</sup>; Jalil Razavi<sup>1</sup>; *Dehao Liu*<sup>1</sup>; <sup>1</sup>Binghamton University

### 11:40 AM

**A Data-driven Active Learning Paradigm to Model Dislocation Mobility From Atomistics:** Yifeng Tian<sup>1</sup>; Soumendu Bagchi<sup>1</sup>; Liam Myhill<sup>1</sup>; Giaocomo Po<sup>1</sup>; Danny Perez<sup>1</sup>; Enrique Martinez-Saez<sup>1</sup>; Yen Ting Lin<sup>1</sup>; *Nithin Mathew*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithm Development in Materials Science and Engineering — Algorithm Development for Crystal Plasticity and Damage Mechanics I

#### *Sponsored by:*

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

**Monday AM | March 4, 2024**

**Bayhill 28 | Hyatt**

**Session Chair:** Richard Hennig, University of Florida

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### 8:30 AM

**A Line-free Discrete Dislocation Dynamics Method for Finite Domains:** *Aitor Cruzado*<sup>1</sup>; Pilar Ariza<sup>2</sup>; Alan Needleman<sup>1</sup>; Michael Ortiz<sup>3</sup>; Amine Benzerga<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of Sevilla; <sup>3</sup>Caltech

### 8:50 AM

**Bayesian Interpretable Machine Learning of Yield Surface Models with Noisy Data:** *Donovan Birky*<sup>1</sup>; Nolan Strauss<sup>1</sup>; Jacob Hochhalter<sup>1</sup>; <sup>1</sup>University of Utah



**9:10 AM Invited**

**Field Fluctuations Viscoplastic Self-consistent Crystal Plasticity: Applications to Predicting Texture Evolution during Deformation and Recrystallization of Cubic Polycrystalline Metals:** *Marko Knezevic*<sup>1</sup>; <sup>1</sup>University of New Hampshire

**9:40 AM**

**Initializing Grain and Sub-grain scale Residual Stress in Crystal Plasticity Simulations:** Ritwik Bandyopadhyay<sup>1</sup>; Kartik Kapoor<sup>1</sup>; *Michael Sangid*<sup>1</sup>; <sup>1</sup>Purdue University

**10:00 AM Break**

**10:20 AM**

**Inverse Problem Analysis of Phase Fraction Prediction in Aluminum Alloys Using Differentiable Deep Learning Models:** *Yu Okano*<sup>1</sup>; Takeshi Kaneshita<sup>1</sup>; Shimpei Takemoto<sup>1</sup>; Yoshishige Okuno<sup>1</sup>; <sup>1</sup>Resonac Corporation

**10:40 AM**

**Development of a Research and Production Material Model Library for Computational Solid Mechanics:** *William Scherzinger*<sup>1</sup>; Brian Lester<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**11:00 AM**

**Solid-state Precipitation in Molecular Dynamics: KMC-MD Hybrid Simulations:** *Jacob Tavenner*<sup>1</sup>; Mikhail Mendeleev<sup>2</sup>; John Lawson<sup>2</sup>; <sup>1</sup>KBR - NASA Ames; <sup>2</sup>NASA Ames Research Center

## BIOMATERIALS

### Biological Materials Science — Biological Materials Science I

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

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

**Monday AM | March 4, 2024**  
**Celebration 15 | Hyatt**

**Session Chairs:** Steven Naleway, University of Utah; Grace Gu, University of California, Berkeley

**8:30 AM**

**Strong and Tough Tape-based Quasi-composites:** Ben Skopic<sup>1</sup>; *Hannes Schniepp*<sup>1</sup>; <sup>1</sup>William & Mary

**8:50 AM Invited**

**Towards Architecting Bacterial Cellulose From the Bottom-up Using Electric Fields:** *Rodrigo Martinez-Duarte*<sup>1</sup>; Sindora Baddam<sup>1</sup>; Suma Ravi<sup>1</sup>; <sup>1</sup>Clemson University

**9:20 AM Invited**

**Biomimetics by Freeze Casting: Emulating Performance-defining Features in Bulk:** *Ulrike G. K. Wegst*<sup>1</sup>; <sup>1</sup>Northeastern University

9:50 AM Break

10:10 AM Invited

**Exploiting Disorder in the Design of Architected Materials:** *Kevin Turner*<sup>1</sup>; Sumukh Pander<sup>1</sup>; Sage Fulco<sup>1</sup>; <sup>1</sup>University of Pennsylvania

10:40 AM

**Bioinspired Materials Templated by Nature:** *Steven Naleway*<sup>1</sup>; Debora Lyn Porter<sup>2</sup>; Tony Yin<sup>1</sup>; Josh Fernquist<sup>1</sup>; Maddie Schmitz<sup>1</sup>; Elise Hotz<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of California, Merced

11:00 AM

**Controlling Bioinspired Magnetic Freeze-cast Alumina Scaffolds Using the Hall Effect:** *Maddie Schmitz*<sup>1</sup>; Steven Naleway<sup>1</sup>; Isaac Nelson<sup>1</sup>; <sup>1</sup>University of Utah

11:20 AM Invited

**Leveraging Artificial Intelligence for Bio-inspired Design: An Examination of Fibrillar Adhesives and Bio-inspired Composites:** *Seunghwa Ryu*<sup>1</sup>; <sup>1</sup>Kaist

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## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Advanced Characterization Methods I**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Monday AM | March 4, 2024**

**Regency O | Hyatt**

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

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8:30 AM

**Characterizing Dislocations by Formulating the Invisibility Criteria for DFXM:** *Dayeeta Pal*<sup>1</sup>; Yifan Wang<sup>1</sup>; Ramya Gurunathan<sup>2</sup>; Leora Marais<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>National Institute of Standards and Technology

8:50 AM

**Characterization of Grain Boundary Network Structure-property Relations Through Harmonic Expansion:** *Christopher Adair*<sup>1</sup>; Oliver Johnson<sup>1</sup>; <sup>1</sup>Brigham Young University

9:10 AM

**Analysis of Coronado State Historic Site Artifacts Using X-rays:** *Brian Patterson*<sup>1</sup>; Steven Young<sup>1</sup>; James Valdez<sup>1</sup>; Michelle Espy<sup>1</sup>; Alex Edgar<sup>1</sup>; Jack Brett<sup>1</sup>; Clay Mathers<sup>2</sup>; Matthew Barbour<sup>3</sup>; Michael Pettes<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Archaeological Analysis and Graphics; <sup>3</sup>New Mexico Historic Sites

**9:30 AM**

**Accelerating New Material Development with an Innovative Characterization Tool:** *Ellen Williams*<sup>1</sup>; Jonathan Putman<sup>1</sup>; Peyton Willis<sup>1</sup>; <sup>1</sup>Exum Instruments

**9:50 AM**

**Five-parameter Grain Boundary Character and Surface Character of Gold Nanoparticles Using Three-dimensional Orientation Mapping in the Transmission Electron Microscope:** *Wanquan Zhu*<sup>1</sup>; Guilin Wu<sup>2</sup>; Andrew Godfrey<sup>3</sup>; Søren Schmidt<sup>4</sup>; Qiongyao He<sup>1</sup>; Zongqiang Feng<sup>1</sup>; Tianlin Huang<sup>1</sup>; Ling Zhang<sup>1</sup>; Xiaoxu Huang<sup>1</sup>; <sup>1</sup>Chongqing University; <sup>2</sup>University of Science and Technology Beijing; <sup>3</sup>Tsinghua University; <sup>4</sup>European Spallation Source ERIC

**10:10 AM Break**

**10:25 AM**

**Small-scale Centrifugal Loading and XCT for High Explosive Mock Development:** *Alexandra Burch*<sup>1</sup>; John Yeager<sup>2</sup>; Carl Cady<sup>1</sup>; Tomislav Kosta<sup>2</sup>; Brian Patterson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Air Force Research Laboratory

**10:45 AM**

**Correlative Cutting Techniques for Rapid Microcantilever Beam Preparation and Notch Analysis:** *Md Tariqul Islam*<sup>1</sup>; Christopher Weinberger<sup>2</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>The University of Alabama; <sup>2</sup>Colorado State University

**11:05 AM**

**Spectral Computed Tomography, a New Dimension to Non-destructive 3D Imaging:** Wesley De Boever<sup>1</sup>; Marijn Boone<sup>1</sup>; *Ksenija Nikolic*<sup>1</sup>; <sup>1</sup>Tescan

**11:25 AM**

**Estimation Prediction of CaO–SiO<sub>2</sub>–FeO Slag System Based on Microstructure Analysis:** *Rui Zhang*<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Zhihe Dou<sup>1</sup>; Mao Chen<sup>2</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>Pangang Group Company Limited

**11:45 AM**

**Characterization of Sub-stoichiometric Titanium Hydride Powders: A Synergistic Application of XRD, Laser-induced Breakdown Spectroscopy (LIBS), and Quartz-crystal Microbalance (QCM) Methods:** *Stewart Youngblood*<sup>1</sup>; Doinita Neiner<sup>1</sup>; Ronald Goeke<sup>1</sup>; Danielle Hartstein<sup>1</sup>; Michael Thomas<sup>1</sup>; Daniel Bufford<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Grain Boundaries and Interfacial Line Defects

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

**Monday AM | March 4, 2024**  
**Bayhill 25 | Hyatt**

**Session Chairs:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

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**8:30 AM Invited**

**Back and Forth are Not the Same: The Migration of Typical Grain Boundaries:** *David Srolovitz*<sup>1</sup>; *Caihao Qiu*<sup>2</sup>; *Siqi Wang*<sup>2</sup>; *Marco Salvalaglio*<sup>3</sup>; *Jian Han*<sup>2</sup>; <sup>1</sup>University of Hong Kong; <sup>2</sup>City University of Hong Kong; <sup>3</sup>TU Dresden

**9:00 AM Invited**

**The Stochastic Nature of Microstructural Evolution:** *Elizabeth Holm*<sup>1</sup>; *Meizhong Lyu*<sup>1</sup>; *Anqi Qiu*<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Carnegie Mellon University

**9:30 AM**

**The Effect of Grain Boundary Energy Anisotropy and Triple Junctions on Grain Growth:** *Zipeng Xu*<sup>1</sup>; *Gregory Rohrer*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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

**Towards a Statistical Mechanical Theory of Disconnections in Grain Boundaries:** *Nikhil Chandra Admal*<sup>1</sup>; *Himanshu Joshi*<sup>1</sup>; *Ian Chesser*<sup>2</sup>; *Brandon Runnels*<sup>3</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Iowa State University

**10:40 AM**

**Systematic Generation of a Grain Boundary Database Using High-throughput Simulations and Grand Canonical Optimization:** *Enze Chen*<sup>1</sup>; *Mark Asta*<sup>1</sup>; *Timofey Frolov*<sup>2</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Livermore National Laboratory

**11:00 AM**

**Strain Accommodations and Disconnection Distributions in Nonplanar Grain Boundaries:** *Alejandro Hinojos*<sup>1</sup>; *Darcey Britton*<sup>2</sup>; *Michelle Hummel*<sup>1</sup>; *David Adams*<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

**11:20 AM**

**Revealing Line Defect Structures in Crystalline Interfaces:** *Ryan Sills*<sup>1</sup>; *Nipal Deka*<sup>1</sup>; *David Gordon*<sup>1</sup>; *Alexander Stukowski*<sup>2</sup>; <sup>1</sup>Rutgers University; <sup>2</sup>OVITO GmbH

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**
**Computational Discovery and Design of Materials — Session I**

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

**Program Organizers:** *Houlong Zhuang*, Arizona State University; *Ismaila Dabo*, Pennsylvania State University; *Arezoo Emdadi*, Missouri University of Science and Technology; *Yang Jiao*, Arizona State University; *Sara Kadkhodaei*, University Of Illinois Chicago; *Mahesh Neupane*, DEVCOM Army Research Laboratory; *Xiaofeng Qian*, Texas A&M University; *Arunima Singh*, Arizona State University; *Natasha Vermaak*, Lehigh University

**Monday AM | March 4, 2024**

**Bayhill 33 | Hyatt**

**Session Chairs:** *Arezoo Emdadi*, Missouri University of Science and Technology; *Houlong Zhuang*, Arizona State University

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**8:30 AM Invited**

**Computational Design of Dual-metal-site Catalysts for Oxygen Reduction Reaction:** *Guoxiang Hu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**8:55 AM Invited**

**Representation-based Generative Models for Materials:** *Victor Fung*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**9:20 AM**

**Design Principles of N-doped Carbon Supported Single Atom Catalyst --- A High-throughput Computational Investigation:** *Zhengda He*<sup>1</sup>; *Bin Ouyang*<sup>1</sup>; <sup>1</sup>Florida State University

**9:40 AM**

**Data-Driven Optimization of Interlocking Metasurface Design:** *Nathan Brown*<sup>1</sup>; *Ben Young*<sup>1</sup>; *Brett Clark*<sup>1</sup>; *Ophelia Bolmin*<sup>1</sup>; *Brad Boyce*<sup>1</sup>; *Philip Noell*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:00 AM Break**

**10:20 AM Invited**

**Discovery of Surfaces with Extreme Work Functions and High Stability by Machine Learning:** *Peter Schindler*<sup>1</sup>; <sup>1</sup>Northeastern University

**10:45 AM**

**A Combined Physics-based and Data-driven Approach to Optimize the Device Characteristics of Multi-component Organic-photovoltaics:** *Fiyanshu Kaka*<sup>1</sup>; *Manjeet Keshav*<sup>2</sup>; <sup>1</sup>Defence Institute of Advanced Technology; <sup>2</sup>Pandit Deendayal Energy University

**11:05 AM**

**Evaluation of Effective, Nonlinear Material Behavior of Fibrous Soft Tissues Using Embedded Finite Elements:** *Sotirios Kakaletsis*<sup>1</sup>; *Adarsh Chaurasia*<sup>1</sup>; *Ali Najafi*<sup>1</sup>; <sup>1</sup>Ansys

**11:25 AM**

**First-principles Tools for the Design of Multi-component Materials:** *Anirudh Raju Natarajan*<sup>1</sup>; <sup>1</sup>École Polytechnique Fédérale de Lausanne (EPFL)

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Phase Stability & Phase Transitions

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** *Anirudh Raju Natarajan*, École Polytechnique Fédérale de Lausanne (EPFL); *Seth Blackwell*, Los Alamos National Laboratory; *Rinkle Juneja*, Oak Ridge National Laboratory; *Eva Zarkadoula*, Oak Ridge National Laboratory; *Damien Tournet*, IMDEA Materials Institute; *Fadi Abdeljawad*, Lehigh University

**Monday AM | March 4, 2024**

**Bayhill 29 | Hyatt**

**Session Chairs:** *Joerg Neugebauer*, Max-Planck-Institut; *Javier Llorca*, IMDEA Materials Institute & Technical University of Madrid

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**8:30 AM Invited**

**Metastable Defect Phase Diagrams as a Road Map for Defect Design:** *Ali Tehranchi*<sup>1</sup>; *Prince Mathews*<sup>1</sup>; *Jing Yang*<sup>1</sup>; *Mira Todorova*<sup>1</sup>; *Tilman Hickel*<sup>1</sup>; *Joerg Neugebauer*<sup>1</sup>; <sup>1</sup>Max-Planck-Institut fuer Eisenforschung

**9:00 AM****Local Lattice Distortions and Structural Phase Stability in Nb-Ta-Ti-Hf 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**9:20 AM****Thermodynamic Stability of Phases in Zr-Nb Alloys:** *Vidur Tuli*<sup>1</sup>; Antoine Claisse<sup>2</sup>; Claudio Cazorla<sup>3</sup>; Patrick Burr<sup>1</sup>; <sup>1</sup>The University of New South Wales; <sup>2</sup>Westinghouse Electric Sweden; <sup>3</sup>Universitat Politècnica de Catalunya**9:40 AM****Computational Determination of the Metastable Fe-V Phase Diagram:** *Jorge Munoz*<sup>1</sup>; <sup>1</sup>University of Texas at El Paso**10:00 AM Break****10:20 AM****Intercalation of Ferrocene into Vanadyl Phosphate by Density Functional Theory:** *Yuan Liu*<sup>1</sup>; An Ta<sup>1</sup>; Seaton Ullberg<sup>1</sup>; Jiahui Liu<sup>1</sup>; Daniel Talham<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida**10:40 AM****Quasicrystal Bulk and Surface Energies from Density Functional Theory:** *Woohyeon Baek*<sup>1</sup>; Sambit Das<sup>1</sup>; Vikram Gavini<sup>1</sup>; *Wenhao Sun*<sup>1</sup>; <sup>1</sup>University of Michigan**11:00 AM Invited****Accurate Prediction of Phase Diagrams of Binary and Ternary Systems from First-principles Calculations:** *Sha Liu*<sup>1</sup>; Wei Shao<sup>2</sup>; *Javier Llorca*<sup>1</sup>; <sup>1</sup>Yanshan University; <sup>2</sup>Polytechnic University of Madrid

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**MECHANICS OF MATERIALS****Defects and Interfaces: Modeling and Experiments — Session for Richard Hoagland: Open Session****Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Nanomechanical Materials Behavior Committee**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University**Monday AM | March 4, 2024****Coral Spring II | Hyatt***Funding support provided by:* **Los Alamos National Laboratory****Session Chairs:** Amit Misra, University of Michigan; Peter Anderson, Ohio State University

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**8:30 AM Introductory Comments**

Welcome/Introductory Remarks- Jian Wang, Peter Anderson [include video recorded messages from John Hirth and David Embury]

**9:00 AM Remarks by Harriet Kung, DOE, Office of Basic Energy Sciences****9:15 AM Keynote****Atomic-scale Analysis of Chemistry at Lattice Defects:** *Dierk Raabe*<sup>1</sup>; <sup>1</sup>Max-Planck Institute

**9:45 AM Invited**

**Lattice Dislocations in High Angle Grain Boundaries:** *Diana Farkas*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

**10:10 AM Break**

**10:20 AM Remarks by John Vetrano, DOE, Office of Basic Energy Sciences**

**10:35 AM Invited**

**Influence of Thick 3-dimensional Interfaces on Deformation of Metallic Nanolayered Composites:** *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>; Jonathan Poplawsky<sup>4</sup>; Jon Baldwin<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>Oak Ridge National Laboratory

**11:00 AM Invited**

**Exploring the Interplay between Disconnections and Grain Boundary Facet Junctions:** *Douglas Medlin*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**11:25 AM Keynote**

**Dislocation - Interface Interactions: Slip Transmission, Interface Sliding, and Polycrystal Plasticity:** *David Srolovitz*<sup>1</sup>; Jinxin Yu<sup>2</sup>; Jian Han<sup>2</sup>; Alfonso Ngan<sup>1</sup>; <sup>1</sup>University of Hong Kong; <sup>2</sup>City University of Hong Kong

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**
**Electronic Packaging and Interconnection Materials — 3D Microelectronic Packaging and Emerging Interconnects**

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

**Monday AM | March 4, 2024**

**Bayhill 27 | Hyatt**

**Session Chairs:** Yu-An Shen, Feng Chia University, Taiwan; Tae-Kyu Lee, Cisco Systems

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**8:30 AM Introductory Comments****8:35 AM**

**Low-temperature Direct Bonding of Co-sputtered Cu-Ag Alloy Thin Films:** *Yu-Chieh Wang*<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**8:55 AM**

**Cu-Cu Interconnection With Electroplated Ga and Ni UBM:** *Tzu-hsuan Huang*<sup>1</sup>; Jian-wei Huang<sup>1</sup>; Zhih-feng Lin<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**9:15 AM**

**Development of Low-temperature Cu-to-Cu Direct Bonding Technology Using Glycerol Vapor as Cu Surface Antioxidant:** *Jeehoo Na*<sup>1</sup>; Eunhye Lee<sup>2</sup>; So Jeong Lee<sup>2</sup>; Dongwoo Lee<sup>3</sup>; Tae-Ik Lee<sup>2</sup>; <sup>1</sup>Korea Institute of Industrial Technology, Sungkyunkwan University; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Sungkyunkwan University

**9:35 AM****Additive-induced Crystallization of Highly (111) Textured Cu Nanotwins by Electroless Deposition:** *Po Shao Shih*<sup>1</sup>; Jeng Hau Huang<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University**9:55 AM****Investigation of In-passivated Cu-to-Cu Direct Bonding With a Sn Diffusion Barrier Layer:** *Yi-Chen Tseng*<sup>1</sup>; Po-Yu Kung<sup>1</sup>; Yung-Sheng Lin<sup>2</sup>; Yun-Ching Hung<sup>3</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Advanced Semiconductor Engineering (ASE) Group; <sup>3</sup>Advanced Semiconductor Engineering (ASE) Group**10:15 AM Break****10:35 AM****Low-temperature Direct Bonding of Co-sputtered Nano-twinned Cu-Ag Alloy Thin Films:** Fan-Yi Ouyang<sup>1</sup>; Chun-Yen Li<sup>1</sup>; *Yu Tang*<sup>2</sup>; <sup>1</sup>National Tsing Hua University; <sup>2</sup>College of Semiconductor Research, National Tsing Hua University**10:55 AM****The Kinetic Analysis and Inhibition Efficiency of the Anti-immersion Agent for the Ag Replacement Reaction.:** *Chieh Pu Tsaï*<sup>1</sup>; <sup>1</sup>National Center University**11:15 AM****The Formation of Ag Nodule Structures From Ag-Si Metastable States:** *Koji Nakayama*<sup>1</sup>; Minoru Ueshima<sup>2</sup>; Masahiko Nishijima<sup>1</sup>; Chuantong Chen<sup>1</sup>; Katsuaki Suganuma<sup>1</sup>; <sup>1</sup>Osaka University; <sup>2</sup>Daicel Corporation**11:35 AM****Phase Formation and Transformation Behavior in Rapidly Solidified Ag-Si Alloys:** *Yicheng Zhang*<sup>1</sup>; Koji Nakayama<sup>1</sup>; Chuantong Chen<sup>1</sup>; Minoru Ueshima<sup>2</sup>; Katsuaki Suganuma<sup>1</sup>; <sup>1</sup>SANKEN, Osaka University; <sup>2</sup>Daicel Corporation**11:55 AM****The Effect of Surface Roughness on Spreading of SAC305 on Ag Substrates:** *Wunmi Olukoya*<sup>1</sup>; Russell Goodall<sup>1</sup>; <sup>1</sup>University of Sheffield

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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**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, Karlsruhe Institute of Technology (KIT); Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.**Monday AM | March 4, 2024****Coral Spring I | Hyatt****Session Chairs:** Wenjun Cai, Virginia Polytechnic Institute and State University; Srujan Rokkam, Advanced Cooling Technologies, Inc.

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**8:30 AM****Comparison of Pitting Corrosion Behavior of Additively Manufactured and Forged P91 in Molten Sulfate Salt:** *Ting Sun*<sup>1</sup>; Shanshan Hu<sup>1</sup>; Xingbo Liu<sup>1</sup>; <sup>1</sup>West Virginia University**8:50 AM****Effects of Varying Al Content on the Microstructure of the Fe-Cr-Ni-Mn-Al Multi-component Alloy System:** *Kara Krogh*<sup>1</sup>; Saikumaran Ayyappan<sup>1</sup>; Geoffrey Beausoleil<sup>2</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory**9:10 AM****Orientation Dependency of Hydrogen-induced Cracks in Single-crystalline CrCoNi Medium-entropy Alloy:** *Dae Cheol Yang*<sup>1</sup>; Alireza Zargarani<sup>1</sup>; Sang Yoon Song<sup>1</sup>; Ju-Hyun Baek<sup>1</sup>; Jung Wan Lee<sup>1</sup>; Hyoung Seop Kim<sup>1</sup>; Jin-Yoo Suh<sup>1</sup>; Young Sang Na<sup>1</sup>; Seok Su Sohn<sup>1</sup>; <sup>1</sup>Korea University**9:30 AM Invited****Deformation Behavior of High Entropy Alloys as a Function of Strain Rate and Temperature:** *Shristy Jha*<sup>1</sup>; *Sundeep Mukherjee*<sup>1</sup>; <sup>1</sup>University of North Texas**9:50 AM Break****10:05 AM****Corrosion Resistance of 316L Stainless Steel in Hydrochloric Acid:** *ThankGod Nwokocha*<sup>1</sup>; Thomas Burleigh<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology**10:25 AM****Impaired Repassivation Kinetics of Multi-principal Element Alloy Surfaces Caused by Selective Oxidation and Nickel Enrichment:** *Jia Chen*<sup>1</sup>; *Zhengyu Zhang*<sup>1</sup>; *Wenjun Cai*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University**10:45 AM Invited****Accelerating the Design and Discovery of Tribocorrosion-resistant Metals by Interfacing Multiphysics Modeling With Machine Learning and Genetic Algorithms:** *Yucong Gu*<sup>1</sup>; *Wenjun Cai*<sup>2</sup>; *Lin Li*<sup>3</sup>; <sup>1</sup>The University of Alabama; <sup>2</sup>Virginia Polytechnic Institute and State University; <sup>3</sup>Arizona State University**11:05 AM****Study of the Corrosive Effect of Enzymatic, Multi-enzymatic, and Sodium Hypochlorite Solutions on Surgical-grade Stainless Steel Instruments Used in the Operating Room Area of the Clinical Hospital:** *Jhasmmany Lovera*<sup>1</sup>; <sup>1</sup>UMSA**11:25 AM Invited****Some Effects of Hydrogen on the CoCrFeMnNi Alloy:** *Dierk Raabe*<sup>1</sup>; <sup>1</sup>Max-Planck Institute**11:45 AM Invited****Bottom-up versus Top-down Oxide Scale Design in Refractory High Entropy Alloys:** *Mitra Taheri*<sup>1</sup>; Elaf Anber<sup>1</sup>; Sebastian Lech<sup>1</sup>; David Beaudry<sup>1</sup>; Charlie Brandenburg<sup>2</sup>; Elizabeth Opila<sup>2</sup>; Michael Waters<sup>3</sup>; James Rondinelli<sup>3</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Virginia; <sup>3</sup>Northwestern University

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**MECHANICS OF MATERIALS****Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Predictive Methods for Fatigue Properties**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; Ashley Spear, University of Utah; Brian Wisner, Ohio University

**Monday AM | March 4, 2024**  
**Manatee Spring II | Hyatt**

**Session Chair:** Orion Kafka, NIST

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**8:30 AM**

**Beyond Goodman Diagram in Fatigue: Accurate Correlations of Mean Stress Effects on Fatigue Life Based on Physical Model of S-N Fatigue:** *K. S. Ravi Chandran*<sup>1</sup>; <sup>1</sup>University of Utah

**8:50 AM**

**In Situ Failure Analysis of Ni-718 Using Machine Learning to Identify Failure States:** *Jesse Yochens*<sup>1</sup>; Thomas Miller<sup>1</sup>; Dino Celli<sup>2</sup>; Brian Wisner<sup>1</sup>; <sup>1</sup>Ohio University; <sup>2</sup>Airforce Research Laboratory

**9:10 AM**

**A Two-surface Modeling to Improve Creep-fatigue Predictions in Ni-based Single-crystal Superalloys:** *Jean-Briac le Graverend*<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:30 AM**

**Fatigue Damage Prediction Using Graph Neural Networks on Microstructure Representations:** *Ali Riza Durmaz*<sup>1</sup>; Akhil Thomas<sup>1</sup>; Christoph Eberl<sup>1</sup>; Peter Gumbsch<sup>2</sup>; <sup>1</sup>Fraunhofer IWM; <sup>2</sup>Karlsruhe Inst of Technology KIT

**9:50 AM Invited**

**Fatigue Indicator Parameters: Effects of Phase Transformation and Nonlocality:** *John Moore*<sup>1</sup>; Caitlin Martinez<sup>1</sup>; Jacob P. Rusch<sup>1</sup>; Parisa Shabani Nezhad<sup>2</sup>; Sivom Manchiraju<sup>3</sup>; Ayushi Chandel<sup>4</sup>; Dinc Erdeniz<sup>5</sup>; <sup>1</sup>Marquette University; <sup>2</sup>GE Healthcare; <sup>3</sup>Ansys, Inc; <sup>4</sup>Brookfield Academy; <sup>5</sup>University of Cincinnati

**10:20 AM Break**

**10:40 AM**

**Multi-time Scaling Techniques for Accelerating Crystal Plasticity Fatigue Simulations of Additively Manufactured Inconel 718:** *George Weber*<sup>1</sup>; Saikumar Reddy Yeratapally<sup>2</sup>; Joshua Pribe<sup>3</sup>; Edward Glaessgen<sup>1</sup>; <sup>1</sup>NASA Langley Research Center; <sup>2</sup>Science and Technology Corporation; <sup>3</sup>Analytical Mechanics Associates

**11:00 AM**

**Interpretable Machine Learning for the Prediction of Crack Initiation in Additively Manufactured Inconel 718:** *Jonas Merrell*<sup>1</sup>; Krzysztof Stopka<sup>2</sup>; Michael Sangid<sup>2</sup>; Jacob Hochhalter<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Purdue University

**11:20 AM**

**Simulation of Dislocation Slip Bands during Fatigue of a Precipitate Strengthened Nickel-based Superalloy:** *Miguel Espadero*<sup>1</sup>; Hector Basoalto<sup>2</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>University of Sheffield

**11:40 AM**

**Micromechanical Modeling of Plastic Damage in Metallic Materials:** *Gururaj Gopal Rao*<sup>1</sup>; Leslie T Mushongera<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

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## MATERIALS SYNTHESIS AND PROCESSING

### Formability and Spring-back Issues in Ultra-high Strength Steels and High Strength Aluminum Alloys — Session I

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

**Program Organizers:** Mert Efe, Pacific Northwest National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory; Lu Huang, General Motors; Gang Huang, ArcelorMittal; Yannis Korkolis, Ohio State University; Amir Asgharzadeh, EWI

**Monday AM | March 4, 2024**

**Celebration 2 | Hyatt**

**Session Chairs:** Piyush Upadhyay, Pacific Northwest National Laboratory; Mert Efe, Pacific Northwest National Laboratory; Gang Huang, ArcelorMittal Global R&D- East Chicago

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**8:30 AM Invited**

**Hot Stamping of Third Generation Advanced High Strength Steels:** Abdelbaset Midawi<sup>1</sup>; Cameron Tolton<sup>1</sup>; Timothy Skszek<sup>2</sup>; Clifford Butcher<sup>1</sup>; *Michael Worswick*<sup>1</sup>; <sup>1</sup>University of Waterloo; <sup>2</sup>Pacific Northwest National Laboratory

**9:10 AM Invited**

**The “Next Era in Stamping Technology” (NEST), The Fundamentals of a Hybrid Stamping Technology:** *Vincent Millioto*<sup>1</sup>; <sup>1</sup>Martinrea International

**9:50 AM**

**On Local Formability of Multi-phase Ultra-high-strength Steels:** *Jun Hu*<sup>1</sup>; <sup>1</sup>Cleveland-Cliffs Steel

**10:10 AM Break**

**10:30 AM Invited**

**Influence of Yoshida-Uemori Model on Springback Prediction:** *Xavier Lemoine*<sup>1</sup>; Jean-Marc Devin<sup>2</sup>; <sup>1</sup>ArcelorMittal Maizières; <sup>2</sup>ArcelorMittal Montataire

**11:10 AM**

**Hybrid Bead Development and Validation; Auto Steel Partnership:** *Chris Roman*<sup>1</sup>; <sup>1</sup>General Motors

**11:30 AM**

**High Strength Aluminum Alloy Forming and Springback Performance:** *Xiaoming Chen*<sup>1</sup>; <sup>1</sup>Novelis Corp

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials I: One-Dimensional Nanostructures

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Monday AM | March 4, 2024**  
**Bayhill 21 | Hyatt**

**Session Chairs:** Mostafa Bedewy, University of Pittsburgh; Changhong Cao, McGill University

**8:30 AM Keynote**

**Self-assembly and Bottom-up Growth of Aligned Semiconducting Carbon Nanotubes and Graphene Nanoribbons for Next-Gen Microelectronics:** *Michael Arnold*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**9:05 AM Invited**

**Ru-promoted Co Catalysts for CVD Growth of Small-diameter Single-Wall Carbon Nanotubes Using Rapid Experimentation:** Brian Everhart<sup>1</sup>; Rahul Rao<sup>2</sup>; Benji Maruyama<sup>2</sup>; Pavel Nikolaev<sup>2</sup>; *Placidus Amama*<sup>1</sup>; <sup>1</sup>Kansas State University; <sup>2</sup>AFRL

**9:35 AM**

**Dynamic Chemical Vapor Deposition for Controlling Geometric Uniformity of Macroscopic Carbon Nanotube Forests:** Golnaz Najaf Tomaraei<sup>1</sup>; Moataz Abdulhafez<sup>1</sup>; Soumalya Ghosh<sup>1</sup>; Jaegeun Lee<sup>1</sup>; *Mostafa Bedewy*<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**9:55 AM**

**Highly Stretchable Supercapacitors via Crumpled Vertically Aligned Carbon Nanotube Forests:** *Changyong Cao*<sup>1</sup>; <sup>1</sup>Case Western Reserve University

**10:15 AM Break**

**10:35 AM Keynote**

**Soft Materials Approaches to Carbon Nanotubes: Gels and Composites:** *Mohammad Islam*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**11:10 AM Invited**

**Fabrication of One-dimensional Topological Nanomaterials through Thermomechanical Induced Epitaxy:** *Yi-Xiang Yang*<sup>1</sup>; Naijia Liu<sup>2</sup>; Cai Lu<sup>3</sup>; Sungwoo Sohn<sup>1</sup>; Sebastian Kube<sup>4</sup>; Miguel Costa<sup>5</sup>; Ze Liu<sup>3</sup>; Jan Schroers<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>Northwestern University; <sup>3</sup>Wuhan University; <sup>4</sup>University of California, Santa Barbara; <sup>5</sup>University of Cambridge

**11:40 AM**

**Synthesis and Characterization of Directional Graphene Aerogel Electrodes for Organic Electrochemical System:** *Seungha Shin*<sup>1</sup>; Yu-Kai Weng<sup>1</sup>; Md Abdullah Al Hasan<sup>1</sup>; Mian Umar Saeed<sup>1</sup>; Kenneth Kihm<sup>1</sup>; Douglas Aaron<sup>1</sup>; Mohammad Bahzad<sup>1</sup>; <sup>1</sup>University of Tennessee

**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**High Temperature Electrochemistry: An FMD Symposium Honoring Uday B. Pal — High Temperature Electrochemistry and Sustainable Metallurgy I**

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Soumendra Basu, Boston University; Srikanth Gopalan, Boston University; Adam Powell, Worcester Polytechnic Institute; Filippos Patsiogiannis, Bridgnorth Aluminium Ltd; Xiaofei Guan, Shanghaitech University

**Monday AM | March 4, 2024**  
**Bayhill 24 | Hyatt**

**Session Chairs:** Soumendra Basu, Boston University; Adam Powell, Worcester Polytechnic Institute

**8:30 AM Introductory Comments:** Soumendra Basu will introduce Prof. Uday Pal at the start of his honorary symposium and will speak briefly about his achievements in the area of high temperature electrochemistry.

**8:35 AM Keynote**

**A Journey through New Research Applications in High Temperature Electrochemistry:** *Uday Pal*<sup>1</sup>; <sup>1</sup>Boston University

**9:05 AM Invited**

**Examples of High Temperature Electrochemical Research:** *Patrick Taylor*<sup>1</sup>; Judith Vidal<sup>2</sup>; Fangyu Liu<sup>3</sup>; Liam Witteman<sup>1</sup>; Wenming Wang<sup>4</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>NREL; <sup>3</sup>Hatch; <sup>4</sup>First Solar

**9:30 AM Invited**

**Transforming Residues to Resources and How Sustainable Metallurgy Can Set the Example:** *Yiannis Pontikes*<sup>1</sup>; Michiel Giels<sup>1</sup>; Vincent Hallet<sup>1</sup>; Tobias Hertel<sup>1</sup>; <sup>1</sup>KU Leuven

**9:55 AM Invited**

**Transport Modeling in High-temperature Electrochemical Systems:** *Robert Hyers*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**10:20 AM Break**

**10:35 AM Invited**

**Fundamental and Engineering of Molten Salt CO<sub>2</sub> Capture and Electrochemical Transformation (MSCC-ET) Process:** Kaifa Du<sup>1</sup>; Huayi Yin<sup>1</sup>; Bowen Deng<sup>1</sup>; *Dihua Wang*<sup>1</sup>; <sup>1</sup>Wuhan University

**11:00 AM Invited**

**The Long Road to SOM Primary Magnesium Production:** *Adam Powell*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**11:25 AM Invited**

**Degradation Mechanisms and Mitigation Strategies of YSZ Membranes in Contact with Oxy-Fluorite Flux:** *Soumendra Basu*<sup>1</sup>; JiaPeng Xu<sup>2</sup>; Jicheng Guo<sup>3</sup>; Uday Pal<sup>1</sup>; <sup>1</sup>Boston University; <sup>2</sup>TS Technology Co.; <sup>3</sup>Argonne National Laboratory

**11:50 AM Invited**

**Taking SOM to the Moon: A Lunar Demonstrator for Oxygen and Metals Extraction from Regolith Based on the ROXY Process:** *Achim Seidel*<sup>1</sup>; Emanuele Monchieri<sup>1</sup>; Ulrich Kuebler<sup>1</sup>; Uday Pal<sup>2</sup>; Georg Poehle<sup>3</sup>; Christian Redlich<sup>3</sup>; <sup>1</sup>Airbus Defence and Space; <sup>2</sup>Boston University; <sup>3</sup>Fraunhofer IFAM

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

## Hume-Rothery Symposium on Alloy Microstructure Science and Engineering — Modeling and Experiments for High-Performance Alloy Design

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

**Monday AM | March 4, 2024**  
**Bayhill 23 | Hyatt**

**Session Chairs:** Long-Qing Chen, The Pennsylvania State University; Qing Chen, The Thermo-Calc Software AB

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**8:30 AM Introductory Comments**

**8:40 AM Keynote**

**William Hume-Rothery Award Lecture: Deformation Pathway Engineering and Compositionally and Structurally Modulated Alloy Design:** *Yunzhi Wang*<sup>1</sup>; <sup>1</sup>The Ohio State University

**9:10 AM Invited**

**Friction-mediated Subsurface Structural Transformations:** *Peter Gumbsch*<sup>1</sup>; Christian Haug<sup>1</sup>; Christian Greiner<sup>1</sup>; <sup>1</sup>Karlsruhe Institute of Technology (KIT)

**9:40 AM Invited**

**On Slip Irreversibility during Cyclic Deformation of FCC Alloys:** Jean-Charles Stinville<sup>1</sup>; *Tresa Pollock*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**10:10 AM Break**

**10:30 AM Invited**

**Perspectives on Metal Science for Materials Design:** *Dennis Dimiduk*<sup>1</sup>; Daniel Miracle<sup>2</sup>; <sup>1</sup>BlueQuartz Software LLC; <sup>2</sup>Air Force Research Laboratory, Materials and Manufacturing Directorate

**11:00 AM Invited**

**Dynamic Local Phase Transformations: A New Creep Strengthening Mechanism in Ni-Base Superalloys:** *Michael Mills*<sup>1</sup>; Ashton Egan<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Fei Xue<sup>2</sup>; Longsheng Feng<sup>3</sup>; Stephen Niezgod<sup>1</sup>; Maryam Ghazisaeidi<sup>1</sup>; Emmanuelle Marquis<sup>2</sup>; Yunzhi Wang<sup>1</sup>; Timothy Smith<sup>4</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University of Michigan; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>NASA Glenn Research Center

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### NUCLEAR MATERIALS

**Irradiation Testing: Facilities, Capabilities, and Experimental Designs — Ion Irradiation Strategies and Capabilities**

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

**Program Organizers:** Walter Luscher, Pacific Northwest National Laboratory; Peter Hosemann, University of California, Berkeley; Andrew Hoffman, GE Research; Joris Van den Bosch, SCK CEN; Brenden Heidrich, Nuclear Science User Facilities

**Monday AM | March 4, 2024**  
**Rainbow Spring I | Hyatt**

**Session Chairs:** Kenneth Geelhood, Pacific Northwest National Laboratory; Danny Edwards, Pacific Northwest National Laboratory

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**8:30 AM Invited**

**Accelerating the Pace of Radiation Damage Experiments through Novel Sample Geometries, Beam Line Architecture, and Machine Learning Analysis:** *Kevin Field*<sup>1</sup>; Charles Hirst<sup>1</sup>; Aäron Penders<sup>1</sup>; Hangyu Li<sup>1</sup>; Robert Renfrow<sup>1</sup>; Alexander Flick<sup>1</sup>; Kai Sun<sup>1</sup>; Zhijie Jiao<sup>1</sup>; Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan

**9:00 AM**

**Accelerated Irradiation Creep Testing of Structural Materials for Advanced Reactors:** *Charles Hirst*<sup>1</sup>; Mackenzie Warwick<sup>1</sup>; Wyatt Peterson<sup>1</sup>; Kevin Field<sup>1</sup>; <sup>1</sup>University of Michigan

**9:20 AM**

**Increasing Ion Irradiation Sample Throughput with Gas Implantation Gradients:** *Aaron Penders*<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

**9:40 AM**

**Ultrafast-Electron-diffraction Studies of Radiation-damaged Materials: An Example on the Melting Behavior of He-implanted W:** *Mianzhen Mo*<sup>1</sup>; Ling Wang<sup>1</sup>; Thies Albert<sup>2</sup>; Alfredo Correa<sup>3</sup>; Zhijiang Chen<sup>1</sup>; Leora Dresselhaus-Marais<sup>4</sup>; Mungo Frost<sup>1</sup>; Nicholas Hartley<sup>1</sup>; Laurenz Kremeyer<sup>2</sup>; Matthias Kling<sup>1</sup>; Emma McBride<sup>1</sup>; Samuel Murphy<sup>5</sup>; Benjamin Ofori-Okai<sup>1</sup>; Alexander Reid<sup>1</sup>; Adam Summers<sup>1</sup>; Klaus Sokolowski-Titen<sup>2</sup>; Xiaozhe Shen<sup>1</sup>; Artur Tamm<sup>6</sup>; Yongqiang Wang<sup>7</sup>; Xueli Zheng<sup>4</sup>; Siegfried Glenzer<sup>1</sup>; <sup>1</sup>Slac National Accelerator Laboratory; <sup>2</sup>University of Duisburg-Essen; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>Stanford University; <sup>5</sup>Lancaster University; <sup>6</sup>University of Tartu; <sup>7</sup>Los Alamos National Laboratory

**10:00 AM Break**

**10:20 AM**

**Comparison between Ion and Neutron Irradiated Tungsten to Simulate Damage in Commercial Nuclear Fusion Reactors:** *Kieran Rivers*<sup>1</sup>; Adrien Couet<sup>2</sup>; Junliang Liu<sup>2</sup>; Andrew London<sup>3</sup>; Dmitry Terentyev<sup>4</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>University of Wisconsin-Madison; <sup>3</sup>UK Atomic Energy Authority; <sup>4</sup>Belgium Nuclear Research Centre

**10:40 AM**

**Investigating Water Ice Under Ion Irradiation for Future Exploration of Europa:** Y Hong<sup>1</sup>; B Mejia<sup>1</sup>; W Storms<sup>1</sup>; MS Gudipati<sup>2</sup>; BL Henderson<sup>2</sup>; L Shao<sup>1</sup>; *Michael Demkowicz*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>JPL

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**LIGHT METALS**

## Magnesium Technology 2024 — Corrosion and Coatings

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

**Monday AM | March 4, 2024**

**Windermere Y-3 | Hyatt**

**Session Chairs:** Aerial Leonard, The Ohio State University; Domonkos Tolnai, Helmholtz-Zentrum Hereon

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**8:30 AM Introductory Comments**

**8:50 AM Keynote**

**Different Analytical Methods to Determine the Influence of Pitting on the Residual Performance of Mg Alloys as Implant Materials:** *Petra Maier*<sup>1</sup>; <sup>1</sup>University of Applied Sciences Stralsund

**9:30 AM**

**Dissolution Rate Change of Dissolving Magnesium in a Deoxygenated Environment:** *Timothy Dunne*<sup>1</sup>; *Lei Zhao*<sup>1</sup>; *Jiaxiang Ren*<sup>1</sup>; *Peng Cheng*<sup>1</sup>; *Yu Liu*<sup>1</sup>; <sup>1</sup>CNPC USA Corp

**9:50 AM**

**Improved Formability and Corrosion Resistance of Pure Magnesium by Parts-per-million-level Addition of Copper and Calcium:** *Mingzhe Bian*<sup>1</sup>; *Isao Nakatsugawa*<sup>1</sup>; *Xinsheng Huang*<sup>1</sup>; *Yasumasa Chino*<sup>1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology

**10:10 AM Break**

**10:30 AM Invited**

**Evaluation of Corrosion Performance of Friction Stir Processed Magnesium Alloys Using Multimodal Analysis Across Length Scales:** *Sridhar Niverty*<sup>1</sup>; *Shuai Tan*<sup>1</sup>; *Venkateshkumar Prabhakaran*<sup>1</sup>; *Piyush Upadhyay*<sup>1</sup>; *Hrishikesh Das*<sup>1</sup>; *Rajib Kalsar*<sup>1</sup>; *David Garcia*<sup>1</sup>; *Mageshwari Komarasamy*<sup>1</sup>; *Glenn Grant*<sup>1</sup>; *Darrell Herling*<sup>1</sup>; *Vineet Joshi*<sup>1</sup>; <sup>1</sup>PNNL

**10:55 AM**

**Corrosion Rates by Immersion and Calorimetry on the Example of Extruded Mg<sub>10</sub>Gd(1Nd)1La:** *Petra Maier*<sup>1</sup>; *Benjamin Clausius*<sup>1</sup>; *Thea-Simone Tegtmeier*<sup>1</sup>; *Lars Wadsö*<sup>2</sup>; *Dmytro Orlov*<sup>2</sup>; <sup>1</sup>University of Applied Sciences Stralsund; <sup>2</sup>Lund University

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

**Materials and Chemistry for Molten Salt Systems — Morphological and Chemical Evolution of Materials 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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

**Monday AM | March 4, 2024**  
**Bayhill 20 | Hyatt**

**Session Chair:** Yu-chen Karen Chen-Wiegart, Stony Brook University

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**8:30 AM Introductory Comments:** Explain mandatory time for Q&A

**8:35 AM**

**An Electrochemical Approach to Graphitization via Molten Salts:** *Sheng Dai*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:00 AM**

**Novel In-situ and High-throughput Experimental Approaches to Study Molten Salt Corrosion Mechanisms in Extreme Environments:** *Adrien Couet*<sup>1</sup>; Bonita Goh<sup>1</sup>; Cole Evered<sup>1</sup>; Junliang Liu<sup>1</sup>; Kailee Buttice<sup>1</sup>; Jagadeesh Sure<sup>1</sup>; Karen Chen-Wiegart<sup>2</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Stonybrook University

**9:20 AM**

**Elucidating Microstructural Evolution of Metals in Molten Salt Environments:** *Katsuyo Thornton*<sup>1</sup>; <sup>1</sup>University of Michigan

**9:40 AM**

**Phase Field Modeling of NiCr Alloys Undergoing Molten Salt Dealloying Corrosion:** *Nathan Bieberdorf*<sup>1</sup>; Xueyang Wu<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

**10:00 AM Break**

**10:20 AM**

**Electron Microscopy Characterization of Molten Salt Corrosion in Metals:** *Lingfeng He*<sup>1</sup>; <sup>1</sup>North Carolina State University

**10:40 AM**

**Cr Migration in De-alloyed Ni-Cr Exposed to Molten FLiNaK via STEM-based Methods:** *Sean Mills*<sup>1</sup>; Ho Chan<sup>2</sup>; Nathan Bieberdorf<sup>1</sup>; Minsung Hong<sup>1</sup>; Elena Romanovskaia<sup>2</sup>; Laurent Capolungo<sup>3</sup>; Mark Asta<sup>1</sup>; John Scully<sup>2</sup>; Peter Hosemann<sup>1</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

**11:00 AM**

**Continuation of Aluminum Laser Ablation Treatment for Corrosion Resistance in Molten Salt Systems:** *Peggy Milota*<sup>1</sup>; Supathorn Phongikaroon<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**11:20 AM**

**Modeling the Corrosion of Structural Alloys by Molten Salt at the Mesoscale:** *Michael Tonks*<sup>1</sup>; Chaityanya Bhave<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

## Materials Corrosion Behavior in Advanced Nuclear Reactor Environments — Molten Salt Corrosion

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

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Caitlin Huotilainen, TerraPower; Nidia Gallego, Oak Ridge National Laboratory; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison; Julie Tucker, Oregon State University

**Monday AM | March 4, 2024**  
**Silver Spring I-II | Hyatt**

**Session Chair:** Suraj Persaud, Queen's University

**8:30 AM**

**Evolution of Molten Salt Corrosion Morphology Under the Presence of Irradiation:** *Riley Moeykens*<sup>1</sup>; <sup>1</sup>MIT

**8:50 AM**

**Investigating the Corrosion Mechanisms of Ni-Cr alloys in Molten Fluoride Salt:** *Hamdy Arkoub*<sup>1</sup>; *Miaomiao Jin*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**9:10 AM**

**Corrosion Behavior of Pre- and Post-irradiated Metals in Molten Chloride Salts:** *Robert Gentile*<sup>1</sup>; *Michael Woods*<sup>2</sup>; *Laura Hawkins*<sup>2</sup>; *Ruchi Gakhar*<sup>2</sup>; *Trishelle Copeland-Johnson*<sup>2</sup>; *Daniel Murray*<sup>2</sup>; *Zhihan Hu*<sup>3</sup>; *Lin Shao*<sup>3</sup>; *Lingfeng He*<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Lab; <sup>3</sup>Texas A&M University

**9:30 AM**

**Corrosion Mechanism of Cold Worked 316 Stainless Steel in Molten FLiNaK Salt:** *Minsung Hong*<sup>1</sup>; *Shmuel Samuha*<sup>1</sup>; *Peter Hosemann*<sup>1</sup>; <sup>1</sup>University of California - Berkeley

**9:50 AM**

**In-situ Irradiation and Molten Fluoride Salt Corrosion of Structural Alloys with 3D EBSD Reconstruction:** *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

**10:10 AM Break**

**10:30 AM**

**Molten Salt Corrosion of Proton Irradiated Additively Manufactured 316L Stainless Steel Doped with Hafnium:** *Laura Hawkins*<sup>1</sup>; *Jingfan Yang*<sup>2</sup>; *Zhihan Hu*<sup>3</sup>; *Michael Woods*<sup>1</sup>; *Ruchi Gakhar*<sup>1</sup>; *Lin Shao*<sup>3</sup>; *Xiaoyuan Lou*<sup>2</sup>; *Daniel Murray*<sup>1</sup>; *Lingfeng He*<sup>4</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Purdue University; <sup>3</sup>Texas A&M University; <sup>4</sup>North Carolina State University

**10:50 AM**

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

**11:10 AM**

**Impact of Elastic Stress on the Corrosion Behavior of 316H Stainless Steel By Molten FLiNaK:** *Thompson Igunma*<sup>1</sup>; *Michael Tonks*<sup>1</sup>; <sup>1</sup>University of Florida

**11:30 AM Panel Discussion:** This panel will discuss emerging topics concerning

elucidating corrosion mechanisms in molten salt environments, based on the work presented in this session.

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing and Kinetic Phenomena: From Thin Films and Micro/ Nano Systems to Advanced Manufacturing — Honoring Carl Thompson: Academic Colleagues I

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

**Monday AM | March 4, 2024**  
**Celebration 11 | Hyatt**

**Session Chair:** Hang Yu, Virginia Tech

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#### 8:30 AM Introductory Comments

#### 8:35 AM Keynote

**The Interface between a Body-centered Cubic Crystal and Its Melt:** *Frans Spaepen*<sup>1</sup>; <sup>1</sup>Harvard University

#### 9:10 AM Keynote

**Atomic Kinetics in Highly Metastable Metallic Systems:** *A. Lindsay Greer*<sup>1</sup>; <sup>1</sup>University of Cambridge

#### 9:45 AM Break

#### 10:05 AM Invited

**Grain Growth Redux: beyond Smith, von Neumann, and Mullins:** *David Srolovitz*<sup>1</sup>; *Jian Han*<sup>2</sup>; <sup>1</sup>University of Hong Kong; <sup>2</sup>City University of Hong Kong

#### 10:35 AM Invited

**Nanoscale Morphology Control Using Ion Beams with Applications in Materials and Life Sciences:** *Michael Aziz*<sup>1</sup>; <sup>1</sup>Harvard University

#### 11:05 AM Invited

**Relating Residual Stress Evolution to the Processes of Thin Film Growth:** *Eric Chason*<sup>1</sup>; *Tong Su*<sup>1</sup>; <sup>1</sup>Brown University

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Iron and Steel Production — Numerical Models

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

**Program Organizers:** Samuel Wagstaff, Oculatus Consulting; Alexandra Anderson, Gopher Resource; Chukwunwike Iloeje, Argonne National Laboratory; Adrian Sabau, Oak Ridge National Laboratory

**Monday AM | March 4, 2024**  
**Celebration 8 | Hyatt**

**Session Chairs:** Alexandra Anderson, Gopher Resource; Chukwunwike Iloeje, Argonne National Laboratory

### 8:30 AM Introductory Comments

**8:35 AM**

**Numerical Simulation of the Behavioral Characteristics Sprayed Water Droplets in a Hot Gas-solid Fluidized Bed:** *Xinyong Dai*<sup>1</sup>; Liangying Wen<sup>1</sup>; Yan Zhao<sup>1</sup>; Bo Liu<sup>1</sup>; <sup>1</sup>Chongqing University

**8:55 AM**

**A Novel Electrode Model for Søderberg Electrodes:** *Kurian J. Vachaparambil*<sup>1</sup>; Stein Tore Johansen<sup>1</sup>; Sten Yngve Larsen<sup>2</sup>; Mehdi Kadkhodabeigi<sup>2</sup>; Torbjørn Pettersen<sup>1</sup>; <sup>1</sup>SINTEF Industry; <sup>2</sup>Eramet Norway AS

**9:15 AM**

**Simulation on the Melting Behavior of Steel Scrap in a Converter with Top-bottom Combined Blowing:** Hua Zhang<sup>1</sup>; *Jiahui Wang*<sup>1</sup>; Qing Fang<sup>1</sup>; Weining Shi<sup>2</sup>; Hongwei Ni<sup>1</sup>; <sup>1</sup>Wuhan University of Science and Technology; <sup>2</sup>Hunan Valin Xiangtan Iron and Steel Co., Ltd

**9:35 AM**

**Numerical Simulation of Slag-iron Flow in Simple Coke Bed:** *Lianda Zhao*<sup>1</sup>; Yingli Liu<sup>1</sup>; Jing-Song Wang<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Materials for Global Development - Cancer**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Monday AM | March 4, 2024**  
**Celebration 14 | Hyatt**

**Session Chairs:** Jun Lou, Rice University; Jing Du, Penn State University

**8:30 AM Keynote**

**Materials for Global Development:** *Winston Soboyejo*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**9:15 AM Invited**

**PLGA-PEG Microparticles for Targeted Drug Delivery in the Treatment of Triple Negative Breast Cancer Cells:** *Sandra Borbor-Sawyer*<sup>1</sup>; John Obayemi<sup>2</sup>; Ali Salifu<sup>3</sup>; Clare Nwazojie<sup>4</sup>; Vanessa Uzonwanne<sup>3</sup>; Olushola Odusanya<sup>5</sup>; Winston Soboyejo<sup>2</sup>; <sup>1</sup>State University of New York, Buffalo State University; <sup>2</sup>Worcester Polytechnic Institute; <sup>3</sup>Boston College; <sup>4</sup>African University of Science and Technology; <sup>5</sup>Sheda Science and Technology Complex

**9:40 AM Invited**

**Targeted Theranostic Nanoparticles and Drugs Systems for The Detection and Treatment of Triple Negative Breast Cancer:** *John Obayemi*<sup>1</sup>; Ali Salifu<sup>2</sup>; Jingjie Hu<sup>3</sup>; Vanessa Uzonwanne<sup>2</sup>; Winston Soboyejo<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Boston College; <sup>3</sup>North Carolina State University

**10:05 AM Break****10:25 AM Invited**

**An Assessment of the Near-infrared Photothermal Effects of Honey-mediated Au Nanoparticles for Cancer Treatment via Experiments and Models:** *Kwabena Kan-Dapaah*<sup>1</sup>; <sup>1</sup>University of Ghana

**10:50 AM Invited**

**Mechanical Biomarkers and Molecular Biomarkers: A Theragnostic Approach for Breast cancer Detection/Treatment:** *Theresa Ezenwafor*<sup>1</sup>; Wole Soboyejo<sup>1</sup>; John Obayemi<sup>1</sup>; Said Amin<sup>1</sup>; Shola Odusanya<sup>1</sup>; Vitalis Anye<sup>2</sup>; Vanessa Uzonwanne<sup>1</sup>; Jonathan Mmadukwe<sup>1</sup>; <sup>1</sup>Worcester Polytechnic; <sup>2</sup>African University of Science and Technology, Abuja

**11:15 AM**

**Conjugation of Non-cadmium Based Ternary QDs to Porphyrins as Novel Therapeutic Agents in Photodynamic Therapy Against Cancerous Cell and Bacterial:** *Samuel Oluwafemi*<sup>1</sup>; <sup>1</sup>University of Johannesburg

**11:35 AM**

**Combined Drug Release and Laser-induced Heating of Multi-component Microspheres for the Treatment of Triple-negative Breast Cancer:** *Vanessa Uzonwanne*<sup>1</sup>; Suhani Gupta<sup>1</sup>; John obayemi<sup>2</sup>; Precious Etinosa<sup>2</sup>; Ali Salifu<sup>1</sup>; <sup>1</sup>Boston College; <sup>2</sup>Worcester Polytechnic Institute (WPI)

**11:55 AM**

**A Data Science Approach for Detecting Breast Cancer Using Shear Assay Measurements and Functional Principal Component Analysis:** *Jolene Cao*<sup>1</sup>; Killian Onwudiwe<sup>2</sup>; Jingjie Hu<sup>3</sup>; Meenal Datta<sup>2</sup>; Wole Soboyejo<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>University of Notre Dame; <sup>3</sup>North Carolina State University

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**MECHANICS OF MATERIALS****Mechanical Behavior at the Nanoscale VII – Deformation Mechanisms I**

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Monday AM | March 4, 2024**

**Manatee Spring I | Hyatt**

**Session Chairs:** Matthew Daly, University of Illinois Chicago; Daniel Kiener, Montanuniversität Leoben

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**8:30 AM Invited**

**Healing of Nano-cracks in Metals Induced by Microstructure Evolution:** T Duong<sup>1</sup>; A Molkeri<sup>1</sup>; C Barr<sup>2</sup>; A Srivastava<sup>1</sup>; K Hattar<sup>3</sup>; B Boyce<sup>2</sup>; *Michael Demkowicz*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>SNL; <sup>3</sup>UTK

**9:00 AM**

**The Effect of Composition and Long-range Order on the Strength of Defect-free Faceted Cu-Au Nanoparticles:** Zhao Liang<sup>1</sup>; *Eugen Rabkin*<sup>1</sup>; <sup>1</sup>Technion

**9:20 AM**

**Hyper-Elastic Deformation via Martensitic Phase Transformation in CdTe:** *Qi An*<sup>1</sup>; Kun Luo<sup>1</sup>; Lin Li<sup>2</sup>; Feng Yan<sup>2</sup>; Yufeng Zheng<sup>3</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Arizona State University; <sup>3</sup>University of Nevada, Reno

**9:40 AM**

**Influence of Ordering on the Mechanical Properties of CuAu Alloy Nanowires:** *Peter Schweizer*<sup>1</sup>; Lilian Vogl<sup>1</sup>; Johann Michler<sup>2</sup>; Andrew Minor<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Lab; <sup>2</sup>Swiss Federal Laboratory for Materials Science and Technology - Empa

**10:00 AM Break**

**10:20 AM**

**Orientation Dependent Plasticity of the Refractory Multi-principal Element Alloy MoNbTi Investigated via Micropillar Compression:** *Glenn Balbus*<sup>1</sup>; Oleg Senkov<sup>2</sup>; Satish Rao<sup>2</sup>; Eric Payton<sup>3</sup>; <sup>1</sup>Lehigh University; <sup>2</sup>Air Force Research Laboratory, Materials and Manufacturing Directorate; <sup>3</sup>University of Cincinnati

**10:40 AM**

**Helium Bubble Evolution in a Fully Twinned -ZrH Microstructure and Its Effect on Deformation Behavior:** *Darren Parkison*<sup>1</sup>; Caitlin Kohnert<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Matthew Chancey<sup>2</sup>; Thomas Nizolek<sup>2</sup>; Aditya Shivprasad<sup>2</sup>; Tarik Saleh<sup>2</sup>; Peter Hosemann<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Los Alamos National Laboratory

**11:00 AM**

**On the Anisotropy of Dynamic Strain Aging (DSA) Mediated Serrated Flow:** *Henry Ovrí*<sup>1</sup>; <sup>1</sup>Helmholtz Zentrum Hereon

**11:20 AM Invited**

**Electropulsing Induced Microstructural Changes and Electroplasticity in Metallic Materials:** *Jiangwei Wang*<sup>1</sup>; Xing Li<sup>1</sup>; Youran Hong<sup>1</sup>; <sup>1</sup>Zhejiang University

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**BIOMATERIALS**

**Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues — Collagen & Soft Biomaterials**

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

**Program Organizers:** Bernd Gludovatz, UNSW Sydney; Elizabeth Zimmermann, McGill University; Steven Naleway, University of Utah

**Monday AM | March 4, 2024**

**Celebration 13 | Hyatt**

**8:30 AM Keynote**

**The Giving Nature of the Mechanosensory Periodontal Complex:** Yongmei Wang<sup>1</sup>; Sunita Ho<sup>1</sup>; <sup>1</sup>UCSF

**9:00 AM Keynote**

**Micro- and Nanomechanics of Collagen-rich Tissues and Individual Fibrils:** Philipp Thurner<sup>1</sup>; Mathis Nalbach<sup>1</sup>; Magdalena Fuchs<sup>1</sup>; Orestis Andriotis<sup>1</sup>; Alessandra Carriero<sup>2</sup>; Georg Schitter<sup>1</sup>; <sup>1</sup>TU Wien; <sup>2</sup>City College of New York

**9:30 AM Invited**

**Exploring the Intricacies of Fibrillar Collagen in the Human Aorta: A Window into Ultrastructural Attributes and Nanomechanical Properties:** Meisam Asgari<sup>1</sup>; <sup>1</sup>University of South Florida

**9:55 AM**

**Small-scale Deformation Mechanisms of Collagen-based Biological Materials: A Systematic Review And Meta-analysis:** Lander Manrique<sup>1</sup>; Meisam Asgari<sup>2</sup>; Elizabeth Zimmermann<sup>1</sup>; <sup>1</sup>McGill University; <sup>2</sup>University of South Florida

**10:15 AM Break**

**10:35 AM Invited**

**The Mechanics of Living Organisms: Some Observations:** Marc Meyers<sup>1</sup>; Haocheng Quan<sup>2</sup>; Tarah Sullivan<sup>1</sup>; Andrey Pissarenko<sup>1</sup>; Benjamin Lazarus<sup>1</sup>; Sheron Tavares<sup>1</sup>; Iwona Jasiuk<sup>3</sup>; Eduard Arzt<sup>2</sup>; Robert McMeeking<sup>4</sup>; <sup>1</sup>University of California-San Diego; <sup>2</sup>INM – Leibniz Institute for New Materials; <sup>3</sup>University of Illinois Urbana-Champaign; <sup>4</sup>University of California, Santa Barbara

**11:00 AM Invited**

**Stretchable and 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

**11:25 AM**

**Plant Tissue Structural Adaptation under Salt Tolerance:** Anamika Prasad<sup>1</sup>; Maruthi Bhaskar<sup>1</sup>; <sup>1</sup>Florida International University

**11:45 AM**

**Synthesis of Highly Elastomeric Hydrogel Interpenetrating Networks through Ambient Dual-Crosslinking:** Ashwin Velraj<sup>1</sup>; Abhishek Pachauri<sup>1</sup>; Audri Dara<sup>1</sup>; Jeffrey Bates<sup>1</sup>; <sup>1</sup>University of Utah

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**ADDITIVE MANUFACTURING**

**Nano and Micro Additive Manufacturing – Joint Session with Additive Manufacturing Across Length Scales: Size Effects in Alloys**

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

**Program Organizers:** Wendy Gu, Stanford University; Mostafa Hassani, Cornell University; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Christoph Eberl, Fraunhofer IWM

**Monday AM | March 4, 2024**  
**Gulf | Hyatt**

**Session Chairs:** X. Wendy Gu, Stanford University; Mostafa Hassani, Cornell University

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**8:30 AM Invited**

**Microstructure Control of Additively Manufacturing Metal Alloys through Microscale Laser Beam Engineering:** *Manyalibo Matthews*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**9:00 AM**

**Manufacturing Size Effect on the Microstructural, Static Mechanical, and Fatigue Properties of Additively Manufactured Ti-6Al-4V Microbeams:** *Kaiyang Yin*<sup>1</sup>; Bo Cao<sup>2</sup>; Juraj Todt<sup>3</sup>; Florian Gutmann<sup>1</sup>; Hasan Tunçay<sup>1</sup>; Georg Ganzenmüller<sup>1</sup>; Jozef Keckes<sup>3</sup>; Stefan Hiermaier<sup>1</sup>; Chris Eberl<sup>1</sup>; <sup>1</sup>University of Freiburg; <sup>2</sup>Northwestern Polytechnical University; <sup>3</sup>Montanuniversität Leoben

**9:20 AM**

**Size-Effects on Microstructure and Mechanical Properties in LPBF-Fabricated, Thin-walled Hastelloy X and SS316L Components:** *Christian Leinenbach*<sup>1</sup>; Rafal Wrobel<sup>1</sup>; <sup>1</sup>Empa, Swiss Federal Laboratories for Materials Science and Technology

**9:40 AM Invited**

**Additive Manufacturing at the Nanoscale - What Are the Materials Challenges?:** *Ralph Spolenak*<sup>1</sup>; <sup>1</sup>ETH Zurich

**10:10 AM Break**

**10:30 AM**

**Dynamically Size Droplet Printing (DynaSD): Towards Low-cost, High Value Metal Additive Manufacturing:** *Kaushalendra Singh*<sup>1</sup>; Atieh Moridi<sup>1</sup>; <sup>1</sup>Cornell University

**10:50 AM**

**Investigating Governing Size Effect Mechanisms in Ti-6Al-4V Manufactured by Laser Powder Bed Fusion and Electron-Beam Melting:** *Mehrdad Pourjam*<sup>1</sup>; Daniel June<sup>1</sup>; Kavan Hazeli<sup>1</sup>; Jason Mayeur<sup>2</sup>; <sup>1</sup>University of Arizona; <sup>2</sup>Oak Ridge National Laboratory

**11:10 AM Invited**

**Strengthening Effect in 3D Architected Ni-Al<sub>2</sub>O<sub>3</sub> Nanocomposite:** *Seung Min Han*<sup>1</sup>; <sup>1</sup>KAIST

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments II – Irradiation Environment

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Monday AM | March 4, 2024**  
**Bayhill 19 | Hyatt**



**Session Chair:** Haiming Wen, Missouri University of Science and Technology

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### 8:30 AM Introductory Comments

#### 8:35 AM Invited

**Radiation Effects in Borides: The Role of Interfaces and Layering:** *Izabela Szlufarska*<sup>1</sup>; Hongliang Zhang<sup>2</sup>; Shuguang Wei<sup>1</sup>; Muhammad Waqas Qureshi<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Fudan University

#### 9:00 AM Invited

**Self-organization of Grain Boundary Precipitate Structures in Irradiated Alloys:** *Pascal Bellon*<sup>1</sup>; Sourav Das<sup>1</sup>; Amit Verma<sup>1</sup>; Marie-Agathe Charpagne<sup>1</sup>; Robert Averback<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

#### 9:25 AM

**Steady-state Microstructures in Nanocrystalline Al-Sb Alloy under Irradiation:** *Sourav Das*<sup>1</sup>; Amit Verma<sup>1</sup>; Pascal Bellon<sup>1</sup>; Robert Averback<sup>1</sup>; <sup>1</sup>University of Illinois, Urbana-Champaign

#### 9:45 AM

**Effect of Neutron Irradiation on Parent and Friction Stir Processed Ni-based ODS MA754:** *Ramprashad Prabhakaran*<sup>1</sup>; Kayla Yano<sup>1</sup>; Dan Edwards<sup>1</sup>; Mychailo Toloczko<sup>1</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

### 10:05 AM Break

#### 10:25 AM Invited

**Nanostructured Materials Subjected to Ion Irradiation:** *Yanwen Zhang*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

#### 10:50 AM Invited

**Irradiation-induced Athermal Crystallization in Nanostructured Amorphous Ceramics:** *Janelle Wharry*<sup>1</sup>; Hui Xiong<sup>2</sup>; Tristan Olsen<sup>2</sup>; Cyrus Koroni<sup>2</sup>; Chao Yang<sup>3</sup>; Min Lun Lau<sup>2</sup>; Dewen Hou<sup>2</sup>; Zhongxia Shang<sup>1</sup>; Md Ali Muntaha<sup>1</sup>; Khalid Hattar<sup>4</sup>; Wei-Ying Chen<sup>5</sup>; Min Long<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University; <sup>3</sup>Rensselaer Polytechnic Institute; <sup>4</sup>University of Tennessee; <sup>5</sup>Argonne National Laboratory

#### 11:15 AM Invited

**Low Fluence Neutron Irradiation Responses of a Uranium-molybdenum Alloy:** *Maria Okuniewski*<sup>1</sup>; Sukanya Majumder<sup>1</sup>; Gyuchul Park<sup>1</sup>; T. K. Yao<sup>2</sup>; Kaustubh Bawane<sup>2</sup>; Cameron Howard<sup>2</sup>; Kourtney Wright<sup>2</sup>; Brandon Miller<sup>2</sup>; Mehmet Topsakal<sup>3</sup>; Simerjeet Gill<sup>3</sup>; Benjamin Beeler<sup>4</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>North Carolina State University

#### 11:40 AM

**Stability of VN, TaN, and TaC MX-type Precipitates in Neutron Irradiated Model Ferritic Alloys:** *Emily Proehl*<sup>1</sup>; Weicheng Zhong<sup>2</sup>; Ying Yang<sup>2</sup>; Lizhen Tan<sup>2</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee-Knoxville; <sup>2</sup>Oak Ridge National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIII — Advanced 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; Chao-hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; Yee-wen Yen, National Taiwan University of Science and Technology; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Ping-Chuan Wang, SUNY New Paltz; Yu-An Shen, Feng Chia University

**Monday AM | March 4, 2024**

**Bayhill 30 | Hyatt**

**Session Chairs:** Yu-chen Liu, National Cheng Kung University; Chih-Ming Chen, National Chung Hsing University

**8:30 AM Invited**

**In-situ Study of Phase Transformation and Strain Localization in Multi-phase Alloys:**

*Hyunseok Oh*<sup>1</sup>; *Jiyun Kang*<sup>2</sup>; *Menglei Jiang*<sup>3</sup>; *Cemal Cem Tasan*<sup>4</sup>; <sup>1</sup>Massachusetts Institute of Technology, Current: University of Wisconsin - Madison; <sup>2</sup>Massachusetts Institute of Technology, Current: Stanford University; <sup>3</sup>Massachusetts Institute of Technology, Current: Questek; <sup>4</sup>Massachusetts Institute of Technology

**8:55 AM**

**X-ray Diffraction on Solder-related Intermetallic Phases:** *Andreas Leineweber*<sup>1</sup>; <sup>1</sup>Tu Bergakademie Freiberg

**9:15 AM**

**Exploration of Gel Hardness by Using Machine Learning Method:** *Yu-Chen Liu*<sup>1</sup>; *Ariel Wu*<sup>2</sup>; *Chin Yi Cho*<sup>2</sup>; *Wallace Chuang*<sup>2</sup>; *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>Robert Bosch Taiwan Co., Ltd

**9:35 AM**

**Evolution of Vibrational Modes during Antiferrodistortive Phase Transition in SrTiO<sub>3</sub>:** *Saqeeb Adnan*<sup>1</sup>; *Amey Khanolkar*<sup>2</sup>; *David Hurley*<sup>2</sup>; *Marat Khafizov*<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Idaho National Laboratory

**9:55 AM Break**

**10:15 AM**

**Electric Current Effects on Stability and Mechanical Properties of Monoclinic Cu<sub>6</sub>Sn<sub>5</sub> Phase Based on In-situ Nanoindentation:** *Shubhayan Mukherjee*<sup>1</sup>; *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**10:35 AM**

**Phase Stability and Binodal/Spinodal Decomposition of Ag- and S-alloyed CIGS Absorbers: An Ab Initio-assisted CALPHAD Study with Key Experiments:** *Thung-Yu Tsai*<sup>1</sup>; *Ngoc Thanh Thuy Tran*<sup>2</sup>; *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>Hierarchical Green-Energy Materials Research Center (Hi-GEM), National Cheng Kung University

## 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:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Monday AM | March 4, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Le Zhou, Marquette University

**8:30 AM Invited**

**Phase Transformations during Cryogenic Treatment of Additively Manufactured Nitrogen Atomized 17-4PH Stainless Steel:** *James Zuback*<sup>1</sup>; *Fan Zhang*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**9:00 AM**

**Phase Transformation of an Additively Manufactured Martensitic Steel:** *Fan Zhang*<sup>1</sup>; *Greta Lindwall*<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>KTH Royal Institute of Technology

**9:20 AM**

**Grain Boundary Engineering in Additive Manufactured Stainless Steels:** *Yuheng Nie*<sup>1</sup>; *Marie-Agathe Charpagne*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**9:40 AM**

**Microstructure Evolution and High Temperature Mechanical Performance of Laser Additively Manufactured Ferritic-Martensitic Steel:** *Madhavan Radhakrishnan*<sup>1</sup>; *Selvamurugan Palaniappan*<sup>1</sup>; *Narendra Dahotre*<sup>1</sup>; <sup>1</sup>University of North Texas

**10:00 AM Break**

**10:20 AM**

**Synchrotron X-ray Hierarchical Imaging of Phase Transformations during Laser Additive Manufacturing:** *Yunhui Chen*<sup>1</sup>; *Artjom Bolender*<sup>2</sup>; *David Collins*<sup>3</sup>; *Carsten Detlefs*<sup>4</sup>; *Alexander Rack*<sup>4</sup>; *Veijo Honkimaki*<sup>4</sup>; *Peter Lee*<sup>5</sup>; *Philip Withers*<sup>6</sup>; *Mark Easton*<sup>1</sup>; *Alexander Liehr*<sup>2</sup>; *Thomas Niendorf*<sup>2</sup>; <sup>1</sup>RMIT University; <sup>2</sup>University of Kassel; <sup>3</sup>University of Birmingham; <sup>4</sup>The European Synchrotron; <sup>5</sup>University College London; <sup>6</sup>University of Manchester

**10:40 AM**

**Texture Preference and Variant Analysis of Martensite Formation in Laser Powder Bed Fusion:** *Jubert Pasco*<sup>1</sup>; *Clodualdo Aranas Jr.*<sup>1</sup>; *Youliang He*<sup>2</sup>; *Ali Keshavarzkermani*<sup>3</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>Natural Resources Canada; <sup>3</sup>voestalpine Additive Manufacturing Center

**11:00 AM**

**Processing Parameters Driven Microstructural Evolution and Corrosion Performance of Laser Additively Fabricated Bio-medical Ti-25Nb alloys:** *Selvamurugan Palaniappan*<sup>1</sup>; *Madhavan Radhakrishnan*<sup>1</sup>; *Shashank Sharma*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; *Narendra Dahotre*<sup>1</sup>; <sup>1</sup>University of North Texas

## MATERIALS SYNTHESIS AND PROCESSING

**Powder Materials Processing and Fundamental Understanding — Advanced Characterization**

**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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

**Monday AM | March 4, 2024**  
**Celebration 9 | Hyatt**

**Session Chairs:** Shen Dillon, University of California, Irvine; Eduard Hryha, Chalmers University of Technology

**8:30 AM**

**Aging Responses and Mechanical Properties of Al-Zn-Mg Alloys with high Zn Concentration:** *Miran Joo*<sup>1</sup>; Donghyun Bae<sup>1</sup>; <sup>1</sup>Yonsei University

**8:50 AM Invited**

**In Situ TEM Characterization of Sintering: New Insights into Densification Mechanisms:** *Shen Dillon*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**9:20 AM**

**Hot Isostatic Pressing of Oxide Dispersion Strengthened Steels: Microstructure and Mechanical Properties:** *Alice Appleby*<sup>1</sup>; Raja Khan<sup>2</sup>; Yu-Lung Chiu<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>TWI Ltd

**9:40 AM**

**Porosity Evolution during Heating of Copper Made from Powder by Friction Extrusion:** Xiaolong Ma<sup>1</sup>; *Xiao Li*<sup>2</sup>; Angel Ortiz<sup>2</sup>; Mageshwari Komarasamy<sup>2</sup>; Scott Whalen<sup>2</sup>; Glenn Grant<sup>2</sup>; Suveen Mathaudhu<sup>3</sup>; Nicole Overman<sup>2</sup>; <sup>1</sup>City University of Hong Kong; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Colorado School of Mines

**10:00 AM**

**Powder Property Evolution during Die Compaction through Novel Experiments and Coordinated Modeling:** *Daniel Bufford*<sup>1</sup>; Stewart Youngblood<sup>1</sup>; Marlene Barela<sup>1</sup>; Dan Bolintineanu<sup>1</sup>; Joel Clemmer<sup>1</sup>; William Erikson<sup>1</sup>; Stewart Silling<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:20 AM Break**

**10:30 AM**

**Visualization of Eu<sup>2+</sup>/Eu<sup>3+</sup> Coactivated BaAl<sub>2</sub>O<sub>4</sub> Phosphor Using X-ray Nanobeam:** *Yu-Hao Wu*<sup>1</sup>; Tu-Ngoc Lam<sup>1</sup>; Chien-Yu Lee<sup>2</sup>; Bo-Yi Chen<sup>2</sup>; Gung-Chian Yin<sup>2</sup>; Mau-Tsu Tang<sup>2</sup>; E-Wen Huang<sup>1</sup>; Bi-Hsuan Lin<sup>2</sup>; <sup>1</sup>National Yang Ming Chiao Tung University; <sup>2</sup>National Synchrotron Radiation Research Center

**11:00 AM**

**Design Overview and Operational Characteristics of a Custom Designed Continuous Electric Field Assisted Sintering System:** *Jorgen Rufner*<sup>1</sup>; Andrew Gorman<sup>1</sup>; Troy Holland<sup>2</sup>; Mark Small<sup>1</sup>; Anthony D'Andrea<sup>1</sup>; Zherui Guo<sup>1</sup>; Golam Gause Jaman<sup>3</sup>; Marco Schoen<sup>3</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Samtec; <sup>3</sup>Idaho State University

**11:20 AM**

**Low-oxygen Ti Powders Prepared from TiO<sub>2</sub> through Combining Metallothermic Reduction with Electrochemical Reduction:** *Xinyu Zhou*<sup>1</sup>; Zhihe Dou<sup>1</sup>; Ting-an Zhang<sup>1</sup>; <sup>1</sup>Northeastern University

11:40 AM

The Efficient Optimization of Additive Manufacturing Parameters and Post-Build Processing Using Small Punch Test: *Zachary Courtright*<sup>1</sup>; <sup>1</sup>Georgia Tech

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## 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, TMS: Additive Manufacturing Committee

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

Monday AM | March 4, 2024  
Orlando L | Hyatt

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

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8:30 AM Invited

Additive Electronics Manufacturing of Instrumentation and Sensors for Extreme Environments: *Dave Estrada*<sup>1</sup>; <sup>1</sup>Boise State University

8:55 AM Invited

Can Conductive, Additive-free MXene Inks Replace Metals and Carbon in Printed Electronics?: *Yury Gogotsi*<sup>1</sup>; <sup>1</sup>Drexel University

9:20 AM Invited

High-throughput Printing of Combinatorial Materials from Aerosols: *Yanliang Zhang*<sup>1</sup>; <sup>1</sup>University of Notre Dame

9:45 AM

In-line Improved Adhesion and Conductivity Characteristics in Plasma-jet Printed Metallic Inks: *Jacob Manzi*<sup>1</sup>; *Tony Varghese*<sup>2</sup>; *Josh Eixenberger*<sup>2</sup>; *David Estrada*<sup>2</sup>; *Harish Subbaraman*<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Boise State University

10:05 AM Break

10:25 AM Invited

Ink Formulation for Aerosol Jet Printing: Leveraging Process Fundamentals and Experimental Tools to Accelerate Development: *Ethan Secor*<sup>1</sup>; <sup>1</sup>Iowa State University

10:50 AM

Machine Learning-enabled Feature Classification of Evaporation-driven Multi-scale 3D Printing: *Samannoy Ghosh*<sup>1</sup>; *Marshall Johnson*<sup>2</sup>; *James Hardin*<sup>3</sup>; *John Berrigan*<sup>3</sup>; *Surya Kalidindi*<sup>2</sup>; *Yong Lin Kong*<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Georgia Institute of Technology; <sup>3</sup>Air Force Research Laboratory

11:10 AM Invited

Ag-BST Convertible Ink for Printed Electronics and Additive Manufacturing: *Gavin Alexander*<sup>1</sup>; *Andrew Luce*<sup>1</sup>; *Guinevere Strack*<sup>1</sup>; *Craig Armiento*<sup>1</sup>; *Alkim Akyurtlu*<sup>1</sup>; *Oshadha Ranasingha*<sup>1</sup>; <sup>1</sup>University of Massachusetts Lowell

11:30 AM Invited

**Electrical Conductivity-morphology Relationships of Liquid-exfoliated Graphite:** Harrison Loh<sup>1</sup>; Alan Bristow<sup>1</sup>; Konstantinos Sierros<sup>1</sup>; <sup>1</sup>West Virginia University

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## 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; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

Monday AM | March 4, 2024

Celebration 3 | Hyatt

**Session Chairs:** Kerstin Forsberg, KTH Royal Institute of Technology; Takanari Ouchi, University of Tokyo; Athanasios Karamalidis, Pennsylvania State University

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8:30 AM Keynote

**EPD Distinguished Award Lecture: Advanced Hydrometallurgical Process Innovations: Clean Environmental Applications and Sustainable Electrochemical Energy Materials and Technologies:** George Demopoulos<sup>1</sup>; <sup>1</sup>McGill University

9:10 AM

**High-performance Solid Phase Extraction Chromatography as Part of a Process for Recycling NdFeB Magnet Waste:** Tiaan Punt<sup>1</sup>; Kerstin Forsberg<sup>1</sup>; Michael Svärd<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

9:30 AM

**Recovery of Rare Earth Sulfate Hydrates Using Antisolvent Crystallization:** Nitin Pawar<sup>1</sup>; Michael Svärd<sup>1</sup>; Kerstin Forsberg<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

9:50 AM

**Rare Earth Magnet Recycling via Liquid Metal Leaching and Distillation:** Emmanuel Opoku<sup>1</sup>; Hiba Khan<sup>1</sup>; Chinenye Chinwego<sup>1</sup>; Adam Powell<sup>1</sup>; <sup>1</sup>WPI

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## ADVANCED CHARACTERIZATION METHODS

### Recent Advances in Electron Back-Scattered Diffraction and Related Techniques — Indexing

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

**Program Organizers:** Stuart Wright, EDAX; Marc De Graef, Carnegie Mellon University; David Rowenhorst, Naval Research Laboratory; Katharina Marquardt, University of Oxford

Monday AM | March 4, 2024

Blue Spring I | Hyatt

**Session Chair:** Marc De Graef, Carnegie Mellon University

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**8:30 AM Introductory Comments****8:35 AM Invited**

**Fast Forward Model Indexing: Theory and Application:** *Will Lenthe*<sup>1</sup>; Stuart Wright<sup>1</sup>; Rene de Kloe<sup>2</sup>; Matt Nowell<sup>1</sup>; <sup>1</sup>EDAX / Gatan; <sup>2</sup>EDAX

**9:00 AM**

**Spherical Indexing Based on Dictionary Indexing Applied to Overlapping Pattern of Low-scattering Forsterite Due to Small Grain Sizes:** Alexandra Austin<sup>1</sup>; René de Kloe<sup>2</sup>; Katharina Marquardt<sup>3</sup>; <sup>1</sup>Imperial College; <sup>2</sup>EDAX; <sup>3</sup>University of Oxford

**9:20 AM**

**The Use of NLPAR in the Analysis of Low Misorientation Gradients:** *David Rowenhorst*<sup>1</sup>; <sup>1</sup>US Naval Research Laboratory

**9:40 AM**

**Accelerating Dictionary Indexing with Principal Component Analysis:** *Zachary Varley*<sup>1</sup>; Marc De Graef<sup>1</sup>; Gregory Rohrer<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**10:00 AM**

**Enhanced SEM-based Electron Diffraction Analyses Using Intelligent Hybrid Pattern Matching:** *Michael Hjelmstad*<sup>1</sup>; Pat Trimby<sup>1</sup>; Aimo Winkelmann<sup>2</sup>; <sup>1</sup>Oxford Instruments; <sup>2</sup>ST Development GmbH

**10:20 AM Break****10:35 AM Invited**

**Kikuchipy: An Open-Source Toolbox for Analysis of EBSD Patterns:** *Håkon Ånes*<sup>1</sup>; Phillip Crout<sup>2</sup>; Jarle Hjelen<sup>1</sup>; Antonius van Helvoort<sup>1</sup>; Knut Marthinsen<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>University of Cambridge

**11:00 AM**

**Phase Distinction of Ordered Intermetallic Phases Using EBSD:** *Stefan Martin*<sup>1</sup>; Andreas Leineweber<sup>1</sup>; <sup>1</sup>Tu Bergakademie Freiberg

**11:20 AM**

**Phase Differentiation in Half- and Full-Heusler Composites Using EBSD:** *Patrick Callahan*<sup>1</sup>; McLean Echlin<sup>2</sup>; Jason Douglas<sup>2</sup>; Tresa Pollock<sup>2</sup>; <sup>1</sup>US Naval Research Laboratory; <sup>2</sup>University of California Santa Barbara

**11:40 AM**

**Micro-analysis of  $\delta$ -hydrides in Pure Zirconium by HR-EBSD and TKD:** *Xuwei Li*<sup>1</sup>; Angus Wilkinson<sup>1</sup>; David Armstrong<sup>1</sup>; Junliang Liu<sup>2</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>University of Wisconsin-Madison

**12:00 PM**

**Challenges and Prospects of TKD for Nanocrystalline Materials Characterization:** *Alice Bastos S. Fanta*<sup>1</sup>; <sup>1</sup>DTU nanolab

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

**Refractory Metals 2024 — MPEA's, RCCA's, and More**

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

**Program Organizers:** Christopher Thom, Rhenium Alloys, Inc.; Wolfgang Pantleon, Technical University of Denmark; Michael Kirka, Oak Ridge National Laboratory; Gaoyuan Ouyang, Ames Laboratory; Marie Charpagne, University of Illinois; Eric Taleff, University of Texas at Austin; Thomas Bieler, Michigan State University; John Perepezko, University of Wisconsin-Madison

**Monday AM | March 4, 2024**  
**Bayhill 18 | Hyatt**

**Session Chair:** Christopher Thom, Rhenium Alloys Inc.

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**8:30 AM**

**Assessment of Microstructural and Compositional Evolution and Stability in the Ta-(Nb,Mo,W)-V System:** *Alexander Baker*<sup>1</sup>; Connor Rietema<sup>1</sup>; Jibril Shittu<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Aurelien Perron<sup>1</sup>; Joseph McKeown<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**8:50 AM**

**Tailored Multi-phase Refractory Multiple-principal-Element Alloy Composites:** *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>1</sup>; Jun Cui<sup>2</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>Iowa State University

**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>; William Trehern<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:30 AM**

**Discovery of Oxidation-Resistant Refractory Compositionally Complex Alloys Through High-throughput Calculations and Experiments:** *Akhil Bejjipurapu*<sup>1</sup>; Michael S Titus<sup>1</sup>; Kenneth H Sandhage<sup>1</sup>; <sup>1</sup>Purdue University

**9:50 AM**

**Thermo-mechanical Processing of Refractory Multi principal Element Alloys:** *Nathan Peterson*<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Nelson De Campos Neto<sup>1</sup>; Adira Balzac; Kester Clarke<sup>1</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**10:10 AM Break**

**10:30 AM**

**Thermomechanical Processing Maps and Microstructure Characterization of Cr-containing Refractory Complex Concentrated Alloys:** *Nelson Delfino De Campos Neto*<sup>1</sup>; John Rotella<sup>2</sup>; Todd Butler<sup>2</sup>; Samuel Kuhr<sup>2</sup>; Matthew Snyder<sup>3</sup>; Nathan Peterson<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Francisco Coury<sup>4</sup>; Kester Clarke<sup>1</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>ARCTOS Technology Solutions; <sup>4</sup>Federal University of São Carlos

**10:50 AM**

**Controlling the Sources of Interstitial Constituents in Refractory Complex Concentrated All:** *Calvin Belcher*<sup>1</sup>; Sakshi Bajpai<sup>1</sup>; Vivek Verma<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Diran Apelian<sup>1</sup>; Enrique Lavernia<sup>1</sup>; <sup>1</sup>University of California Irvine

**11:10 AM**

**Novel Refractory High-Entropy Metal-ceramic Composites with Superior Mechanical Properties:** *Bai Cui*<sup>1</sup>; Xin Chen<sup>1</sup>; Fei Wang<sup>1</sup>; Xiang Zhang<sup>1</sup>; Shanshan Hu<sup>2</sup>; Xingbo Liu<sup>2</sup>; Samuel Humphry-Baker<sup>3</sup>; Michael Gao<sup>4</sup>; Lingfeng He<sup>5</sup>; Yongfeng Lu<sup>1</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>West Virginia University; <sup>3</sup>Imperial College London; <sup>4</sup>National Energy Technology Laboratory; <sup>5</sup>North Carolina State University



11:30 AM Invited

**Bcc-Superalloys: Refractory Metal bcc Matrix, Reinforced by Ordered-bcc Intermetallic Precipitates:** *Alexander Knowles*<sup>1</sup>; <sup>1</sup>University of Birmingham

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## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Nuclear Fuels

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Monday AM | March 4, 2024**  
**Regency P | Hyatt**

**Session Chair:** Don Wood, Glenn T. Seaborg Institute - INL

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### 8:30 AM Introductory Comments

8:40 AM

**Advanced Characterization to Support the Accelerated Qualification of Nuclear Fuels:** *Joshua White*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

9:05 AM

**Chemistry and Thermodynamic Performance Challenges in Contemporary Nuclear Fuel Development:** *Andrew Nelson*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:30 AM

**Mitigating Lanthanide-Induced Fuel-Cladding Chemical Interaction In U-Zr Based Fuels:** *Yi Xie*<sup>1</sup>; Michael Benson<sup>2</sup>; Chao Jiang<sup>2</sup>; Jason Harp<sup>3</sup>; Lingfeng He<sup>4</sup>; Jinsuo Zhang<sup>5</sup>; Robert Mariani<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>North Carolina State University; <sup>5</sup>Virginia Tech

9:55 AM Break

10:15 AM

**Materials Behavior in Alternate Head End Processing for Used Nuclear Fuel Recycling:** *Leigh Martin*<sup>1</sup>; Kathryn Peruski<sup>1</sup>; Tyler Spano<sup>1</sup>; Allison Greaney<sup>1</sup>; Katie Johnson<sup>1</sup>; Joanna McFarlane<sup>1</sup>; Trent Walker<sup>2</sup>; Chase Cobble<sup>1</sup>; Matt Vick<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Y-12 National Security Complex

10:40 AM

**Modeling Mass Transport and Its Impact on Performance of Nuclear Fuels:** *David Andersson*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Simulations/Experiments Integration for Next Generation Hypersonic Materials — Session I

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

**Program Organizers:** Thomas Voisin, Lawrence Livermore National Laboratory; Jibril Shittu, Lawrence Livermore National Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory; Joseph McKeown, Lawrence Livermore National Laboratory; Raymundo Arroyave, Texas A&M University

**Monday AM | March 4, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chairs:** Thomas Voisin, Lawrence Livermore National Laboratory; Jibril Shittu, Lawrence Livermore National Laboratory; Aurelien Perron, Lawrence Livermore National Laboratory

**8:30 AM Invited**

**Targeted Design of Refractory Multi-principal Element Alloys, Properties and Microstructures:** *Anssi Laukkanen*<sup>1</sup>; Tatu Pinomaa<sup>1</sup>; Abhishek Biswas<sup>1</sup>; Napat Vajragupta<sup>1</sup>; Sicong Ren<sup>1</sup>; Tom Andersson<sup>1</sup>; Joni Kaipainen<sup>1</sup>; Lassi Linnala<sup>1</sup>; Mikko Tahkola<sup>1</sup>; Antti Korkealaakso<sup>1</sup>; Hyunkyung Choo<sup>1</sup>; Jukka Aho<sup>1</sup>; Matti Lindroos<sup>1</sup>; Kate Elder<sup>2</sup>; Aurelien Perron<sup>2</sup>; Scott McCall<sup>2</sup>; Joseph McKeown<sup>2</sup>; Nikolaos Provatas<sup>3</sup>; Supriya Nandy<sup>1</sup>; Tomi Suhonen<sup>1</sup>; Jihad Zraibi<sup>4</sup>; Hitesh Walia<sup>4</sup>; Marzuk Kamal<sup>4</sup>; <sup>1</sup>VTT Technical Research Center of Finland; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>McGill University; <sup>4</sup>Aeonx

**9:05 AM**

**Rapid Computational Design and Experimental Validation of Ductile High Entropy Alloys for Extreme Environments:** *Kate Elder*<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Adam Krajewski<sup>2</sup>; Joel Berry<sup>1</sup>; Benjamin Ellyson<sup>1</sup>; Connor Rietema<sup>1</sup>; Jibril Shittu<sup>1</sup>; Zachary Sims<sup>1</sup>; Hunter Henderson<sup>1</sup>; Alexander Baker<sup>1</sup>; Thomas Voisin<sup>1</sup>; Scott McCall<sup>1</sup>; Aurelien Perron<sup>1</sup>; Joseph McKeown<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Pennsylvania State University

**9:25 AM**

**Design and Rapid Solidification Analysis of Refractory Multi-principal Element Alloys:** *Tatu Pinomaa*<sup>1</sup>; Joni Kaipainen<sup>1</sup>; Lassi Linnala<sup>1</sup>; Mikko Tahkola<sup>1</sup>; Jukka Aho<sup>1</sup>; Abhishek Biswas<sup>1</sup>; Napat Vajragupta<sup>1</sup>; Sicong Ren<sup>1</sup>; Matti Lindroos<sup>1</sup>; Kate Elder<sup>1</sup>; Thomas Voisin<sup>1</sup>; Aurelien Perron<sup>1</sup>; Scott McCall<sup>1</sup>; Joseph McKeown<sup>1</sup>; Nikolaos Provatas<sup>1</sup>; Anssi Laukkanen<sup>1</sup>; <sup>1</sup>VTT Technical Research Centre of Finland Ltd

**9:45 AM**

**CALPHAD-based Thermal Conductivity Modeling Appended with Porosity Effects for Ultra-high Temperature Ceramics Suitable for Hypersonic Applications:** *Soumya Sridar*<sup>1</sup>; Wei Xiong<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**10:05 AM Break**

**10:25 AM Invited**

**Metal Di-boride (MB<sub>2</sub> | M = Ti, Zr, Nb, Hf, Ta) Properties Above 3000 C:** Elizabeth Sobalvarro<sup>1</sup>; Fox Thorpe<sup>2</sup>; Jesus Rivera<sup>1</sup>; Harry Charalambous<sup>1</sup>; Gabriella King<sup>1</sup>; James Cahill<sup>1</sup>; Wyatt Du Frane<sup>1</sup>; Joshua Kuntz<sup>1</sup>; *Scott McCormack*<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>University of California, Davis

**11:00 AM**

**Mechanical and Structural Characterization of Ultra-fast Boriding Process on Refractory Metals:** *Merve Uysal Komurlu*<sup>1</sup>; Cafer Melik Ensar Acemi<sup>1</sup>; Cagatay Yelkarasi<sup>1</sup>; Ali Erdemir<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

**11:20 AM**

**Correlative Multiscale 3D Investigation of Damage in Angle-interlocked Ceramic Matrix Composites:** *Hrishi Bale*<sup>1</sup>; Nathan Johnson<sup>1</sup>; <sup>1</sup>Carl Zeiss Microscopy, Llc

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## MATERIALS SYNTHESIS AND PROCESSING

### Solidification in External Fields — Solidification in External Fields I: Magnetic Fields

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Light Metals Division, TMS: Solidification Committee, TMS: Aluminum Committee

**Program Organizers:** Andrew Kao, University of Greenwich; Catherine Tonry, University of Greenwich; Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Abdellah Kharicha, Montanuniversität; Natalia Shevchenko, Helmholtz Zentrum Dresden Rossendorf; Jiawei Mi, University of Hull

**Monday AM | March 4, 2024**  
**Celebration 6 | Hyatt**

**Session Chairs:** Andrew Kao, University of Greenwich; Xianqiang Fan, UCL

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#### 8:30 AM

**Influence of the Coriolis Force on the Macro-segregation of a Steel Alloy:** *Abdellah Kharicha*<sup>1</sup>; Ibrahim Sari<sup>1</sup>; Menghuai Wu<sup>2</sup>; <sup>1</sup>Montanuniversität of Leoben; <sup>2</sup>University of Leoben

#### 8:50 AM

**Influence of Static Magnetic Field on the Solidification of Inconel 718 Alloys during Additive Manufacturing:** *Dafan Du*<sup>1</sup>; Anping Dong<sup>1</sup>; Baode Sun<sup>1</sup>; <sup>1</sup>Shanghai Jiao Tong University

#### 9:10 AM

**Microstructure Control in Additive Manufacturing Using Magnetic Fields and Strategic Scanning:** *Ivars Krastins*<sup>1</sup>; Xianqiang Fan<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

#### 9:30 AM

**The Effects of External Magnetic Field on Keyhole Behavior in Laser Spot Welding of 316L SS Using In-situ X-ray Imaging:** *Aslan Bafahm Alamdari*<sup>1</sup>; Marwan Haddad<sup>1</sup>; Alex Thomas<sup>1</sup>; Samuel Clark<sup>2</sup>; Kamel Fezzaa<sup>2</sup>; Sarah Wolff<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Argonne National Laboratory

#### 9:50 AM Break

#### 10:10 AM Invited

**Manipulating Flow during Solidification Using Magnetic Fields:** *Xianqiang Fan*<sup>1</sup>; Natalia Shevchenko<sup>2</sup>; Catherine Tonry<sup>3</sup>; Samuel Clark<sup>4</sup>; Robert Atwood<sup>5</sup>; Sven Eckert<sup>2</sup>; Koulis Pericleous<sup>3</sup>; Andrew Kao<sup>3</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Helmholtz-Zentrum Dresden-Rossendorf; <sup>3</sup>University of Greenwich; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>Diamond Light Source Ltd

#### 10:35 AM

**Solidification of Gallium Indium in Static and Pulsed Magnetic Fields:** Qingwei Bai<sup>1</sup>; *Catherine Tonry*<sup>2</sup>; Xianqiang Fan<sup>3</sup>; Natalia Shevchenko<sup>1</sup>; Peter Soar<sup>2</sup>; Ivars Krastins<sup>2</sup>; Sebastian Maurisi<sup>3</sup>; Robert Atwood<sup>4</sup>; Sven Eckert<sup>1</sup>; Koulis Pericleous<sup>2</sup>; Peter Lee<sup>3</sup>; Andrew Kao<sup>2</sup>; <sup>1</sup>Helmholtz-Zentrum Dresden-Rossendorf; <sup>2</sup>University of Greenwich; <sup>3</sup>University College London; <sup>4</sup>Diamond Light Source

#### 10:55 AM

**Multiphysics Modelling of the Solidification Dynamics in Pulse Magnetic Fields and Validation by Synchrotron X-ray Imaging:** *Ling Qin*<sup>1</sup>; Jiawei Mi<sup>2</sup>; <sup>1</sup>University of Wyoming; <sup>2</sup>University of Hull

**11:15 AM**

**Operando Studies of Phase Nucleation and Growth Dynamics of Metal Alloys in Solidification Under External Fields by Synchrotron X-ray Imaging and Scattering:** Kang Xiang<sup>1</sup>; Shi Huang<sup>1</sup>; Hongyuan Song<sup>1</sup>; Mengnie Li<sup>2</sup>; Jiawei Mi<sup>1</sup>; <sup>1</sup>University of Hull; <sup>2</sup>Kunming University of Science and Technology

**11:35 AM**

**Industrial Trials of Permanent Magnet Stirring during Billet Continuous Casting:** Jianfei Peng<sup>1</sup>; Shuaijie Yuan<sup>1</sup>; Wanlin Wang<sup>1</sup>; Jie Zeng<sup>1</sup>; <sup>1</sup>Central South University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Kinetics of Alloys II — Session I

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

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Ji-Cheng Zhao, University of Maryland; Shuanglin Chen, CompuTherm LLC; Wei Xiong, University of Pittsburgh

**Monday AM | March 4, 2024**

**Bayhill 31 | Hyatt**

**Session Chairs:** Chuan Zhang, Computherm; Yijia Gu, Missouri University of Science and Technology

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**8:30 AM Invited**

**A Molar Volume Database for Co-base Superalloys:** Ursula Kattner<sup>1</sup>; Júlio Pereira dos Santos<sup>2</sup>; Sean Griesemer<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Northwestern University

**9:00 AM Invited**

**Modeling Phase Selection and Extended Solubility in Rapid Solidified Alloys:** Yijia Gu<sup>1</sup>; Azeez Akinbo<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

**9:30 AM**

**DFT Calculation of Thermal Expansion within Debye-Grüneisen Framework Made Simple and Accurate:** Yi Wang<sup>1</sup>; Michael Gao<sup>2</sup>; <sup>1</sup>Leidos Inc; <sup>2</sup>National Energy Technology Laboratory

**9:50 AM**

**Efficient Ab Initio Estimation of the High-temperature Liquidus Curve:** Shibo Tan<sup>1</sup>; Joshua Willwerth<sup>1</sup>; Wenhao Sun<sup>1</sup>; <sup>1</sup>University of Michigan

**10:10 AM Break****10:30 AM**

**Mo Diffusion in FCC and Rhombohedral Phases in FeNiMoW Using Atomistic Calculations:** Sarah O'Brien<sup>1</sup>; Matthew Beck<sup>1</sup>; <sup>1</sup>University of Kentucky

**10:50 AM**

**Interdiffusion Study in - (Ni,Pt)Al Bond Coat System at 1100 °C:** Biswarupa Samantaray<sup>1</sup>; Kaustubh Kulkarni<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur

**11:10 AM**

**Dynamics of Strain-energy-driven Grain Growth:** Marcel Chlupsa<sup>1</sup>; Zachary Croft<sup>1</sup>; Guanglong Huang<sup>1</sup>; Eli Rotman<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; Ashwin Shahani<sup>1</sup>; <sup>1</sup>University of Michigan

**11:30 AM**

**Grain Size Effects on Interdiffusion in Multicomponent Alloys:** *Bhawna Yadav*<sup>1</sup>; Nuli Krishna Chaitanya<sup>1</sup>; Aditya Burla<sup>1</sup>; Sadhasivam<sup>2</sup>; Guruvidyathri K<sup>3</sup>; Joydip Joardar<sup>4</sup>; KG Pradeep<sup>2</sup>; Mayur Vaidya<sup>1</sup>; <sup>1</sup>IIT Hyderabad; <sup>2</sup>IIT Madras; <sup>3</sup>University of Hyderabad; <sup>4</sup>ARCI, Hyderabad

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## MATERIALS SYNTHESIS AND PROCESSING

### **Towards a Future of Sustainable Production and Processing of Metals and Alloys – Decarbonizing Steel Making-Hydrogen Direct Reduction**

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

**Program Organizers:** Arun Devaraj, Pacific Northwest National Laboratory; Dierk Raabe, Max-Planck Institute; Suhas Eswarappa Prameela, Massachusetts Institute of Technology (MIT); Leora Dresselhaus-Marais, Stanford University; Petrus Pistorius, Carnegie Mellon University

**Monday AM | March 4, 2024**  
**Celebration 4 | Hyatt**

**Session Chair:** Arun Devaraj, Pacific Northwest National Laboratory

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#### **8:30 AM Introductory Comments**

##### **8:35 AM Invited**

**Current Attempts and Challenges in Decarbonizing Steel Production:** *Susanne Michelic*<sup>1</sup>; Johannes Schenk<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

##### **9:05 AM**

**Visualizing the Atomic Scale Diffusional Mechanisms during Reduction of Epitaxial and Single Crystalline Iron Oxides with Hydrogen:** *Arun Devaraj*<sup>1</sup>; Francelia Sanchez<sup>1</sup>; Zehao Li<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Tingkun Liu<sup>1</sup>; sten Lambeets<sup>1</sup>; Jack Grimm<sup>1</sup>; Ewa Ronnebro<sup>1</sup>; Yingge Du<sup>1</sup>; Ramana Chintalapalle<sup>1</sup>; Tiffany Kaspar<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

##### **9:25 AM Invited**

**Influence of Pre-oxidation on the Hydrogen-based Direct Reduction of Combusted Iron Powder:** *Laurine Choisez*<sup>1</sup>; Kira Hemke<sup>2</sup>; Özge Özgün<sup>2</sup>; Dierk Raabe<sup>2</sup>; Yan Ma<sup>2</sup>; <sup>1</sup>UCLouvain; <sup>2</sup>Max-Planck Institute for Iron research

##### **9:55 AM**

**Hydrogen-based Iron Oxide Reduction for Green Steel Making Studied by Atomprobe Tomography:** *Dierk Raabe*<sup>1</sup>; Ayman El-Zoka<sup>1</sup>; Baptiste Gault<sup>1</sup>; <sup>1</sup>Max-Planck Institute

##### **10:15 AM Break**

##### **10:30 AM**

**Research and Application on Low-carbon Technologies of Ironmaking Process:** *Zhang Fuming*<sup>1</sup>; Yanbo Chen<sup>1</sup>; Xiangfeng Cheng<sup>1</sup>; <sup>1</sup>Shougang Group Co. Ltd.

##### **10:50 AM**

**Reduction Kinetics of Hematite Powder Using Hydrogen Plasma with Prospects for Near-net Shaping of Sustainable Iron:** *Rangasayee Kannan*<sup>1</sup>; Adam Stevens<sup>1</sup>; Roger Miller<sup>1</sup>; Christopher Fancher<sup>1</sup>; Jack Ward Jr<sup>1</sup>; Sudarsanam Babu<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

11:10 AM

**Hydrogen Reduction of Ferroalloys:** *Maryam Al-Buainain*<sup>1</sup>; Samuel Pennell<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

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## 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; Ramana Chintalapalle, University of Texas at El Paso

**Monday PM | March 4, 2024**

**Orlando N | Hyatt**

**Session Chairs:** Mohsen Zaeem, National Science Foundation; Nuggehalli Ravindra, New Jersey Institute of Technology

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**2:00 PM Introductory Comments**

**2:10 PM Invited**

**Graphene Based Protective Coatings:** *Eugene Zakar*<sup>1</sup>; Theodore Anthony<sup>1</sup>; Wayne Churaman<sup>1</sup>; Madan Dubey<sup>1</sup>; <sup>1</sup>Army Research Laboratory

**2:30 PM Invited**

**2D Amorphous Carbon Dielectric Prepared from Solution Precursor for Nanoelectronics:** *Congjun Wang*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**2:50 PM Invited**

**Extensive Study of Graphene Growth Mechanism on Supported Cu Films Using Cold Wall CVD and Perspective on Growth Mechanism of Graphene From Scaling Functions of Graphene Island Size Distribution:** *Shantanu Das*<sup>1</sup>; <sup>1</sup>Intel Corporation

**3:10 PM Invited**

**Direct Ink Writing of Graphene Based Solutions for Gas and Water Sensing Applications:** *Konstantinos Sierros*<sup>1</sup>; <sup>1</sup>West Virginia University

**3:30 PM Break**

**3:50 PM Invited**

**Graphene as a Bioscaffold for Musculoskeletal Tissue Engineering:** *Dave Estrada*<sup>1</sup>; <sup>1</sup>Boise State University

**4:10 PM Invited**

**Chemical Vapor Deposition Synthesis of 2D Refractory Metal Carbides:** *Eric Payton*<sup>1</sup>; Phillisity Neal<sup>1</sup>; Jesus Acosta<sup>1</sup>; Aleksey Ruditskiy<sup>2</sup>; Andrea Giordano<sup>3</sup>; W. Josh Kennedy<sup>4</sup>; <sup>1</sup>University of Cincinnati; <sup>2</sup>UES, Inc; <sup>3</sup>National Research Council of the National Academies of Sciences, Engineering, and Medicine; <sup>4</sup>Air Force Research Laboratory

**4:30 PM**

**Multifunctional Graphene Nanoplatelet (GNP) - Boron Nitride Nanoplatelet (BNNP) Hybrid Foam Sensors for Harsh Environments:** *Kazue Orikasa*<sup>1</sup>; Arvind

Agarwal<sup>1</sup>; Luiza Benedetti<sup>1</sup>; Cheol Park<sup>2</sup>; Sang-Hyon Chu<sup>2</sup>; Tyler Dolmetsch<sup>1</sup>; Tony Thomas<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>NASA Langley Research Center

**4:50 PM**

**Synthesis and Characterization of Q-carbon Layer Growth on 3D Nanostructures:** *Sumeer Khanna*<sup>1</sup>; Siba Sahoo<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>NC State University

**5:10 PM**

**2D Materials in Photovoltaics – An Overview:** *Matias Daniel De Almeida*<sup>1</sup>; Allyson Tarifa<sup>1</sup>; Nuggehalli Ravindra<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

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## MECHANICS OF MATERIALS

**Accelerated Discovery and Insertion of Next Generation Structural Materials – Accelerated Insertion of Materials - Session II**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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

**Monday PM | March 4, 2024**  
**Barrel Spring I | Hyatt**

**Session Chairs:** Jonah Klemm-Toole, Colorado School of Mines; Bharat Gwalani, NC State; Andrew Bobel, General Motors

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**2:00 PM**

**An Experimental High Throughput to High Fidelity Study Towards Discovering Al-Cr Containing Corrosion-resistant Compositionally Complex Alloys:** *Emily Holcombe*<sup>1</sup>; Debashish Sur<sup>2</sup>; William Blades<sup>3</sup>; Elaf Anber<sup>4</sup>; Daniel Foley<sup>4</sup>; Brian DeCost<sup>5</sup>; Jing Liu<sup>6</sup>; Jason Hattrick-Simpers<sup>7</sup>; Karl Sieradzki<sup>3</sup>; Howie Jorress<sup>5</sup>; John Scully<sup>2</sup>; Mitra Taheri<sup>4</sup>; <sup>1</sup>Naval Surface Warfare Center Carderock, Johns Hopkins University; <sup>2</sup>University of Virginia; <sup>3</sup>Arizona State University; <sup>4</sup>Johns Hopkins University; <sup>5</sup>National Institute of Standards and Technology; <sup>6</sup>Manhattan College; <sup>7</sup>University of Toronto

**2:20 PM**

**Machine Learning-CALPHAD Assisted Design of L12-strengthened Ni-Al-Co-Cr-Fe-Ti Complex Concentrated Superalloy for Multi-property Optimization:** *Sudeepta Mukherjee*<sup>1</sup>; Surendra Makineni<sup>1</sup>; B.S. Murty<sup>2</sup>; Satyam Suwas<sup>1</sup>; <sup>1</sup>Indian Institute of Science, Bengaluru, India; <sup>2</sup>Indian Institute of Technology, Hyderabad, India

**2:40 PM**

**Machine Learning and CALPHAD Assisted Design of High Performance Structural High Entropy Alloys:** *Joshua Berry*<sup>1</sup>; Yunus Azakli<sup>1</sup>; Matthew Turton<sup>1</sup>; Olivier Messe<sup>2</sup>; Iain Todd<sup>1</sup>; Katerina Christofidou<sup>1</sup>; <sup>1</sup>University Of Sheffield; <sup>2</sup>Oerlikon AM Europe GmbH

**3:00 PM**

**High Throughput Exploration and Optimization of the Mechanical Properties of FCC Complex Concentrated Alloys for Extreme Conditions:** *Wenle Xu*<sup>1</sup>; Daniel Salas<sup>1</sup>; Matthew Skokan<sup>1</sup>; Trevor Hastings<sup>1</sup>; Daniel Lewis<sup>1</sup>; Mrinalini Mulukutla<sup>1</sup>; Nicole Person<sup>1</sup>; Douglas Allaire<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; James Paramore<sup>2</sup>; Brady Butler<sup>2</sup>; George Pharr<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Army CCDC

Army Research Laboratory

**3:20 PM**

**Accelerating Materials Discovery of HEA's through Constraint Based High Throughput Design, Synthesis and Batch Bayesian Optimization Framework:** *Mrinalini Mulukutla*<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Danial Khatamsaz<sup>1</sup>; James Paramore<sup>1</sup>; Brady Butler<sup>1</sup>; Trevor Hastings<sup>1</sup>; Daniel Lewis<sup>1</sup>; Daniel Salas<sup>1</sup>; Nicole Person<sup>1</sup>; Wenle Xu<sup>1</sup>; Douglas Allaire<sup>1</sup>; George Pharr<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:40 PM Break**

**3:55 PM**

**Computational Design of Complex Concentrated Alloys for Nuclear Applications:** *Koutheir Riahi*<sup>1</sup>; Anna Fraczkiwicz<sup>1</sup>; Franck Tancret<sup>2</sup>; <sup>1</sup>Ecole des Mines de Saint-Etienne; <sup>2</sup>Nantes Université

**4:15 PM**

**Profound Formability in Lightweight, As-cast High Entropy Alloys during Cold Rolling:** *Aditya Balpande*<sup>1</sup>; Shavi Agrawal<sup>2</sup>; Satyam Suwas<sup>2</sup>; Sheng Guo<sup>3</sup>; Saurabh Nene<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur; <sup>2</sup>Indian Institute of Science, Bangalore; <sup>3</sup>Chalmers University of Technology

**4:35 PM**

**Amorphous to Crystalline: High-throughput Thermal Stability Investigation on IV- and V- group Refractory High-entropy Alloy Systems:** *Changjun Cheng*<sup>1</sup>; Renfei Feng<sup>2</sup>; Tianyi Lyu<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto; <sup>2</sup>Canadian Light Source

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## NUCLEAR MATERIALS

**Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Experimental Methods for Accelerating Qualification**

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Monday PM | March 4, 2024**  
**Regency Q | Hyatt**

**Session Chairs:** Lingfeng He, North Carolina State University; Rongjie Song, Idaho National Laboratory

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**2:00 PM Invited**

**Experimental Methods for Accelerating Nuclear Structural Material Qualification:** *Michael McMurtrey*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**2:30 PM**

**Primary Radiation Damage Evaluation on Thick Films Using a High-throughput Approach:** *Elena Botica Artalejo*<sup>1</sup>; Gregory Wallace<sup>2</sup>; Kevin Woller<sup>2</sup>; Angus Wylie<sup>1</sup>; Michael Short<sup>2</sup>; <sup>1</sup>MIT; <sup>2</sup>MIT Plasma Science and Fusion Center



**2:50 PM**

**High Throughput Assessment of Creep Behavior of Advanced Nuclear Reactor Structural Alloys by Nanoindentation:** *Minh Tam Hoang*<sup>1</sup>; Kevin Schmalbach<sup>2</sup>; Eric Hintsala<sup>2</sup>; Douglas Stauffer<sup>2</sup>; Justin Cheng<sup>1</sup>; Moujhuri Sau<sup>1</sup>; Ben Eftink<sup>3</sup>; Nathan Mara<sup>1</sup>; <sup>1</sup>University of Minnesota-Twin Cities; <sup>2</sup>Bruker Nano; <sup>3</sup>Los Alamos National Laboratory

**3:10 PM**

**A Novel In-situ Miniature Creep Tester for Evaluation of New Cladding Alloys.:** *Lucas Maciel de Andrade Lima*<sup>1</sup>; Jacob Eapen<sup>1</sup>; Korukonda Murty<sup>1</sup>; Tasnim Hassan<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:30 PM Break****3:45 PM Invited**

**Accelerating the Qualification of High Temperature Structural Materials for Nuclear Reactor Applications:** *Mark Messner*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**4:15 PM**

**Probing Anharmonicity Effects at Elevated Temperatures in Ceramic Nuclear Fuels and Surrogates using Raman Spectroscopy:** *Amey Khanolkar*<sup>1</sup>; Saqeeb Adnan<sup>2</sup>; David Hurley<sup>1</sup>; Marat Khafizov<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>The Ohio State University

**4:35 PM**

**In Situ Ion Irradiation of a Spent UO<sub>2</sub> Fuel:** *Yunyuan Lu*<sup>1</sup>; Cameron Howard<sup>2</sup>; Wei-Ying Chen<sup>3</sup>; Sudipta Biswas<sup>2</sup>; Chao Jiang<sup>2</sup>; Dewen Yushu<sup>2</sup>; Jatuporn Burns<sup>2</sup>; Lingfeng He<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Argonne National Laboratory

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Accelerated Testing to Understand the Long Term Performance of High Temperature Materials — Session II

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

**Program Organizers:** Jonah Klemm-Toole, Colorado School of Mines; Benjamin Adam, Oregon State University; Andrew Wessman, University of Arizona; Dinc Erdeniz, University of Cincinnati; Chantal Sudbrack, National Energy Technology Laboratory; Kinga Unocic, Oak Ridge National Laboratory

**Monday PM | March 4, 2024**

**Windermere X-3 | Hyatt**

**Session Chairs:** Benjamin Adam, Oregon State University; Chantal Sudbrack, National Energy Technology Laboratory

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**2:00 PM Invited**

**Accelerated Evaluation of Nanometer Scale Plastic Deformation Events Characteristics for Long-term Performance Prediction:** Dhruv Anjaria<sup>1</sup>; Christopher Bean<sup>2</sup>; Samuel Hemery<sup>3</sup>; *J.C. Stinville*<sup>4</sup>; <sup>1</sup>University of Illinois Urbana Champaign; <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>Institute Prime - Ensma; <sup>4</sup>University of Illinois at Urbana-Champaign

**2:40 PM**

**Effect of Compositional Complexity on the Creep of High Entropy Alloys:** *Tzu-Yi Chang*<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Tianyi Chen<sup>2</sup>; Boopathy Kombaiyah<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Oregon State University

**3:00 PM**

**Grain Boundary Segregation Behavior in Ni and Fe Based Alloys During Diffusional Creep:** *Boopathy Kombariah*<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Chaitanya Bhave<sup>1</sup>; Shehab Shousha<sup>1</sup>; Advika Chesetti<sup>1</sup>; Saurabh Kadambi<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**3:20 PM**

**Non-isothermal Creep Loading Under Multiaxial Stress State in Ni-based Single Crystal Superalloys:** *Jose Dominic*<sup>1</sup>; Jean-Briac le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:40 PM Break**

**4:00 PM**

**Phase-field Modeling of Tertiary  $\gamma'$  Precipitation During Non-isothermal Loading in Ni-based Single-crystal Superalloys:** *Jose Dominic*<sup>1</sup>; Jean-Briac le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

**4:20 PM**

**Microstructure and Mechanical Properties of Austenitic Stainless Steel at Extreme Temperatures:** *Adnan Khan*<sup>1</sup>; Vasanth C. Shunmugasamy<sup>2</sup>; Bilal Mansoor<sup>3</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Texas A&M University at Qatar; <sup>3</sup>Texas A&M University

**4:40 PM**

**Exploring the Service Life Extremes of 716 in Highly Corrosive Environments:** *Timothy Dunne*<sup>1</sup>; Lei Zhao<sup>1</sup>; Jiaxiang Ren<sup>1</sup>; Peng Cheng<sup>1</sup>; Yu Liu<sup>1</sup>; Huailiang Liu<sup>1</sup>; <sup>1</sup>CNPC USA Corp

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Keynote Session — Additive Manufacturing Keynote Session

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizer:** Eric Lass, University of Tennessee-Knoxville

**Monday PM | March 4, 2024**  
Plaza Int'l IJK | Hyatt

**Session Chair:** Eric Lass, University of Tennessee-Knoxville

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**2:00 PM Keynote**

**MELD: The Development of a Disruptive Additive Manufacturing Technology:** *Chase Cox*<sup>1</sup>; <sup>1</sup>MELD Manufacturing Corporation

**2:35 PM Question and Answer Period**

**2:40 PM Keynote**

**Alloy-Design for Additive Manufacturing: An Atomic-Scale Perspective:** *Dierk Raabe*<sup>1</sup>; <sup>1</sup>Max-Planck Institute

**3:15 PM Question and Answer Period**

**3:20 PM Break**

**3:40 PM Keynote**

**Additive Manufacturing at Every "Sea" State:** *Cindy Waters*<sup>1</sup>; <sup>1</sup>Naval Surface Warfare Research Center Carderock Division

4:15 PM Question and Answer Period

4:20 PM Keynote

**TMS Young Innovator in the Materials Science of Additive Manufacturing Award: Meta-crystals: Synergistic Combination of Materials Science and Additive Manufacturing:** *Minh-Son Pham*<sup>1</sup>; <sup>1</sup>Imperial College London

4:55 PM Question and Answer Period

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## BIOMATERIALS

### **Advanced Biomaterials for Biomedical Implants – Multifunctional Biomaterials**

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

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Pennsylvania State University Harrisburg; Vinoy Thomas, University of Alabama at Birmingham

**Monday PM | March 4, 2024**  
**Celebration 12 | Hyatt**

**Session Chair:** Tolou Shokuhfar, University of Illinois at Chicago

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2:00 PM Invited

**Design-specific and Multi-functional (Bioactive and Antibacterial) PEEK-based Implants:** *Prabaha Sikder*<sup>1</sup>; <sup>1</sup>Cleveland State University

2:30 PM

**Mechanical Integrity Testing of Bioresorbable Zn-based Alloy Under Static and Cyclic Loadings:** *Henry Summers*<sup>1</sup>; *Jeremy Goldman*<sup>1</sup>; *Jaroslav Drelich*<sup>1</sup>; <sup>1</sup>Michigan Technological University

2:50 PM

**Bioactive Glasses for Bone Repair and Dental Applications: A Review of Osteointegration and Controlled Ion Release Capabilities:** *Casmir Okereke*<sup>1</sup>; *Joshua Onaifo*<sup>2</sup>; *Ikhazuagbe Ifijen*<sup>3</sup>; *Angela Ogbu*<sup>4</sup>; *Stanley Omorogbe*<sup>3</sup>; <sup>1</sup>Department of Chemistry, Faculty of Physical Sciences, University of Benin, Benin City, Edo State, Nigeria; <sup>2</sup>Department of Chemistry, Ambrose Ali University, Ekpoma, Edo State, Nigeria; <sup>3</sup>Rubber Research Institute of Nigeria; <sup>4</sup>Benson Idahosa University, Benin City, Edo State, Nigeria

3:10 PM Invited

**Young Leaders International Scholar – KIM Lecture: Electrochemically Controlled Drug Delivery Valve that Exploits Crevice Corrosion:** *Jahyun Koo*<sup>1</sup>; <sup>1</sup>Korea University

3:40 PM Break

4:00 PM

**Design and Enhancing Biocompatibility of - titanium Alloy via Electro-discharge Treatment Process:** *Ajaytaj Sidhu*<sup>1</sup>; *Sarabjeet Sidhu*<sup>2</sup>; <sup>1</sup>I. Horbachevsky Ternopil National Medical University; <sup>2</sup>Sardar Beant Singh State University, Gurdaspur

4:20 PM

**In Vivo Inflammatory Reaction and Elemental Trafficking of Magnesium Bioimplant Derived Aluminum:** *Weilue He*<sup>1</sup>; *Sreenivas Raguraman*<sup>2</sup>; *Timothy Weihs*<sup>2</sup>; *Roger Guillory*<sup>3</sup>; <sup>1</sup>Michigan Technological University; <sup>2</sup>Johns Hopkins University; <sup>3</sup>Medical College of Wisconsin

4:40 PM

**Development of Antibacterial Metal Oxide Thin Films for Neurostimulation Applications via Atomic Layer Deposition:** *Henna Khosla*<sup>1</sup>; Shahram Amini<sup>2</sup>; Gang Feng<sup>1</sup>; <sup>1</sup>Villanova University; <sup>2</sup>Pulse Technologies

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — In-situ Diffraction II

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

**Monday PM | March 4, 2024**  
**Celebration 1 | Hyatt**

**Session Chairs:** Matthew Barnett, Deakin Univeristy; Ashley Bucsek, University of Michigan

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2:00 PM

**Multimodal 4D Laboratory and Synchrotron X-ray Studies of Heterogeneous Plastic Deformation and Effects hereof on Recrystallization in Metals:** *Dorte Juul Jensen*<sup>1</sup>; <sup>1</sup>Technical University of Denmark

2:20 PM

**Validation Study of Laboratory-scale High-energy Diffraction Microscopy (Lab-HEDM):** *Seunghee Oh*<sup>1</sup>; Yuefeng Jin<sup>1</sup>; Sangwon Lee<sup>1</sup>; Wenxi Li<sup>1</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University of Michigan

2:40 PM

**Direct Observation of Intragranular Slip Initiation in Polycrystalline Titanium Using Point-focused High-energy Diffraction Microscopy:** *Wenxi Li*<sup>1</sup>; Hemant Sharma<sup>2</sup>; Peter Kenesei<sup>2</sup>; Sidharth Ravi<sup>3</sup>; Huseyin Sehitoglu<sup>3</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University Of Michigan; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>University of Illinois at Urbana-Champaign

3:00 PM

**Characterizing Intermittent Plastic Events in Ti-7Al Under Creep Loading Using Far-field High-energy Diffraction Microscopy:** *Yuefeng Jin*<sup>1</sup>; Amlan Das<sup>2</sup>; Wenxi Li<sup>1</sup>; Katherine Shanks<sup>3</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University Of Michigan; <sup>2</sup>Cornell High Energy Synchrotron Source ; <sup>3</sup>Cornell High Energy Synchrotron Source

3:20 PM

**Deformation Mechanisms of AZ31 Magnesium Alloy at 21K Revealed by In-situ Neutron Diffraction:** *Wu Gong*<sup>1</sup>; Takuro Kawasaki<sup>1</sup>; Ruixiao Zheng<sup>2</sup>; Tsuyoshi Mayama<sup>3</sup>; Kazuya Aizawa<sup>1</sup>; Stefanus Harjo<sup>1</sup>; Nobuhiro Tsuji<sup>4</sup>; <sup>1</sup>J-PARC Center, Japan Atomic Energy Agency; <sup>2</sup>Beihang University; <sup>3</sup>Kumamoto University; <sup>4</sup>Kyoto University

3:40 PM Break

4:00 PM

**3D Mapping of Cell Refinement During Tensile Deformation of Aluminum by DFXM:** *Albert Zelenika*<sup>1</sup>; Can Yildirim<sup>2</sup>; Carsten Detlefs<sup>2</sup>; Raquel Rodriguez-Lamas<sup>2</sup>; Flemming Grumsen<sup>3</sup>; Henning Poulsen<sup>3</sup>; Grethe Winther<sup>3</sup>; <sup>1</sup>Technical University

of Denmark/European Synchrotron Radiation Facility; <sup>2</sup>European Synchrotron Radiation Facility; <sup>3</sup>Technical University of Denmark

**4:20 PM**

**Correlating Experiments and Models through Crystallographic Orientation Mapping:** *Khalid Hattar*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**4:40 PM**

**Grains ain't Misbehaving or Going Wild? The Initiation of Abnormal Grain Growth!**: *Klaus-Dieter Liss*<sup>1</sup>; *Pingguang Xu*<sup>2</sup>; *Ayumi Shiro*<sup>3</sup>; *Shuoyuan Zhang*<sup>4</sup>; *Eitaro Yukutake*<sup>5</sup>; *Takahisa Shobu*<sup>2</sup>; *Megumi Kawasaki*<sup>6</sup>; *Koichi Akita*<sup>7</sup>; <sup>1</sup>University of Wollongong; <sup>2</sup>Japan Atomic Energy Agency; <sup>3</sup>National Institutes for Quantum Science and Technology; <sup>4</sup>Comprehensive Research Organization for Science and Society; <sup>5</sup>Industrial Technology Innovation Center of Ibaraki Prefecture; <sup>6</sup>Oregon State University; <sup>7</sup>Tokyo City University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Functional and Structural Thin Films and Coatings – Thin Films and Interfaces: Fabrication & Characterization I

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

**Program Organizers:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Karine Mougine, Cnrs, Is2m; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

**Monday PM | March 4, 2024**  
**Bayhill 26 | Hyatt**

**Session Chairs:** Ravindra Nuggehalli, New Jersey Institute of Technology; Adele Carrado, University of Strasbourg

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**2:00 PM Introductory Comments**

**2:05 PM Keynote**

**Molecular Beam Epitaxy of Binary and Ternary Manganese and Chromium Nitrides:** *Kevin Vallejo*<sup>1</sup>; *Krzysztof Gofryk*<sup>1</sup>; *Sandra Gutiérrez-Ojeda*<sup>2</sup>; *Maria Muñoz*<sup>3</sup>; *Tehseen Adel*<sup>3</sup>; *Gregorio Cocolletzi*<sup>4</sup>; *Angela Hight Walker*<sup>3</sup>; *Brelon May*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Universidad Nacional Autónoma de México; <sup>3</sup>National Institute of Standards and Technology; <sup>4</sup>Benemérita Universidad Autónoma de Puebla

**2:45 PM**

**Study of Binary Layer Ceramic Coating of Zirconium Nitride and Molybdenum Diselenide Deposited on Aluminium Composite Substrate:** *Ankit Kumar*<sup>1</sup>; *Ramver Singh*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology (IIT) Bombay, Mumbai India

**3:10 PM**

**Fluorescent Multi-layer Europium-doped Coatings Created using Ion Assisted Deposition:** *Richard Kim*<sup>1</sup>; *Yuelan Zhang*<sup>1</sup>; *William Ready*<sup>1</sup>; *Yi C. Mazumdar*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**3:35 PM Break**

**3:55 PM Invited**

**Steep Temperature-dependent Permittivity in BCZT Thin Films for Capacitive Thermoelectric Converter Application:** *Chukwudike Ukeje*<sup>1</sup>; <sup>1</sup>Imperial College

**4:35 PM**

**CrSi Protective Coatings for Thermoelectric Materials against High-temperature Oxidation:** *Mikdat Gurtaran*<sup>1</sup>; Zhenxue Zhang<sup>1</sup>; Xiaoying Li<sup>1</sup>; Alvise Bianchin<sup>2</sup>; Serena Busatto<sup>2</sup>; Hanshan Dong<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>MBN Nanomaterialia

**5:00 PM**

**Effect of Ag on TiO<sub>2</sub> Thin Films Prepared via Sol-gel Proces:** *Dewi Suriyani Che Halin*<sup>1</sup>; Mohd Arif Anuar Mohd Salleh<sup>1</sup>; Mohd Mustafa Al Bakri Abdullah<sup>1</sup>; Juyana A Wahab<sup>1</sup>; Dharshini Karikalan<sup>1</sup>; Lukasz Kaczmarek<sup>1</sup>; Andrei Victor Sandu<sup>1</sup>; Petrica Vizureanu<sup>1</sup>; <sup>1</sup>Universiti Malaysia Perlis

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging – Mechanical Properties

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials 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 4, 2024**

**Blue Spring II | Hyatt**

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

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**2:00 PM Invited**

**Delamination Mechanisms in 2D Transition-Metal Dichalcogenides by In-situ Nanoscratch Visualization:** *Arvind Agarwal*<sup>1</sup>; <sup>1</sup>Florida International University

**2:20 PM Invited**

**In-situ Imaging of Architected Materials Made from Nanoclusters and DNA:** *Wendy Gu*<sup>1</sup>; John Kulikowski<sup>1</sup>; David Doan<sup>1</sup>; Qi Li<sup>1</sup>; Yonggang Ke<sup>2</sup>; Shuang Wang<sup>2</sup>; <sup>1</sup>Stanford University; <sup>2</sup>Emory University

**2:40 PM Invited**

**In-situ Imaging of Transonic Dislocations & Plasticity:** *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University

**3:00 PM**

**Shining a Light on Quantum Dots Incorporated Electrospun Nanofibers: Branching and Reinforcement Mechanisms:** *Lihua Lou*<sup>1</sup>; Tyler Dolmetsch<sup>1</sup>; Brandon Aguiar<sup>1</sup>; Sohail Mazher Ali Khan Mohammed<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Mechanical and Materials Engineering, Florida International University

**3:20 PM**

**Dynamic Imaging of Fast Processes Using Laboratory X-ray Computed Tomography:** Wesley De Boever<sup>1</sup>; Jan Dewancke<sup>1</sup>; *Ksenija Nikolic*<sup>1</sup>; <sup>1</sup>Tescan

**3:40 PM Break**

**4:00 PM Invited**

**Mechanics of Architected Materials through the Lens of In Situ Characterization:** Somayajulu Dhulipala<sup>1</sup>; Rachel Sun<sup>1</sup>; Thomas Butruille<sup>1</sup>; Yun Kai<sup>1</sup>; Thomas Pezeril<sup>2</sup>; Carlos Portela<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Institut de Physique de Rennes, UMR CNRS 6251, Université Rennes

**4:20 PM Invited**

**Seeing Buried Metal/Oxide Interfaces in Action:** *Guangwen Zhou*<sup>1</sup>; <sup>1</sup>State University of New York at Binghamton

**4:40 PM**

**Non-destructive Evaluation of Defects and Inclusions in Composite Structures Using Terahertz Time Domain Analysis:** Sushrut Karmarkar<sup>1</sup>; *Mahavir Singh*<sup>1</sup>; Vikas Tomar<sup>1</sup>; <sup>1</sup>Purdue University

**5:00 PM**

**Sub-microsecond X-ray Radiography at the Formation and Shaping Technology (FAST) Beamline at CHESS:** *Amlan Das*<sup>1</sup>; Katherine Shanks<sup>1</sup>; Jim Shanks<sup>1</sup>; Todd Hufnagel<sup>2</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Johns Hopkins University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco — Magnetocaloric Materials and Processing for Applications**

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

**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center

**Monday PM | March 4, 2024**

**Bayhill 22 | Hyatt**

**Session Chair:** Jia Yan Law, University of Seville

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**2:00 PM Invited**

**Magnetocaloric Materials for the Liquefaction of Hydrogen:** *Tino Gottschall*<sup>1</sup>; Catalina Salazar-Mejía<sup>1</sup>; Timo Niehoff<sup>1</sup>; Marc Straßheim<sup>1</sup>; Eduard Bykov<sup>1</sup>; Yurii Skourski<sup>1</sup>; Jochen Wosnitza<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Dresden-Rossendorf

**2:30 PM Invited**

**Assessing Rapid Solidification Processing to Produce Magnetocaloric Alloys for Gas Liquefaction:** *Pablo Álvarez-Alonso*<sup>1</sup>; Jonathan Zamora<sup>2</sup>; César Fidel Sánchez-Valdés<sup>3</sup>; Jose Luis Sánchez-Llamazares<sup>2</sup>; <sup>1</sup>Universidad de Oviedo; <sup>2</sup>Instituto Potosino de Investigación Científica y Tecnológica; <sup>3</sup>Universidad Autónoma de Ciudad Juárez

**3:00 PM Invited**

**Advances in Additive Manufacturing of Metamagnetic Shape Memory Alloys for Magnetocaloric Applications:** *Daniel Salazar*<sup>1</sup>; <sup>1</sup>BCMaterials

**3:30 PM Break**

**3:50 PM Invited**

**Advancements in the Development of Magnetic Refrigerators Operating at Near Room Temperature:** *Jader Barbosa*<sup>1</sup>; <sup>1</sup>Universidade Federal de Santa Catarina

**4:20 PM**

**Effective Evaluation Setups for the Real Cooling Performance of Magnetocaloric Materials:** *Jong-Woo Kim*<sup>1</sup>; Ki Hoon Kang<sup>1</sup>; A Young Lee<sup>1</sup>; Kookchae Chung<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

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## BIOMATERIALS

**Advances in Biomaterials for 3D Printing of Scaffolds and Tissues – Advances in Biomaterials for 3D Printing of Scaffolds and Tissues II**

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

**Program Organizers:** Changxue Xu, Texas Tech University; Zhengyi Zhang, Huazhong University of Science and Technology; Yifei Jin, University of Nevada Reno; Jun Yin, Zhejiang University

**Monday PM | March 4, 2024**

**Celebration 16 | Hyatt**

**Session Chairs:** Yifei Jin, University of Nevada, Reno; Changxue Xu, Texas Tech University

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**2:00 PM**

**3D Printing and Growing Fungal Tissue in Ambient Environment and Properties:** *Hortense Le Ferrand*<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**2:20 PM**

**Design and Optimization of a 3D-printed Bioreactor for Long-term Ex-vivo Bone Tissue Culture:** *Anamika Prasad*<sup>1</sup>; Paula Gustin<sup>1</sup>; <sup>1</sup>Florida International University

**2:40 PM**

**Structure-property Relationships in Solvent-cast 3D-printed Polymeric Biomaterials:** *Santiago Lazarte*<sup>1</sup>; John Tolbert<sup>2</sup>; Lesley Chow<sup>2</sup>; Brandon Krick<sup>1</sup>; <sup>1</sup>Florida State University; <sup>2</sup>Lehigh University

**3:00 PM**

**Migration Behavior of Invasive and Non-invasive Breast Cancer Cells on a Graded Micropillar Surface:** Marielena Molinares Ponce<sup>1</sup>; *Changxue Xu*<sup>1</sup>; <sup>1</sup>Texas Tech University

**3:20 PM Break**

**3:50 PM**

**Improving Structural Integrity of a Bioinspired Structures through 3D Printing for Advancing Bone Tissue Engineering:** Fariborz Tavangarian<sup>1</sup>; Shadi Emam<sup>1</sup>; *Niloofer Fani*<sup>1</sup>; <sup>1</sup>Pennsylvania State University Harrisburg

**4:10 PM**

**Filaments Made of Magnesium-incorporated Polymer for Potential Use in Bone Implants:** *Sumama Nuthana kalva*<sup>1</sup>; Muammer Koç<sup>1</sup>; <sup>1</sup>HBKU



4:30 PM

**The Influence of Iso-value on 3D-printed Sheet TPMS Ti6Al4V Scaffolds' Mechanical Responses:** Xin Zhang<sup>1</sup>; Dekun Zhang<sup>2</sup>; Rizhi Wang<sup>1</sup>; <sup>1</sup>University of British Columbia; Centre for Aging SMART; <sup>2</sup>China University of Mining and Technology

4:50 PM

**Improving Predictability of Additively Manufactured Ti-6Al-4V Lattices for Customised Orthopaedic Devices:** Xue Cao<sup>1</sup>; Luke Carter<sup>1</sup>; Victor Villapún<sup>1</sup>; Kenny Man<sup>1</sup>; Sophie Cox<sup>1</sup>; <sup>1</sup>University of Birmingham

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — High-entropy Ceramic Materials

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

**Monday PM | March 4, 2024**  
**Celebration 10 | Hyatt**

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

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**2:00 PM Introductory Comments**

**2:05 PM Invited**

**High-entropy 2D Transition Metal Carbide MXenes:** Babak Anasori<sup>1</sup>; <sup>1</sup>Purdue University Indianapolis

**2:25 PM Invited**

**Interplay between Structure, Charge, and Spin in Entropy-stabilized Oxides for Widely Tunable Responses:** John Heron<sup>1</sup>; <sup>1</sup>University of Michigan

**2:45 PM**

**Phase Transformations in Entropy Stabilized Oxides:** Alexander Dupuy<sup>1</sup>; Julie Schoenung<sup>2</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>University of California, Irvine

**3:05 PM**

**Role of Secondary Phase Formation on Electrical Behavior in Sodium Doped High Entropy Oxides:** Justin Cortez<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Yiheng Xiao<sup>1</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>University of Connecticut

**3:25 PM Invited**

**Non-equimolar Multicomponent Rare Earth Oxides as Environmental Barrier Coatings:** Elizabeth Opila<sup>1</sup>; Kristyn Ardrey<sup>1</sup>; Rachel Rosner<sup>1</sup>; Prasanna Balachandran<sup>1</sup>; Bi-Cheng Zhou<sup>1</sup>; Patrick Hopkins<sup>1</sup>; <sup>1</sup>University of Virginia

3:45 PM Break

4:00 PM Invited

**Will “High Entropy” Carbides be Enabling Materials for Extreme Environments:** *Bai Cui*<sup>1</sup>; Fei Wang<sup>1</sup>; Lanh Trinh<sup>1</sup>; Luke Wadle<sup>1</sup>; Kaustubh Bawane<sup>2</sup>; Zilong Hua<sup>2</sup>; Linu Malakkal<sup>2</sup>; Lingfeng He<sup>3</sup>; Cody Dennett<sup>4</sup>; Frederic Monteverde<sup>5</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>North Carolina State University; <sup>4</sup>Massachusetts Institute of Technology; <sup>5</sup>National Research Council of Italy – Institute of Science, Technology and Sustainability for Ceramics

4:20 PM Invited

**Synthesis and Characterization of High-entropy Perovskite Ceramics: Paving the Way for Advanced Multifunctional Materials:** *Veerle Keppens*<sup>1</sup>; Rubayet Tanveer<sup>1</sup>; William Weber<sup>1</sup>; <sup>1</sup>University of Tennessee

4:40 PM

**Engineering the Functional and Mechanical Behavior of Multiphase Entropy Stabilized Oxides by Controlling Microstructural Evolution:** *Jacob Norman*<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>UCI; <sup>2</sup>University of Connecticut

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials – Advanced Manufacturing Methods

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

**Program Organizers:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

Monday PM | March 4, 2024  
Bayhill 28 | Hyatt

**Session Chair:** Alexander Baker, Lawrence Livermore National Laboratory

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2:00 PM Invited

**Hot Roll Nanocrystalline Anisotropic Nd-Fe-B Magnet:** *Jun Cui*<sup>1</sup>; Chaochao Pan<sup>1</sup>; Wei Tang<sup>1</sup>; Gaoyuan Ouyang<sup>1</sup>; xubo Liu<sup>1</sup>; Rayn Ott<sup>1</sup>; Ikenna Nlebedim<sup>1</sup>; <sup>1</sup>Ames National Laboratory

2:30 PM Invited

**Additive Manufacturing of NdFeB Bonded Magnets:** *Mariappan Paranthaman*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

3:00 PM

**Advanced Magnet Synthesis from Lab to Pilot-scale:** *Ryan Ott*<sup>1</sup>; Ikenna Nlebedim<sup>1</sup>; Baozhi Cui<sup>1</sup>; Wei Tang<sup>1</sup>; Xubo Liu<sup>1</sup>; Jun Cui<sup>1</sup>; <sup>1</sup>Ames National Lab

3:20 PM Break

3:35 PM Invited

**Advance Manufacturing of Sub-mm Magnetic Nanocomposites:** *Camilo Velez Cuervo*<sup>1</sup>; <sup>1</sup>University of California, Irvine

4:05 PM

**Processing Induced Thermo-kinetics Driven Microstructure and Magnetic Properties of Additively Manufactured AlNiCo:** *Saikumar Dussa*<sup>1</sup>; Sameehan Joshi<sup>1</sup>;

Rajarshi Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**4:25 PM**

**Effects of LPBF Parameters and Heat Treatment on Physical and Magnetic Properties of Ni-Fe-Mo Permalloy:** *Nicolas Ayers*<sup>1</sup>; Ashton Grace<sup>1</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida

**4:45 PM**

**Preparation and Characterization of Magnetite Microparticles from Alluvial Gold Mine Tailings:** *Gustavo Neira-Arenas*<sup>1</sup>; Fabio Rios-Cuitiva<sup>1</sup>; Hugo Estupiñán-Durán<sup>1</sup>; <sup>1</sup>Universidad Nacional de Colombia

**5:05 PM**

**Magnetic and Optical Study of Zinc Ferrite Produced by the Ceramic Method:** *Mery Gomez Marroquin*<sup>1</sup>; Fernando Huamán-Pérez<sup>2</sup>; Henry Colorado<sup>3</sup>; Nilton Cárdenas-Falcón<sup>4</sup>; José Carlos D'Abreu<sup>5</sup>; Abraham Terrones-Ramirez<sup>2</sup>; Kim Patthi-Satto<sup>2</sup>; <sup>1</sup>FIGMM UNI; <sup>2</sup>National University of Engineering; <sup>3</sup>University of Antioquia - UdeA; <sup>4</sup>Pontifical Catholic University of Peru; <sup>5</sup>Pontifical Catholic University of Rio de Janeiro

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## MECHANICS OF MATERIALS

### **Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Monday PM | March 4, 2024**

**Barrel Spring II | Hyatt**

**Session Chairs:** Tirumalai Srivatsan, The University of Akron; Jennifer Carter, Case Western Reserve University

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**2:00 PM**

**Modeling Distribution of Local Chemical Fluctuations in Refractory High Entropy Alloys to Improve Ductility Prediction Accuracy:** *Christopher Tandoc*<sup>1</sup>; Yong-Jie Hu<sup>1</sup>; <sup>1</sup>Drexel University

**2:20 PM**

**Chemical Core-shell Metastability-induced Large Ductility in a Medium-entropy Managing Alloy:** *Farahnaz Haftlang*<sup>1</sup>; Jae Bok Seol<sup>2</sup>; Alireza Zargaran<sup>3</sup>; Jongun Moon<sup>4</sup>; Hyoung Seop Kim<sup>3</sup>; <sup>1</sup>Department of Materials Science & Engineering, Northwestern University; <sup>2</sup>Gyeongsang National University; <sup>3</sup>Pohang University of Science and Technology; <sup>4</sup>Kongju National University

**2:40 PM**

**Decision Science-driven Selection of Competitor Refractory Multi-principal Element Alloys to Benchmark Superalloys at Various Temperature Profiles for Jet Engines in Aerospace:** *Tanjore Jayaraman*<sup>1</sup>; Ramachandra Canumalla<sup>2</sup>; <sup>1</sup>United States Air Force Academy; <sup>2</sup>Weldaloy Specialty Forgings

**3:00 PM Invited**

**A High-performance Alloy Design Map for the Ni-Co-Cr Alloy System:** *Yang Tong*<sup>1</sup>; *Ruixin Sheng*<sup>1</sup>; *Caixia Wang*<sup>1</sup>; *Caijuan Shi*<sup>2</sup>; *Weidong Li*<sup>3</sup>; *Fei Zhang*<sup>2</sup>; *Liang Jiang*<sup>1</sup>; *Peter Liaw*<sup>3</sup>; <sup>1</sup>Yantai University; <sup>2</sup>Beijing Synchrotron Radiation Facility; <sup>3</sup>The University of Tennessee-Knoxville

**3:20 PM Invited**

**Design Metastability in High-entropy Alloys by Tailoring Unstable Fault Energies:** *Chenyang Li*<sup>1</sup>; *Xing Wang*<sup>2</sup>; *Wei Xiong*<sup>2</sup>; *Wei Chen*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology; <sup>2</sup>University of Pittsburgh

**3:40 PM Break****4:00 PM Invited**

**Informatics Driven ICME for Multicomponent Alloy Design:** *Krishna Rajan*<sup>1</sup>; *Scott Broderick*<sup>1</sup>; <sup>1</sup>University at Buffalo- State University of New York

**4:20 PM Invited**

**Development of an Alloys Design Platform for High-performance Refractory High-entropy Alloys Using an Experimentally Driven High-throughput Technique:** *Chanho Lee*<sup>1</sup>; *Benjamin Derby*<sup>2</sup>; *Jon Baldwin*<sup>2</sup>; *Christopher Tandoc*<sup>3</sup>; *Yong-Jie Hu*<sup>3</sup>; *Gian Song*<sup>4</sup>; *Nan Li*<sup>2</sup>; *Peter Liaw*<sup>5</sup>; *Saryu Fensin*<sup>2</sup>; <sup>1</sup>Auburn University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Drexel University; <sup>4</sup>Kongju National University; <sup>5</sup>The University of Tennessee

**4:40 PM**

**Tensile and Fracture Toughness Behavior of Refractory High-entropy Alloys at Temperatures from Ambient to 1200°C:** *Punit Kumar*<sup>1</sup>; *David Cook*<sup>1</sup>; *Madelyn Payne*<sup>2</sup>; *Wenqing Wang*<sup>2</sup>; *Pedro Borges*<sup>2</sup>; *Mingwei Zhang*<sup>2</sup>; *Eun Soo Park*<sup>3</sup>; *Yi Li*<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>Seoul National University; <sup>4</sup>Institute of Metal Research, Chinese Academy of Sciences

**5:00 PM Invited**

**A Dual-phase Alloy with Ultrahigh Strength-ductility Synergy Over a Wide Temperature Range:** *Jianzhong Jiang*<sup>1</sup>; *Raymond Nutor*<sup>1</sup>; *Qingping Cao*<sup>1</sup>; *Xiaodong Wang*<sup>1</sup>; *Dongxian Zhang*<sup>1</sup>; <sup>1</sup>Zhejiang University

**5:20 PM Invited**

**Creep-resistant Refractory High-entropy Alloy NbTaTiV for High-temperature Applications:** *Huamiao Wang*<sup>1</sup>; *Chuhao Liu*<sup>1</sup>; <sup>1</sup>Shanghai Jiao Tong University

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**MATERIALS SYNTHESIS AND PROCESSING**

**Advances in Pyrometallurgy: Furnace Containment — Panel Discussion: On No! What Went Wrong. Furnace Design Lesson Learnt**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, TMS: Industrial Advisory Committee

**Program Organizers:** Gerardo Alvear Flores, CaEng Associates; Camille Fleuriault, Eramet Norway; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Hugo Joubert, Tenova Pyromet; Stuart Nicol, Glencore Technology; Phillip Mackey, P.J. Mackey Technology, Inc.; Jesse White, Kanthal AB; Isabelle Nolet, Hatch

**Monday PM | March 4, 2024**

**Celebration 5 | Hyatt**

**Session Chairs:** Isabelle Nolet, Hatch; Gerardo Alvear Flores, Canadian Engineering Associate Ltd

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**2:00 PM Introductory Comments**

**2:10 PM Keynote**

**Electric Furnace Integrity Practices and Design Improvements Over 45 Years of Operation - Sudbury Integrated Nickel Operations, A Glencore Company:** *Laura Shultz*<sup>1</sup>; <sup>1</sup>Sudbury Integrated Nickel Operations

**2:35 PM Keynote**

**Reflections on the Design of Cooling Systems for Furnace Containment:** *Hugo Joubert*<sup>1</sup>; <sup>1</sup>Tenova Pyromet

**3:00 PM**

**Improving Maintenance Safety and Campaign Life of Tuyere Lines in Bath Smelting and Converting Using Punchless Tuyeres:** *Maria de Campos*<sup>1</sup>; *Joel Kapusta*<sup>1</sup>; <sup>1</sup>BBA Inc.

**3:20 PM Break**

**3:35 PM Panel Discussion:** Panelists will include Lloyd Nelson, LR Nelson Consulting; Allan MacRae, MacRae Technologies; Avi Nanda, Freeport-McMoran; and Harman Oterdoom, Butterbridge.

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

**Advances in the State-of-the-Art of High Temperature Alloys — Mechanical Behavior**

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

**Program Organizers:** Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Michael Kirka, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Juan Carlos Madeni, Johns Manville Technical Center; Govindarajan Muralidharan, Oak Ridge National Laboratory

**Monday PM | March 4, 2024**  
**Bayhill 17 | Hyatt**

**Session Chair:** Dinc Erdeniz, University of Cincinnati

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**2:00 PM Invited**

**A Phase-Field-Informed Micromechanical Modeling of Ni-based Single-crystal Superalloys to Predict Anisotropic Behavior During Monotonic Tension:** *Jean-Briac le Graverend*<sup>1</sup>; *Rajendran Harikrishnan*<sup>1</sup>; <sup>1</sup>Texas A&M University

**2:30 PM Invited**

**Microstructure and Mechanical Properties of Cu-Al<sub>2</sub>O<sub>3</sub> Composites for Elevated Temperatures Applications:** *Ramasis Goswami*<sup>1</sup>; *Alex Moser*<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

**3:00 PM**

**Effect of Cr on Twinning in Ni-based Superalloys:** *Valery Borovikov*<sup>1</sup>; *Mikhail Mendeleev*<sup>1</sup>; *Timothy Smith*<sup>1</sup>; *John Lawson*<sup>1</sup>; <sup>1</sup>Nasa

**3:20 PM**

**Comparison of the Dwell Fatigue Crack Growth Behavior of Additively and Conventionally Manufactured Inconel 718:** *Zachary Harris*<sup>1</sup>; *Isabelle Heintz*<sup>1</sup>; *Santosh Narasimhachary*<sup>2</sup>; *Robert Stephens*<sup>3</sup>; *Cody Gibson*<sup>4</sup>; *Ramesh Subramanian*<sup>5</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Siemens Corporation; <sup>3</sup>University of Idaho; <sup>4</sup>Idaho National Laboratory; <sup>5</sup>Siemens Energy

**3:40 PM Break****3:55 PM Invited**

**Enhancing the Creep Performance of Ni-based Superalloy Castings:** *Martin Detrois*<sup>1</sup>; *Stoichko Antonov*<sup>1</sup>; *Kyle Rozman*<sup>2</sup>; *Paul Jablonski*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>NETL Support Contractor

**4:25 PM**

**Improving Creep Resistance of  $\gamma$ -strengthened Al-Cu Alloys Through Grain-boundary Strengthening:** *Jovid Rakhmonov*<sup>1</sup>; *Sumit Bahl*<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

**4:45 PM**

**Microstructure and Mechanical Properties of Ni-based Superalloys Nimonic 105 With Varying Carbon Content:** *Xiaotian Fang*<sup>1</sup>; *Stoichko Antonov*<sup>1</sup>; *Paul Jablonski*<sup>1</sup>; *Martin Detrois*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**5:05 PM**

**Microstructure-property Linkage of LW-DED Haynes 282® Superalloy to Fabrication and Post-processing Heat Treatment:** *Rui Feng*<sup>1</sup>; *Kristin Tippey*<sup>1</sup>; *Nicole Ceballos*<sup>1</sup>; *Chantal Sudbrack*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**LIGHT METALS****Advances in Titanium Technology – Session II**

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

**Program Organizers:** *Rongpei Shi*, Harbin Institute of Technology; *Yu Zou*, University of Toronto; *Iman Ghamarian*, The University of Oklahoma; *Yu Lung Chiu*, University of Birmingham; *Yufeng Zheng*, University of North Texas

**Monday PM | March 4, 2024**

**Windermere X-1 | Hyatt**

**Session Chairs:** *Yu Zou*, University of Toronto; *Ajay Talbot*, University of Toronto

**2:00 PM Invited**

**Hollow-strut Titanium Lattice Materials: A Viable Option for Lightweight Engineering:** *Ma Qian*<sup>1</sup>; *Jordan Noronha*<sup>1</sup>; *Haozhang Zhong*<sup>2</sup>; *Martin Leary*<sup>1</sup>; *Milan Brandt*<sup>1</sup>; <sup>1</sup>Royal Melbourne Institute of Technology; <sup>2</sup>Shanghai Jiao Tong University

**2:25 PM**

**Development of a TWIP Beta Titanium Alloy for Additive Manufacturing:** *Mathew Cohen*<sup>1</sup>; *Brian Welk*<sup>1</sup>; *Zachary Kloenne*<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

**2:45 PM**

**Laser Powder-bed Fusion (LPBF) Based Additive Manufacturing of Ti-6Al-4V + TiB In-situ Metal Ceramic Composite:** *Tirthesh Ingale*<sup>1</sup>; *Abhishek Sharma*<sup>1</sup>; *Sai Sree Varahabhatla*<sup>1</sup>; *Advika Chesetti*<sup>1</sup>; *Srinivas Mantri*<sup>1</sup>; *D. Zhili*<sup>2</sup>; *R. Ramanujan*<sup>2</sup>; *M. Zhou*<sup>2</sup>; *Narendra Dahotre*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Nanyang Technological University

**3:05 PM**

**Mechanical Property Comparison for Ti6Al4V Titanium Alloy Components Made From Current Additive Manufacturing Processes:** *Anastasia Burns-Ma*<sup>1</sup>; Spencer Lundt<sup>1</sup>; Cham Hang (Jacky) Yeung<sup>1</sup>; John Bridge<sup>1</sup>; <sup>1</sup>University of Washington

**3:25 PM Break****3:45 PM Invited**

**Additive Manufacturing of Beta Titanium Alloys: Precipitation, Strength, and Strain Hardening Behaviour:** Mohan Sai Kiran Kumar Yadav Nartu<sup>1</sup>; Srinivas Aditya Mantri<sup>1</sup>; Sriswaroop Dasari<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Fan Sun<sup>2</sup>; Srinivasan Srivilliputhur<sup>1</sup>; Frederic 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, Institut de Recherche de Chimie Paris

**4:10 PM**

**Microstructure and Mechanical Properties of Ti-15Nb-5Sn (at. %) Alloy by Metal Fused Filament Fabrication (MFFF):** *Gyeong Ho Kang*<sup>1</sup>; Lim Jinhwan<sup>1</sup>; Giseong Kim<sup>1</sup>; Sooyeong Kim<sup>1</sup>; Taehyun Nam<sup>1</sup>; <sup>1</sup>Gyeongsang National University

**4:30 PM**

**Multiscale Mechanical Behaviours of a Near-alpha Titanium Alloy Made by Additive Manufacturing:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto

**4:50 PM**

**Single-crystal Structure Formation of Ti-6Al-2Sn-4Zr-6Mo Alloy in Laser Powder Bed Fusion and Unique Alpha Variant Selection After Beta Annealing:** *Tomonori Kitashima*<sup>1</sup>; Dennis Jodi<sup>2</sup>; Takanobu Hiroto<sup>1</sup>; Makoto Watanabe<sup>1</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>Kyushu University

**5:10 PM**

**Optimizing Performance of Ti/h-BN Metal Matrix Composites Through Improved Composition and Spark Plasma Sintering Process:** *Satyavan Digole*<sup>1</sup>; Sanoj Karki<sup>1</sup>; Manoj Mugale<sup>1</sup>; Amit Choudhari<sup>1</sup>; Jay Desai<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

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## ADDITIVE MANUFACTURING

**Agile Additive Manufacturing by Employing Breakthrough Functionalities — Agile AM - Material Investigations**

**Sponsored by:** TMS: Additive Manufacturing Committee

**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; John Carpenter, Los Alamos National Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Alex Kitt, Edison Welding Institute; Sougata Roy, Iowa State University; Sneha Prabha Narra, Carnegie Mellon University; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC

**Monday PM | March 4, 2024**  
**Atlantic | Hyatt**

**Session Chairs:** Sneha Narra, CMU; Sougata Roy, Iowa State; Peeyush Nandwana, ORNL; Chantal Sudbrack, NETL

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**2:00 PM Invited**

**Are There Yet? How to Accelerate the Transition From Fundamental Science of Additive Manufacturing to Pragmatic Deployment:** *Sudarsanam Babu*<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

**2:20 PM**

**Effects of Scanning Strategies and Beam Shaping on Microstructure Variation in Laser Powder Bed Fusion:** *Michael Paleos*<sup>1</sup>; Shawn Hinnebusch<sup>1</sup>; Albert To<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**2:40 PM**

**In-situ Microstructure Control During Wire and Arc Additive Manufacturing:** *Joao Oliveira*<sup>1</sup>; <sup>1</sup>Faculdade Ciencias Tecnologias

**3:00 PM**

**Microstructural Control of Additively Manufactured Ti-6Al-4V via In-situ Laser Annealing:** *Connor Rietema*<sup>1</sup>; John Roehling<sup>1</sup>; William Smith<sup>1</sup>; Kaila Bertsch<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**3:20 PM**

**Consideration of Interplay of Physical Phenomena Across Spatiotemporal Scales for Achieving Application Specific Properties in Large Scale Additive Manufacturing:** *Saket Thapliyal*<sup>1</sup>; Yousub Lee<sup>1</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Andrzej Nycz<sup>1</sup>; Andres Rossy<sup>1</sup>; Michael Kirka<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:40 PM Break**

**4:00 PM**

**Grain Nucleation From Cavitation Instabilities Induced by Nanosecond Laser Irradiation in Additive Manufacturing Melt Pools:** *Michael J Abere*<sup>1</sup>; Hannah Sims<sup>1</sup>; Levi Van Bastian<sup>1</sup>; Hyein Choi<sup>1</sup>; Jonathan Pegues<sup>1</sup>; <sup>1</sup>Sandia National Labs

**4:20 PM**

**Surface Chemistry Modification and Surface Roughness Reduction Post Processing of AM 316:** *David Sapiro*<sup>1</sup>; <sup>1</sup>Schonpiro Materials

**4:40 PM**

**Bulk Material Libraries via Laser-remelting: Combinatorial Analysis of Complex Structural Materials:** *Christopher Zenk*<sup>1</sup>; Tobias Gaag<sup>1</sup>; Louisa Besenbeck<sup>1</sup>; Carolin Korner<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session II**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Monday PM | March 4, 2024  
Bayhill 32 | Hyatt**



**Session Chair:** Saaketh Desai, Sandia National Laboratories

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**2:00 PM**

**Diffusion Model for Dislocation Evolution Prediction:** *Dylan Madisetti*<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

**2:20 PM**

**Generalizable Graph Neural Network Surrogate Models for Microstructure Analysis:** *Kyle Farmer*<sup>1</sup>; Elizabeth Holm<sup>1</sup>; <sup>1</sup>University of Michigan

**2:40 PM**

**Application of Deep Learning Based Generative Networks in Automated Microstructure Quantification:** Amrutha Anantatamukula<sup>1</sup>; *Mani Krishna Karri*<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**3:00 PM**

**Automated Analysis of Crystal Structures in X-ray Diffraction Data Using Deep Learning:** *Jerardo Salgado*<sup>1</sup>; Zhaotong Du<sup>1</sup>; Samuel Lerman<sup>1</sup>; Ayoub Shahnazari<sup>1</sup>; Zeliang Zhang<sup>1</sup>; Chenliang Xu<sup>1</sup>; Niaz Abdolrahim<sup>1</sup>; <sup>1</sup>University of Rochester

**3:20 PM**

**Automation of Void Identification in Microstructure With Computer Vision:** *Abhijith Thoopul Anantharanga*<sup>1</sup>; Brandon Runnels<sup>1</sup>; <sup>1</sup>Iowa State University

**3:40 PM Break**

**4:00 PM**

**Finding “Trigger Sites” of Reactions Among Heterogeneous Materials From X-ray Microscopic Big Data Using Persistent Homology:** *Masao Kimura*<sup>1</sup>; Ippei Obayashi<sup>2</sup>; Daiki Kido<sup>1</sup>; Yasuhiro Niwa<sup>1</sup>; Xichan Gao<sup>3</sup>; Kazuto Akagi<sup>3</sup>; <sup>1</sup>High Energy Accelerator Research Organization (KEK); <sup>2</sup>Okayama University; <sup>3</sup>Tohoku University

**4:20 PM**

**A Needed Bridge Between the Microscopy and Data Science Communities: Electron Backscatter Diffraction and Machine Learning Case:** *Julian Escobar*<sup>1</sup>; Benjamin Schuessler<sup>1</sup>; Jenna Pope<sup>1</sup>; Keerti Kappagantula<sup>1</sup>; Matthew Olszta<sup>1</sup>; Donald Todd<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**4:40 PM**

**Machine Learning-guided Investigation of the Impacts of Grain Geometry on Twin Formation in MgY alloys:** *Peter Mastracco*<sup>1</sup>; Kehang Yu<sup>1</sup>; Xin Wang<sup>1</sup>; Julie Schoenung<sup>1</sup>; Enrique Lavernia<sup>1</sup>; Stacy Copp<sup>1</sup>; <sup>1</sup>University of California, Irvine

**5:00 PM**

**Universal Machine Learning System for Material Properties Prediction:** Natalija Scepanovic<sup>1</sup>; *Mariagrazia Vottari*<sup>1</sup>; <sup>1</sup>Total Materia Ag

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## LIGHT METALS

**Aluminum Alloys: Development and Manufacturing — 6xxx and 7xxx Alloys**

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

**Monday PM | March 4, 2024**

**Windermere W-1 | Hyatt**

**Session Chairs:** Christopher Hutchinson, Monash University; Damilola Alewi, University of Kentucky

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**2:00 PM**

**New 6xxx Al-Mg-Si Alloy with High Electric Conductivity and Great Bendability for EV Application:** *Gregor Michael*<sup>1</sup>; *Josef Berneder*<sup>1</sup>; *Roland Lorenz*<sup>1</sup>; <sup>1</sup>Amag Austria Metall

**2:25 PM**

**Effects of Alloying Elements Content on Microstructural Properties of AlMgSiCu Alloy:** *Osman Halil Celik*<sup>1</sup>; *Onuralp Yucel*<sup>1</sup>; *Senem Iscioglu*<sup>2</sup>; *Mustafa Demirkazik*<sup>3</sup>; <sup>1</sup>Istanbul Technical Univ; <sup>2</sup>Sakarya University; <sup>3</sup>Turkish Aerospace

**2:50 PM**

**Influence of Feed Rate on Microstructure and Hardness of Conventionally Spin-formed Al 6061-O Plate:** *Andrew Boddorff*<sup>1</sup>; *Wesley Tayon*<sup>1</sup>; *David Stegall*<sup>1</sup>; *Cecilia Mulvaney*<sup>1</sup>; <sup>1</sup>NASA Langley Research Center

**3:15 PM**

**Influence of Copper Addition on the Thermal Stability and Corrosion Behavior of Aluminum 6082 Alloy:** *Ilyas Artunc Sari*<sup>1</sup>; *Gorkem Ozcelik*<sup>1</sup>; *İbrahim Bat*<sup>1</sup>; *Alptug Tanses*<sup>1</sup>; *Zeynep Tutku Ozen*<sup>1</sup>; <sup>1</sup>Asas Aluminum

**3:40 PM Break**

**3:55 PM**

**Corrosion Effect on Mechanical Properties of Stamped Al Alloy 6451 for Auto Applications:** *Mozi Abdul*<sup>1</sup>; *Wutian Shen*<sup>1</sup>; *Hongfa Hu*<sup>1</sup>; <sup>1</sup>University of Windsor

**4:20 PM**

**X-ray Computed Tomography of Fracture Paths in AA7075-T6 Sheet Torn at 200 °C:** *Daniel Nikolai*<sup>1</sup>; *Philip Noell*<sup>2</sup>; *Eric Taleff*<sup>1</sup>; <sup>1</sup>University of Texas Austin; <sup>2</sup>Sandia National Laboratories

**4:45 PM**

**Utilizing Magnetic Field Annealing to Enhance the Microstructure and Mechanical Properties of 7075 Aluminum Alloy:** *Damilola Alewi*<sup>1</sup>; *Kirk Lemmen*<sup>1</sup>; *Haluk Karaca*<sup>1</sup>; *Paul Rottmann*<sup>1</sup>; <sup>1</sup>University of Kentucky

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## LIGHT METALS

### **Aluminum Reduction Technology — Cell Modernization, Modelling, and Energy Optimization**

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Monday PM | March 4, 2024**

**Windermere Y-2 | Hyatt**

**Session Chair:** Andre-Felipe Schneider, Hatch

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**2:00 PM**

**Aluminium Carbide and Carbon Dust in Aluminium Electrolysis Cells. A Conceptual Model for Loss in Current Efficiency**  
: *Asbjorn Solheim*<sup>1</sup>; <sup>1</sup>SINTEF Industry

**2:25 PM**

**A Method of Cell Heat Balance Control to Enable Variable Power Usage by Aluminium Smelters:** *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

**2:50 PM**

**Computational Simulation of Electromagnetic Fields in an Aluminum Electrolysis Cell:** *Ryan Soncini*<sup>1</sup>; <sup>1</sup>Alcoa

**3:15 PM**

**A Method for Anode Effect Prediction in Aluminum Electrolysis Cells Based on Multi-scale Time Series Modeling:** *Kejia Qiang*<sup>1</sup>; *Jie Li*<sup>1</sup>; *Jinghong Zhang*<sup>1</sup>; *Jiaqi Li*<sup>1</sup>; *Ling Ran*<sup>1</sup>; *Hongliang Zhang*<sup>1</sup>; <sup>1</sup>Central South University

**3:40 PM Break****3:55 PM**

**Predicting Electrolyte and Liquidus Temperatures of Aluminium Smelting Cells for Power Modulation Using Dynamic Model:** *Choon-Jie Wong*<sup>1</sup>; *Jie Bao*<sup>1</sup>; *Maria Skyllas-Kazacos*<sup>1</sup>; *Barry Welch*<sup>1</sup>; *Jing Shi*<sup>2</sup>; *Nadia Ahli*<sup>2</sup>; *Amal Aljasmi*<sup>2</sup>; *Mohamed Mahmoud*<sup>2</sup>; *Mustafa Mustafa*<sup>2</sup>; <sup>1</sup>University of New South Wales; <sup>2</sup>Emirates Global Aluminium

**4:20 PM**

**Construction and Application of Digital Twin in Aluminum Electrolysis:** *Jiaqi Li*<sup>1</sup>; *Kejia Qiang*<sup>1</sup>; *Chunhua Yang*<sup>1</sup>; *Xiaofang Chen*<sup>1</sup>; <sup>1</sup>Central South University

**4:45 PM**

**Estimation of the Spatial Alumina Concentration of an Aluminium Smelting Cell Using a Huber Function-based Kalman Filter:** *Luning Ma*<sup>1</sup>; *Choon-Jie Wong*<sup>1</sup>; *Jie Bao*<sup>1</sup>; *Maria Skyllas-Kazacos*<sup>1</sup>; *Jing Shi*<sup>2</sup>; *Nadia Ahli*<sup>2</sup>; *Amal Aljasmi*<sup>2</sup>; *Mohamed Mahmoud*<sup>2</sup>; <sup>1</sup>University of New South Wales; <sup>2</sup>Emirates Global Aluminium

**5:10 PM**

**Limits for the Current Efficiency in Hall-Héroult Cells:** *Asbjorn Solheim*<sup>1</sup>; <sup>1</sup>SINTEF Industry

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## BIOMATERIALS

### Biological Materials Science — Biological Materials Science II

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

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

**Monday PM | March 4, 2024**

**Celebration 15 | Hyatt**

**Session Chairs:** *Ling Li*, Virginia Tech; *Grace Gu*, University of California, Berkeley

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**2:00 PM Invited**

**The Shape of Nature's Stingers Revealed:** *Marc Meyers*<sup>1</sup>; *Haocheng Quan*<sup>2</sup>; *Xudong Liang*<sup>3</sup>; *Xuan Zhang*<sup>2</sup>; *Robert McMeeking*<sup>4</sup>; *Eduard Arzt*<sup>1</sup>; <sup>1</sup>University of California-San Diego; <sup>2</sup>INM – Leibniz Institute for New Materials; <sup>3</sup>Harbin Institute of Technology (Shenzhen); <sup>4</sup>University of California, Santa Barbara

**2:30 PM**

**On the Mechanical Designs of Avian Eggs:** *Ling Li*<sup>1</sup>; Zian Jia<sup>1</sup>; Zhifei Deng<sup>1</sup>; Mary Stoddard<sup>2</sup>; <sup>1</sup>Virginia Polytechnic Institute; <sup>2</sup>Princeton University

**2:50 PM**

**Nanostructural and Nanomechanical Mapping of Sea Urchin Tooth:** *Riley McCarry*<sup>1</sup>; Alyssa Stark<sup>1</sup>; Gang Feng<sup>1</sup>; <sup>1</sup>Villanova University

**3:10 PM Invited**

**A Comparison of Tooth Enamel Across Primates: A Lesson in Materials Design for Function:** Izabella Carpenter<sup>1</sup>; Cameron Renteria<sup>1</sup>; Jack Grimm<sup>1</sup>; Debra Guatelli-Steinberg<sup>1</sup>; Scott McGraw<sup>1</sup>; *Dwayne Arola*<sup>1</sup>; <sup>1</sup>University of Washington

**3:40 PM Break****4:00 PM Invited**

**Optically Functional Molecular Crystals in Animal Coloration and Vision:** *Benjamin Palmer*<sup>1</sup>; A. Wagner<sup>1</sup>; N. Pinsk<sup>1</sup>; K. Shavit<sup>1</sup>; T. Lemcoff<sup>1</sup>; J. S. Haataja<sup>2</sup>; L. Schertel<sup>2</sup>; <sup>1</sup>Ben-Gurion University; <sup>2</sup>University of Cambridge

**4:30 PM**

**A Novel Compositional Comparison of Crocodilian, Murine, and Human Enamels at the Nanocrystal Scale:** *Jack Grimm*<sup>1</sup>; Cameron Renteria<sup>1</sup>; Arun Devaraj<sup>2</sup>; Dwayne Arola<sup>1</sup>; <sup>1</sup>University of Washington; <sup>2</sup>Pacific Northwest National Laboratory

**4:50 PM**

**Hierarchical Organization in Nature: Length-scale Dependent Structure-property Correlations in the Organ Pipe Coral:** *Swapnil Morankar*<sup>1</sup>; Amey Luktuke<sup>1</sup>; Ankit Kumar<sup>1</sup>; Yash Mistry<sup>2</sup>; Dhruv Bhate<sup>2</sup>; Clint Penick<sup>3</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Arizona State University; <sup>3</sup>Auburn University

**5:10 PM Invited**

**Manipulating Light and Color With Soft and Structured Matter:** *Mathias Kolle*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

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**ADVANCED CHARACTERIZATION METHODS**

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Advanced Characterization Methods II**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Monday PM | March 4, 2024**

**Regency O | Hyatt**

**Session Chairs:** Jian Li, CanmetMATERIALS; Andrew D. Brown, DEVCOM ARL Army Research Office

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**2:00 PM**

**Magnon-phonon Hybrid Enhances Function in a Magnetic Shape Memory Alloy:** *Michael Manley*<sup>1</sup>; Paul Stonaha<sup>2</sup>; Ibrahim Karaman<sup>3</sup>; Raymundo Arroyave<sup>3</sup>; Songxue Chi<sup>1</sup>; Douglas Abernathy<sup>1</sup>; Jeffrey Lynn<sup>4</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Lafayette College; <sup>3</sup>Texas A&M University; <sup>4</sup>NIST

**2:20 PM**

**In-situ Temperature Monitoring and Characterization of Axlebox Bearing in Railway Vehicle:** *Jeongguk Kim*<sup>1</sup>; <sup>1</sup>Korea Railroad Research Institute

**2:40 PM**

**Ex-situ Synchrotron X-ray Diffraction Mapping of Al-Al and Al-steel Joints Formed Using the Novel HiVe Process:** *Rakesh Kamath*<sup>1</sup>; Jonova Thomas<sup>1</sup>; Sridhar Niverty<sup>2</sup>; Benjamin Schuessler<sup>2</sup>; Andrew Chih-Pin Chuang<sup>1</sup>; Vineet Joshi<sup>2</sup>; Dileep Singh<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Pacific Northwest National Laboratory

**3:00 PM**

**Modified Calculation Method for Heat Distribution of Iron Ore Sintering Bed:** *Wenzheng Jiang*<sup>1</sup>; Huibo Liu<sup>1</sup>; Liangping Xu<sup>1</sup>; Qiang Zhong<sup>1</sup>; Guanghui Li<sup>1</sup>; <sup>1</sup>Central South University

**3:20 PM**

**Characterising Lattice Misfit of Single Crystal Nickel-based Superalloys Using Monochromatic Synchrotron X-ray Diffraction:** *Jessica Pitchforth*<sup>1</sup>; Howard Stone<sup>1</sup>; Leigh Connor<sup>2</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Diamond Light Source

**3:40 PM Break****3:55 PM**

**Impact of Interface: Using Resonant Ultrasound Spectroscopy (RUS) to Evaluate the Bonding of 1100 Aluminum and Cp Grade 1 Titanium:** *Mathew Hayne*<sup>1</sup>; Zachary Levin<sup>1</sup>; Paul Geimer<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:15 PM**

**Numerical Multi-field Coupling Simulation of Multiple Slab Stacks Heated by Natural Gas Combustion in a Trolley Furnace:** Bo Liu<sup>1</sup>; Jiulin Tang<sup>2</sup>; *Dong Yue*<sup>1</sup>; Liangying Wen<sup>1</sup>; <sup>1</sup>School of Materials Science and Engineering, Chongqing University; <sup>2</sup>Dongfang Electric Group Dongfang Boiler Co., Ltd. Equipment Department

**4:35 PM**

**Al and Cr Induced Defects Characterization in UO<sub>2</sub> Doped Systems Using XAS and Neutron Scattering:** *Arjen van Veelen*<sup>1</sup>; Joshua White<sup>1</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Adrien Terricabras<sup>1</sup>; Tarik Saleh<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:55 PM**

**Correlative Micro-nano X-ray Tomography with Scanning Electron Microscopy at the Advanced Light Source:** *Arun Bhattacharjee*<sup>1</sup>; Harrison Lisabeth<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Lab

**5:15 PM**

**Characterization of Cements and Concretes Using 3D Automated Quantitative Mineralogy and Enhanced Deep-learning Reconstruction via X-ray Microscopy:** *Ria Mitchell*<sup>1</sup>; John Provis<sup>2</sup>; Dan Geddes<sup>2</sup>; Giacomo Torelli<sup>2</sup>; Antonia Yorkshire<sup>2</sup>; Richard Taylor<sup>1</sup>; Andy Holwell<sup>1</sup>; <sup>1</sup>ZEISS Microscopy; <sup>2</sup>The University of Sheffield

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Chemistry and Physics of Interfaces — Phase Transformations and Grain Boundary Segregation**

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

**Monday PM | March 4, 2024**  
**Bayhill 25 | Hyatt**

**Session Chairs:** Arun Devaraj, Pacific Northwest National Laboratory; Shen Dillon, University of California, Irvine

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**2:00 PM**

**Machine Learning Meets Interface Physics: A Case Study of Grain Boundary Solute Segregation:** *Fadi Abdeljawad*<sup>1</sup>; Malek Alkayyali<sup>1</sup>; <sup>1</sup>Clemson University

**2:20 PM**

**Consequences of the Solute Vibrational Contribution in Grain Boundary Segregation:** *Nutth Tuchinda*<sup>1</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:40 PM**

**Insight into Cobalt Segregation in Aluminum Grain Boundaries Spanning the 5D Space:** *Ethan Cluff*<sup>1</sup>; Lydia Harris Serafin<sup>1</sup>; Gus Hart<sup>1</sup>; Eric Homer<sup>1</sup>; <sup>1</sup>Brigham Young University

**3:00 PM**

**Computational Modeling of Grain Boundary Segregation:** *Chongze Hu*<sup>1</sup>; Remi Dingreville<sup>2</sup>; Brad Boyce<sup>2</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Sandia National Labs

**3:20 PM Break**

**3:40 PM Invited**

**Surfaces and Interfaces as Mediators of Martensitic Transformations in Structural Alloys:** *Janelle Wharry*<sup>1</sup>; Caleb Clement<sup>2</sup>; Grayson Nemets<sup>1</sup>; Elliot Marrero Jackson<sup>1</sup>; Patrick Warren<sup>3</sup>; Chao Yang<sup>4</sup>; Keyou Mao<sup>5</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Westinghouse Electric Company, LLC; <sup>3</sup>University of Texas at San Antonio; <sup>4</sup>Rensselaer Polytechnic Institute; <sup>5</sup>Florida State University

**4:10 PM**

**An In-situ Transmission Electron Microscopy Study of Phase Stability in Fe-W Crystalline-Amorphous Nanomultilayers:** *Cormac Killeen*<sup>1</sup>; Kyle Russell<sup>2</sup>; Andrea Hodge<sup>2</sup>; Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>University of Southern California

**4:30 PM Invited**

**3D In-situ Measurements of Stress-induced Twin and Martensitic Phase Interfaces Using X-ray Tomotomography and Dark-field X-ray Microscopy:** *Ashley Bucsek*<sup>1</sup>; <sup>1</sup>University of Michigan

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Computational Discovery and Design of Materials — Session II**

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

**Program Organizers:** Houlong Zhuang, Arizona State University; Ismaila Dabo, Pennsylvania State University; Arezoo Emdadi, Missouri University of Science and Technology; Yang Jiao, Arizona State University; Sara Kadkhodaei, University Of Illinois Chicago; Mahesh Neupane, DEVCOM Army Research Laboratory; Xiaofeng Qian, Texas A&M University; Arunima Singh, Arizona State University; Natasha Vermaak, Lehigh University

**Monday PM | March 4, 2024**  
**Bayhill 33 | Hyatt**

**Session Chair:** Arunima Singh, Arizona State University

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**2:00 PM Invited**

**Composition Design of High-entropy Alloys with Deep Sets Learning:** *Wei Chen*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

**2:25 PM**

**Augmenting the Discovery of Computationally Complex Ceramics for Extreme Environments with Machine Learning:** *Salil Bavdekar*<sup>1</sup>; Richard Hennig<sup>1</sup>; Ghatu Subhash<sup>1</sup>; <sup>1</sup>University of Florida

**2:45 PM**

**Computational Discovery of B2 Phases in the Refractory High Entropy Alloys:** *Junxin Wang*<sup>1</sup>; Maryam Ghazisaeidi<sup>1</sup>; <sup>1</sup>Ohio State University

**3:05 PM**

**Materials Discovery via Machine Learning on Li-based Battery Materials:** *Suchismita Goswami*<sup>1</sup>; <sup>1</sup>Mest

**3:25 PM Break**

**3:45 PM Invited**

**Machine Learning Driven Discovery and Modeling of Materials for Hydrogen Storage and Generation:** *Matthew Witman*<sup>1</sup>; <sup>1</sup>Sandia National Labs

**4:10 PM**

**High-Throughput Artificial Neural Network - Kinetic Monte Carlo (ANN-KMC) Framework for Diffusion Studies in FeNiCrCoCu High-entropy Alloys of Versatile Compositions:** *Wenjiang Huang*<sup>1</sup>; Xianming Bai<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

**4:30 PM**

**Homogeneous Solute Segregation Suppressing Strain Localization in Nanocrystalline Ni-Nb Alloys:** *Roshan Jha*<sup>1</sup>; Sumantra Mandal<sup>1</sup>; <sup>1</sup>IIT KGP

**4:50 PM**

**Unraveling the Mechanisms of Stability in CoMoFeNiCu High Entropy Alloys via Physically Interpretable Graph Neural Networks:** Miguel Tenorio<sup>1</sup>; *James Chapman*<sup>1</sup>; <sup>1</sup>Boston University

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Computational Thermodynamics and Kinetics — Diffusion & Transport**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tournet, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Monday PM | March 4, 2024**  
**Bayhill 29 | Hyatt**

**Session Chairs:** Hui Zheng, Lawrence Berkeley National Laboratory; Yuri Mishin, George Mason University

**2:00 PM Invited**

**The Largest Ab Initio Amorphous Materials Database and Machine Learning Prediction for Diffusivity:** *Hui Zheng*<sup>1</sup>; Eric Sivonxay<sup>1</sup>; Max Gallant<sup>1</sup>; Ziyao Luo<sup>1</sup>; Matthew McDermott<sup>1</sup>; Kristin Persson<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

**2:30 PM**

**Investigations of Possible Sluggish Diffusion in High Entropy Alloys:** Axel Seoane<sup>1</sup>; Wenjiang Huang<sup>1</sup>; Diana Farkas<sup>1</sup>; *Xian-Ming Bai*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**2:50 PM**

**Vacancy-mediated Transport of Solute Atoms in fcc Nickel under Diffusional Creep: A Density Functional Theory Study:** *Shehab Shousha*<sup>1</sup>; Boopathy Kombariah<sup>2</sup>; Sourabh Kadambi<sup>2</sup>; <sup>1</sup>Idaho National Laboratory, North Carolina State University; <sup>2</sup>Idaho National Laboratory

**3:10 PM**

**Atomistic Modeling of Interphase Boundary Diffusion:** Omar Hussein<sup>1</sup>; *Raj Koju*<sup>1</sup>; Yuri Mishin<sup>1</sup>; <sup>1</sup>George Mason University

**3:30 PM Break**

**3:50 PM**

**Equilibrium Concentration and Thermal Partition of Dumbbell Interstitials in Complex Concentrated Alloys:** *Peng Wei*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**4:10 PM**

**Impact of Soret Effect on Hydrogen and Helium Retention in PFC Tungsten under ELM-like Conditions:** *Enrique Martinez Saez*<sup>1</sup>; Dwaipayan Dasgupta<sup>2</sup>; Sophie Blondle<sup>2</sup>; Dimitrios Maroudas<sup>3</sup>; Brian Wirth<sup>2</sup>; <sup>1</sup>Clemson University; <sup>2</sup>University of Tennessee; <sup>3</sup>University of Massachusetts

**4:30 PM**

**Quantifying the Effect of External Magnetic Fields on Carbon Diffusion in Ferrite:** *Luke Wirth*<sup>1</sup>; Dallas Trinkle<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

**4:50 PM Invited**

**Point Defects and Diffusion in Refractory Carbides from First-principles Calculations:** Indiras Khatri<sup>1</sup>; Raj Koju<sup>1</sup>; *Yuri Mishin*<sup>1</sup>; <sup>1</sup>George Mason University

## MECHANICS OF MATERIALS

**Defects and Interfaces: Modeling and Experiments — Session for Richard Hoagland: Dislocations, Interfaces, Mechanical Behavior**



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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Monday PM | March 4, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Jian Wang, University of Nebraska - Lincoln; Xinghang Zhang, Purdue University

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**2:00 PM Invited**

**Role of Residual Dislocation Burgers Vector Magnitude and Mobility on Grain Boundary Slip Transfer in Aluminum:** *Douglas Spearot*<sup>1</sup>; Rodrigo Santos-Guemes<sup>2</sup>; Javier Llorca<sup>3</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Universidad Rey Juan Carlos; <sup>3</sup>IMDEA Materials Institute

**2:20 PM Invited**

**Mechanistic-Design of Multilayered Metal-Metal and Metal-Ceramic Nanocomposites for Tunable Strength and Toughness:** *Siddhartha (Sid) Pathak*<sup>1</sup>; Amit Misra<sup>2</sup>; Nathan Mara<sup>3</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of Michigan; <sup>3</sup>University of Minnesota

**2:40 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

**3:00 PM Invited**

**The Effect of System Size and Interatomic Potential on Non-Arrhenius Boundary Migration of Incoherent Twin Grain Boundaries in Nickel:** *Eric Homer*<sup>1</sup>; Akarsh Verma<sup>1</sup>; Oliver Johnson<sup>1</sup>; Gregory Thompson<sup>2</sup>; Shigenobu Ogata<sup>3</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of Alabama; <sup>3</sup>Osaka University

**3:20 PM Invited**

**Beyond Defect Counting:** *Khalid Hattar*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**3:40 PM Break**

**3:55 PM Invited**

**Mechanical Behavior of Nanotwinned Al Alloys:** *Xinghang Zhang*<sup>1</sup>; Xuanyu Sheng<sup>1</sup>; Nicholas Richter<sup>1</sup>; Jian Wang<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Nebraska-Lincoln

**4:15 PM Invited**

**Investigating the Mechanical Effects of Twin Boundaries and Heterophase Boundaries through In Situ Mechanical Testing:** *Nan Li*<sup>1</sup>; Ben Liu<sup>1</sup>; Saryu Fensin<sup>1</sup>; John Hirth<sup>1</sup>; Youxing Chen<sup>2</sup>; Nathan Mara<sup>3</sup>; Irene Beyerlein<sup>4</sup>; Jian Wang<sup>5</sup>; Xinghang Zhang<sup>6</sup>; Amit Misra<sup>7</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>The University of North Carolina at Charlotte; <sup>3</sup>University of Minnesota, Twin Cities; <sup>4</sup>University of California, Santa Barbara; <sup>5</sup>University of Nebraska, Lincoln; <sup>6</sup>Purdue University, West Lafayette; <sup>7</sup>University of Michigan, Ann Arbor

**4:35 PM Invited**

**Beyond Cu-Nb Interfaces: The Materials Science Behind:** *Xiang-Yang Liu*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:55 PM**

**Twin Density and Twin Thickness Evolution in Sputtered Al-Mg Alloy:** *Xuanyu Sheng*<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

**5:15 PM**

**Investigating Atomic Defect Structures and Behaviors in High Throughput:** *Lucas Hale*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials — Reliability in Microelectronic Packaging

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

**Monday PM | March 4, 2024**

**Bayhill 27 | Hyatt**

**Session Chairs:** Praveen Kumar, Indian Institute of Science; Yan Li, Samsung

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**2:00 PM**

**Enhancing Joint Strength and Microstructural Modification Through the Addition of Eco-friendly Nanofibers in SAC Solder:** *Chia-Jung Hsu*<sup>1</sup>; Chang-Meng Wang<sup>2</sup>; Yu-Cheng Chen<sup>3</sup>; Tsao-Cheng Huang<sup>3</sup>; Chao-Chin Chang<sup>3</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>National Central University; <sup>2</sup>Shenmao Technology INC.; <sup>3</sup>Formosa Plastics Corporation

**2:20 PM**

**Reliability of Silver-tin Alloy Sintering for Power Electronic Applications:** *Wei-Chen Huang*<sup>1</sup>; Chin-Hao Tsai<sup>1</sup>; C. R. Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

**2:40 PM**

**Strain-controlled High-cycle Fatigue of Solder Joints for High-reliability Environments:** *David Kemmenoe*<sup>1</sup>; John Laing<sup>1</sup>; Benjamin White<sup>1</sup>; <sup>1</sup>Sandia National Lab

**3:00 PM**

**Thermal Strain Measurement of Solder Joint in Electronic Packages:** *Minjeong Sohn*<sup>1</sup>; Minhyuck Lee<sup>1</sup>; Dongyurl Yu<sup>1</sup>; Byeong-Kwon Ju<sup>2</sup>; Tae-Ik Lee<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea University

**3:20 PM**

**Effect of Grain Size and Stress Relaxation on Whisker Growth Under Applied Pressure:** *Eric Chason*<sup>1</sup>; Nupur Jain<sup>1</sup>; Piyush Jagtap<sup>1</sup>; Allan Bower<sup>1</sup>; <sup>1</sup>Brown University

**3:40 PM Break**

**4:00 PM**

**Microstructure, Texture, and Properties Evolutions in Pure Nickel Metal Under High-density Electric Current Stressing:** *Pao-Hsuan Yang*<sup>1</sup>; Hsuan-Cheng Huang<sup>1</sup>; Meng-Chun Chiu<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

4:20 PM

**Numerical Modeling the Effect of Copper Solute on Electromigration Stress Development in Al Interconnects:** *James Gordineer*<sup>1</sup>; Ping-Chuan Wang<sup>1</sup>; <sup>1</sup>SUNY New Paltz

4:40 PM

**Investigations of Current-induced Grain Growth and Properties Variation in Pure Ag Metal Under Extremely High Current Density:** *Su-Chen Liao*<sup>1</sup>; Hsuan-Cheng Huang<sup>1</sup>; Po-Hsuan Yang<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

5:00 PM

**Electro-recrystallization in Pure Cu Metal Induced by Current Stressing: A Comprehensive Study of Microstructure, Crystallinity, and Properties:** *Hsuan-Cheng Huang*<sup>1</sup>; Meng-Chun Chiu<sup>1</sup>; Pao-Hsuan Yang<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

5:20 PM

**Electromigration Test of Electroless Copper Plating Interconnection:** *Chun-Yung Hung*<sup>1</sup>; Yu-Chun Lin<sup>1</sup>; Min-Yan Tsai<sup>2</sup>; Yun-Ching Hung<sup>2</sup>; C.R. Kao<sup>1</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Advanced Semiconductor Engineering (ASE) Group

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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

**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, Karlsruhe Institute of Technology (KIT); Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Monday PM | March 4, 2024**  
Coral Spring I | Hyatt

**Session Chairs:** Mark Weaver, University of Alabama; XiaoXiang Yu, Novelis Inc.

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2:00 PM

**Advanced Studies of Radiation Damage in Compositionally Complex Alloys:** *Nathan Curtis*<sup>1</sup>; Michael Moorehead<sup>2</sup>; Mukesh Bachhav<sup>2</sup>; Phalgun Nelaturu<sup>1</sup>; Junliang Liu<sup>1</sup>; Daniel Murray<sup>2</sup>; Bao-Phong Nguyen<sup>1</sup>; Nate Eklof<sup>1</sup>; Dan Thoma<sup>1</sup>; Haiming Wen<sup>3</sup>; Dane Morgan<sup>1</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

2:20 PM

**Isothermal High Temperature Oxidation of Cantor's-based MC-reinforced HEAs Versus Their Mn and Cr Contents:** Pauline Spaeter<sup>1</sup>; Nassima Chenikha<sup>1</sup>; Corentin Gay<sup>1</sup>; Lionel Aranda<sup>1</sup>; *Patrice Berthod*<sup>1</sup>; <sup>1</sup>University of Lorraine

2:40 PM

**Combinatorial Synthesis of Non-equiatomic CrMoNbTaW With Improved Strength and Oxidation Resistance:** *Md Imran Noor*<sup>1</sup>; Paul F. Rottmann<sup>1</sup>; <sup>1</sup>University of Kentucky

**3:00 PM**

**Comparison of Initial-stage High Temperature Oxidation Behavior of MCrAlY and Hf-YCco-doped CoCrFeNiAl High-entropy Alloy in Wet Air:** *Tian-Wei Lu*<sup>1</sup>; Xing-Ru Tan<sup>1</sup>; Michael Gao<sup>2</sup>; Shan-Shan Hu<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>National Energy Technology Laboratory

**3:20 PM Break****3:35 PM Invited**

**Oxidation of NiCoCr Alloys in High Temperature Air and Steam Environments:** *William Musinski*<sup>1</sup>; Elmer Prenzl<sup>1</sup>; Benjamin Church<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

**3:55 PM**

**Insights on the Oxidation Behavior of Refractory High Entropy Alloys:** *Todd Butler*<sup>1</sup>; Byron McArthur<sup>1</sup>; Samuel Kuhr<sup>1</sup>; Oleg Senkov<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

**4:15 PM Invited**

**Role of Surface Deformation on the High-temperature Oxidation Response of FeCrNi-Based Multi-principal Element Alloys:** Ian Greeley<sup>1</sup>; Thomas Maulbeck<sup>1</sup>; Kate Moo<sup>1</sup>; Daniele Fatto Offidani<sup>1</sup>; Fei Xue<sup>1</sup>; *Emmanuelle Marquis*<sup>1</sup>; <sup>1</sup>University of Michigan

**4:35 PM**

**Irradiation and Oxidation Behavior of Multi-principal Element Alloys Manufactured by Different Techniques:** *Haiming Wen*<sup>1</sup>; Matthew Luebbe<sup>1</sup>; Hans Pommerenke<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

**4:55 PM**

**Behavior in Cooling-induced Oxide Scale Spallation of Original and Modified Cantor's HEA Alloys Oxidized at High Temperature:** Nassima Chenikha<sup>1</sup>; Corentin Gay<sup>1</sup>; Pauline Spaeter<sup>1</sup>; Lionel Aranda<sup>1</sup>; *Patrice Berthod*<sup>1</sup>; <sup>1</sup>University of Lorraine

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## 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 4, 2024**  
Plaza Int'l F | Hyatt

**Session Chairs:** Bogdan Alexandreanu, Argonne National Laboratory; Xiaoyuan Lou, Purdue University

**2:00 PM Invited**

**Long-term Performance of High-Cr, Nickel-based Alloys and Weldments in LWR Environment:** *Bogdan Alexandreanu*<sup>1</sup>; Yiren Chen<sup>1</sup>; Xuan Zhang<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; <sup>1</sup>Argonne National Lab

**2:30 PM Invited**

**Precursor Damage Evolution and Stress Corrosion Crack Initiation of Ni-base Alloy 600 and Alloy 690 in PWR Primary Water:** *Ziqing Zhai*<sup>1</sup>; Mychailo Toloczko<sup>1</sup>;

Karen Kruska<sup>1</sup>; Stephen Bruemmer<sup>1</sup>; Jia Liu<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:00 PM**

**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

**3:20 PM**

**Physics-based Modeling of Corrosion Crack Dynamics and Fracture Using 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

**3:40 PM Break**

**4:00 PM Invited**

**Recent Learning on Improving IASCC/SCC Resistance of Austenitic Stainless Steel in High Temperature Water:** *Xiaoyuan Lou*<sup>1</sup>; Jingfan Yang<sup>1</sup>; <sup>1</sup>Purdue University

**4:30 PM**

**Effect of Crack-initiating Feature on the Environment-assisted Cracking Behavior of Sensitized AA5456-H116 in Marine Environments:** *Zachary Harris*<sup>1</sup>; Lara Ojha<sup>2</sup>; Jayendran Srinivasan<sup>2</sup>; Robert Kelly<sup>2</sup>; James Burns<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of Virginia

**4:50 PM**

**Effect of Chloride Concentration on the Atmospheric Environment-assisted Cracking Behavior of Sensitized AA5083-H131:** *Zachary Harris*<sup>1</sup>; Patrick Steiner<sup>2</sup>; James Burns<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of Virginia

**5:10 PM**

**Enhanced Understanding of the Protocol for Characterizing Environment Assisted Cracking and Justification for a Modified Testing Standard:** *James Burns*<sup>1</sup>; Zach Harris<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>University of Pittsburgh

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## MECHANICS OF MATERIALS

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

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; Ashley Spear, University of Utah; Brian Wisner, Ohio University

**Monday PM | March 4, 2024**

**Manatee Spring II | Hyatt**

**Session Chair:** Brian Wisner, Ohio University

**2:00 PM**

**High Temperature Fatigue Crack Growth in Nickel-based Alloys Joined by Brazing and Additive Manufacturing:** *Ashok Bhadeliya*<sup>1</sup>; Birgit Rehmer<sup>1</sup>; Bernard Fedelich<sup>1</sup>; Torsten Jokisch<sup>1</sup>; Birgit Skrotzki<sup>1</sup>; Jürgen Olbricht<sup>1</sup>; <sup>1</sup>Federal Institute for Materials

Research and Testing (BAM)

**2:20 PM**

**The Effects of HIP Treatment Schemes on HCF Behavior at Intermediate Temperature for Nickel-based SX Superalloy:** *Siliang He*<sup>1</sup>; Song Lu<sup>1</sup>; Longfei Li<sup>2</sup>; Qiang Feng<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>University of Science and Technology Beijing

**2:40 PM**

**Understand the Influence of Precipitates on the Fatigue Performance of Ni50.3Ti29.7Hf20 High Temperature Shape Memory Alloys Through In Situ Heating:** *Jiaqi Dong*<sup>1</sup>; Alexander Demblon<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Kelvin Xie<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:00 PM**

**An Oxidation-dependent Mean-field Approach to Predict the Mechanical Behavior of Polycrystalline Ni-based Superalloys at High Temperatures:** *Jean-Briac le Graverend*<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:20 PM Break**

**3:40 PM**

**The Effect of Specimen Thickness on the Fatigue Behavior of AA7075-T651 in Low Water Vapor Environments:** *James Burns*<sup>1</sup>; Zach Harris<sup>2</sup>; Adam Thompson<sup>1</sup>; Jake Hochhalter<sup>3</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>University of Pittsburgh; <sup>3</sup>University of Utah

**4:00 PM**

**Some Impact of Hydrogen Concentration and Distribution on Low Cycle Fatigue Behavior of Titanium Alloys:** Larissa Caroline Martins Moreira<sup>1</sup>; *Xavier Feaugas*<sup>1</sup>; Jamaa Bouhattate<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Simon Frappart<sup>1</sup>; Aude Mathis<sup>1</sup>; Thierry Millot<sup>1</sup>; Cyril Berziou<sup>1</sup>; Guillaume Lotte<sup>1</sup>; Stéphane Cohendoz<sup>1</sup>; <sup>1</sup>La Rochelle Université

**4:20 PM**

**The Effects of Temperature and Microstructure on Slip Localization in Microtextured Ti-6Al-2Sn-4Zr-2Mo Under Dwell Fatigue:** *Michelle Harr*<sup>1</sup>; Glenn Balbus<sup>2</sup>; Daniel Rhoads<sup>1</sup>; Ayman Salem<sup>1</sup>; Adam Pilchak<sup>1</sup>; Thomas Broderick<sup>2</sup>; Samuel Kuhr<sup>2</sup>; Samantha Daly<sup>3</sup>; <sup>1</sup>Materials Resources LLC; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>University of California, Santa Barbara

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## MATERIALS SYNTHESIS AND PROCESSING

### **Formability and Spring-back Issues in Ultra-high Strength Steels and High Strength Aluminum Alloys — Session II**

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

**Program Organizers:** Mert Efe, Pacific Northwest National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory; Lu Huang, General Motors; Gang Huang, ArcelorMittal; Yannis Korkolis, Ohio State University; Amir Asgharzadeh, EWI

**Monday PM | March 4, 2024**

**Celebration 2 | Hyatt**

**Session Chairs:** Michael Miles, Brigham Young University; Lu Huang, General Motors

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**2:00 PM Invited**

**Retrogression Forming and Reaging for Forming and Joining AA7075-T6 Sheet:** *Eric Taleff*<sup>1</sup>; Danny Nikolai<sup>1</sup>; <sup>1</sup>University of Texas at Austin

**2:40 PM**

**Anisotropic Fracture of Mild and Advanced High Strength Steel in Non-linear Strain Paths:** *Clifford Butcher*<sup>1</sup>; Armin Abedini<sup>1</sup>; K. Cheong<sup>1</sup>; Farinaz Khameneh<sup>1</sup>; Thomas Stoughton<sup>2</sup>; E. McCarty<sup>3</sup>; <sup>1</sup>University of Waterloo; <sup>2</sup>General Motors; <sup>3</sup>Auto/Steel Partnership

**3:00 PM Invited**

**Dimensional Control in Flexible Fabrication of Sheet Metals for Automotive Applications:** *Joshua Solomon*<sup>1</sup>; Lu Huang<sup>1</sup>; Hui-ping Wang<sup>1</sup>; Vivian Vasquez<sup>1</sup>; <sup>1</sup>General Motors

**3:40 PM Break****4:00 PM**

**A Investigation of the Bendability of Friction-stir Processed Aluminum 7075 & 6111 Alloys and Its Effect on Formability:** *Shivakant Shukla*<sup>1</sup>; Kranthi Balusu<sup>1</sup>; Hrishikesh Das<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Piyush Upadhyay<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab

**4:20 PM**

**Roller Bending/Unbending Process for Improving the Local Mechanical Properties of Aluminum Sheets:** *Katherine Rader*<sup>1</sup>; Wahaz Nasim<sup>1</sup>; Angel Ortiz<sup>1</sup>; Nathan Canfield<sup>1</sup>; Kyoo Sil Choi<sup>1</sup>; Mert Efe<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

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**SPECIAL TOPICS**

**Frontiers of Materials Award Symposium: Physics-Informed Machine Learning for Modeling and Design of Materials and Manufacturing Processes – Session I**

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

**Program Organizer:** Pinar Acar, Virginia Tech

**Monday PM | March 4, 2024**

**Plaza Int'l E | Hyatt**

**Session Chair:** Pinar Acar, Virginia Tech

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**2:00 PM Keynote**

**Inverse Design for Crystal Plasticity Model Identification via Physics-informed Neural Networks:** *Pinar Acar*<sup>1</sup>; Ender Eger<sup>1</sup>; ARULMURUGAN Senthilnathan<sup>1</sup>; Md Mahmudul Hasan<sup>1</sup>; Mohamed Elleithy<sup>1</sup>; <sup>1</sup>Virginia Tech

**2:30 PM Invited**

**Adaptive Surrogate Models Using Unbalanced Data for Material Design:** *Yulun Wu*<sup>1</sup>; *Yumeng Li*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**3:00 PM Invited**

**Physics-Informed Machine Learning for Scan Path Optimization:** *Benjamin Stump*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:30 PM Break**

**3:50 PM Invited**

**Interpretability and Generalizability of Constitutive Models using Symbolic Regression:** *Jacob Hochhalter*<sup>1</sup>; Karl Garbrecht<sup>2</sup>; Donovan Birky<sup>3</sup>; Nolan Strauss<sup>4</sup>; Geoffrey Bomarito<sup>5</sup>; Laurent Capolungo<sup>2</sup>; John Emery<sup>6</sup>; <sup>1</sup>TMS; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University Of Utah; <sup>4</sup>University of Utah; <sup>5</sup>NASA Langley Research Center; <sup>6</sup>Sandia National Laboratories

**4:20 PM Invited**

**A Machine-learning Based Hierarchical Framework to Discover Novel Functional Materials:** *Anjana Talapatra*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:50 PM Invited**

**Physics-Aware Recurrent Convolutional Neural Networks for Modeling Hotspot Formation and Growth in Energetic Materials**  
: *Stephen Baek*<sup>1</sup>; <sup>1</sup>University of Virginia

**5:20 PM Reception**

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials II: Two-Dimensional Nanostructures

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Monday PM | March 4, 2024**  
**Bayhill 21 | Hyatt**

**Session Chairs:** Mostafa Bedewy, University of Pittsburgh; Michael Cai Wang, University of South Florida

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**2:00 PM Keynote**

**Scalable Synthesis of Two-dimensional Carbides and Carbonitrides (MXenes):** *Yury Gogotsi*<sup>1</sup>; <sup>1</sup>Drexel University

**2:40 PM Invited**

**Applications of Two-dimensional and Layered Materials in Energy, Water, and Healthcare:** *Dave Estrada*<sup>1</sup>; <sup>1</sup>Boise State University

**3:10 PM**

**Scalable Nanomanufacturing of Highly-uniform, Atomically-thin 2D Nanoribbons with ångström-precise Edge Chirality:** *Zhewen Yin*<sup>1</sup>; Michael Cai Wang<sup>1</sup>; <sup>1</sup>University of South Florida

**3:30 PM Break**

**3:50 PM Invited**

**Wafer-Scale Integration of 2D Materials on Arbitrary Substrates for Mechanically Reconfigurable and Chemically Tunable Electronics:** *Yeonwoong Jung*<sup>1</sup>; <sup>1</sup>University of Central Florida



**4:20 PM Invited**

**Strain-exciton Coupling in Two-dimensional Semiconductors:** *SungWoo Nam*<sup>1</sup>; Jin Myung Kim<sup>1</sup>; Peiwen Ma<sup>1</sup>; Soyeong Kwon<sup>1</sup>; <sup>1</sup>University of California, Irvine

**4:50 PM**

**2D MoS<sub>2</sub> Additives for Improved Performance and Stability of Hybrid Perovskite Solar Cells:** *Chang-Yong Nam*<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory

**5:10 PM**

**3D Printed Soft Electronics with Metamaterials-inspired Electromagnetic Architecture:** *LeiBin Li*<sup>1</sup>; Samannoy Ghosh<sup>1</sup>; Jared Anklam<sup>1</sup>; Dwipak Prasad Sahu<sup>1</sup>; Samuel Hales<sup>1</sup>; Yong Lin Kong<sup>1</sup>; <sup>1</sup>University of Utah

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**High Temperature Electrochemistry: An FMD Symposium Honoring Uday B. Pal – High Temperature Electrochemistry and Sustainable Metallurgy II**

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Soumendra Basu, Boston University; Srikanth Gopalan, Boston University; Adam Powell, Worcester Polytechnic Institute; Filippos Patsiogiannis, Bridgnorth Aluminium Ltd; Xiaofei Guan, Shanghaitech University

**Monday PM | March 4, 2024**

**Bayhill 24 | Hyatt**

**Session Chairs:** Akbar Rhamdhani, Swinburne University of Technology; Hojong Kim, Pennsylvania State University

**2:00 PM Invited**

**Electrically Enhanced Metal Refining Using Slag – Recent Developments and Future Outlook:** Katri Avarmaa<sup>1</sup>; Andreas Putera<sup>1</sup>; Aliakbar Dehkordi<sup>1</sup>; Matthew Humbert<sup>1</sup>; Geoffrey Brooks<sup>1</sup>; *M. Akbar Rhamdhani*<sup>1</sup>; <sup>1</sup>Swinburne University of Technology

**2:25 PM Invited**

**Electrochemical Attempts in Molten Salts for Extraction, Recycling, and Synthesis:** *Hongmin Zhu*<sup>1</sup>; Osamu Takeda<sup>1</sup>; Xin Lu<sup>2</sup>; Jiusan Xiao<sup>2</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>University of Science and Technology Beijing

**2:50 PM Invited**

**Electrode Processes of Reactive Rare-earth Metals and Alloys in Molten Salt Electrolytes:** *Hojong Kim*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**3:15 PM Invited**

**High Performance Battery Materials from Sustainable Sources:** *Eric Gratz*<sup>1</sup>; <sup>1</sup>Ascend Elements

**3:40 PM Break**

**3:55 PM Invited**

**Combination of Electrolysis and Thermocatalysis for Dry Reforming of Methane in a Liquid Alloy-salt Catalytic System:** *Xiaofei Guan*<sup>1</sup>; <sup>1</sup>Shanghaitech University

**4:20 PM**

**High-Throughput Measurement Techniques for Physical Properties of Molten Salt:** *Alexander Levy*<sup>1</sup>; Haoxuan Yan<sup>1</sup>; Uday Pal<sup>1</sup>; <sup>1</sup>Boston University

**4:40 PM Invited**

**Electrochemical Recovery of Rare Earth Elements from Magnets in Molten Salts:** *Aida Abbasalizadeh*<sup>1</sup>; Seshadri Seetharaman<sup>2</sup>; <sup>1</sup>Delft University of Technology; <sup>2</sup>Royal Institute of Technology

**5:00 PM**

**Assessment of Phase Evolution and Cycling Performance for the Li-Sb-Sn Liquid Metal Battery System with Mixed Cation Molten Salt Electrolytes:** *Kelly Varnell*<sup>1</sup>; Sanghyeok Im<sup>1</sup>; Peyman Asghari-Rad<sup>1</sup>; Hojong Kim<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**5:20 PM**

**Processing Contributions to the Conduction Variability of  $\text{Sr}_{2-x}\text{VMoO}_{6-\delta}$ :** *Julia Esakoff*<sup>1</sup>; David Driscoll<sup>1</sup>; Stephen Sofie<sup>1</sup>; <sup>1</sup>Montana State University

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Hume-Rothery Symposium on Alloy Microstructure Science and Engineering – Atomistic Simulation, Theory, and Property Modeling**

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

**Monday PM | March 4, 2024**  
**Bayhill 23 | Hyatt**

**Session Chairs:** Liang Qi, University of Michigan; Kaisheng Wu, The Thermo-Calc Software Company

**2:00 PM Invited**

**Invention and Applications of Universal Machine Learning Interatomic Potential:** *Ju Li*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:30 PM Invited**

**Linking Phenomenological Theories of Phase Transformations to First-principles Descriptions of Solids:** *Anton Van der Ven*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**3:00 PM Invited**

**3D Diffuse Scattering, Displacement Short-range Ordering, and Phonons in Pre-martensitic State:** *Yu Wang*<sup>1</sup>; Yongmei Jin<sup>1</sup>; <sup>1</sup>Michigan Technological University

**3:30 PM Break****3:50 PM Invited**

**Through-process Modeling of Local Mechanical Properties of Cast Aluminum Alloys:** *Qigui Wang*<sup>1</sup>; <sup>1</sup>General Motors Corporation

**4:20 PM Invited**

**Combined Creep and Fatigue Modeling:** *Youhai Wen*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**NUCLEAR MATERIALS**

## Irradiation Testing: Facilities, Capabilities, and Experimental Designs — Experimental Challenges and Frameworks

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

**Program Organizers:** Walter Luscher, Pacific Northwest National Laboratory; Peter Hosemann, University of California, Berkeley; Andrew Hoffman, GE Research; Joris Van den Bosch, SCK CEN; Brenden Heidrich, Nuclear Science User Facilities

**Monday PM | March 4, 2024**  
**Rainbow Spring I | Hyatt**

**Session Chair:** Walter Luscher, Pacific Northwest National Laboratory

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**2:00 PM Invited**

**Challenges and Solutions for Fast Neutron Irradiation of Bulk Material Specimens:** *Nicolas Woolstenhulme*<sup>1</sup>; Calvin Downey<sup>1</sup>; Michael Worrall<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**2:30 PM Invited**

**Developing Irradiation Experiments to Enable Characterization and Qualification of Advanced Nuclear Materials:** *Richard Howard*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:00 PM Invited**

**The Role of Nuclear Science User Facilities in Nuclear Energy Materials Research and Development:** *Brenden Heidrich*<sup>1</sup>; <sup>1</sup>Nuclear Science User Facilities

**3:30 PM Break**

**3:50 PM**

**INL's Mission Incorporating Neutrons in Post-irradiation Examination of Nuclear Materials:** *Scott Moore*<sup>1</sup>; Aaron Craft<sup>1</sup>; Colin Judge<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**4:10 PM**

**Electron Energy Loss Spectroscopy (EELS) Characterization of Fuel Cladding Chemical Interaction (FCCI) Region in U-Zr Metallic Fuel Cladded with HT-9:** *Arnold Pradhan*<sup>1</sup>; Daniele Salvato<sup>1</sup>; Fei Xu<sup>1</sup>; Tiankai Yao<sup>1</sup>; <sup>1</sup>INL

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion — Short-range Order in MPEAs

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

**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley

**Monday PM | March 4, 2024**  
**Windermere X-2 | Hyatt**

**Session Chairs:** Yang Yang, The Pennsylvania State University; Penghui Cao, University of California, Irvine; Robert Ritchie, University of California, Berkeley; Fadi Abdeljawad, Clemson University

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**2:00 PM Invited**

**Impact of Chemical Ordering on Sluggish Diffusion in Medium Entropy Alloys:** *Shigenobu Ogata*<sup>1</sup>; <sup>1</sup>Osaka University

**2:30 PM Invited**

**A Computational Thermodynamics Framework with Intrinsic Chemical Short-range Order:** Chu-Liang Fu<sup>1</sup>; *Bi-Cheng Zhou*<sup>1</sup>; <sup>1</sup>University of Virginia

**3:00 PM**

**How Can We Tune the Short-range Order (SRO) in Multi-principal Element Alloys (MPEAs)?:** Ying Han<sup>1</sup>; Hangman Chen<sup>2</sup>; *Yongwen Sun*<sup>1</sup>; Jian Liu<sup>3</sup>; Bijun Xie<sup>2</sup>; Zhiyu Zhang<sup>1</sup>; Meng Li<sup>4</sup>; Judith Yang<sup>5</sup>; Wen Chen<sup>3</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>University of Massachusetts; <sup>4</sup>University of Pittsburgh; <sup>5</sup>University of Pittsburgh & Brookhaven National Laboratory

**3:20 PM**

**Elucidating the Roles of Chemistry, Compositional Complexity, and Short-range Order in the Dislocation Energetics of Refractory Alloys:** *Wenqing Wang*<sup>1</sup>; Flynn Walsh<sup>1</sup>; Robert Ritchie<sup>1</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Lab

**3:40 PM Break**

**4:00 PM Invited**

**Three-dimensional Atomic Positions and Local Chemical Order of Medium- and High-Entropy Alloys:** *Jianwei (John) Miao*<sup>1</sup>; Saman Moniri<sup>1</sup>; Yao Yang<sup>1</sup>; Yakun Yuan<sup>1</sup>; Jihan Zhou<sup>1</sup>; Long Yang<sup>1</sup>; Fan Zhu<sup>1</sup>; Yuxuan Liao<sup>1</sup>; Yonggang Yao<sup>2</sup>; Liangbing Hu<sup>2</sup>; Peter Ercius<sup>3</sup>; Jun Ding<sup>4</sup>; <sup>1</sup>University of California Los Angeles; <sup>2</sup>University of Maryland, College Park; <sup>3</sup>Lawrence Berkeley National Laboratory; <sup>4</sup>Xi'an Jiaotong University

**4:30 PM Invited**

**Mechanics of High-entropy Alloys:** *Ting Zhu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**5:00 PM**

**Capturing Short-range Order in High-entropy Alloys with Machine-learning Potentials:** *Yifan Cao*<sup>1</sup>; Killian Sheriff<sup>1</sup>; Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**5:20 PM**

**Understanding Processing Pathways for Chemical Short-range Order in Equiatomic CoCrNi Alloy:** *Sakshi Bajpai*<sup>1</sup>; Yuan Tian<sup>1</sup>; Yutong Bi<sup>1</sup>; Xin Wang<sup>1</sup>; Calvin Belcher<sup>1</sup>; Vivek Verma<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Timothy Rupert<sup>1</sup>; Xiaoqing Pan<sup>1</sup>; Enrique Lavernia<sup>1</sup>; Diran Apelian<sup>1</sup>; <sup>1</sup>University of California Irvine

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**LIGHT METALS**

**Magnesium Technology 2024 — Microstructural Evolution and Phase Transformations**

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

**Monday PM | March 4, 2024**  
**Windermere Y-3 | Hyatt**

**Session Chairs:** Tracy Berman, University of Michigan; Steven Johnson, Central Connecticut State University

**2:00 PM Keynote**

**3D In-situ Diffraction Microstructure Imaging Techniques: Applications to Recrystallization and Deformation Twinning in Mg Alloys:** *Ashley Bucsek*<sup>1</sup>;

<sup>1</sup>University of Michigan

**2:40 PM**

**Understanding the Influence of Ca and Zn on the Microstructure and Texture Evolution of Mg-(Ca, Zn) Alloys during Static Recrystallization:** *Rogine Gomez*<sup>1</sup>; Aerial Leonard<sup>1</sup>; <sup>1</sup>The Ohio State University

**3:00 PM**

**Microstructural Evolution Near Microcrack in AZ31 Mg Alloy Under Electropulses:** *Jinyeong Yu*<sup>1</sup>; Seong Ho Lee<sup>1</sup>; Seho Cheon<sup>1</sup>; Mooseong Mun<sup>2</sup>; Jeong Hun Lee<sup>3</sup>; Taekyung Lee<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Pusan National University / Korea Institute of Industrial Technology; <sup>3</sup>Korea Institute of Industrial Technology

**3:20 PM**

**Data Science Approaches for EBSD Data Processing & Materials Design for Magnesium Alloy:** *Haoran Yi*<sup>1</sup>; Xun Zeng<sup>2</sup>; Dikai Guan<sup>1</sup>; <sup>1</sup>University of Southampton; <sup>2</sup>University of Science and Technology Beijing

**3:40 PM Break**

**4:00 PM**

**Microstructural Evolution of Hot-rolled AZ31 Mg Plate Induced by Electropulsing Treatment:** *Seho Cheon*<sup>1</sup>; Jinyeong Yu<sup>2</sup>; Seong Ho Lee<sup>1</sup>; Sung Hyuk Park<sup>3</sup>; Taekyung Lee<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Pusan National University (PNU); <sup>3</sup>Kyungpook National University

**4:20 PM Invited**

**An Integrated Computational and Experimental Study of Static Recrystallization in the Mg-Zn-Ca Alloy System:** *Tracy Berman*<sup>1</sup>; David Montiel Taboada<sup>1</sup>; Michael Pilipchuk<sup>1</sup>; Mohammadreza Yaghoobi<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>Intel

**4:45 PM**

**Energetic Terms Associated with Twin Nucleation in Magnesium:** Enver Kapan<sup>1</sup>; Sertan Alkan<sup>1</sup>; C. Aydiner<sup>1</sup>; *Jeremy Mason*<sup>2</sup>; <sup>1</sup>Bogazici University; <sup>2</sup>University of California, Davis

**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

**Materials and Chemistry for Molten Salt Systems — Impurity and Radiation Effects on Molten Salt Structure and 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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

**Monday PM | March 4, 2024**  
**Bayhill 20 | Hyatt**

**Session Chairs:** Michael Short, MIT; Amanda Leong, Virginia Tech

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**2:00 PM**

**Impurities Determination in Molten Salts:** *Amanda Leong*<sup>1</sup>; Logan Mcilwain<sup>1</sup>; Ahab Mohamed<sup>1</sup>; Xander Hromiak<sup>1</sup>; Trevor Bradshaw<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute

**2:20 PM**

**Modeling the Chemical Behavior of Complex Molten Salt Nuclear Fuel in Prospective Reactors:** Theodore Besmann<sup>1</sup>; *Juliano Schorne-Pinto*<sup>1</sup>; Mina Aziziha<sup>1</sup>; Jorge Paz Soldan Palma<sup>1</sup>; Amir Mofrad<sup>1</sup>; Clara Dixon<sup>1</sup>; Ronald Booth<sup>1</sup>; Jack Wilson<sup>1</sup>; <sup>1</sup>University of South Carolina

**2:40 PM**

**Optical Basicity Determination of Molten Halide Salts:** *Kailee Buttice*<sup>1</sup>; Adrien Couet<sup>1</sup>; Ruchi Gakhar<sup>2</sup>; Qiufeng Yang<sup>2</sup>; <sup>1</sup>University of Wisconsin - Madison; <sup>2</sup>Idaho National Laboratory

**3:00 PM**

**Modeling Radiolysis Effects in FLiNaK and FLiBe Molten Fluoride Salt:** *Adria Peterkin*<sup>1</sup>; Herve Caralp<sup>2</sup>; Mike Short<sup>1</sup>; Weiyue Zhou<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Brown University

**3:20 PM Break**

**3:40 PM**

**Unraveling Impurity-Dependent Morphological Evolution of Ni<sub>20</sub>Cr Alloy in Eutectic LiClKCl Molten Salt Using In Situ Transmission X-ray Microscopy:** *Yuxiang Peng*<sup>1</sup>; Xiaoyang Liu<sup>1</sup>; Ellie Kim<sup>2</sup>; Phillip Halstenberg<sup>2</sup>; Ankita Mohanty<sup>1</sup>; Xiaohui Xiao<sup>3</sup>; James Wishart<sup>3</sup>; Sheng Dai<sup>4</sup>; Mingyuan Ge<sup>3</sup>; Yu-chen Karen Chen-Wiegart<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>University of Tennessee Knoxville; <sup>3</sup>Brookhaven National Laboratory; <sup>4</sup>Oak Ridge National Laboratory

**4:00 PM**

**Advanced Measurement of the O and H contents in FLiBe salt:** *Guiqiu Zheng*<sup>1</sup>; Caroline Sorensen<sup>1</sup>; <sup>1</sup>Commonwealth Fusion Systems

**4:20 PM**

**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

**4:40 PM**

**Effect of Metal Ion Solutes on Molten Salt Corrosion of Ni-20Cr Model Alloy:** *Kaustubh Bawane*<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; William Phillips<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

5:00 PM

**Impact of Iodide Species on Crystal Structure and Thermodynamic Properties of LiCl-KCl Eutectic Salt:** *Maria del Rocio Rodriguez Laguna*<sup>1</sup>; Gregory Holmbeck<sup>1</sup>; Mehmet Topsakal<sup>2</sup>; Simerjeet Gill<sup>2</sup>; Ruchi Gakhar<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Brookhaven National Laboratory

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## NUCLEAR MATERIALS

### **Materials Corrosion Behavior in Advanced Nuclear Reactor Environments – Computational Modelling and Other Novel Perspectives in Elucidating Corrosion Mechanisms**

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

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Caitlin Huotilainen, TerraPower; Nidia Gallego, Oak Ridge National Laboratory; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison; Julie Tucker, Oregon State University

**Monday PM | March 4, 2024**  
**Silver Spring I-II | Hyatt**

**Session Chair:** Osman Anderoglu, University of New Mexico

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2:00 PM

**Charged Point Defect Transport through Passivating Oxide Films Simulated with Cluster Dynamics Models:** *Aaron Kohnert*<sup>1</sup>; Edward Holby<sup>1</sup>; Blas Uberuaga<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

2:20 PM

**Mesoscale Modeling of Structural Alloy Corrosion in Molten Salt Reactor:** *Xueyang Bognarova*<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

2:40 PM

**Studies of Complexation of Ni-Cr in Molten Salts Using Machine Learning Interatomic Potentials:** *Siamak Attarian*<sup>1</sup>; Dane Morgan<sup>1</sup>; Izabela Szlufarska<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison

3:00 PM

**Pitting Corrosion at Atomic Scale Revealed by an Elegant Monte Carlo Scheme:** *Zhiliang Pan*<sup>1</sup>; Baojun Huang<sup>1</sup>; <sup>1</sup>Guilin University of Electronic Technology

3:20 PM

**The Role of Coupled Thermodynamic-kinetic Processes on the Environmental Degradation of Materials in Advanced Nuclear Reactors:** *Marie Romedenne*<sup>1</sup>; Rishi Pillai<sup>1</sup>; Dino Sulejmanovic<sup>1</sup>; Ian Greenquist<sup>1</sup>; Bruce Pint<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

3:40 PM Break

4:00 PM Invited

**Environmental Induced Defects on the Microstructure of Nuclear Graphite:** *Jose Arregui-Mena*<sup>1</sup>; Jisue Moon<sup>1</sup>; Cristian Contescu<sup>1</sup>; Lianshan Lin<sup>1</sup>; Nidia Gallego<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**4:30 PM**

**A Meshless Peridynamics Framework for Environmentally-induced Corrosion Cracking and Fracture:** *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

**4:50 PM**

**Dual Irradiation-corrosion of Reduced Activation Ferritic Martensitic Steels for Fusion Applications:** *Liam Hughes*<sup>1</sup>; Yu-Lung Chiu<sup>1</sup>; Martin Freer<sup>1</sup>; Joven Lim<sup>2</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>United Kingdom Atomic Energy Authority

**5:10 PM Question and Answer Period** This question and answer period provides additional time for the audience to engage with presenters from this session.

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## NUCLEAR MATERIALS

### Materials Informatics to Accelerate Nuclear Materials Investigation – Machine Learning Enhanced Prediction of Materials Behavior

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

**Program Organizers:** Miaomiao Jin, Pennsylvania State University; Yongfeng Zhang, University of Wisconsin; Tiankai Yao, Idaho National Laboratory; Anjana Talapatra, Los Alamos National Laboratory; Luca Messina, CEA Cadarache; Fei Xu, Idaho National Laboratory; Benjamin Afflerbach, University of Wisconsin-Madison

**Monday PM | March 4, 2024**  
**Rainbow Spring II | Hyatt**

**Session Chairs:** Miaomiao Jin, Pennsylvania State University; Yongfeng Zhang, University of Wisconsin

**2:00 PM**

**ICME and ML Modeling Framework to Inform U-10%wtMo Fuel Fabrication Processes:** *Ayoub Soulami*<sup>1</sup>; William Frazier<sup>1</sup>; Lei Li<sup>1</sup>; Yucheng Fu<sup>1</sup>; Kyoo Sil Choi<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**2:20 PM Invited**

**Machine Learning for Predicting Reactor Pressure Vessel Embrittlement:** *Dane Morgan*<sup>1</sup>; Ryan Jacobs<sup>1</sup>; G. Robert Odette<sup>2</sup>; Takuya Yamamoto<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of California, Santa Barbara

**2:50 PM Invited**

**Putting Artificial Intelligence into Action to Quantify Radiation Effects in Materials:** *Steven Spurgeon*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:20 PM**

**Optimizing Thermal Conductivity Prediction of Uranium Compounds using Balanced Multiclass Classification:** *Yifan Sun*<sup>1</sup>; Masaya Kumagai<sup>1</sup>; Yuji Ohishi<sup>2</sup>; Eriko Sato<sup>1</sup>; Masako Aoki<sup>1</sup>; Ken Kurosaki<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Osaka University

**3:40 PM Break**

**3:55 PM Invited**

**Materials Genomics Search for Helium-absorbing Nano-phases in Fusion Structural Materials:** *Ju Li*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology



**4:25 PM Invited**

**Emergent Molecular Structure and Dynamics of Tetrahedral Liquids Revealed by Neural Network Forcefield Simulations and Neutron Spin Echo Experiments:** *Yang Zhang*<sup>1</sup>; <sup>1</sup>University of Michigan

**4:55 PM**

**Scaling Ductility from Microscale to Bulk by Coupling Crystal Plasticity Simulations with 3D Convolutional Neural Networks:** *Laura Vietz*<sup>1</sup>; Carter Cocke<sup>1</sup>; Eduardo Trevino<sup>2</sup>; Ashley Spear<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Idaho National Lab

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## MATERIALS SYNTHESIS AND PROCESSING

**Materials Processing and Kinetic Phenomena: From Thin Films and Micro/Nano Systems to Advanced Manufacturing — Honoring Carl Thompson: Academic Colleagues II**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

**Monday PM | March 4, 2024**  
**Celebration 11 | Hyatt**

**Session Chair:** To Be Announced

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**2:00 PM Invited**

**Thin Film Research to Market Application: A Story of Fundamental Innovation:** *Eugene Fitzgerald*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:30 PM Invited**

**Microstructure by Design: Thin Film Grain Growth Experiments, Simulations, Data Analytics:** *Katayun Barmak*<sup>1</sup>; <sup>1</sup>Columbia University

**3:00 PM Invited**

**Electrical Resistivity in Nanoscale Metals: Role of Surfaces and Grain Boundaries:** *Kevin Coffey*<sup>1</sup>; <sup>1</sup>University of Central Florida

**3:30 PM Break**

**3:50 PM Invited**

**Design of Alloys with Solid-state Phase Evolutions that Accelerate Sintering and 3D Printing:** *Christopher Schuh*<sup>1</sup>; Yannick Naunheim<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:20 PM Invited**

**A Multitude of Fast Material Transport Paths in Solid State Dewetting of Thin Films:** *Eugen Rabkin*<sup>1</sup>; <sup>1</sup>Technion

**4:50 PM Invited**

**A Journey into Thin Metal Films - From Texture to Dewetting from Ultrathin Films to Nanophotonics:** *Ralph Spolenak*<sup>1</sup>; <sup>1</sup>ETH Zurich

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Iron and Steel Production — Thermodynamics and Slag Behavior

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

**Program Organizers:** Samuel Wagstaff, Oculatus Consulting; Alexandra Anderson, Gopher Resource; Chukwunwike Iloeje, Argonne National Laboratory; Adrian Sabau, Oak Ridge National Laboratory

**Monday PM | March 4, 2024**  
**Celebration 8 | Hyatt**

**Session Chairs:** Adrian Sabau, Oak Ridge National Laboratory; Alexandra Anderson, Gopher Resource

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**2:00 PM** Introductory Comments

**2:05 PM**

**Thermodynamic Properties of Sulfur in the CaO-Al<sub>2</sub>O<sub>3</sub>-La<sub>2</sub>O<sub>3</sub>-Ce<sub>2</sub>O<sub>3</sub> System:** Ryohei Takada<sup>1</sup>; Kazuki Morita<sup>1</sup>; <sup>1</sup>The University of Tokyo

**2:25 PM**

**Influence of a Rising Bubble on the Behavior of the Slag-steel Interface:** Yong Liu<sup>1</sup>; Shusen Cheng<sup>1</sup>; Wenxuan Xu<sup>2</sup>; <sup>1</sup>The University of Science and Technology Beijing; <sup>2</sup>Research Institute of Technology of Shougang Group Co., Ltd.

**2:45 PM**

**Influence of TiO<sub>2</sub> and V<sub>2</sub>O<sub>3</sub> on the Viscosity and Flow Behaviour of Iron Making Slag:** Arnab Majumdar<sup>1</sup>; <sup>1</sup>Giesserei Institut der RWTH Aachen

**3:05 PM**

**Thermodynamic Properties of Zn-Al-Mg-, Mg-Al- and Al-Si-based Eutectic Alloys for Latent Heat Storage:** Kei Shimaoka<sup>1</sup>; Yusuke Kageyama<sup>1</sup>; Kazuki Morita<sup>1</sup>; <sup>1</sup>University of Tokyo

**3:25 PM** Break

**3:40 PM**

**Effect of Heating Rate on the Production of Iron Nugget from Off-grade Iron Ore Fines:** Banty Kumar<sup>1</sup>; Gour Gopal Roy<sup>1</sup>; <sup>1</sup>IIT Kharagpur

**4:00 PM**

**Study on the Key Technology of Preparing Vanadium Base Alloy for Nuclear Power:** Heli Wan<sup>1</sup>; Li Wang<sup>2</sup>; <sup>1</sup>National Engineering Laboratory for Vacuum Metallurgy; <sup>2</sup>Hebei Normal University for Nationalities

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## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Materials for Global Development - Health**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Monday PM | March 4, 2024**  
**Celebration 14 | Hyatt**

**Session Chairs:** John Obayemi, Worcester Polytechnic Institute; Theresa Ezenwafor, Worcester Polytechnic Institute

### 2:00 PM Keynote

**Using Electrons, Ions, X-rays, Atomic Force, and More for Materials Characterization: An Expeditious Update on Their Development and Application:** *Nan Yao*<sup>1</sup>; <sup>1</sup>Princeton University

### 2:30 PM Invited

**Engineering Functional Bone Constructs for Repairing Non-union Bone Defects:** *Ali Salifu*<sup>1</sup>; John Obayemi<sup>2</sup>; Vanessa Uzonwanne<sup>1</sup>; Precious Etinosa<sup>2</sup>; Chukwudalu Nwazojie<sup>3</sup>; Joshua Gershlak<sup>4</sup>; Glenn Gaudette<sup>1</sup>; Wole Soboyejo<sup>2</sup>; <sup>1</sup>Boston College; <sup>2</sup>Worcester Polytechnic Institute; <sup>3</sup>African University of Science and Technology; <sup>4</sup>Massachusetts General Hospital

### 2:55 PM

**Effects of RGD Functionalization and Host Immune Response on the Quality of Tissue-engineered Bone for Dental Applications:** *Precious Etinosa*<sup>1</sup>; Ali Salifu<sup>2</sup>; Sarah Osafo<sup>1</sup>; John Obayemi<sup>1</sup>; Vanessa Uzonwanne<sup>2</sup>; Winston Soboyejo<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Boston College

### 3:15 PM

**Hydroxyapatite Coating of Biomaterials Surfaces: Pack Cementation of Robust Layers for Cell/Surface Integration:** *Sarah Osafo*<sup>1</sup>; Tabiri Asumadu<sup>1</sup>; Precious Etinosa<sup>1</sup>; John Obayemi<sup>1</sup>; Benjamin Tuffour<sup>1</sup>; David Arhin<sup>1</sup>; Abu Yaya<sup>1</sup>; Winston Soboyejo<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

### 3:35 PM Break

### 3:55 PM Invited

**A Portable Microcontroller Based Aptasensor for In-vitro Amodiaquine Sensing:** *Pranav Shrotriya*<sup>1</sup>; Nianyu Jiang<sup>1</sup>; <sup>1</sup>Iowa State University

### 4:20 PM

**Reactive Hierarchical Surface Restructuring: A Novel Technology for Manufacturing Low-cost, Sustainable, and High-performing Neural Interfacing Electrodes:** *Shahram Amin*<sup>1</sup>; <sup>1</sup>Pulse Technologies Inc.

### 4:40 PM

**Magnetite Nanoparticle Reinforced Poly-Di-Methyl-Siloxane (PDMS-MNP) Nanocomposites for Localized Breast Cancer Treatment:** *Maria Chinyerem Onyekanne*<sup>1</sup>; Ali Salifu<sup>2</sup>; Nima Rahbar<sup>3</sup>; John David Obayemi<sup>3</sup>; Olushola Odusanya<sup>4</sup>; Ange Nzihou<sup>5</sup>; Winston Soboyejo<sup>3</sup>; <sup>1</sup>African University of Science and Technology Abuja, Nigeria; <sup>2</sup>Boston College; <sup>3</sup>Worcester Polytechnic Institute; <sup>4</sup>National Centre for Technology Management (NACETEM); <sup>5</sup>IMT Mines Albi (France)

## MECHANICS OF MATERIALS

**Mechanical Behavior at the Nanoscale VII — Atomistic Simulations**

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Monday PM | March 4, 2024**  
**Manatee Spring I | Hyatt**

**Session Chairs:** Niaz Abdolrahim, University of Rochester; Wei Gao, Texas A&M University

**2:00 PM Invited**

**Isolated Dislocation Core Energy from First Principles Energy Density Method:** Dallas Trinkle<sup>1</sup>; Yang Dan<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**2:30 PM**

**Phase-transformation Assisted Twinning in Molybdenum Nanomaterials:** Linh Vu<sup>1</sup>; zheming Guo<sup>1</sup>; Ali Shargh<sup>1</sup>; Aditya Dey<sup>1</sup>; Niaz Abdolrahim<sup>1</sup>; Hesam Askari<sup>1</sup>; <sup>1</sup>University of Rochester

**2:50 PM**

**Atomistic-to-Microscale Analysis of Plastic Flow in Polycrystalline Alloys:** Thanh Phan<sup>1</sup>; Liming Xiong<sup>1</sup>; Yipeng Peng<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:10 PM**

**Ability of Molecular Dynamics to Take into Account the Tension/Compression Asymmetry in the Ni<sub>3</sub>Al/Ni Systems Observed in Nickel Base Superalloys:** Alla Ndiaye Dieng<sup>1</sup>; Celine Gerard<sup>1</sup>; Jonathan Cormier<sup>1</sup>; Jean-Claude Grandidier<sup>1</sup>; <sup>1</sup>Pprime Institute - Cnrs - Ensma

**3:30 PM Break**

**3:50 PM**

**Atomistic Modeling of Anti-twinning in BCC Nanocrystals:** Zifeng Wang<sup>1</sup>; Yin Zhang<sup>2</sup>; Ting Zhu<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Peking University

**4:10 PM**

**Tension-compression Asymmetric Behavior of Screw Dislocation in Body-centered-cubic Metal Nanopillars:** Alexander Horvath<sup>1</sup>; Zhongyuan Li<sup>1</sup>; Gyuho Song<sup>1</sup>; Seok-Woo Lee<sup>1</sup>; <sup>1</sup>University of Connecticut

**4:30 PM**

**Interaction of < a > Prismatic Screw Dislocations with the  $\alpha$ - $\beta$  Interface Side Face in  $\alpha$ - $\beta$  Ti Alloys:** Ali Rida<sup>1</sup>; Satish Rao<sup>1</sup>; Jaafar El-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**4:50 PM Invited**

**Symmetry Breaking Induced Intrinsic Deformation Asymmetry in Ordered Intermetallic Alloys:** Jun Song<sup>1</sup>; Cheng Chen<sup>2</sup>; <sup>1</sup>McGill University; <sup>2</sup>Northwestern Polytechnical University

## BIOMATERIALS

**Mechanics and Physiological Adaptation of Hard and Soft Biomaterials and Biological Tissues — Bone & Adaptation in Mineralized Tissue**

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

**Program Organizers:** Bernd Gludovatz, UNSW Sydney; Elizabeth Zimmermann, McGill University; Steven Naleway, University of Utah

**Monday PM | March 4, 2024**  
**Celebration 13 | Hyatt**

**Session Chair:** Elizabeth Zimmermann, McGill University

**2:00 PM Invited**

**The Paradox of Fragile but Dense Bones in Type 2 Diabetes:** *Eve Donnelly*<sup>1</sup>; <sup>1</sup>Cornell University

**2:25 PM Invited**

**Mechanisms of Bone Fracture Resistance during Skeletal Growth:** *Alessandra Carriero*<sup>1</sup>; <sup>1</sup>The City College of New York

**2:50 PM Invited**

**Understanding the Dynamic Structural Adaptations of Mineralized Tissues:** *Ottman Tertuliano*<sup>1</sup>; <sup>1</sup>University of Pennsylvania

**3:15 PM**

**Impact of Test Environment on the Fracture Resistance and Critical Damage Strain of Cortical Bone:** *Bernd Gludovatz*<sup>1</sup>; Mihee Shin<sup>1</sup>; Penny Martens<sup>1</sup>; Jamie Kruzic<sup>1</sup>; Björn Busse<sup>2</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>University Medical Center Hamburg-Eppendorf

**3:35 PM Break**

**4:00 PM Invited**

**Micropetrosis: Occlusion of Osteocyte Lacunae as a Marker of Impaired Bone Quality:** *Bjorn Busse*<sup>1</sup>; <sup>1</sup>University Medical Center Hamburg

**4:25 PM Invited**

**Spatial Adaptation of Bone Lacuno-canalicular Network to High Mineral Demand in Lactation:** *Claire Acevedo*<sup>1</sup>; <sup>1</sup>University of Utah

**4:50 PM**

**Versatile and Tailored Bone Scaffolds from Freeze Casting:** *Steven Naleway*<sup>1</sup>; Tony Yin<sup>1</sup>; Josh Fernquist<sup>1</sup>; Maddie Schmitz<sup>1</sup>; <sup>1</sup>University of Utah

## LIGHT METALS

### Melt Processing, Casting and Recycling – Heating, Melting and Batching

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

**Program Organizers:** Anne Kvithyld, SINTEF; Tao Wang, Rio Tinto; Samuel Wagstaff, Oculatus Consulting

**Monday PM | March 4, 2024**  
**Windermere Y-1 | Hyatt**

**Session Chair:** Georges Salloum-Abou-Jaoude, Constellium C-Tec

**2:00 PM**

**Reverberatory Furnaces Decarbonization – The Case of Hydrogen Combustion: Proof of Concept and First Experimental Results on Borel Furnace:** *Louis Piquard*<sup>1</sup>; Alain Vassel<sup>1</sup>; Emilien Clement<sup>1</sup>; Tomas Ekman<sup>2</sup>; <sup>1</sup>Constellium Technology Center;

<sup>2</sup>Linde Gas

**2:25 PM**

**Decarbonization of Aluminum Reverberatory Furnaces: The Case of Plasma Melting:** *Juan Salazar*<sup>1</sup>; *Louis Piquard*<sup>2</sup>; *Simon Vecten*<sup>1</sup>; *Emilien Clement*<sup>2</sup>;

<sup>1</sup>PyroGenesis Canada Inc.; <sup>2</sup>Constellium Technology Center

**2:50 PM**

**Influence of Water Vapor on the Oxidation Behavior of Molten Aluminum Magnesium Alloys:** *Stefan Tichy*<sup>1</sup>; *Simon Dopfermann*<sup>2</sup>; *Philip Pucher*<sup>2</sup>; *Bernd Prillhofer*<sup>2</sup>; *Stefan Wibner*<sup>1</sup>; *Helmut Antrekowitsch*<sup>1</sup>; <sup>1</sup>University of Leoben; <sup>2</sup>AMAG Casting GmbH

**3:15 PM**

**Dissolution Rates of Various Manganese Alloying Elements in Aluminium:** *Anne Kvithyld*<sup>1</sup>; *Sarina Bao*<sup>1</sup>; *Martin Syvertsen*<sup>1</sup>; *Arne Petter Ratvik*<sup>1</sup>; *Kjerstin Ellingsen*<sup>1</sup>; *Kristján Leósson*<sup>2</sup>; <sup>1</sup>SINTEF; <sup>2</sup>DTE

**3:40 PM Break**

**3:55 PM**

**Results Achieved with the Application of Optifine High Efficiency Grain Refiner in the Production of AA5182 Can Lid Stock:** *John Courtenay*<sup>1</sup>; *Lei Shi*<sup>2</sup>; *Junjun Xia*<sup>2</sup>; *Weitao Zhao*<sup>3</sup>; <sup>1</sup>MQP International Ltd; <sup>2</sup>Zhongfu Aluminium; <sup>3</sup>Sitong New Metal Material Co Ltd

**4:20 PM**

**Efficient Molten Metal Transfer in the Cast House: Introducing a New Thermal Insulation Solution:** *Alireza Hekmat*<sup>1</sup>; *Alain Simard*<sup>1</sup>; *Bo Jin*<sup>1</sup>; *Michael Mastor*<sup>1</sup>; <sup>1</sup>Pyrotek

**4:45 PM**

**An Estimation of Scrap Melting Rates by an Inverted Chvorinov Method:** *Samuel Wagstaff*<sup>1</sup>; *Robert Wagstaff*<sup>1</sup>; *Alexandros Anestis*<sup>2</sup>; <sup>1</sup>Oculatus Consulting; <sup>2</sup>Elval

**5:10 PM**

**Recovery Considerations in the Pyrometallurgical Recycling of Used Beverage Cans:** *Theofani Tzevelekou*<sup>1</sup>; *Malamatena Koklioti*<sup>1</sup>; *Athanasia Flampouri*<sup>1</sup>; *Nikolaos Chamakos*<sup>1</sup>; *Ioannis Contopoulos*<sup>1</sup>; *Alexandros Anestis*<sup>2</sup>; *Grigorios Galeros*<sup>2</sup>; *Epameinondas Xenos*<sup>2</sup>; *Andreas Mavroudis*<sup>2</sup>; <sup>1</sup>ELKEME SA; <sup>2</sup>ElvalHalcor SA

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## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing — Metals and Alloys

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

**Program Organizers:** *Wendy Gu*, Stanford University; *Mostafa Hassani*, Cornell University; *Christian Leinenbach*, Empa, Swiss Federal Laboratories for Materials Science and Technology; *Christoph Eberl*, Fraunhofer IWM

**Monday PM | March 4, 2024**

**Gulf | Hyatt**

**Session Chairs:** *Alain Reiser*, KTH Royal Institute of Technology; *Chris Eberl*, KIT and Fraunhofer IWM

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**2:00 PM Invited****Novel Approaches for Material and Alloy Design for Metal Additive Manufacturing:**

Nesma Aboulkhair<sup>1</sup>; *Giuseppe Del Guercio*<sup>1</sup>; Peifeng Li<sup>2</sup>; Federico Bosio<sup>1</sup>; <sup>1</sup>Technology Innovation Institute; <sup>2</sup>University of Nottingham

**2:30 PM****Microscale 3D Deposition of Metals by Solid-state Kinetic Bonding:** *Alain Reiser*<sup>1</sup>;

Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:50 PM**

**Chemical Focusing of Electrochemical Additive Manufacturing: From Micro and Towards Nanoscale:** *Karuna Aurel Kanés*<sup>1</sup>; <sup>1</sup>Carl von Ossietzky Universität Oldenburg/ Fakultät V - Institut für Chemie

**3:10 PM****Aerosol Jet 3D Printed Multi-layered Stretchable Decals for Biomonitoring Applications:**

Jacob Brenneman<sup>1</sup>; Derya Tansel<sup>1</sup>; Gary Fedder<sup>1</sup>; *Rahul Panat*<sup>1</sup>;

<sup>1</sup>Carnegie Mellon University

**3:30 PM Break****3:50 PM Invited****Reducing the Scale in Wire and Arc Additive Manufacturing:** *Joao Oliveira*<sup>1</sup>;

<sup>1</sup>Faculdade Ciencias Tecnologias

**4:20 PM**

**Direct Out-of-plane Writing of Metals on Insulators by Electron-beam-enabled Electrodeposition with Submicrometer Feature Size:** *Mirco Nydegger*<sup>1</sup>; Ralph Spolenak<sup>1</sup>; Alain Reiser<sup>2</sup>; <sup>1</sup>ETH Zürich; <sup>2</sup>MIT

**4:40 PM**

**Gold Micropillars by Aerosol Jet 3D Nanoprinting Method and Their Behavior Under Compressive Loads:** *Sanjida Jahan*<sup>1</sup>; Chunshan Hu<sup>1</sup>; Bin Yuan<sup>1</sup>; Sandra Ritchie<sup>1</sup>; *Rahul Panat*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**5:00 PM**

**Rapid and High-resolution 3D Printing of Solid or Porous Copper Parts with Tunable Nano-porosity Enabled by CLIP and Nanoporous Copper Powders:** *Natalya Kublik*<sup>1</sup>; Luyang Liu<sup>1</sup>; Xiangfan Chen<sup>1</sup>; Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University

**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN****Nanostructured Materials in Extreme Environments II — Irradiation Coupled Environments**

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Monday PM | March 4, 2024**  
**Bayhill 19 | Hyatt**

**2:00 PM Invited**

**Nanostructured Materials with Complex Microstructures and Chemical Compositions in Extreme Environments:** *Horst Hahn*<sup>1</sup>; <sup>1</sup>University of Oklahoma

**2:25 PM Invited**

**Deformation Mechanisms and Radiation Resistance of Gradient Alloys:** Zhongxia Shang<sup>1</sup>; *Xinghang Zhang*<sup>1</sup>; Brad Boyce<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Sandia National Laboratory

**2:50 PM**

**Ultrafine-grained and Nanocrystalline Steels for Nuclear Applications:** *Haiming Wen*<sup>1</sup>; Joshua Rittenhouse<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

**3:10 PM**

**Effect of Neutron Irradiation on Microstructure and Mechanical Properties of Nanocrystalline Nickel:** *Ramprashad Prabhakaran*<sup>1</sup>; Kayla Yano<sup>1</sup>; Dan Edwards<sup>1</sup>; Stuart Maloy<sup>1</sup>; Korukonda Murty<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>North Carolina State University

**3:30 PM Break**

**3:50 PM**

**Design of Vanadium Alloys for Fusion Applications:** *Daniel Ng*<sup>1</sup>; Malik Wagih<sup>1</sup>; Tianjiao Lei<sup>1</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:10 PM**

**Radiation Effects on Diffusion and Defect Evolution at the Ni/Cr Interface Using 4D-STEM and STEM-EDS:** *Dongye Liu*<sup>1</sup>; Sean Mills<sup>1</sup>; Benjamin Derby<sup>2</sup>; Matthew Chancey<sup>2</sup>; Yongqiang Wang<sup>2</sup>; Andrew Minor<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Los Alamos National Laboratory

**4:30 PM**

**Grain Growth of Nanograined Fe Oxides under Thermal Annealing and Ion Irradiation Using In-situ TEM:** *Dmitrii Kretov*<sup>1</sup>; Benjamin Derby<sup>2</sup>; Tiffany Kaspar<sup>3</sup>; Daniel Schreiber<sup>3</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory

**4:50 PM**

**Development and Characterisation of Fe-Al-X-based BCC Ferritic Superalloys for Nuclear and High-Temperature Environments:** *Sophia Von Tiedemann*<sup>1</sup>; Pedro Ferreirós<sup>2</sup>; Kan Ma<sup>1</sup>; Sandy Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Advanced Materials for Nuclear Energy, VTT Technical Research Centre of Finland

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIII — Advanced 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; Chao-hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; Yee-wen Yen, National Taiwan University of Science and Technology; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Ping-Chuan Wang, SUNY New Paltz; Yu-An Shen, Feng Chia University

**Monday PM | March 4, 2024**

**Bayhill 30 | Hyatt**

**Session Chairs:** Ping-Chuan Wang, SUNY New Paltz; Shih-kang Lin, National Cheng Kung University

**2:00 PM Keynote**

**Properties and Phase Transformations of Manganese Oxides for Environmentally Friendly Batteries:** *Kenneth Takeuchi*<sup>1</sup>; Amy Marschilok<sup>1</sup>; Esther Takeuchi<sup>1</sup>; <sup>1</sup>Stony Brook University

**2:30 PM Invited**

**Electrochemically Based and Coupled Approaches for Tracking Phase Transformations in Energy Storage Materials:** *Amy Marschilok*<sup>1</sup>; Esther Takeuchi<sup>1</sup>; Kenneth Takeuchi<sup>1</sup>; <sup>1</sup>Stony Brook University

**2:55 PM**

**Active Metal Brazing for Fabricating Cu/Si<sub>3</sub>N<sub>4</sub>/Cu Substrates with Ag-Cu-Ti Pastes:** *Shih-kang Lin*<sup>1</sup>; Chia-mei Chen<sup>1</sup>; Shih-yuan Cheng<sup>1</sup>; Chih-han Yang<sup>1</sup>; Klinsmenn Pan<sup>2</sup>; Megan Huang<sup>2</sup>; Vincent Hsu<sup>2</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>Tong Hsing Electronic Industries, LTD

**3:15 PM Break**

**3:35 PM**

**Bonding Strength of ENIG Joint Using Micro-sized Ag Particles with Submicron Ceramic Particles:** *Jianhao Wang*<sup>1</sup>; *Shogo Yodo*<sup>1</sup>; *Hiroaki Tatsumi*<sup>1</sup>; *Hiroshi Nishikawa*<sup>1</sup>; <sup>1</sup>Osaka University

**3:55 PM**

**The Effect of Nitrogen on Thermomechanical Behavior during the  $\beta$ -Phase Transformation in W Thin Films:** *Yue Zhao*<sup>1</sup>; *Hannah Morgan-Smith Myers*<sup>2</sup>; *Shefford Baker*<sup>1</sup>; <sup>1</sup>Cornell University; <sup>2</sup>New Mexico Institute of Mining and Technology

**4:15 PM**

**The Effect of Nitrogen on the Stability of the Phase in W Thin Films during Thermal Annealing:** *Yue Zhao*<sup>1</sup>; *Shefford Baker*<sup>1</sup>; <sup>1</sup>Cornell University

## MATERIALS SYNTHESIS AND PROCESSING

**Phase Transformations and Microstructural Evolution — Microstructure Engineering**

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Monday PM | March 4, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Tushar Borkar, Cleveland State University

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**2:00 PM Invited**

**Directional Recrystallization of Net-shaped Additively Manufactured Superalloys:**  
*Zachary Cordero*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:30 PM**

**Integration of PRISMS-PF with other PRISMS computational tools for modeling of recrystallization and twin morphology evolution:** *David Montiel*<sup>1</sup>; Supriyo Chakraborty<sup>1</sup>; Zachary Croft<sup>1</sup>; Michael Pilipchuk<sup>1</sup>; Mohammadreza Yaghoobi<sup>1</sup>; Brian Puchala<sup>1</sup>; Tracy Berman<sup>1</sup>; Anton Van der Ven<sup>2</sup>; Veera Sundararaghavan<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

**2:50 PM**

**Beyond Cooling Rates: Unraveling the Paradox of Finer Grains in Direct Energy Deposition Compared to Powder Bed Fusion:** *Kaushalendra Singh*<sup>1</sup>; Atieh Moridi<sup>1</sup>; <sup>1</sup>Cornell University

**3:10 PM**

**Nano-Crystalline Chrome-Alloy Phase Stability for Jet Engine Applications:** *Marissa Brennan*<sup>1</sup>; Steve Buresh<sup>1</sup>; Jason Leszczewicz<sup>1</sup>; Chris McLasky<sup>1</sup>; Michael Spencer<sup>2</sup>; Brian Gordon<sup>2</sup>; Peeyush Nandwana<sup>3</sup>; Bryan Lim<sup>3</sup>; <sup>1</sup>General Electric; <sup>2</sup>Touchstone Research Lab Ltd.; <sup>3</sup>Oak Ridge National Lab

**3:30 PM Break**

**3:50 PM Invited**

**Forming Bulk Al Metallic Glass Using Laser Powder Bed Fusion:** *Alice Perrin*<sup>1</sup>; Jon Poplawsky<sup>1</sup>; Kinga Unocic<sup>1</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Alex Plotkowski<sup>1</sup>; Ying Yang<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**4:20 PM**

**Characterization of Zircaloy-4 Processed via Solid Phase Processing:** *Mageshwari Komarasamy*<sup>1</sup>; Jens Darsell<sup>1</sup>; Nathan Canfield<sup>1</sup>; David Garcia<sup>1</sup>; Danny Edwards<sup>1</sup>; Anthony Guzman<sup>1</sup>; David Senior<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**4:40 PM**

**Evaluation of Threshold Stress Inducing Hydride Reorientation in Zirconium Cladding Using Multiphase Field Modeling:** *Wooseob Shin*<sup>1</sup>; *Kunok Chang*<sup>1</sup>; <sup>1</sup>Kyung Hee University

**5:00 PM**

**Linking Constituent Phase Redistribution with Porosity of EBR-II Irradiated U-Pu-Zr:** *Mitchell Mika*<sup>1</sup>; Assel Aitkaliyeva<sup>1</sup>; Luca Capriotti<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Idaho National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Powder Materials Processing and Fundamental Understanding — Field-Assisted and Advanced Sintering Technologies I

**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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

**Monday PM | March 4, 2024**  
**Celebration 9 | Hyatt**

**Session Chairs:** Jose Torralba, Universidad Carlos III Madrid-Imdea Materials Institute; Charles Maniere, Cnrs - Laboratoire Crismat

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**2:00 PM**

**Controlling and Designing Thermal Gradients during FAST Processing of Titanium Alloy /Composite:** *James Pepper*<sup>1</sup>; Sam Lister<sup>1</sup>; Lucia Scotti<sup>1</sup>; Martin Jackson<sup>1</sup>; <sup>1</sup>The University of Sheffield

**2:20 PM Invited**

**A Sustainable Approach to Developing High-Entropy Alloys Using Commodity Powders: A Proof of Concept Using SPS, PBF-LB/M, and MIM:** *Jose Torralba*<sup>1</sup>; S. Venkatesh Kumaran<sup>1</sup>; Dariusz Garbicz<sup>2</sup>; Bala Malladi<sup>3</sup>; Eduard Hryha<sup>3</sup>; Alberto Meza<sup>4</sup>; <sup>1</sup>Universidad Carlos III Madrid-Imdea Materials Institute; <sup>2</sup>Sie Badawcza ukasiewicz - Poznanski Instytut Technologiczny; <sup>3</sup>Chalmers University of Technology; <sup>4</sup>IMDEA Materials Institute

**2:50 PM**

**Residual Stress Mapping Using Neutrons of Large-Scale Samples (12-inch Diameter) Created by Electric Field Assisted Sintering:** *Jorgen Rufner*<sup>1</sup>; Tiankai Yao<sup>1</sup>; Arin Preston<sup>1</sup>; Charles Aicher<sup>1</sup>; Robert Byrnes<sup>1</sup>; Chuting Tsai<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**3:10 PM**

**High Entropy Nitrides: Spark Plasma Sintering of Mechanically Alloyed Nitrides to Investigate the Mechanical, Tribological, and Oxidation Properties:** *Ganesh Walunj*<sup>1</sup>; Tushar Borkar<sup>2</sup>; Manoj Mugale<sup>2</sup>; <sup>1</sup>Buffalo State University; <sup>2</sup>Cleveland State University

**3:30 PM Break**

**3:50 PM Invited**

**Spark Plasma Sintering Coupled with Stereolithography for the Production of Titanium Complex Shapes:** *Charles Maniere*<sup>1</sup>; Claude Estournes<sup>2</sup>; Sylvain Marinel<sup>1</sup>; Joseph Le Cloarec<sup>1</sup>; <sup>1</sup>Cnrs - Laboratoire Crismat; <sup>2</sup>CIRIMAT

**4:20 PM**

**Spark Plasma Sintering of Carbides:** Eugene Olevsky<sup>1</sup>; *Elisa Torresani*<sup>1</sup>; Thomas Grippi<sup>1</sup>; Chris Haines<sup>2</sup>; Darold Martins<sup>3</sup>; <sup>1</sup>San Diego State University; <sup>2</sup>DEVCOM Army Research Laboratory; <sup>3</sup>DEVCOM Army Armaments Center

**4:40 PM**

**The Influence of TiB<sub>2</sub> Particles on the As-built and Heat Treated Microstructure of IN718 Processed by Direct Energy Deposition:** *I-Ting Ho*<sup>1</sup>; Dhruv Tiparti<sup>2</sup>; Tilo Buerger<sup>3</sup>; Fred Carter<sup>3</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>The University of Arizona; <sup>2</sup>Illinois Institute of

Technology; <sup>3</sup>DMG Mori Advanced Solutions

**5:00 PM**

**Microstructures and Mechanical Properties of B<sub>4</sub>C/Al Composites Fabricated by Hot Pressing and Spark Plasma Sintering:** *Taek Gyu Kwon*<sup>1</sup>; *Yi Je Cho*<sup>1</sup>; <sup>1</sup>National Suncheon University

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## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Processing of Rare Earth Elements, Vanadium and Lithium

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

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

**Monday PM | March 4, 2024**

**Celebration 3 | Hyatt**

**Session Chairs:** Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan; Neale Neelameggham, IND LLC

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**2:00 PM**

**Recovery of High Purity Vanadium Salts from Bayer Liquor:** *Cledwyn Mangunda*<sup>1</sup>; *Michael Svärd*<sup>1</sup>; *Kerstin Forsberg*<sup>1</sup>; <sup>1</sup>KTH - Royal Institute of Technology

**2:20 PM Invited**

**Molecular Mechanisms in Specific Separation of Late Transition Metals from Rare Earth Elements:** *Gulaim Seisenbaeva*<sup>1</sup>; <sup>1</sup>Swedish University of Agricultural Sciences

**2:40 PM**

**Investigation of the Solvometallurgical Leaching Performance of Light Rare Earth Elements in Beylikova, Eskisehir Ores:** *Cisem Celik Kurtulan*<sup>1</sup>; *Sevki Kaplan*<sup>2</sup>; *Gülâh Türker*<sup>1</sup>; *Belma Soyda Sözer*<sup>1</sup>; *Sebahattin Gurmen*<sup>2</sup>; *Gokhan Orhan*<sup>3</sup>; *Seref Sonmez*<sup>2</sup>; <sup>1</sup>Rare Earth Elements Research Institute (TENMAK-NATEN); <sup>2</sup>Istanbul Technical University; <sup>3</sup>Istanbul University - Cerrahpasa

**3:00 PM**

**Direct Recycling of Lithium-ion Batteries Using Hydrothermal Relithiation:** *Gisele Azimi*<sup>1</sup>; *Ka Ho Chan*<sup>1</sup>; <sup>1</sup>University of Toronto

**3:20 PM**

**Leaching of Critical Metals from Spent Lithium-ion Battery Using Acidic Organophosphorus Extractant:** *Kurniawan Kurniawan*<sup>1</sup>; *Sookyung Kim*<sup>2</sup>; *Hyunju Lee*<sup>2</sup>; *Mooki Bae*<sup>2</sup>; *Hongin Kim*<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)

**3:40 PM Break**

**4:00 PM**

**Mechanochemical Extraction of Lithium from  $\alpha$ -Spodumene at Low Temperatures:** *Tyler Del Rose*<sup>1</sup>; *Yuting Li*<sup>1</sup>; *Long Qi*<sup>1</sup>; *Ihor Hlova*<sup>1</sup>; <sup>1</sup>Ames National Laboratory

4:20 PM

**Synthetic Alkali Aluminosilicate-hydroxide Systems as an Analog To Optimize Lithium Recovery from LCT Pegmatites:** *Nail Zagrtednov*<sup>1</sup>; Yves Thibault<sup>1</sup>; Joanne Gamage McEvoy<sup>1</sup>; Dominique Duguay<sup>1</sup>; <sup>1</sup>CanmetMINING

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## ADVANCED CHARACTERIZATION METHODS

### Recent Advances in Electron Back-Scattered Diffraction and Related Techniques — Data Acquisition and Analysis

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

**Program Organizers:** Stuart Wright, EDAX; Marc De Graef, Carnegie Mellon University; David Rowenhorst, Naval Research Laboratory; Katharina Marquardt, University of Oxford

**Monday PM | March 4, 2024**

**Blue Spring I | Hyatt**

**Session Chair:** David Rowenhorst, Naval Research Laboratory

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2:00 PM Invited

**Exploring New Capabilities in Electron Backscattered Diffraction Using Direct Electron Detectors:** *Daniel Gianola*<sup>1</sup>; <sup>1</sup>University of California-Santa Barbara

2:25 PM Invited

**A Multi-generational Study of Detectors for Use in Cross-correlation-based EBSD: From Scintillators to Direct Detection:** *Josh Kacher*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

2:50 PM

**Extraction of Defect Images by Post-processing of EBSD Patterns:** *Marc De Graef*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

3:10 PM

**Application of a Differential Evolution Optimization Algorithm on Deformation Extraction from EBSD Patterns:** *Crestienne DeChaine*<sup>1</sup>; Ann Choi<sup>2</sup>; Katharina Marquardt<sup>3</sup>; Marc De Graef<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Kansas City National Security Campus managed by Honeywell FM&T; <sup>3</sup>Imperial College

3:30 PM

**Cross-sectional Electron Channeling Contrast Imaging:** *Julia Deitz*<sup>1</sup>; Timothy Ruggles<sup>1</sup>; Andrew Polonsky<sup>1</sup>; Luis Jauregui<sup>1</sup>; Douglas Trotter<sup>1</sup>; <sup>1</sup>Sandia National Laboratory

3:50 PM Break

4:05 PM Invited

**Applications of 3D EBSD for Understanding Complex Microstructures:** *Andrew Polonsky*<sup>1</sup>; Julia Deitz<sup>1</sup>; Hojun Lim<sup>1</sup>; Michael Melia<sup>1</sup>; Kyle Johnson<sup>1</sup>; Peter Renner<sup>1</sup>; KasandraHerrera<sup>1</sup>; LuisJauregui<sup>1</sup>; DamionCummings<sup>1</sup>; <sup>1</sup>SandiaNationalLaboratories

4:30 PM

**Toward Correlative Grain Boundary Analysis in CIGS:** *Marzieh Baan*<sup>1</sup>; Tyler Grassman<sup>2</sup>; <sup>1</sup>CEMAS; <sup>2</sup>The Ohio State University

4:50 PM

**Microstructural Evolution Revealed by EBSD in Aluminum Alloys After Severe Plastic Deformation:** *Ning Zhu*<sup>1</sup>; Paul Allison<sup>1</sup>; Brian Jordon<sup>1</sup>; <sup>1</sup>Baylor University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2024 — Tungsten- and Molybdenum-based Alloys

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

**Program Organizers:** Christopher Thom, Rhenium Alloys, Inc.; Wolfgang Pantleon, Technical University of Denmark; Michael Kirka, Oak Ridge National Laboratory; Gaoyuan Ouyang, Ames Laboratory; Marie Charpagne, University of Illinois; Eric Taleff, University of Texas at Austin; Thomas Bieler, Michigan State University; John Perepezko, University of Wisconsin-Madison

**Monday PM | March 4, 2024**  
**Bayhill 18 | Hyatt**

**Session Chair:** Marie Charpagne, University of Illinois Urbana-Champaign

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**2:00 PM**

**Thermal Stability of Rolled Tungsten Plates at Temperatures between 1100 °C and 1400 °C:** *Wolfgang Pantleon*<sup>1</sup>; <sup>1</sup>Technical University of Denmark

**2:20 PM**

**Utilizing Grain Boundary Segregation Engineering for Nanostructured Tungsten Thin Films:** *Julius Keckes*<sup>1</sup>; Markus Alfreider<sup>1</sup>; Michael Wurmshuber<sup>1</sup>; Anna Hirle<sup>2</sup>; Stefan Wurster<sup>3</sup>; Helmut Riedl<sup>2</sup>; Daniel Kiener<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben; <sup>2</sup>Institute of Materials Science and Technology, TU Wien; <sup>3</sup>Erich-Schmid Institute of Materials Science, Austrian Academy of Sciences

**2:40 PM**

**Recrystallization, Tensile Ductility, and Flow Stress of TZM and Mo-La Alloys at 1500 and 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>H.C. Starck Solutions

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## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Molten Salts for Nuclear Applications

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Monday PM | March 4, 2024**  
**Regency P | Hyatt**

**Session Chair:** Toni Karlsson, Idaho National Laboratory

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**2:00 PM**

**Advances in Actinide Fuel Salts through the U.S. Molten Salt Reactor Program:** *Patricia Paviet*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**2:25 PM**

**Irradiation of Enriched Uranium Bearing Chloride Salt:** *Abdalla Abou-Jaoude*<sup>1</sup>;  
<sup>1</sup>Idaho National Laboratory

**2:50 PM**

**Exploring the Impact of Molten-salt Reactor Contaminants on Actinide Speciation:**  
*Ashini Jayasinghe*<sup>1</sup>; Julie Bowen<sup>1</sup>; Aaron Wilson<sup>1</sup>; Ruchi Gakhar<sup>1</sup>; <sup>1</sup>Idaho National  
Laboratory

**3:15 PM Break**

**3:35 PM**

**Molten Salt and Cerium Driven Corrosion and Embrittlement of Refractory Metals:**  
*Elise Shauf*<sup>1</sup>; Stephan Raiman<sup>1</sup>; <sup>1</sup>University of Michigan

**4:00 PM**

**Exploring the Behavior of Hydrogen Defects in -Pu through Density Functional  
Theory:** *Charles Fricke*<sup>1</sup>; Sarah Hernandez<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:25 PM**

**An Industrial Perspective on Actinide Research for Molten Salt Reactors:** *James  
Amphlett*<sup>1</sup>; Laura Voigt<sup>1</sup>; <sup>1</sup>Seaborg Technologies

**4:50 PM**

**Mixing Enthalpy of Molten Salt Studied by Molecular Model and Calorimetry:**  
*Xiaofeng Guo*<sup>1</sup>; Vitaliy Goncharov<sup>1</sup>; William Smith<sup>1</sup>; Bryn Merrill<sup>1</sup>; Kenita Dahal<sup>1</sup>;  
Jeffrey Eakin<sup>1</sup>; Luke Gibson<sup>2</sup>; Hongwu Xu<sup>3</sup>; Jason Lonergan<sup>4</sup>; Wei Xiong<sup>5</sup>; Zi-kui  
Liu<sup>6</sup>; Vyacheslav Bryantsev<sup>2</sup>; Aurora Clark<sup>7</sup>; <sup>1</sup>Washington State University; <sup>2</sup>Oak  
Ridge National Laboratory; <sup>3</sup>Arizona State University; <sup>4</sup>Pacific Northwest National  
Laboratory; <sup>5</sup>University of Pittsburgh; <sup>6</sup>The Pennsylvania State University; <sup>7</sup>The  
University of Utah

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Simulations/Experiments Integration for Next Generation Hypersonic Materials — Session II

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

**Program Organizers:** Thomas Voisin, Lawrence Livermore National Laboratory;  
Jibril Shittu, Lawrence Livermore National Laboratory; Aurelien Perron,  
Lawrence Livermore National Laboratory; Joseph McKeown, Lawrence  
Livermore National Laboratory; Raymundo Arroyave, Texas A&M University

**Monday PM | March 4, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chairs:** Thomas Voisin, Lawrence Livermore National Laboratory; Jibril  
Shittu, Lawrence Livermore National Laboratory; Aurelien Perron, Lawrence  
Livermore National Laboratory

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**2:00 PM Invited**

**Microstructure and Property Evaluation of Refractory-based High Entropy Alloys:**  
*Kavin Ram*<sup>1</sup>; Benjamin Ellyson<sup>2</sup>; Connor Rietema<sup>2</sup>; Jibril Shittu<sup>2</sup>; Joseph McKeown<sup>2</sup>;  
Peter Hosemann<sup>1</sup>; <sup>1</sup>UC Berkeley; <sup>2</sup>Lawrence Livermore National Laboratory

**2:35 PM**

**Size Effect at High Temperature in Additive Metals:** *Daniel June*<sup>1</sup>; Mehrdad Pourjam<sup>1</sup>;  
Jason Mayeur<sup>2</sup>; Gabe Demeneghi<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>NASA Marshall Space Flight Center

**2:55 PM**

**First-principles Calculations of Diffusion Coefficients in High-temperature Carbides:** *Indiras Khatri*<sup>1</sup>; Raj Koju<sup>1</sup>; Yuri Mishin<sup>1</sup>; <sup>1</sup>George Mason University

**3:15 PM**

**Foundational Molecular Dynamic Models and Experiments of SiC Oxidation for Materials Development in Extreme Environments:** *Robert Slapikas*<sup>1</sup>; Mike Ammendola<sup>2</sup>; Anindya Ghoshal<sup>1</sup>; Luis Bravo<sup>2</sup>; Ryan MCGowan<sup>1</sup>; Muthuvel Murugan<sup>1</sup>; Patrick Albert<sup>2</sup>; Justin Reiss<sup>2</sup>; Douglas Wolfe<sup>2</sup>; <sup>1</sup>Army Research Lab; <sup>2</sup>The Pennsylvania State University

**3:35 PM Break**

**3:55 PM**

**Mesoscale Thermomechanical Modeling of Woven Carbon Composites:** *Sean Skweres*<sup>1</sup>; Peter Creveling<sup>2</sup>; Scott Roberts<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Sandia National Laboratories

**4:15 PM**

**High-temperature Oxygen Plasma Experiments and Atomistic Simulations of Active Oxidation in Nanocrystalline SiC Woven Fibers:** *Frederic Sansoz*<sup>1</sup>; Luc Capaldi<sup>1</sup>; <sup>1</sup>The University of Vermont

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## MATERIALS SYNTHESIS AND PROCESSING

### **Solidification in External Fields — Solidification in External Fields II: Ultrasonics, Microgravity and Electric Fields**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Light Metals Division, TMS: Solidification Committee, TMS: Aluminum Committee

**Program Organizers:** Andrew Kao, University of Greenwich; Catherine Tonry, University of Greenwich; Dmitry Eskin, Brunel University; Laurentiu Nastac, University of Alabama; Abdellah Kharicha, Montanuniversität; Natalia Shevchenko, Helmholtz Zentrum Dresden Rossendorf; Jiawei Mi, University of Hull

**Monday PM | March 4, 2024**

**Celebration 6 | Hyatt**

**Session Chairs:** Peter Galenko, University of Jena; Catherine Tonry, University of Greenwich

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**2:00 PM**

**Dendrite Growth Under Forced Convective Flow in External Fields:** *Peter Galenko*<sup>1</sup>; <sup>1</sup>Friedrich Schiller University Jena

**2:25 PM**

**Dynamic Nucleation Events in Zr-2.5Nb during Microgravity Electromagnetic Levitation Experiments:** *Gwendolyn Bracker*<sup>1</sup>; Stephan Schneider<sup>1</sup>; Robert Hyers<sup>2</sup>; <sup>1</sup>DLR Institute of Materials Physics in Space; <sup>2</sup>Worcester Polytechnic Institute

**2:45 PM**

**Structure and Properties of the Terrestrial vs. Microgravity Solders Under Extreme Conditions of Elevated and Cryo Temperatures:** *Manish Kumar*<sup>1</sup>; Ralph Napolitano<sup>1</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University

**3:05 PM**

**Dynamics of Individual Bubbles in Acoustic Cavitation-induced Solidification Using High-Speed Imaging and Deep Learning:** *Sohail Mohammed*<sup>1</sup>; Brandon



Aguiar<sup>1</sup>; Giuseppe Bianco<sup>1</sup>; Tanaji Paul<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

**3:25 PM Break**

**3:45 PM**

**Solidification of Glass Forming Metallic Liquids Under Aerodynamic Levitation:** *Konstantinos Georgarakis<sup>1</sup>; Martin Stiehler<sup>1</sup>; Konstantinos Salonitis<sup>1</sup>; Mark Jolly<sup>1</sup>;* <sup>1</sup>Cranfield University

**4:10 PM**

**Analogue Study of Nanoparticles' Deagglomeration in Lightweight Alloys Melt:** Zhuocheng Xu<sup>1</sup>; Catherine Tonry<sup>2</sup>; *Qianqian Li<sup>1</sup>; Andrew Kao<sup>2</sup>; Christopher Beckwith<sup>2</sup>; Koulis Pericleous<sup>2</sup>; Milo Shaffer<sup>1</sup>;* <sup>1</sup>Imperial College London; <sup>2</sup>University of Greenwich

**4:30 PM**

**Insights into Phase Refinement via Low-power Electric Current Processing by Synchrotron-based Imaging:** *Jonathan Goettsch<sup>1</sup>; Jaime Perez Coronado<sup>1</sup>; Joshua Willwerth<sup>1</sup>; Parth Agrawal<sup>1</sup>; Shanmukha Kiran Aramanda<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; Alan Taub<sup>1</sup>;* <sup>1</sup>University of Michigan

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## MECHANICS OF MATERIALS

**Structure-Property Relationships of Bulk Metallic Glasses — Atomic Structure and Dynamics I: Short and Medium Range Order**

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Monday PM | March 4, 2024**

**Orlando M | Hyatt**

**Session Chair:** Sebastian Kube, University of Wisconsin - Madison

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**2:00 PM Introductory Comments**

**2:10 PM Invited**

**Three-dimensional Atomic Structure of Amorphous Materials:** *Jianwei (John) Miao<sup>1</sup>;* <sup>1</sup>University of California Los Angeles

**2:35 PM Invited**

**Current Status and Prospects of Understanding Nanoscale Heterogeneity in Metallic Glasses Using Electron Nanodiffraction:** Gabriel Calderon<sup>1</sup>; Mihazul Islam<sup>1</sup>; Yuchi Wang<sup>1</sup>; Yuchu Wang<sup>2</sup>; Geun-Hee Yoo<sup>3</sup>; Eun-Soo Park<sup>3</sup>; Yue Fan<sup>2</sup>; Yunzhi Wang<sup>1</sup>; *Jinwoo Hwang<sup>1</sup>;* <sup>1</sup>Ohio State University; <sup>2</sup>University of Michigan; <sup>3</sup>Seoul National University

**3:00 PM**

**Experimental Assessment of Local Environments in Metallic Glasses 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

3:20 PM Break

3:40 PM Invited

**Role of Medium-range Order in Atomic Dynamics of Liquid and Glass:** *Takeshi Egami*<sup>1</sup>; <sup>1</sup>University of Tennessee

4:05 PM Invited

**Medium-range Order in Metallic Glasses:** *Daniel Miracle*<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

4:30 PM **Poster Pitches:** Aurelia Moriyama-Gurish, Minhazul Islam, Shuhan Zhang

4:50 PM

**Dependence of the Nanometer-scale Structural Heterogeneity of a Bulk Metallic Glass on Its Fictive Temperature:** Xinzhe Wang<sup>1</sup>; Amit Datye<sup>1</sup>; Shuhan Zhang<sup>1</sup>; John Thornton<sup>2</sup>; Jan Schroers<sup>1</sup>; *Udo Schwarz*<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>Bruker Nano Surfaces

5:10 PM

**Processing Dependent Elastic Heterogeneities in Bulk Metallic Glasses:** *Reza Rashidi*<sup>1</sup>; Birte Riechers<sup>1</sup>; Robert Maass<sup>2</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM); <sup>2</sup>a. Federal Institute of Materials Research and Testing (BAM); b. Department of Materials Science and Engineering, University of Illinois at Urbana-Champaign

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Kinetics of Alloys II – Session II

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

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Ji-Cheng Zhao, University of Maryland; Shuanglin Chen, CompuTherm LLC; Wei Xiong, University of Pittsburgh

Monday PM | March 4, 2024

Bayhill 31 | Hyatt

**Session Chairs:** Julio Cesar Pereira Dos Santos, Northwestern University; Johann Mogeritsch, Montanuniversitaet Leoben

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2:00 PM Invited

**The CHiMaD Thermodynamic Database for Co-based Superalloys:** *Julio Cesar Pereira Dos Santos*<sup>1</sup>; Sean Griesemer<sup>1</sup>; Ursula Kattner<sup>2</sup>; Carelyn Campbell<sup>2</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>NIST

2:30 PM

**Multi-Objective Design of a 7xxx High Strength Aluminum Plate Alloy:** *Maria-Ioanna Tzini*<sup>1</sup>; Gregory Olson<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

2:50 PM

**FeasibilityMap: A CALPHAD-Based Tool to Design Nonlinear Composition Pathway for Desired Properties of Materials Processed by Advanced Manufacturing:** *Hui Sun*<sup>1</sup>; Brandon Bocklund<sup>2</sup>; Zhening Yang<sup>1</sup>; Bo Pan<sup>1</sup>; Jingjing Li<sup>1</sup>; Allison Beese<sup>1</sup>; Shun-Li Shang<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Lawrence Livermore National Laboratory

3:10 PM

**Temperature-dynamic Phase-field Modeling of Hot Isostatic Pressing for Joining Dissimilar Metals:** *Albert Lin*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; Xiaoyuan Lou<sup>2</sup>; <sup>1</sup>University of

Wisconsin - Madison; <sup>2</sup>Purdue University

**3:30 PM**

**Prediction of the FCC Formation Region of the Co-Cr-Fe-Ni-Ti High-Entropy Alloys by the CALPHAD Method and Study on Microstructure and Mechanical Properties:** *Yung-Chin Lin*<sup>1</sup>; Yu-Xuan Ho<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; Satoshi Iikubo<sup>2</sup>; <sup>1</sup>National Taiwan University of Science and Technology; <sup>2</sup>National University Corporation Kyushu University

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## MATERIALS SYNTHESIS AND PROCESSING

**Towards a Future of Sustainable Production and Processing of Metals and Alloys – Decarbonizing Steel Making-hydrogen and Electrolysis**

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

**Program Organizers:** Arun Devaraj, Pacific Northwest National Laboratory; Dierk Raabe, Max-Planck Institute; Suhas Eswarappa Prameela, Massachusetts Institute of Technology (MIT); Leora Dresselhaus-Marais, Stanford University; Petrus Pistorius, Carnegie Mellon University

**Monday PM | March 4, 2024**  
**Celebration 4 | Hyatt**

**Session Chairs:** Leora Dresselhaus-Marais, Stanford University; Semanti Mukhopadhyay, Pacific Northwest National Laboratory

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**2:00 PM Introductory Comments**

**2:05 PM Invited**

**HYBRIT Pilot Development for Transformation to Fossil Free Iron and Steel:** *Gunilla Hyllander*<sup>1</sup>; Henrik von Schenck<sup>1</sup>; Niklas Kojola<sup>2</sup>; Pär Ljungqvist<sup>2</sup>; Shabbir Lakdawala<sup>3</sup>; Jenny Wikström<sup>3</sup>; Joel Carlsson<sup>2</sup>; Joakim Eck<sup>1</sup>; Javad Fayazi<sup>1</sup>; Reine Granström<sup>1</sup>; Damian Guido<sup>1</sup>; Farzad Mohseni<sup>1</sup>; Hedda Poussette<sup>2</sup>; Johan Riesbeck<sup>1</sup>; Anna-Maria Suup<sup>1</sup>; Per Hellberg<sup>1</sup>; Martin Pei<sup>2</sup>; Volker Schöllmann<sup>1</sup>; <sup>1</sup>HYBRIT Development AB; <sup>2</sup>SSAB AB; <sup>3</sup>Luossavaara-Kiirunavaara Aktiebolag

**2:35 PM**

**Phase-field Modeling of Iron Oxide Reduction with Hydrogen: Role of Porosities:** *Kartik Sunil Umate*<sup>1</sup>; Yang Bai<sup>1</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max-Planck-Institut für Eisenforschung GmbH

**2:55 PM**

**Numerical Modelling of Hydrogen Pre-reduction Lump Ores in Shaft Furnace for Ironmaking:** Yinxuan Qiu<sup>1</sup>; Erlei Li<sup>1</sup>; *Geoff Wang*<sup>1</sup>; <sup>1</sup>The University of Queensland

**3:15 PM**

**Accelerating Rate Limited Kinetics in Hydrogen-direct Iron Reduction: Combining Ptycho-Tomography and Percolation Insights:** *Subhechcha Paul*<sup>1</sup>; Xueli Zheng<sup>1</sup>; Lauren Moghimi<sup>1</sup>; Yifan Wang<sup>1</sup>; Leora Dresselhaus-Marais<sup>1</sup>; Junjing Deng<sup>2</sup>; Yan Ma<sup>3</sup>; Dierk Raabe<sup>3</sup>; <sup>1</sup>Stanford University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Max Planck Institute of Iron Research GmbH

**3:35 PM Break**

**3:50 PM Invited**

**Iron Production by Molten Sulfide Electrolysis:** Kimaya Suryarao<sup>1</sup>; Gen Kamimura<sup>1</sup>; Katrin Daehn<sup>1</sup>; *Antoine Allanore*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:20 PM**

**Low Emission Blast Furnace Ironmaking by Using Pre-reduced Iron Ores:** Xiaodong Ma<sup>1</sup>; Haifa Xu<sup>2</sup>; Jinming Zhu<sup>2</sup>; Fengqiu Tang<sup>1</sup>; Tim Evans<sup>3</sup>; Baojun Zhao<sup>4</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>Baosteel Central Research Institute; <sup>3</sup>Rio Tinto Iron Ore; <sup>4</sup>Jiangxi University of Science and Technology

**4:40 PM**

**Metal Paste Deposition of Iron Parts from Iron Oxide (Fe<sub>3</sub>O<sub>4</sub>) Paste:** Sajad Shirzad<sup>1</sup>; Dawood Al Nabhani<sup>1</sup>; Krisanu Bandyopadhyay<sup>1</sup>; Pravansu Mohanty<sup>1</sup>; Christopher Pannier<sup>1</sup>; <sup>1</sup>University of Michigan

**5:00 PM**

**Making Green Steel by Using Ammonia as Reductant:** Dierk Raabe<sup>1</sup>; Yan Ma<sup>1</sup>; <sup>1</sup>Max-Planck Institute

**5:20 PM**

**Manufacturing Fe-W Foams with Hierarchical Porosities via Hydrogen Reduction:** Ming Chen<sup>1</sup>; Samuel Pennell<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

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## NUCLEAR MATERIALS

### Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Radiation Effects I

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Tuesday AM | March 5, 2024**  
**Regency Q | Hyatt**

**Session Chairs:** Tianyi Chen, Oregon State University; Lingfeng He, North Carolina State University

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**8:00 AM Invited**

**Challenges Related to Traditional Qualification of Fuels and Materials for Nuclear Reactors:** Anne Campbell<sup>1</sup>; Josina Geringer<sup>1</sup>; Yanli Wang<sup>1</sup>; John Hunn<sup>1</sup>; Tyler Gerczak<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**8:30 AM**

**Understanding Nuclear Graphite's Changes Upon Irradiation Across Microscopy to Mesoscopic Length Scales:** David Sprouster<sup>1</sup>; Sean Fayfar<sup>2</sup>; Boris Khaykovich<sup>2</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Massachusetts Institute of Technology

**8:50 AM**

**Radiation-driven Diffusion of U, Si, and Xe in Amorphous U<sub>3</sub>Si<sub>2</sub>:** Gyuchul Park<sup>1</sup>; Zhi-Gang Mei<sup>1</sup>; Benjamin Beeler<sup>2</sup>; Bei Ye<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>North Carolina State University

**9:10 AM**

**Determination of the Radiation Induced Athermal Diffusivity in Uranium Mononitride from an Integrated Approach:** Anton Schneider<sup>1</sup>; Michael Cooper<sup>1</sup>; Jason Rizk<sup>1</sup>; Topher Matthews<sup>1</sup>; Maria Kosmidou<sup>1</sup>; David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:30 AM**

**Comparison of High-dose Microstructure Evolution in Ferritic-martensitic Steels Across Reactor Environments:** *Stephen Toller*<sup>1</sup>; Arthur Motta<sup>2</sup>; Kevin Field<sup>3</sup>; Gary Was<sup>3</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>The Pennsylvania State University; <sup>3</sup>University of Michigan

**9:50 AM Break**

**10:05 AM Invited**

**Toward Qualification of PM-HIP RPV Steels and their Electron Beam Weldments:** *Janelle Wharry*<sup>1</sup>; Grayson Nemets<sup>1</sup>; Elliot Marrero Jackson<sup>1</sup>; Jasmyne Emerson<sup>1</sup>; Wen Jiang<sup>1</sup>; Yangyang Zhao<sup>1</sup>; Yu Lu<sup>2</sup>; Maria Okuniewski<sup>1</sup>; Benjamin Sutton<sup>3</sup>; David Gandy<sup>3</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Boise State University; <sup>3</sup>Electric Power Research Institute

**10:35 AM**

**Nanoprecipitates to Enhance Radiation Tolerance in High-Entropy Alloys:** Boopathy Kombaiyah<sup>1</sup>; Yufan Zhou<sup>2</sup>; Ke Jin<sup>2</sup>; Anus Manzoor<sup>3</sup>; Jonathan Poplowsky<sup>2</sup>; Jeffrey Aguiar<sup>1</sup>; Hongbin Bei<sup>4</sup>; Dilpuneet Aidhy<sup>5</sup>; Philip Edmondson<sup>2</sup>; *Sriswaroop Dasari*<sup>1</sup>; Yanwen Zhang<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Wyoming; <sup>4</sup>Zhejiang University; <sup>5</sup>Clemson University

**10:55 AM**

**Uncovering Grain Boundary Metastability as a Response to Radiation in FCC and BCC Single Phase Compositionally Complex Alloys:** *Annie Barnett*<sup>1</sup>; Emily Hopkins<sup>1</sup>; Jaime Marian<sup>2</sup>; Mitra Taheri<sup>1</sup>; Michael Falk<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California Los Angeles

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials – Steels

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

**Tuesday AM | March 5, 2024**

**Plaza Int'l D | Hyatt**

**Session Chair:** Riccardo Casati, Politecnico Di Milano

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**8:00 AM Invited**

**Multi-Metallic Laser Powder Bed Fusion: Critical Challenges to Overcome for the Creation of Robust Interfaces in a CuSn10 and 316L system:** Alasdair Bulloch<sup>1</sup>; Andy Harris<sup>2</sup>; Allin Groom<sup>2</sup>; Chris Tuck<sup>1</sup>; Amanda Cruchley<sup>3</sup>; *Marco Simonelli*<sup>1</sup>; <sup>1</sup>University of Nottingham; <sup>2</sup>Autodesk; <sup>3</sup>The Manufacturing Technology Centre

**8:30 AM**

**Enhanced Cryogenic Tensile Properties of Additive Manufacturing Processed STS316L by the Reusable Powder:** *Chohyeon Lee*<sup>1</sup>; Wonhui Jo<sup>1</sup>; Bohyeon Kim<sup>1</sup>; Tiwari Saurabh<sup>1</sup>; Hyoungseop Kim<sup>2</sup>; Junggi Kim<sup>1</sup>; Jaebok Seol<sup>1</sup>; <sup>1</sup>Gyeongsang National University; <sup>2</sup>Pohang University of Science and Engineering

**8:50 AM****Influence of Temperature and Print Orientation on Anisotropy Sintering in Binder Jet Stainless Steels:** Khadijeh Esmati<sup>1</sup>; Apratim Chakraborty<sup>1</sup>; Srinivas Pendurti<sup>2</sup>; Arunkumar Natarajan<sup>2</sup>; *Étienne Martin*<sup>1</sup>; <sup>1</sup>Polytechnique Montréal; <sup>2</sup>GE Additive**9:10 AM****Microstructure and Mechanical Properties of 304SS Printed by Metal Additive manufacturing Using Powder Sheets (MAPS):** *Silvia Marola*<sup>1</sup>; Wenyou Zhang<sup>2</sup>; William Abbott<sup>2</sup>; Asli Coban<sup>3</sup>; Sean McConnel<sup>4</sup>; Jörg Volpp<sup>5</sup>; Ramesh Babu Padamati<sup>3</sup>; Rocco Lupoi<sup>2</sup>; Riccardo Casati<sup>1</sup>; <sup>1</sup>Politecnico di Milano; <sup>2</sup>Trinity College Dublin, The University of Dublin; <sup>3</sup>Trinity College Dublin, The University of Dublin, CRANN, & AMBER; <sup>4</sup>3C Project Technologies Ltd.; <sup>5</sup>Luleå University of Technology**9:30 AM Break****9:45 AM Invited****Latest Process Developments for Wire and Arc Additive Manufacturing:** *Goncalo Pardal*<sup>1</sup>; Stewart Williams<sup>1</sup>; <sup>1</sup>Cranfield University**10:15 AM****Effects of Gas Atomization Reaction Synthesis (GARS) Powder Size and Microstructure on Laser Powder Bed Fusion Consolidated ODS Steel:** *Matthew deJong*<sup>1</sup>; Sourabh Saptarshi<sup>1</sup>; Iver Anderson<sup>2</sup>; Christopher Rock<sup>1</sup>; Tim Horn<sup>1</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Ames Laboratory

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**ADDITIVE MANUFACTURING****Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification — Session II****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; Steve Daniewicz, University of Alabama**Tuesday AM | March 5, 2024**  
**Plaza Int'l E | Hyatt****Session Chair:** Nima Shamsaei, Auburn University**8:00 AM Invited****NDI and Fatigue Assessment of AM-med Components:** *Stefano Beretta*<sup>1</sup>; <sup>1</sup>Politecnico Di Milano Mechanical Engineer**8:20 AM****An Investigation into Non-destructive Material and Part Qualification for Fatigue Critical Applications:** *Alireza Jam*<sup>1</sup>; Shahryar Baig<sup>1</sup>; Jia Liu<sup>1</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University**8:40 AM****Fatigue-based Process Window for Laser Powder Bed Fusion Additive Manufacturing:** *Tharun Reddy*<sup>1</sup>; Austin Ngo<sup>2</sup>; Justin Miner<sup>1</sup>; Christian Gobert<sup>1</sup>; Jack Beuth<sup>1</sup>; John Lewandowski<sup>2</sup>; Anthony Rollett<sup>1</sup>; Sneha Narra<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Case Western Reserve University

**9:00 AM**

**Fatigue Performance and DADT Certification of Powder-bed Additively Manufactured Ti-6Al-4V: Defect Assessments, EIDS Distributions, and Inspection Limits:** Matthew Krug<sup>1</sup>; *Sushant Jha*<sup>2</sup>; Reji John<sup>1</sup>; Patrick Golden<sup>1</sup>; Luke Sheridan<sup>1</sup>; Bryce Jolley<sup>1</sup>; <sup>1</sup>US Air Force Research Laboratory; <sup>2</sup>University of Dayton Research Institute

**9:20 AM Break**

**9:40 AM Invited**

**Towards the Use of Representative Specimens for the Qualification of Additively Manufactured Parts:** *Mauro Madia*<sup>1</sup>; Sergio Blasón<sup>1</sup>; Kai Hilgenberg<sup>1</sup>; <sup>1</sup>Bundesanstalt fuer Materialforschung und -pruefung (BAM)

**10:00 AM**

**Localized Residual Stress Measurements via Energy-based Nanoindentation in Titanium Alloys Processed with Laser Powder Bed Fusion:** *Jia-Huei Tien*<sup>1</sup>; David Brice<sup>2</sup>; David Bahr<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>ATI Specialty Materials

**10:20 AM**

**Low-Cycle-Fatigue Behavior of Stainless Steel 316L Manufactured by Laser Powder Bed Fusion:** *Luis Avila Calderon*<sup>1</sup>; Birgit Rehmer<sup>1</sup>; Alexander Ulbricht<sup>1</sup>; Gunther Mohr<sup>1</sup>; Alexander Evans<sup>1</sup>; Birgit Skrotzki<sup>1</sup>; <sup>1</sup>Federal Institute for Materials Research and Testing (BAM)

**10:40 AM**

**Impact of Surface Texture and Temperature on the Low Cycle Fatigue Life of Laser Powder Bed Fusion GRCo-42:** *Gabriel Demeneghi*<sup>1</sup>; Paul Gradl<sup>1</sup>; Agustin Diaz<sup>2</sup>; Kavan Hazeli<sup>3</sup>; <sup>1</sup>NASA; <sup>2</sup>REM Surface Engineering; <sup>3</sup>The University of Arizona

**11:00 AM Invited**

**Accelerated Development of Tungsten Alloy Plasma Facing Materials:** Hyeji Im<sup>1</sup>; Jason Trelewicz<sup>2</sup>; *Ian Mccue*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Stony Brook University

**11:20 AM**

**The Influence of Additive Manufacturing Process Parameters on Residual Stress Of 17-4 PH Stainless Steel Parts Manufactured by Laser Powder Bed Fusion Additive Manufacturing System:** *Gökhan Çelik*<sup>1</sup>; <sup>1</sup>ROKETSAN

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning – Physics-based Models I

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**Tuesday AM | March 5, 2024**

**Orlando N | Hyatt**

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center; Jing Zhang, Indiana University-Purdue University Indianapolis

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**8:00 AM**

**Compensating for Sintering Distortion in Additively Manufactured Copper using Physics-Informed Gaussian Process Regression:** Samuel Moran<sup>1</sup>; Basil Paudel<sup>2</sup>; Albert To<sup>2</sup>; *Annika Bauman*<sup>3</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of Pittsburgh; <sup>3</sup>Sandia National Laboratory

**8:20 AM**

**Leveraging Convolutional Neural Networks for the Prediction of Enhanced Plume and Coating Quality in Atmospheric Plasma Spraying:** *Giuseppe Bianco Atria*<sup>1</sup>; Abhijith Sukumaran<sup>1</sup>; Cheng Zhang<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

**8:40 AM**

**A Multi-physics Model for Melt Pool and Keyhole Dynamics in Laser Powder Bed Fusion Process:** *Lichao Fang*<sup>1</sup>; Sen Liu<sup>2</sup>; Vivek Thampy<sup>2</sup>; Zane Taylor<sup>1</sup>; Christopher Tassone<sup>2</sup>; Leora Dresselhaus-Marais<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>SLAC National Accelerator Laboratory

**9:00 AM**

**Predicting the Printable Parameter Space for Laser Directed Energy Deposition Using a Calibrated Model:** *Peter Morcos*<sup>1</sup>; Matthew Vaughan<sup>1</sup>; Alaa Elwany<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:20 AM**

**Solidification Kinetics in Ternary Alloys: Insights from Phase Field Modeling:** *Yitao Wang*<sup>1</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University

**9:40 AM Break**

**10:00 AM**

**Critical Velocity and Deposition Efficiency in Cold Spray: A Reduced-order Model and Experimental Validation:** *Che Zhang*<sup>1</sup>; Tesfaye Molla<sup>1</sup>; Christian Brandl<sup>1</sup>; Graham Schaffer<sup>1</sup>; <sup>1</sup>The University of Melbourne

**10:20 AM**

**Efficient Computational Framework for Image-based Micromechanical Analysis of Additively Manufactured Ti-6Al-4V Alloys:** *Somnath Ghosh*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**10:40 AM**

**Additive Manufacturing Process Optimization and Property Prediction with Integrated Computational Materials Design:** Kerem Taskin<sup>1</sup>; *Clay Houser*<sup>2</sup>; <sup>1</sup>Questek Innovations Llc; <sup>2</sup>QuesTek Innovations

**11:00 AM**

**Physics-constrained, Inverse Design of High-temperature Strength Printable Aluminum Alloys with Low Cost and CO<sub>2</sub> Emissions for High Demand Industries:** *Benjamin Glaser*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**11:20 AM**

**Validation of a Transient Heat Source Model for Laser Powder Bed Fusion:** *John Coleman*<sup>1</sup>; Gerry Knapp<sup>1</sup>; Benjamin Stump<sup>1</sup>; Matt Rolchigo<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>ORNL

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## ADDITIVE MANUFACTURING

**Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Metallic Materials: Process Development & Mo and Pt Alloys**



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

**Program Organizers:** Faramarz Zarandi, RTX Corporation; Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias

**Tuesday AM | March 5, 2024**  
**Rainbow Spring II | Hyatt**

**Session Chairs:** Antonio Ramirez, Ohio State University; Eric Lass, University of Tennessee-Knoxville

**8:00 AM**

**Surface Finishing, Coating, and Testing of Additive Manufactured C103, Mo, and W.:** *Fernando Reyes Tirado*<sup>1</sup>; Omar Mireles<sup>2</sup>; <sup>1</sup>NASA Marshall Space Flight Center; <sup>2</sup>Nasa Marshall Space Flight Center

**8:20 AM**

**High Energy X-ray and Neutron Tomography Characterization of Additive Manufacture Refractory Metal Components with Engineered Defects:** *Jarvis Caffrey*<sup>1</sup>; Omar Mireles<sup>1</sup>; <sup>1</sup>Nasa Marshall Space Flight Center

**8:40 AM**

**High Absorptivity Nanotextured Powders for Metal 3D Printing:** *Adrian Lew*<sup>1</sup>; Ottman Tertuliano<sup>2</sup>; Philip DePond<sup>1</sup>; Andrew Lee<sup>1</sup>; Jiho Hong<sup>1</sup>; David Doan<sup>1</sup>; Mark Brongersma<sup>1</sup>; Wendy Gu<sup>1</sup>; Manyalibo Matthews<sup>3</sup>; Wei Cai<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>University of Pennsylvania; <sup>3</sup>Lawrence Livermore National Laboratory

**9:00 AM**

**Numerical Simulation of Radio-Frequency Inductively Coupled Plasma Spheroidization of Tungsten Powder: Effects of Flow Field, Particle Trajectory and Surface Tension:** *Shashank Sharma*<sup>1</sup>; Jitesh Kumar<sup>1</sup>; Ishtiaq Ahmed F Rabbi<sup>1</sup>; Dussa Saikumar<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**9:20 AM**

**Development of Molybdenum Alloys for Use with Powder Blown Laser Directed Energy Deposition Additive Manufacturing:** *Nathaniel Lies*<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**9:40 AM Break**

**10:00 AM**

**Laser Beam Directed Energy Deposition Fabrication of MoNbTaTi Refractory High Entropy Alloy via Elemental Powder Processing:** *Erin Barrick*<sup>1</sup>; Levi Van Bastian<sup>1</sup>; Sarah Birchall<sup>1</sup>; Jonathan Pegues<sup>1</sup>; Andrew Kustas<sup>1</sup>; <sup>1</sup>Sandia National Labs

**10:20 AM**

**Additive Manufacturing of Platinum-based Alloys for Industrial Ultra-high Temperature Structural Applications:** *Parastoo Jamshidi*<sup>1</sup>; Selassie Dorvlo<sup>1</sup>; Biao Cai<sup>2</sup>; Moataz Attallah<sup>2</sup>; <sup>1</sup>Cooksongold 59-83; <sup>2</sup>University of Birmingham

**10:40 AM**

**Atomization and Additive Manufacturing of Refractory Alloys:** *Jennifer Glerum*<sup>1</sup>; Catherine Ott<sup>1</sup>; Ian Mccue<sup>1</sup>; <sup>1</sup>Northwestern University

## Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — Invited Session II: Facility Development and Outlook

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

**Tuesday AM | March 5, 2024**  
**Orlando M | Hyatt**

**Session Chairs:** Fan Zhang, NIST; Donald Brown, Los Alamos National Laboratory

### 8:00 AM Invited

**New Insights into Laser Additive Manufacturing from Correlative Synchrotron X-ray Imaging at the European Synchrotron:** *Yunhui Chen*<sup>1</sup>; Yuanbo Tang<sup>2</sup>; David Collins<sup>3</sup>; Samuel Clark<sup>4</sup>; Can Yildirim<sup>5</sup>; Wolfgang Ludwig<sup>5</sup>; Carsten Detlefs<sup>5</sup>; Alexander Rack<sup>5</sup>; Veijo Honkimaki<sup>5</sup>; Roger Reed<sup>2</sup>; Peter Lee<sup>6</sup>; Philip Withers<sup>7</sup>; Mark Easton<sup>1</sup>; <sup>1</sup>RMIT University; <sup>2</sup>University of Oxford; <sup>3</sup>University of Birmingham; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>The European Synchrotron; <sup>6</sup>University College London; <sup>7</sup>University of Manchester

### 8:25 AM Invited

**Neutron Diffraction Characterization of Additively Manufactured Metals:** *Bjørn Clausen*<sup>1</sup>; Donald Brown<sup>1</sup>; D. Carver<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

### 8:50 AM Invited

**Enabling Real-time Characterization of Laser-based Additive Manufacturing through Operando Techniques:** *Steven Van Petegem*<sup>1</sup>; <sup>1</sup>Paul Scherrer Institut

### 9:15 AM Invited

**The New Capabilities of the Enhanced 32-ID at the APS-U: Opportunities for Additive Manufacturing Research:** *Samuel Clark*<sup>1</sup>; Kamel Fezzaa<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

### 9:40 AM Break

### 9:55 AM Invited

**High-energy X-ray Capabilities at APS for Additive Manufacturing Research:** *Andrew Chuang*<sup>1</sup>; Peter Kenesei<sup>1</sup>; Jun-Sang Park<sup>1</sup>; Jonathon Almer<sup>1</sup>; Sarvjit Shastri<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

### 10:20 AM Invited

**A Suite of High-energy Synchrotron Tools for Studies of Additive Manufacturing from Processing to Performance:** *Katherine Shanks*<sup>1</sup>; Amlan Das<sup>1</sup>; Ho Yeung<sup>2</sup>; Steven Grantham<sup>2</sup>; Darren Pagan<sup>3</sup>; Thien Phan<sup>4</sup>; <sup>1</sup>Cornell University; <sup>2</sup>NIST; <sup>3</sup>Pennsylvania State University; <sup>4</sup>Lawrence Livermore National Laboratory

### 10:45 AM Invited

**Operando X-ray Imaging of LPBF at X-ray Free Electron Lasers:** Lichao Fang<sup>1</sup>; Zane Taylor<sup>1</sup>; Sen Liu<sup>2</sup>; Vivek Thampy<sup>2</sup>; Peiyu Quan<sup>2</sup>; Ilana Porter<sup>2</sup>; Matthew Seaberg<sup>2</sup>; Philip Hart<sup>2</sup>; Franz-Josef Decker<sup>2</sup>; Frank Seiboth<sup>3</sup>; Tim van Driel<sup>2</sup>; Bernard Kozioziemski<sup>4</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 National Accelerator Lab; <sup>3</sup>DESY; <sup>4</sup>LLNL

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Nanoindentation Studies of Additively Manufactured Alloys

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Tuesday AM | March 5, 2024**  
Plaza Int'l F | Hyatt

**Session Chairs:** Sezer Özerinç, Middle East Technical University; Wendy Gu, Stanford University

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#### 8:00 AM Invited

**Generating Structure-processing- Property Maps in 3D Printed Alloys:** Eric Hintsala<sup>1</sup>; Bernard Becker<sup>1</sup>; Ude Hangen<sup>2</sup>; Nathan Mara<sup>3</sup>; *Douglas Stauffer*<sup>1</sup>; <sup>1</sup>Bruker Nano Surfaces & Metrology; <sup>2</sup>Bruker Nano GmbH; <sup>3</sup>University of Minnesota

#### 8:30 AM

**Nano-scratch Behavior of an Additively Manufactured Multiphase High-entropy Alloy:** *Xipeng Tan*<sup>1</sup>; Baixin Dong<sup>1</sup>; Chenkai Gao<sup>1</sup>; <sup>1</sup>National University of Singapore

#### 8:50 AM

**The Microstructural Picture of Mechanical Strain-rate Dependence in Additively Manufactured NiTiNb Shape Memory Alloys:** *Rebecca Gallivan*<sup>1</sup>; Nerea Abando<sup>1</sup>; Nancy Li<sup>2</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich; <sup>2</sup>University of Toronto

#### 9:10 AM

**Building Orientation Effect on the Micro-scale Deformation and Damage Behaviour of 7075 Aluminium Alloy Processed by Laser Powder Bed Fusion:** *Nicolas Nothomb*<sup>1</sup>; Yongkang Luo<sup>2</sup>; Lv Zhao<sup>2</sup>; Marie-Noëlle Avettand-Fénoël<sup>3</sup>; Aude Simar<sup>1</sup>; <sup>1</sup>UCLouvain, IMMC; <sup>2</sup>Huazhong University of Science and Technology; <sup>3</sup>Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207, UMET, Unité Matériaux et Transformations

#### 9:30 AM Break

#### 9:50 AM Invited

**Mechanical Microscopy of Additively-manufactured Steels Using High-speed Nanoindentation:** *Jeff Wheeler*<sup>1</sup>; <sup>1</sup>Femtotools Ag

#### 10:20 AM

**Controlling the Interplay of Geometry and Microstructure in LPBF of Shell-based Architected Materials Made of 17-4 Precipitation Hardened Stainless Steel:** *Julia Pürstl*<sup>1</sup>; Brandon Fields<sup>1</sup>; Diran Apelian<sup>1</sup>; Lorenzo Valdevit<sup>1</sup>; <sup>1</sup>University of California, Irvine

#### 10:40 AM

**Identification of Microstructure and Mechanical Properties of Waspaloy Deposited by Wire Arc Additive Manufacturing (WAAM):** *Azdine Nait-Ali*<sup>1</sup>; Marjolaine Sazerat<sup>1</sup>; patrick villechaise<sup>1</sup>; Alice Cervellon<sup>1</sup>; Jonathan Cormier<sup>1</sup>; <sup>1</sup>Isae-Ensma

**11:00 AM****Stochastic Nanoarchitected Metals with Ultra-high Energy Absorption:** *Hanxun Jin*<sup>1</sup>; Wenxin Zhang<sup>1</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology**11:20 AM Invited****Length-scale Effects of Volumetric Defects on High Cycle Fatigue of Additively Manufactured Ti-6Al-4V:** *Shuai Shao*<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

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**ADDITIVE MANUFACTURING****Additive Manufacturing: Materials Design and Alloy Development VI – Closed-Loop Alloy Design – High Temperature Alloys****Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS; Additive Manufacturing Committee**Program Organizers:** Behrang Poorganji, University of Toledo; James Saal, Citrine Informatics; Hunter Martin, HRL Laboratories LLC; Orlando Rios, University of Tennessee; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC; S. Mohadeseh Taheri-Mousavi, Carnegie Mellon University**Tuesday AM | March 5, 2024****Bayhill 28 | Hyatt****Session Chairs:** Atieh Moridi, Cornell University; Mohadeseh Taheri Mousavi, Carnegie Mellon University**8:00 AM Invited****GRX-810: A 3D Printable Alloy Designed for Extreme Environments:** *Timothy Smith*<sup>1</sup>; Christopher Kantzos<sup>1</sup>; Paul Gradl<sup>2</sup>; Milan Heczko<sup>3</sup>; Bryan Harder<sup>1</sup>; Aaron Thompson<sup>1</sup>; Michael Mills<sup>3</sup>; Timothy Gabb<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center; <sup>2</sup>NASA Marshall Space Flight Center; <sup>3</sup>The Ohio State University**8:30 AM****A Data-Driven Alloy Design Framework to Enable Location-Specific Phase Manipulation in Additively Manufactured Stainless Steels:** *Joseph Aroh*<sup>1</sup>; Fan Zhang<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology**8:50 AM****Tailoring Microstructure with Precipitation to Improve the Mechanical Properties of Laser Powder Bed Fused Maraging Steel:** Hossein Eskandari Sabzi<sup>1</sup>; Roger Castellote-Alvarez<sup>2</sup>; Seoung-Ho Lim<sup>3</sup>; Diego Della Crociata<sup>4</sup>; Xinjiang Hao<sup>1</sup>; David San-Martín<sup>2</sup>; Marco Simonelli<sup>4</sup>; Pyuck-Pa Choi<sup>3</sup>; *Pedro Rivera-Díaz-del-Castillo*<sup>5</sup>; <sup>1</sup>Liberty Powder Metals; <sup>2</sup>National Centre for Metallurgical Research; <sup>3</sup>Korea Advanced Institute of Science and Technology; <sup>4</sup>University of Nottingham; <sup>5</sup>University of Southampton**9:10 AM****The Relationship between Composition and Crack Susceptibility in Additively Manufactured Nickel-based Superalloys:** *Ajay Talbot*<sup>1</sup>; Xiao Shang<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto**9:30 AM****Process Windows of Inconel 625 Fabricated by Direct Energy Deposition-based Lasermeister System:** *Yusufu Ekubaru*<sup>1</sup>; Kei Sekiguchi<sup>1</sup>; <sup>1</sup>Nikon Corporation

**9:50 AM Break**

**10:05 AM Invited**

**Materials Design and Additive Manufacturing of Metal Matrix Composites:** *Ju Li*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**10:35 AM**

**A Study of the Thermal Cycling Effect on Fabricated Zr-Based Bulk Metallic Glass by Standard and Non-standard Beam Distribution Upon Laser Powder Bed Fusion:** *Sepide Hadibeik Neishaboori*<sup>1</sup>; Hossein Ghasemi-Tabasi<sup>2</sup>; Andreas Burn<sup>2</sup>; Florian Spieckermann<sup>3</sup>; Jurgen Eckert<sup>4</sup>; <sup>1</sup>Montanuniversität Leoben; <sup>2</sup>Swiss Advanced Manufacturing Center; <sup>3</sup>University of Leoben; <sup>4</sup>Erich Schmid Institute of Materials Science

**10:55 AM**

**Compositional and Microstructural characterization of 304L and 316L Stainless Steels Produced by L-PBF Additive Manufacturing Using Novel Dry Metal Alloy (DMA) Powder Feedstock:** *Stephen Hanson*<sup>1</sup>; Sudhakar Vadiraja<sup>1</sup>; Nathan Huft<sup>1</sup>; <sup>1</sup>Montana Technological University

**11:15 AM**

**Roles of Solute and Nucleant in Grain Structure Evolution of Additively Manufactured Ti-6Al-4V Alloy:** *Saeid Alipour Masoumabad*<sup>1</sup>; Arezoo Emdadi<sup>1</sup>; <sup>1</sup>Missouri University of Science and Technology

**11:35 AM**

**Fatigue Characterization of Plasma Atomized Ti-6Al-4V Produced by Laser Powder Bed Fusion Process:** *Mahdi Habibnejad*<sup>1</sup>; <sup>1</sup>Advanced Powder and Coating, A GE Additive Division

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Process-induced Microstructures and Defects – Laser Influence and In-situ Monitoring

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

**Tuesday AM | March 5, 2024**

**Florida C | Hyatt**

**Session Chair:** Arezoo Emdadi, Missouri University of Science and Technology

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**8:00 AM**

**A Microstructure Study of Multi-Mode Laser Profiles:** *Austin Tiley*<sup>1</sup>; Rakhi Bawa<sup>1</sup>; Amanda Pizon<sup>1</sup>; <sup>1</sup>The Ohio State University

**8:20 AM**

**High Frequency Beam Oscillation Keyhole Dynamics in Laser Melting Revealed by In-situ X-ray Imaging:** *Guannan Tang*<sup>1</sup>; Ziheng Wu<sup>2</sup>; Samuel J. Clark<sup>3</sup>; Andrey Meshkov<sup>4</sup>; Subhrajit Roychowdhury<sup>4</sup>; Benjamin Gould<sup>3</sup>; Victor Ostroverkhov<sup>4</sup>; Thomas Adcock<sup>4</sup>; Steven J. Duclos<sup>4</sup>; Kamel Fezzaa<sup>3</sup>; Christopher Immer<sup>4</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>GE Research Center

**8:40 AM****Laser Influences on Heterogeneity in Powder Bed Fusion Aluminum with Reactive Additions Studied by X-ray Microtomography:** *Daniel Sinclair*<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>;<sup>1</sup>Purdue University**9:00 AM****Comparing and Optimising Continuous Wave and Pulsed Width Modulation Mode Laser Powder Bed Fusion Parameters for Ti-6Al-4V:** *Elena Ruckh*<sup>1</sup>; Samy Hocine<sup>1</sup>;Sebastian Marussi<sup>1</sup>; Andy Farndell<sup>2</sup>; Ruben Lambert-Garcia<sup>1</sup>; Maureen Fitzpatrick<sup>3</sup>; Anna Getley<sup>1</sup>; Caterina Iantaffi<sup>1</sup>; Saurabh Shah<sup>1</sup>; Marta Majkut<sup>3</sup>; Alexander Rack<sup>3</sup>; Nick Jones<sup>2</sup>; Peter D. Lee<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Renishaw plc.; <sup>3</sup>European Synchrotron Radiation Facility**9:20 AM Break****9:40 AM****In-Situ Monitoring of Melt Pool Temperature, Size, and Cooling Rate of Directed Energy Deposition Inconel 625 and Correlations to Microstructure and Mechanical Properties:** *Tait Mclouth*<sup>1</sup>; Julian Lohser<sup>1</sup>; Paul Panetta<sup>1</sup>; Paul Adams<sup>1</sup>; Isabel Bayardo<sup>1</sup>;<sup>1</sup>The Aerospace Corporation**10:00 AM****Prediction of Microstructural Defects in Additively Manufactured Al Alloys Using In-Situ Process Monitoring Technology:** *Emine Tekerek*<sup>1</sup>; Vignesh Perumal<sup>1</sup>; Lars Jacquemetton<sup>2</sup>;Scott Halliday<sup>3</sup>; Antonios Kontsos<sup>1</sup>; <sup>1</sup>Drexel University; <sup>2</sup>Sigma Additive Inc; <sup>3</sup>Navajo Technical University**10:20 AM****Batched Additive Manufacturing Meets Parallel Bayesian Optimization – Highway for Materials Design:** *Jonathan Pegues*<sup>1</sup>; Anh Tran<sup>1</sup>; Hannah Sims<sup>1</sup>; John Emery<sup>1</sup>;<sup>1</sup>Sandia National Laboratories**10:40 AM****Evaluation of Processing Conditions and Post-Heat Treatment of Quasicrystal Reinforced Candidate Al Alloy for Additive Manufacturing:** *Baris Yavas*<sup>1</sup>; Mingxuan X. Li<sup>1</sup>; S. Pamir Alpay<sup>1</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut

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**BIOMATERIALS****Advanced Biomaterials for Biomedical Implants – Biomedical Materials****Sponsored by:** TMS Functional Materials Division, TMS: Biomaterials Committee**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Pennsylvania State University Harrisburg; Vinoy Thomas, University of Alabama at Birmingham**Tuesday AM | March 5, 2024****Celebration 12 | Hyatt****Session Chair:** Vinoy Thomas, University of Alabama at Birmingham**8:00 AM Invited****Nano-biosensor to Manage COVID-19 Infection and Long-COVID:** *Ajeet Kaushik*<sup>1</sup>;<sup>1</sup>Florida Polytechnic University**8:30 AM****Microstructural and Mechanical Analysis of Aerosol Jet 3D Printed Micropillars and Their Biocompatibility in Mouse Brain:** *Sanjida Jahan*<sup>1</sup>; Chunshan Hu<sup>1</sup>; Bin Yuan<sup>1</sup>; Sandra Ritchie<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**8:50 AM****New MRI-compatible Metallic Materials for Miniaturized Implants:** *Mariana Calin*<sup>1</sup>; Jithin Vishnu<sup>1</sup>; Maria Krautz<sup>1</sup>; Annett Gebert<sup>1</sup>; <sup>1</sup>Ifw Dresden**9:10 AM****Novel Ti-10Mo-Mn Alloys for Biomedical Applications:** *Carlos Grandini*<sup>1</sup>; Mariana Lourenço<sup>1</sup>; <sup>1</sup>Unesp**9:30 AM Break****9:40 AM Invited****Exploring the Microstructure of Marine Sponge Spicules: Insights for Biomimetic Bone Tissue Engineering:** *Niloofar Fani*<sup>1</sup>; Jenna Parke<sup>1</sup>; Fariborz Tavangarian<sup>1</sup>; <sup>1</sup>Pennsylvania State University Harrisburg**10:10 AM****Reimagining Implantable Leads: Exploring the Value of Using Aerosol Printing Technology to Replace Wire-based Structures in High-density Connections:** *Janet Gbur*<sup>1</sup>; Sylvie Crowell<sup>2</sup>; Mitchell Melander<sup>2</sup>; Caroline Kromalic<sup>2</sup>; James Wolfe<sup>2</sup>; Douglas Shire<sup>1</sup>; <sup>1</sup>VA Northeast Ohio Healthcare System; <sup>2</sup>Case Western Reserve University**10:30 AM****The Development of Antimicrobial Ti-Cu Alloys and Understanding of their Mode of Action:** *Daisy Rabbitt*<sup>1</sup>; Luke Carter<sup>1</sup>; Victor Villapun<sup>1</sup>; Sophie Cox<sup>1</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham**10:50 AM****Reducing Stress Shielding in Hip Implants Using 3D Printed Superelastic Titanium Alloy:** *Peter Ibrahim*<sup>1</sup>; Piyapat Jameekornkul<sup>2</sup>; Ajit Panesar<sup>2</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Imperial College**11:10 AM****Using Artificial Intelligence (AI) to Improve Medical Devices:** *Thomas Webster*<sup>1</sup>; <sup>1</sup>Brown University; Hebei University of Technology; Interstellar Therapeutics

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**ADVANCED CHARACTERIZATION METHODS****Advanced Characterization Techniques for Quantifying and Modeling Deformation — EBSD****Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory**Tuesday AM | March 5, 2024****Celebration 1 | Hyatt****Session Chairs:** Dorte Juul Jensen, Technical University of Denmark; Marko Knezevic, University of New Hampshire**8:00 AM****Microstructure Evolution, Deformation, and Damage:** *Veronica Anghel*<sup>1</sup>; Ramon Martinez<sup>1</sup>; Benjamin Derby<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:20 AM**

**Investigation of Deformation Behaviours and Microstructure Evolution with Advanced Characterization:** *Kai Zhang*<sup>1</sup>; <sup>1</sup>University College London

**8:40 AM**

**Elucidating Deformation Mechanisms in Friction-stir Processed Al-7075 Alloy Using In-situ Synchrotron X-ray Diffraction And Ex-situ Electron Backscattered Diffraction Techniques:** *Rakesh Kamath*<sup>1</sup>; Tingkun Liu<sup>2</sup>; Hrishikesh Das<sup>2</sup>; Piyush Upadhyay<sup>2</sup>; Arun Devaraj<sup>2</sup>; Dileep Singh<sup>1</sup>; <sup>1</sup>Argonne National Laboratory; <sup>2</sup>Pacific Northwest National Laboratory

**9:00 AM**

**Multiscale Characterization of Deformation and Defect Structures During Continuous Bending Under Tension in Commercially Pure Titanium:** *Nathan Miller*<sup>1</sup>; David Fullwood<sup>1</sup>; Michael Miles<sup>1</sup>; Asher Webb<sup>1</sup>; Addison McClure<sup>1</sup>; Marko Knezevic<sup>2</sup>; Brad Kinsey<sup>2</sup>; Nicholas Pitkin<sup>2</sup>; Tasnim Oishi<sup>2</sup>; Desmond Mensah<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

**9:20 AM**

**In-situ Experiment for SEM DIC and HREBSD Over a Concurrent Domain:** *Will Gilliland*<sup>1</sup>; Timothy Ruggles<sup>1</sup>; Kaitlynn Conway<sup>1</sup>; Jacob Hochhalter<sup>2</sup>; Jay Carrol<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of Utah

**9:40 AM Break**

**10:00 AM**

**HR-EBSD Characterization of Subgrains in an Interstitial-free Steel Following High-temperature Deformation:** *Thomas Bennett*<sup>1</sup>; Eric Taleff<sup>1</sup>; <sup>1</sup>University of Texas at Austin

**10:20 AM**

**Investigation of Grain Boundary Effect on the Strain Hardening of Mg-4Al by In Situ Tensile Testing in SEM and High Resolution EBSD:** *Eunji Song*<sup>1</sup>; Mohsen Andani<sup>1</sup>; Amit Misra<sup>1</sup>; <sup>1</sup>University of Michigan

**10:40 AM**

**Rapid Characterisation of the Slip Activity in Ordered Intermetallics Using Automated Slip Trace Analysis and Composition Gradients:** *Vincent Gagneur*<sup>1</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham

**11:00 AM Invited**

**An Investigation to the Effects of Texture and Microstructure on Grain-scale Stress Development in Notched Specimens**  
: *Hamidreza Abdolvand*<sup>1</sup>; Alireza Tondro<sup>2</sup>; Brandon Kuo<sup>1</sup>; Karim Louca<sup>2</sup>; Katherine Shanks<sup>3</sup>; <sup>1</sup>The University of Western Ontario; <sup>2</sup>University of Western Ontario; <sup>3</sup>Cornell University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Advanced Functional and Structural Thin Films and Coatings — Thin Films and Interfaces: Fabrication & Characterization II**



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

**Program Organizers:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Karine Mougine, Cnrs, Is2m; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

**Tuesday AM | March 5, 2024**  
**Bayhill 26 | Hyatt**

**Session Chairs:** Ramana Chintalapalle, University of Texas at El Paso; Karine Mougine, Cnrs - Is2m

### 8:00 AM Introductory Comments

**8:05 AM**

**Enhanced Bandgap Emission from Czochralski Silicon by Gate Oxide and Spin-coated Silica Coatings:** *Sufian Abedrabbo*<sup>1</sup>; Ali Abdullah<sup>1</sup>; Mohammad Zeidan<sup>1</sup>; Elmostafa Benchafia<sup>1</sup>; Anthony T. Fiory<sup>2</sup>; Nuggehalli M. Ravindra<sup>3</sup>; <sup>1</sup>Khalifa University; <sup>2</sup>Integron Solutions LLC.; <sup>3</sup>New Jersey Institute of Technology

**8:35 AM**

**Self-organized Nanostructured Bonds through Transient Liquid Phase Bonding:** *Zhaoxi Cao*<sup>1</sup>; Samuel Price<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

**8:55 AM**

**Functionalization Strategies for Rubber Seed Oil-based Thin Films: A Critical Review:** Aireguamen Aigbodion<sup>1</sup>; Best Atoe<sup>2</sup>; Ifeanyi Odiachi<sup>3</sup>; Clinton Ehigie<sup>4</sup>; Ikhazuagbe Ifijen<sup>5</sup>; *Nyaknno Udokpoh*<sup>5</sup>; <sup>1</sup>Benson Idahosa University; <sup>2</sup>Worldwide Healthcare; <sup>3</sup>Delta State Polytechnic; <sup>4</sup>University of Benin; <sup>5</sup>Rubber Research Institute of Nigeria

### 9:15 AM Concluding Comments

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 — Energy Storage with Battery I

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

**Tuesday AM | March 5, 2024**  
**Celebration 13 | Hyatt**

**Session Chairs:** Dongping Lu, PNNL; Sarbajit Banerjee, Texas A&M; Justin Andrews, Purdue University

**8:00 AM Invited**

**An Emerging Paradigm of Learning Electrolyte Mass Transport Behavior from Operando Concentration Profiles:** *Aashutosh Mistry*<sup>1</sup>; Hans-Georg Steinrück<sup>2</sup>; Michael Toney<sup>3</sup>; Nitash Balsara<sup>4</sup>; Venkat Srinivasan<sup>5</sup>; <sup>1</sup>Colorado School of Mines;

<sup>2</sup>Universität Paderborn; <sup>3</sup>University of Colorado Boulder; <sup>4</sup>University of California Berkley; <sup>5</sup>Argonne National Laboratory

**8:25 AM**

**Carbon Coated MnNCN Nanocomposite as an Electrode Material for Li-ion Battery:** *Sanjula Pradhan*<sup>1</sup>; Nand Prasad<sup>1</sup>; <sup>1</sup>IIT BHU

**8:45 AM**

**Carbon Materials: an Indispensable Contender in the Field of Energy Storage Applications:** *Montajar Sarkar*<sup>1</sup>; Rumana Hossain<sup>1</sup>; Veena Sahajwalla<sup>1</sup>; <sup>1</sup>SMART/UNSW

**9:05 AM Keynote**

**Design Principles for Insertion Electrodes and Solid Electrolytes of Anion Batteries:** *Sarbajit Banerjee*<sup>1</sup>; <sup>1</sup>Texas A&M University

**9:35 AM Break**

**9:55 AM**

**Characterization of Black Mass After Different Pre-treatment Processes for Optimized Metal Recovery:** *Amalie Olsen*<sup>1</sup>; *Ragnhild Aune*<sup>1</sup>; Lars Arnberg<sup>1</sup>; Sulalit Bandyopadhyay<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology

**10:15 AM Invited**

**Designing Cathode Materials that Circumvent Phase Transitions: Insight from Scanning Transmission X-ray Microscopy and Resonant Inelastic X-ray Scattering:** *Justin Andrews*<sup>1</sup>; <sup>1</sup>Purdue University

**10:40 AM**

**Development of High-energy All-solid-state Lithium-Sulfur Battery:** *Dongping Lu*<sup>1</sup>; Michael Kindle<sup>1</sup>; Daniel Marty<sup>1</sup>; Jing Wu<sup>1</sup>; Dahee Jin<sup>1</sup>; Un Hyuck Kim<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab

**11:00 AM**

**Electrochemical-driven Green Recovery of Lithium, Graphite and Cathode from Lithium-ion Batteries using Water:** *Ikenna Nlebedim*<sup>1</sup>; Abhishek Sarkar<sup>2</sup>; Prashant Gargh<sup>3</sup>; Anirudha Karati<sup>1</sup>; Sabyasachi Paul<sup>3</sup>; Sourav Das<sup>3</sup>; Pranav Shrotriya<sup>3</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Indian Institute of Technology, Kanpur; <sup>3</sup>Iowa State University

**11:20 AM**

**Two Dimensional Graphene and MoS<sub>2</sub> Based Ultra-micro Supercapacitor:** *Abha Misra*<sup>1</sup>; Vinod Panwar<sup>1</sup>; Pankaj Chauhan<sup>1</sup>; Sumana Kumar<sup>1</sup>; Rahul Tripathi<sup>1</sup>; <sup>1</sup>Indian Institute of Science

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## 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

**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 5, 2024**

**8:00 AM Invited**

**Real-time and In-situ Measurements Using High-speed AFM:** *Stacy Moore*<sup>1</sup>; Tomas Martin<sup>1</sup>; Oliver Payton<sup>2</sup>; Loren Picco<sup>2</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>Bristol Nano Dynamics Ltd.

**8:40 AM Invited**

**Picosecond Laser Ultrasound Spatial and Temporal Tracking of Material Property Changes Under Irradiation:** Elena Botica Artalejo<sup>1</sup>; Greg Wallace<sup>1</sup>; Eleni Mowery<sup>1</sup>; Myles Stapelberg<sup>1</sup>; Aljazzy Alahmadi<sup>1</sup>; Saleem Al Dajani<sup>1</sup>; Benjamin Dacus<sup>1</sup>; Jonas Rajagopal<sup>1</sup>; Angus Wylie<sup>1</sup>; *Michael Short*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:00 AM**

**Limited Angle X-ray Nanotomography Captures Solidification in 4D:** *Soumyadeep Dasgupta*<sup>1</sup>; Kyle Farmer<sup>1</sup>; Paul Chao<sup>1</sup>; Shanmukha Kiran Aramanda<sup>1</sup>; Xianghui Xiao<sup>2</sup>; Elizabeth Holm<sup>1</sup>; Ashwin Shahani<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Brookhaven National Laboratory

**9:20 AM**

**Probing the Dynamics of Materials with Ultrafast Transmission Electron Microscopy:** *Volkan Ortolan*<sup>1</sup>; <sup>1</sup>University of Connecticut

**9:40 AM Break**

**10:00 AM Invited**

**Depicting Fast Processes in Real-time by Ultra-high Speed Synchrotron-based Hard X-ray Imaging:** *Alexander Rack*<sup>1</sup>; <sup>1</sup>European Synchrotron Radiation Facility

**10:20 AM Invited**

**Towards MHz X-ray High-resolution Holography at European XFEL:** *Patrik Vagovic*<sup>1</sup>; Tokushi Sato<sup>2</sup>; Jayanath Koliyadu<sup>2</sup>; Sarlota Birnsteinova<sup>2</sup>; Johan Bielecki<sup>2</sup>; Trey Guest<sup>2</sup>; Marcin Sikorski<sup>2</sup>; Marco Ramilli<sup>2</sup>; Richard Bean<sup>2</sup>; Romain Letrun<sup>2</sup>; Rita Graceffa<sup>2</sup>; Antonio Bonucci<sup>2</sup>; Luigi Adriano<sup>2</sup>; Abhisakh Sarma<sup>2</sup>; Peter Szeles<sup>3</sup>; Daniel Moško<sup>3</sup>; Kristián Sabol<sup>3</sup>; Pablo Villanueva Perez<sup>4</sup>; Jozef Uliný<sup>3, 4</sup>; Alke Meents<sup>1</sup>; Henry Chapman<sup>1</sup>; <sup>1</sup>CFEL, DESY; <sup>2</sup>European XFEL; <sup>3</sup>Šafárik University; <sup>4</sup>Lund University

**10:40 AM**

**XRF: A New Materials-science Research Facility for the International Space Station:** *Wilhelmus Sillekens*<sup>1</sup>; Guillaume Reinhart<sup>2</sup>; Ana Frutos Pastor<sup>1</sup>; Antonella Sgambati<sup>1</sup>; <sup>1</sup>European Space Agency; <sup>2</sup>Aix-Marseille Univ, Université de Toulon

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco — Multicaloric Materials and Their Functional Properties**

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

**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center

**Tuesday AM | March 5, 2024**  
**Bayhill 22 | Hyatt**

**Session Chair:** Tino Gottschall, Helmholtz-Zentrum Dresden-Rossendorf

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**8:00 AM Invited**

**Magnetic Field Suppression of the Martensitic Transition in NiMn-based Metamagnetic Shape Memory Heusler Compounds:** *Patricia Lázpita*<sup>1</sup>; Jon Gutiérrez<sup>1</sup>; David Mérida<sup>1</sup>; Andrew Ammerlaan<sup>2</sup>; Uli Zeitler<sup>2</sup>; Volodymyr Chernenko<sup>1</sup>; <sup>1</sup>University of Basque Country; <sup>2</sup>High Field Magnet Laboratory (HFML-EMFL), Radboud University

**8:30 AM Invited**

**Thermal First Order Reversal Curves (TFORC) measurements and properties of (NiMnSi)<sub>0.66</sub>(Fe<sub>2</sub>Ge)<sub>0.34</sub> alloy:** *Cosmin Radu*<sup>1</sup>; Brad Dodrill<sup>1</sup>; Harry Reichard<sup>1</sup>; Tetsuo Shimizu<sup>1</sup>; David Daughton<sup>1</sup>; Luis Moreno-Ramirez<sup>2</sup>; Victorino Franco<sup>2</sup>; <sup>1</sup>Lake Shore Cryotronics Inc; <sup>2</sup>Universidad de Sevilla

**9:00 AM Invited**

**Multi-caloric Experimental Investigation of FeSMA and MetaSMA Materials NiMn-based: Cast Alloys, Sintered Samples and Melt Spun Ribbons:** *Elena Villa*<sup>1</sup>; <sup>1</sup>CNR ICMATE Lecco Unit

**9:30 AM Break**

**9:50 AM**

**Magnetoelastic Coupling Transition Behavior in (Mn,Ni,Fe)<sub>2</sub>(P,Si) Alloys:** *Ki Hoon Kang*<sup>1</sup>; A Young Lee<sup>1</sup>; Jong-Woo Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

**10:10 AM**

**Small-scale Mechanical Shape-memory Behaviour of Austenitic NiMnGa:** *Adnan Fareed*<sup>1</sup>; Julian Rosalie<sup>1</sup>; Satyakam Kar<sup>2</sup>; Sebastian Fähler<sup>3</sup>; Robert Maaß<sup>1</sup>; <sup>1</sup>BAM; <sup>2</sup>Leibniz IFW Dresden, Institute for Metallic Materials; <sup>3</sup>Institute of Ion Beam Physics and Materials Research Helmholtz-Zentrum Dresden-Rossendorf (HZDR)

**10:30 AM**

**A Solution to the Permalloy Problem:** *Ananya Balakrishna*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — Additive Manufacturing of Ceramic Materials

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

**Tuesday AM | March 5, 2024**

**Celebration 10 | Hyatt**

**Session Chairs:** Eugene Olevsky, San Diego State University; Alexander Dupuy, University of Connecticut

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**8:00 AM Introductory Comments****8:05 AM**

**Additively Formed Composite Carbide Fibers:** Kenan Fronk<sup>1</sup>; Charles Cook<sup>1</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>University of Alabama

**8:25 AM**

**Mechanical Properties Investigation of Amorphous Oxide Coatings Produced by Pulsed Laser Deposition:** Federico Piccagli<sup>1</sup>; <sup>1</sup>X-nano SRL

**8:45 AM**

**Hierarchically-porous, Diatomite-based Absorbents Fabricated by Combining 3D-printed Templating and Freeze Casting Techniques for Wastewater Treatments:** Li-Chin Li<sup>1</sup>; Haw-Kai Chang<sup>1</sup>; Yu-Hsiang Lo<sup>1</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**9:05 AM**

**Spark Plasma Sintering Fabricating Transparent Alumina Complex Shape:** Eugene Olevsky<sup>1</sup>; CheolWoo Park<sup>1</sup>; Elisa Torresani<sup>1</sup>; Christopher Haines<sup>2</sup>; <sup>1</sup>San Diego State University; <sup>2</sup>DEVCOM Army Research Laboratory

**9:25 AM Break****9:40 AM Invited**

**Production of Additive W-Ta Refractory Powders by Mechanical Alloying:** Paul Sanders<sup>1</sup>; Bowen Li<sup>2</sup>; Nick Johnson<sup>3</sup>; Amberlee Haselhuhn<sup>3</sup>; <sup>1</sup>Michigan Technological University; <sup>2</sup>Michigan Technological University; <sup>3</sup>LIFT

**10:00 AM**

**Synthesis and Characterization of Laser Cladding AlMgB14 – Metal Composite Coatings:** Nathan Madden<sup>1</sup>; James Tomich<sup>1</sup>; Josh Hammell<sup>1</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

**10:20 AM**

**3D Printed Carbon-carbon Tooling as an Energy Efficient Alternative to Graphite in EFAS/SPS:** Jorgen Rufner<sup>1</sup>; Arin Preston<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**10:40 AM**

**Control of Vapor Phase Mixtures for Additively Deposited Carbon Structures:** Kyle Pardue<sup>1</sup>; Charles Cook<sup>1</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>University of Alabama

**11:00 AM**

**High Temperature Characterizations of Ceramics and Metals by Heating Microscopy:** Heng Wang<sup>1</sup>; Florian Linseis<sup>1</sup>; Sebastian Seibt<sup>1</sup>; <sup>1</sup>Linseis Inc.

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**MECHANICS OF MATERIALS****Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Tuesday AM | March 5, 2024**

**Barrel Spring II | Hyatt**

**Session Chairs:** Oleg Senkov, MRL Materials Resources LLC; E-Wen Huang, National Yang Ming Chiao Tung University

**8:00 AM Invited**

**Twinning-controlled Deformation Behavior of a MoReW Equimolar Alloy:** Oleg Senkov<sup>1</sup>; Satish Rao<sup>1</sup>; Glenn Balbus<sup>2</sup>; Robert Wheeler<sup>3</sup>; Todd Butler<sup>2</sup>; <sup>1</sup>MRL Materials Resources LLC; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>UES, Inc.

**8:20 AM Invited**

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

**8:40 AM Invited**

**Predicting the Strength of Multi-principal Element Alloys: A Mechanistic Data-driven Approach:** Huajian Gao<sup>1</sup>; Ali Rida<sup>2</sup>; Markus Sudmanns<sup>2</sup>; Yanfei Wang<sup>3</sup>; Zhuocheng Xie<sup>4</sup>; Xiaolong Ma<sup>5</sup>; Wenxin Zhou<sup>6</sup>; Yejun Gu<sup>7</sup>; Jaafar El-Awady<sup>2</sup>; <sup>1</sup>Nanyang Technological University; <sup>2</sup>Johns Hopkins University; <sup>3</sup>Peking University; <sup>4</sup>South China University of Technology; <sup>5</sup>City University of Hong Kong; <sup>6</sup>University of California, San Diego; <sup>7</sup>Institute of High Performance Computing

**9:00 AM Invited**

**Ultra-High Temperature Mechanical Testing Above 1200°C:** Syed Idrees Afzal Jalali<sup>1</sup>; Michael Patullo<sup>1</sup>; Sharon Park<sup>1</sup>; Noah Phillips<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>ATI

**9:20 AM Invited**

**Phase-Specific Damage Tolerance of a Eutectic High Entropy Alloy:** Shristy Jha<sup>1</sup>; Rajiv Mishra<sup>1</sup>; Sundeep Mukherjee<sup>1</sup>; <sup>1</sup>University of North Texas

**9:40 AM Break****10:00 AM**

**Fracture of Refractory High Entropy Alloys in Extreme Temperature Environments:** David Cook<sup>1</sup>; Punit Kumar<sup>2</sup>; Calvin Belcher<sup>3</sup>; Madelyn Payne<sup>1</sup>; Wenqing Wang<sup>1</sup>; Pedro Borges<sup>1</sup>; Flynn Walsh<sup>1</sup>; Mingwei Zhang<sup>2</sup>; Andrew Minor<sup>1</sup>; Mark Asta<sup>1</sup>; Diran Apelian<sup>3</sup>; Enrique Lavernia<sup>3</sup>; Robert Ritchie<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Berkeley National Labs; <sup>3</sup>University of California, Irvine;

**10:20 AM Invited**

**High-temperature Service Performance and Microstructure Evolution of a Nb<sub>45</sub>Ta<sub>25</sub>Ti<sub>15</sub>Hf<sub>15</sub> Refractory High-entropy Alloy:** Gianmarco Sahragard-Monfared<sup>1</sup>; Calvin Belcher<sup>2</sup>; Mingwei Zhang<sup>1</sup>; Cheng Zhang<sup>2</sup>; Andrew Minor<sup>3</sup>; Diran Apelian<sup>2</sup>; Enrique Lavernia<sup>2</sup>; Jeffery Gibeling<sup>1</sup>; <sup>1</sup>University of California, Davis; <sup>2</sup>University of California, Irvine; <sup>3</sup>Lawrence Berkeley National Laboratory (LBNL, LBL)

**10:40 AM**

**Mechanical Properties of Additively Manufactured GRX-810 Alloy from Cryogenic to Elevated Temperatures:** Alireza Jam<sup>1</sup>; Timothy M. Smith<sup>2</sup>; Christopher A. Kantzos<sup>3</sup>; Paul R. Gradl<sup>3</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>Propulsion Department, NASA Marshall Space Flight Center

**11:00 AM**

**The Effect of Atomic Configurations on the Stacking Fault Energy of the FCC Matrix Phase in FeNiMoW:** Sarah O'Brien<sup>1</sup>; Matthew Beck<sup>1</sup>; <sup>1</sup>University of Kentucky

## Advances in Pyrometallurgy: Furnace Containment — Refractories

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, TMS: Industrial Advisory Committee

**Program Organizers:** Gerardo Alvear Flores, CaEng Associates; Camille Fleuriault, Eramet Norway; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Hugo Joubert, Tenova Pyromet; Stuart Nicol, Glencore Technology; Phillip Mackey, P.J. Mackey Technology, Inc.; Jesse White, Kanthal AB; Isabelle Nolet, Hatch

**Tuesday AM | March 5, 2024**  
**Celebration 5 | Hyatt**

**Session Chairs:** Dean Gregurek, RHI Magnesita; Stuart Nicol, Glencore Technology

### 8:00 AM Introductory Comments

**8:05 AM**

**Characterization of a Nickel Flash Smelter Refractory Material – The Effect of Thermal Gradient:** *Juho Lehmusto*<sup>1</sup>; *Saara Söyrinki*<sup>2</sup>; *Juha Lagerbom*<sup>2</sup>; *Tuomas Jokiaho*<sup>2</sup>; *Zaiqing Que*<sup>2</sup>; *Jorma Määttä*<sup>3</sup>; *Leena Hupa*<sup>1</sup>; *Elina Huttunen-Saarivirta*<sup>2</sup>; *Mari Lindgren*<sup>4</sup>; <sup>1</sup>Abo Akademi University; <sup>2</sup>VTT Technical Research Centre of Finland Ltd; <sup>3</sup>University of Turku; <sup>4</sup>Metso

**8:25 AM**

**Anchorage Force and High Temperature Stability of Refractory Fiber Modules:** *Dong Yue*<sup>1</sup>; *Jiulin Tang*<sup>2</sup>; *Bo Liu*<sup>1</sup>; *Liangying Wen*<sup>1</sup>; <sup>1</sup>Chongqing University; <sup>2</sup>Dongfang Boiler Co. Ltd, Dongfang Electric Group

**8:45 AM**

**Important Microstructural Features of Refractory Bricks and Their Relation With the Degradation Mechanisms:** *Annelies Malfliet*<sup>1</sup>; <sup>1</sup>KU Leuven

**9:05 AM**

**Study on Slag Phase Erosion Behavior and Mechanism of Carbon Composite Brick in Hydrogen-rich Blast Furnace Hearth:** *Mingbo Song*<sup>1</sup>; *Kexin Jiao*<sup>1</sup>; *Cui Wang*<sup>1</sup>; *Chuan Wang*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**9:25 AM Break**

**9:45 AM**

**A Modified Rotating Finger Test Aiming to Quantify Refractory Wear Based on Fundamental Equations Governing Refractory Dissolution and Erosion:** *Burhanuddin Burhanuddin*<sup>1</sup>; *Harald Harmuth*<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

**10:05 AM Invited**

**Slag Optimization with Respect to Steel Quality and Refractory Protection in a Steel Ladle Furnace:** *Elmira Moosavi-Khoonsari*<sup>1</sup>; *Kianoosh Kaveh*<sup>2</sup>; *Mohammad Jahazi*<sup>2</sup>; <sup>1</sup>Ecole de technologie superieure; University of Toronto; <sup>2</sup>Ecole de technologie superieure

**10:25 AM**

**Flexospheres Technology - Improved Flexibility and Corrosion Resistance of Fired Magnesia-chromite Bricks:** *Francesca Capó Tous*<sup>1</sup>; *Jürgen Schmidl*<sup>1</sup>; *Bernd Neubauer*<sup>1</sup>; *Dean Gregurek*<sup>1</sup>; <sup>1</sup>RHI Magnesita GmbH

**10:45 AM Concluding Comments**

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Advances in the State-of-the-Art of High Temperature Alloys – Environmental Effects

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

**Program Organizers:** Dinc Erdeniz, University of Cincinnati; Benjamin Adam, Oregon State University; Michael Kirka, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; Juan Carlos Madeni, Johns Manville Technical Center; Govindarajan Muralidharan, Oak Ridge National Laboratory

**Tuesday AM | March 5, 2024**  
**Bayhill 17 | Hyatt**

**Session Chair:** Dinc Erdeniz, University of Cincinnati

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#### 8:00 AM Invited

**Developing a High-throughput Oxidation Screening Test:** *Ian Mccue*<sup>1</sup>; Gregory Natsui<sup>2</sup>; Jihoon Jeong<sup>1</sup>; Rujing Zha<sup>1</sup>; Jennifer Glerum<sup>1</sup>; Wei Chen<sup>1</sup>; Jian Cao<sup>1</sup>; Scott Oppenheimer<sup>2</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>General Electric - Global Research Center

#### 8:30 AM

**High Temperature Oxidation Behavior of (CoCrNi)100-xCx Medium Entropy Alloy Fabricated by Laser Powder Bed Fusion:** *Soobin Kim*<sup>1</sup>; So-Yeon Park<sup>1</sup>; Kee-Ahn Lee<sup>1</sup>; <sup>1</sup>Inha university

#### 8:50 AM

**Investigating the Oxidation Mechanisms of Polycrystalline Ni-based Superalloys at 800°C With Varying Ti:Ta Contents:** *Frances Synnott*<sup>1</sup>; Dennis Premoli<sup>1</sup>; Paraskevas Kontis<sup>2</sup>; Lewis Owen<sup>1</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>Norwegian University of Science and Technology; <sup>3</sup>University of Cambridge; <sup>4</sup>Rolls-Royce plc.

#### 9:10 AM

**Neutron and Synchrotron Diffraction Studies to Understand the Mechanism and the Influence of Hydrogen on the Microstructure of Superalloys:** Alexander Mutschke<sup>1</sup>; *Massimo Fritton*<sup>1</sup>; Oliver Nagel<sup>2</sup>; Steffen Neumeier<sup>2</sup>; Masood Hafez<sup>3</sup>; Bodo Germann<sup>3</sup>; Ralph Gilles<sup>1</sup>; <sup>1</sup>Heinz Maier-Leibnitz Zentrum; <sup>2</sup>Friedrich-Alexander-Universität Erlangen-Nürnberg; <sup>3</sup>VDM-Metals

#### 9:30 AM Break

#### 9:45 AM

**High Temperature Mechanical Behaviour of Novel Chromium Superalloys via Small Punch Testing:** *Tom Blackburn*<sup>1</sup>; Kan Ma<sup>1</sup>; Rebeca Hernandez<sup>2</sup>; Michael Kerbstadt<sup>3</sup>; Tatu Pinomaa<sup>4</sup>; Mathias Galetz<sup>3</sup>; Marta Serrano<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>CIEMAT; <sup>3</sup>DECHEMA-Forschungsinstitut; <sup>4</sup>VTT

#### 10:05 AM

**Role of Diffusion-induced Grain Boundary Migration in the Oxidation Response of a Ni-30Cr Alloy:** *Fei Xue*<sup>1</sup>; Emmanuelle Marquis<sup>1</sup>; <sup>1</sup>University of Michigan

#### 10:25 AM

**Surface-roughness Effects on Oxidation Rate at High Temperatures in Ni-based Single-crystal Superalloys:** *Aidan O'Donnell*<sup>1</sup>; Jean Briac Le-Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University



10:45 AM

**Thermodynamic Model-guided Regulation of Self-propagating In-Situ Synthesis of Titanium-aluminum Alloys:** *Han Jiang*<sup>1</sup>; Zhi-he Dou<sup>1</sup>; Ting-an Zhang<sup>1</sup>;

<sup>1</sup>Northeastern University

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## LIGHT METALS

### Advances in Titanium Technology – Session III

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

Tuesday AM | March 5, 2024

Windermere X-1 | Hyatt

**Session Chair:** Yu-Lung Chiu, University of Birmingham

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8:00 AM Keynote

**2024 Institute of Metals Lecture/Robert Franklin Mehl Award: Optimization of Microstructure of Titanium Alloys Processed Using Additive Manufacturing:**

Mohan Nartu<sup>1</sup>; Brian Welk<sup>2</sup>; Srinivas Mantri<sup>3</sup>; Nevin Taylor<sup>2</sup>; Gopal Viswanathan<sup>2</sup>; Rajarshi Banerjee<sup>4</sup>; Narendra Dahotre<sup>4</sup>; *Hamish Fraser*<sup>2</sup>; <sup>1</sup>PNNL; <sup>2</sup>Ohio State University; <sup>3</sup>ANL; <sup>4</sup>University of North Texas

8:30 AM

**Novel Bainitic Ti Alloys Designed for Additive Manufacturing:** *Duyao Zhang*<sup>1</sup>; Ryan Brooke<sup>1</sup>; Dong Qiu<sup>1</sup>; Mark Gibson<sup>1</sup>; Mark Easton<sup>1</sup>; <sup>1</sup>MIT University

8:50 AM

**Microstructure Transition Gradients in Next-generation Alloy-Alloy-Composite Titanium AM Aerospace Components:** *Alec Davis*<sup>1</sup>; Albert Smith<sup>2</sup>; Jack Donoghue<sup>1</sup>;

Vivek Sahu<sup>1</sup>; Dongchen Hu<sup>1</sup>; Jacob Kennedy<sup>3</sup>; Armando Caballero<sup>4</sup>; Romali Biswal<sup>4</sup>; Philip Prangnell<sup>1</sup>; <sup>1</sup>University of Manchester; <sup>2</sup>TESCAN; <sup>3</sup>Institut Jean Lamour; <sup>4</sup>Cranfield University

9:10 AM

**Additive Friction Stir Deposition of a Metastable -titanium Alloy:** *Anurag Krishnakumar Gumaste*<sup>1</sup>; Abhijeet Dhal<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Rajiv S. Mishra<sup>1</sup>;

<sup>1</sup>University of North Texas

9:30 AM Break

9:50 AM Invited

**Ultrastrong Nanotwinned Titanium Alloys Through Additive Manufacturing:** *Aijun Huang*<sup>1</sup>; Yuman Zhu<sup>1</sup>; <sup>1</sup>Monash University

10:15 AM

**Novel Twinning in Shock Loaded Additive Metastable Ti5553:** *Tim Ruggles*<sup>1</sup>; Josh Kacher<sup>2</sup>; Paul Kotula<sup>1</sup>; Brittany Branch<sup>1</sup>; Paul Specht<sup>1</sup>; <sup>1</sup>Sandia National Laboratories;

<sup>2</sup>Georgia Institute of Technology

10:35 AM

**Microstructural Manipulation of LPBF Ti-6Al-4V by Hydrogen Heat Treatment:**

*Matthew Dunstan*<sup>1</sup>; Matthew Vaughn<sup>1</sup>; James Paramore<sup>1</sup>; Brady Butler<sup>1</sup>; Kevin Hemker<sup>2</sup>; Andelle Kudzal<sup>3</sup>; <sup>1</sup>US Army Research Laboratory; <sup>2</sup>Johns Hopkins University; <sup>3</sup>Naval Surface Warfare Center Carderock Division

**10:55 AM****Effect of Electropulsing on Ti-6Al-4V Fabricated by Selective Laser Melting:** *Seong Ho Lee*<sup>1</sup>; *Jinyeong Yu*<sup>2</sup>; *Seho Cheon*<sup>1</sup>; *Jung Gi Kim*<sup>3</sup>; *Taekyung Lee*<sup>1</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Pusan National University (PNU); <sup>3</sup>Gyeongsang National University**11:15 AM****Solid Phase Recycling of Titanium Scrap by Friction Extrusion:** *Mageshwari Komarasamy*<sup>1</sup>; *Scott Taysom*<sup>1</sup>; *Anthony Reynolds*<sup>1</sup>; *Scott Whalen*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

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**ADDITIVE MANUFACTURING****Agile Additive Manufacturing by Employing Breakthrough Functionalities — Agile AM - Breakthrough Functionalities****Sponsored by:** TMS: Additive Manufacturing Committee**Program Organizers:** Soumya Nag, Oak Ridge National Laboratory; Jonah Klemm-Toole, Colorado School of Mines; John Carpenter, Los Alamos National Laboratory; Peeyush Nandwana, Oak Ridge National Laboratory; Lang Yuan, University of South Carolina; Alex Kitt, Edison Welding Institute; Sougata Roy, Iowa State University; Sneha Prabha Narra, Carnegie Mellon University; Andrzej Nycz, Oak Ridge National Laboratory; Yousub Lee, Oak Ridge National Laboratory; Chantal Sudbrack, National Energy Technology Laboratory; Albert To, University of Pittsburgh; Yashwanth Kumar Bandari, FasTech LLC**Tuesday AM | March 5, 2024**  
**Atlantic | Hyatt****Session Chairs:** Albert To, Univ Pittsburgh; Jonah Klemm-Toole, Colorado School of Mines; John Carpenter, LANL; Soumya Nag, ORNL**8:00 AM Invited****Development of In-plane Functionally Graded Metals via Directed Energy Deposition:** *Douglas Hofmann*<sup>1</sup>; *Samad Firdosy*<sup>2</sup>; *Daniel Oropeza*<sup>3</sup>; <sup>1</sup>NASA Jet Propulsion Laboratory/Caltech; <sup>2</sup>NASA Jet Propulsion Laboratory; <sup>3</sup>University of California, Santa Barbara**8:20 AM Invited****Beyond 3D Printing of Metallic Alloys:** *Raymundo Arroyave*<sup>1</sup>; <sup>1</sup>Texas A&M University**8:40 AM****The Design and Mechanical Performance of Interlocking Metamaterials:** *Philip Noell*<sup>1</sup>; *Benjamin Young*<sup>1</sup>; *Ophelia Bolmin*<sup>1</sup>; *Nathan Brown*<sup>1</sup>; *Brad Boyce*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories**9:00 AM****Understanding Structure-property Relationships in High Temperature Functionally Graded Material:** *Marcus Hansen*<sup>1</sup>; *David Collins*<sup>2</sup>; *James Haley*<sup>2</sup>; *Brian Jordan*<sup>2</sup>; *Yousub Lee*<sup>2</sup>; *Soumya Nag*<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Oak Ridge National Laboratory**9:20 AM Invited****Additively Manufactured Magnetic Materials With Optimized Site Specific Properties:** *Raju Ramanujan*<sup>1</sup>; *Varun Chaudhary*<sup>2</sup>; *Li Tan*<sup>1</sup>; *Rajarshi Banerjee*<sup>3</sup>; <sup>1</sup>Nanyang Technological University; <sup>2</sup>Chalmers University of Technology; <sup>3</sup>University of North Texas

9:40 AM Break

10:00 AM Invited

**An Architecture for Technology Convergence Enabling Disparate Multi-material Parts:** *Jason Jones*<sup>1</sup>; <sup>1</sup>Hybrid Manufacturing Technologies

10:20 AM

**Negative Thermal Expansion Behaviour of Metallic Metamaterials Produced via Multi-material L-PBF:** *Isabel Prestes*<sup>1</sup>; Erhard Buchmann<sup>2</sup>; Philipp Höfer<sup>2</sup>; Eric Jägle<sup>1</sup>; <sup>1</sup>Institute of Materials Science, Universität der Bundeswehr München; <sup>2</sup>Institute of Lightweight Engineering, Universität der Bundeswehr München

10:40 AM

**Crystal Inspired Architected Material: Fracture Mechanism and Crack Propagation:** *Hsing Lin Wu*<sup>1</sup>; Mihn Son Pham<sup>1</sup>; <sup>1</sup>Imperial College London

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session III**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Tuesday AM | March 5, 2024**  
**Bayhill 32 | Hyatt**

**Session Chair:** Stephen Xie, KBR, Inc. at NASA Ames Research Center

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8:00 AM

**Generative Model for Closed-loop Multi-property Materials Predictions and Discovery:** *Christopher Stiles*<sup>1</sup>; Elizabeth Pogue<sup>1</sup>; Alexander New<sup>1</sup>; Brandon Wilfong<sup>2</sup>; Gregory Bassen<sup>2</sup>; Izze Hedrick<sup>2</sup>; Eddie Gienger<sup>1</sup>; Christine Piatko<sup>1</sup>; Janna Domenico<sup>1</sup>; Michael Pekala<sup>1</sup>; Nam Le<sup>1</sup>; Victor Leon<sup>1</sup>; Christopher Ratto<sup>1</sup>; Andrew Lennon<sup>1</sup>; Tyrel McQueen<sup>2</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>Johns Hopkins University

8:20 AM

**High-throughput Screening of Li Solid-State Electrolytes with Bond Valence Methods and Graph Neural Networks:** *Stephen Xie*<sup>1</sup>; Shreyas Honrao<sup>1</sup>; John Lawson<sup>2</sup>; <sup>1</sup>KBR, Inc. at NASA Ames Research Center; <sup>2</sup>NASA Ames Research Center

8:40 AM

**Harnessing Equivariant Neural Networks for High-throughput Screening of Novel Superconductors:** *Jason Gibson*<sup>1</sup>; Ajinkya Hire<sup>1</sup>; Oscar Barrera<sup>1</sup>; Philip Dee<sup>1</sup>; Benjamin Geisler<sup>1</sup>; Peter Hirschfeld<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

9:00 AM

**Global Uncertainty Reduction Through Efficient Acquisition Function Candidate Selection in Predefined Design Spaces for Predicting NMR Peak Positions:** *Ramsey*

Issa<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

9:20 AM

**Generalizable Graph Neural Network to Describe the Local Atomic Environment in High Entropy Alloys:** *Yi Yao*<sup>1</sup>; Lin Li<sup>1</sup>; <sup>1</sup>Arizona State University

9:40 AM Break

10:00 AM

**Not as Simple as We Thought: A Rigorous Examination of Data Aggregation in Materials Informatics:** *Taylor Sparks*<sup>1</sup>; Federico Ottomano<sup>2</sup>; Giovanni De Felice<sup>2</sup>; Vladimir Gusev<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Liverpool

10:20 AM

**Refractory Oxidation Database (RefOxDB): A FAIR Approach to Analyzing Oxidation Kinetics and Enhancing Oxidation Resistance:** *Saswat Mishra*<sup>1</sup>; Sharmila Karumuri<sup>1</sup>; Vincent Mika<sup>1</sup>; Collin Scott<sup>1</sup>; Chadwick Choy<sup>1</sup>; Kenneth Sandhage<sup>1</sup>; Ilias Billionis<sup>1</sup>; Michael Titus<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

10:40 AM

**Stochastic Inverse Microstructure Design:** *Adam Generale*<sup>1</sup>; Andreas Robertson<sup>1</sup>; Conlain Kelly<sup>1</sup>; Surya Kalidindi<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

11:00 AM

**Machine Learning Guided Selection of High Temperature High Entropy Refractory Ceramics:** *Maryam Mansoor*<sup>1</sup>; *Trupti Mohanty*<sup>2</sup>; Mubashir Mansoor<sup>1</sup>; Mehya Mansoor<sup>1</sup>; Hasan M Sayeed<sup>2</sup>; Enes Kurkcu<sup>1</sup>; Mustafa Olgun<sup>1</sup>; Kamil Czelej<sup>3</sup>; Burak Özkal<sup>1</sup>; Filiz Cinar Sahin<sup>1</sup>; Onuralp Yucel<sup>1</sup>; Bora Derin<sup>1</sup>; Onur Ergen<sup>1</sup>; Taylor D. Sparks<sup>2</sup>; <sup>1</sup>Istanbul Technical University; <sup>2</sup>University of Utah; <sup>3</sup>Warsaw University of Technology

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Recycling and Sustainability

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

Tuesday AM | March 5, 2024

Windermere W-1 | Hyatt

**Session Chairs:** Sazol Das, Novelis; Lukas Stemper, AMAG rolling GmbH

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8:00 AM

**Investigating the Potential of Secondary Aluminum Cast Alloys Used as Wrought Alloys:** *Patrick Krall*<sup>1</sup>; Stefan Pogatscher<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben

8:25 AM

**Creative Approaches to Long-term Recycling of Aluminium Scrap Forming AlSiMgMnCu Alloy With Excellent Mechanical and Microstructural Properties:** *Ahmed Aadli*<sup>1</sup>; <sup>1</sup>Aluminium Company of Egypt

8:50 AM

**High-throughput Compositional Study of 3xxx Al Alloy Using Laser Synthesis and Small-scale Rolling: A Case Study:** *Qingyu Pan*<sup>1</sup>; Monica Kapoor<sup>2</sup>; Patrick McGannon<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

**9:15 AM**

**Enhancing Recycling Efficiency and Critical Raw Material Substitution in 6xxx Alloys Production With Respect to Their Extrusion Feasibility and Mechanical Properties:** *Zeynep Tutku Ozen*<sup>1</sup>; Ilyas Artunc Sari<sup>1</sup>; Irem Yaren Siyah<sup>1</sup>; Alptug Tanses<sup>1</sup>; Gorkem Ozcelik<sup>1</sup>; <sup>1</sup>Asas Aluminum

**9:40 AM Break**

**9:55 AM**

**Influence of Solidification Rate and Impurity Content on 5/7-Crossover Alloys:** *Sebastian Samberger*<sup>1</sup>; Lukas Stemper<sup>2</sup>; Peter Uggowitzer<sup>1</sup>; Ramona Tosone<sup>2</sup>; Stefan Pogatscher<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben; <sup>2</sup>AMAG rolling GmbH

**10:20 AM**

**Influence of Increased Fe, Cu and Zn Concentrations on Phase Formation in Aluminum A356 (AlSi7Mg0.3) Alloy:** *Tobias Beyer*<sup>1</sup>; Robert Kleinhans<sup>2</sup>; Marcel Rosefort<sup>1</sup>; Steffen Klan<sup>2</sup>; Alice Siemund<sup>1</sup>; Peer Decker<sup>1</sup>; Wolfram Volk<sup>2</sup>; <sup>1</sup>TRIMET Aluminium SE; <sup>2</sup>Fraunhofer IGCV

**10:45 AM**

**AMAG CrossAlloy<sup>®</sup> – Lightweighting the Future by Unconstraint Alloy Design: A Case Study:** *Lukas Stemper*<sup>1</sup>; Florian Schmid<sup>1</sup>; Ramona Tosone<sup>1</sup>; <sup>1</sup>AMAG rolling GmbH

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## LIGHT METALS

### Aluminum Reduction Technology – Cell Modernization, Modelling, and Energy Optimization / Cell Operations

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Tuesday AM | March 5, 2024**  
**Windermere Y-2 | Hyatt**

**Session Chairs:** Andre-Felipe Schneider, Hatch; Nancy Holt, Hydro Aluminium AS

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**8:00 AM**

**Numerical Modeling of Anode Changes and Their Effect on Current Distribution and Magnetohydrodynamic Behavior of an Aluminium Cell:** *Jinsong Hua*<sup>1</sup>; Pascal Beckstein<sup>2</sup>; Eirik Manger<sup>3</sup>; Steinar Kolås<sup>3</sup>; Øyvind Jensen<sup>1</sup>; Sigvald Marholm<sup>1</sup>; <sup>1</sup>Institute for Energy Technology; <sup>2</sup>Hydro Aluminium Deutschland GmbH; <sup>3</sup>Hydro Aluminium AS

**8:25 AM**

**Thermoelectrical Analysis of Lying-bed Patterns during Preheating Phase:** *Rohini Nandan Tripathy*<sup>1</sup>; Simon-Olivier Tremblay<sup>1</sup>; Daniel Marceau<sup>1</sup>; Duygu Kocaefer<sup>1</sup>; Antoine Godefroy<sup>1</sup>; Sebastien Charest<sup>1</sup>; <sup>1</sup>University Research Centre on Aluminium (CURAL) - REGAL, UQAC

**8:50 AM**

**Specific Energy Reduction Through Design Modifications at Aditya Aluminium Smelter:** *Venkannababu Thalagani*<sup>1</sup>; Rajeev Yadav<sup>1</sup>; Shanmukh Rajgire<sup>1</sup>; Amit Jha<sup>1</sup>; Amit Gupta<sup>1</sup>; Sai Mahati Bottla<sup>2</sup>; Sanjay Pal<sup>2</sup>; Sarthak Mohapatra<sup>2</sup>; Anshu Mangal<sup>2</sup>; Deepak Dash<sup>2</sup>; Anish Das<sup>2</sup>; Madhusmita Sahoo<sup>2</sup>; Kamal Pandey<sup>2</sup>; Vilas Tathavadkar<sup>1</sup>; <sup>1</sup>Aditya Birla Science and Technology Company (P) Ltd; <sup>2</sup>Hindalco Industries Ltd, Aditya Aluminium

**9:15 AM**

**New 32h Tapping Cycle Implementation at ALBRAS:** *Camila Silva*<sup>1</sup>; Franciny Lobato<sup>1</sup>; Benedito Silva<sup>1</sup>; Valfredo Filho<sup>1</sup>; Michel Pena<sup>1</sup>; João Ferreira<sup>1</sup>; Marcio Souza<sup>1</sup>; Pierre Reny<sup>2</sup>; Kurt Nilsson<sup>2</sup>; <sup>1</sup>ALBRAS; <sup>2</sup>Norsk Hydro

**9:40 AM Break**

**9:55 AM**

**Re-usage of Big Butt:** *Andresa Menezes*<sup>1</sup>; *Camila da Silva*<sup>1</sup>; Michel Pena<sup>1</sup>; Marcio Souza<sup>1</sup>; Paulo Junior<sup>1</sup>; Nayary Monteiro<sup>1</sup>; Marcus Brasiliense<sup>1</sup>; João Paulo de Souza Ferreira<sup>1</sup>; Valfredo Costa<sup>1</sup>; <sup>1</sup>Albras Alumínio Brasileiro SA

**10:20 AM**

**Amperage Increase Program and Enablers in EGA Al Taweelah DX Technology Potlines:** *Vishal Ahmad*<sup>1</sup>; Ishaq Alkharusi<sup>1</sup>; Shaikha Al Shehhi<sup>1</sup>; Almero Eybers<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

**10:45 AM**

**Cell Startup and Early Operational Improvements in ALBRAS:** *Ana Nunes*<sup>1</sup>; Michel Pena<sup>1</sup>; Marcio Souza<sup>1</sup>; George Cardoso<sup>1</sup>; Pierre Reny<sup>1</sup>; Ana Guedes<sup>1</sup>; <sup>1</sup>Albras

**11:10 AM**

**Metal Tapping Yoke and Platform Modification for Improved Locking and Unlocking:** *Hassan Al Motairy*<sup>1</sup>; Yousuf Albastaki<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

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## LIGHT METALS

**An Atoms to Autos Approach for Materials Innovations for Lightweighting: An LMD Symposium in Honor of Anil K. Sachdev – Lightweighting and Structural Materials**

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

**Program Organizers:** Alan Luo, Ohio State University; Michele Manuel, University of Florida; Yue Qi, Brown University

**Tuesday AM | March 5, 2024**

**Windermere X-2 | Hyatt**

**Session Chair:** Alan Luo, The Ohio State University

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**8:00 AM Introductory Comments by Anil Sachdev and organizers**

**8:10 AM Keynote**

**Progress in Automotive Lightweighting:** *Alan Taub*<sup>1</sup>; <sup>1</sup>University of Michigan

**8:30 AM Invited**

**Advanced High Strength Sheet Steel Developments to Enable Lightweight Automotive Designs:** *David Matlock*<sup>1</sup>; John Speer<sup>1</sup>; Emmanuel De Moor<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**8:50 AM Invited**

**Increasing the Composition Range of Al-Fe-Si Intermetallics for Automotive Applications:** *Michele Manuel*<sup>1</sup>; Sujeily Soto-Medina<sup>2</sup>; Biswas Rijal<sup>3</sup>; Kausturi Parui<sup>1</sup>; Megan Butala<sup>1</sup>; Richard Hennig<sup>1</sup>; Anil Sachdev<sup>4</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Air Force Research Laboratory; <sup>3</sup>University of Buffalo; <sup>4</sup>General Motors

**9:10 AM Invited**

**Microstructural Evolution and Deformation Mechanisms in Aluminum Alloys by In situ X-ray Micro and Nanotomography:** *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

**9:30 AM Break**

**9:50 AM Keynote**

**Materials for a Connected Vehicle Experience:** *Paul Krajewski*<sup>1</sup>; <sup>1</sup>General Motors Corporation

**10:10 AM Invited**

**A Holistic Approach to Low-cost Ti:** *Zak Fang*<sup>1</sup>; <sup>1</sup>University of Utah

**10:30 AM Invited**

**The Metallurgy and Design of Alloys for Aerospace Structures – A Historical Perspective:** *Krishnan Sankaran*<sup>1</sup>; <sup>1</sup>Washington University in St Louis

**10:50 AM Invited**

**The Possibilities of Aluminum-carbon Fiber Composites for Automobile Structural Components:** *David Weiss*<sup>1</sup>; Orlando Rios<sup>1</sup>; <sup>1</sup>Ce-Ri-SS Materials, LLC

**11:10 AM**

**Effect of Ca and Zn Additions on Texture Weakening in Solid Solution Mg Alloys:** *Yang Yang*<sup>1</sup>; Wesley Cuadrado-Castillo<sup>1</sup>; Aashish Rohatgi<sup>2</sup>; Nicole Overman<sup>2</sup>; Michele Manuel<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Pacific Northwest National Laboratory

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## BIOMATERIALS

### Biological Materials Science — Biological Materials Science III

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

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

**Tuesday AM | March 5, 2024**

**Celebration 15 | Hyatt**

**Session Chairs:** Xiaoguang Dong, Vanderbilt University; Ning Zhang, Baylor University

**8:00 AM**

**Conductive Graphene Foam Bioscaffolds Facilitate Direct Electrical Stimulus for Cartilage Tissue Engineering:** *Mone't Sawyer*<sup>1</sup>; Olivia Nielson<sup>2</sup>; Hailey Burgoyne<sup>1</sup>; Katelyn Wada<sup>1</sup>; Michael Eppel<sup>1</sup>; Raquel Montenegro-Brown<sup>1</sup>; Josh Eixenberger<sup>1</sup>; David Estrada<sup>1</sup>; <sup>1</sup>Boise State University; <sup>2</sup>University of Idaho

**8:20 AM**

**Silk Biomaterials in Wound Healing: Navigating Challenges and Charting the Future of Regenerative Medicine:** *Best Atoe*<sup>1</sup>; Ikhazuagbe Ifijen<sup>2</sup>; Igbako Okemute<sup>2</sup>; Okeke Emmanuel<sup>3</sup>; Muniratu Maliki<sup>4</sup>; <sup>1</sup>Atoe Specialist Medical Centre Limited; <sup>2</sup>Rubber Research Institute of Nigeria; <sup>3</sup>University of Benin; <sup>4</sup>Edo State University

**8:40 AM**

**Dynamic Stress-induced Osteoblast Attachment on 3D Nanoarchitected Scaffold-on-Chip:** Alessandro Maggi<sup>1</sup>; Michael Abrams<sup>1</sup>; Kailin Chen<sup>2</sup>; Alexander Bolaños-Campos<sup>2</sup>; Julia Greer<sup>1</sup>; *Ottman Tertuliano*<sup>2</sup>; <sup>1</sup>California Institute of Technology; <sup>2</sup>University of Pennsylvania

**9:00 AM Invited**

**Bioinspired Ciliary Airway Implants:** *Xiaoguang Dong*<sup>1</sup>; <sup>1</sup>Vanderbilt University

**9:30 AM Break**

**9:50 AM Invited**

**Squid-inspired Protein Networks as Dynamic Self-healing Materials:** *Abdon Pena-Francesch*<sup>1</sup>; <sup>1</sup>University of Michigan

**10:20 AM**

**Cross-platform Bio-inks for 3D Printing Seamless Hydrogels as In-vivo Pressure Sensing Devices:** *Ashwin Velraj*<sup>1</sup>; Jeffrey Bates<sup>1</sup>; <sup>1</sup>University of Utah

**10:40 AM**

**Challenges and Future Perspectives of Biomimetic Materials for Biomedical Applications: Bridging the Gap Between Nature and Medicine:** Augustine Ighodaro<sup>1</sup>; John Osarobo<sup>2</sup>; Innocent Onuguh<sup>3</sup>; Osahon Ogbeide<sup>2</sup>; *Ikhazuagbe Ifijen*<sup>4</sup>; <sup>1</sup>Quantum Pharmaceuticals; <sup>2</sup>University of Benin; <sup>3</sup> Igbinedion University; <sup>4</sup>Rubber Research Institute of Nigeria

**11:00 AM Invited**

**Tapered Multifunctional Fibers for In Vivo Neural Stimulation and Recording:** *Xiaoting Jia*<sup>1</sup>; <sup>1</sup>Virginia Tech

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## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Mineralogical Analysis and Process Improvement**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Tuesday AM | March 5, 2024**

**Regency O | Hyatt**

**Session Chairs:** Bowen Li, Michigan Technological University; Shadia Jamil Ikhmayies, Isra University

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**8:00 AM**

**A Mineralogy/Microstructure Study of Alluvial Zircon From Black Sands of the Lower Cauca Region, Colombia:** *Gustavo Neira-Arenas*<sup>1</sup>; Fabio Rios-Cuitiva<sup>1</sup>; Jose Antonio Henao-Martínez<sup>2</sup>; <sup>1</sup>Universidad Nacional de Colombia; <sup>2</sup>Universidad Industrial de Santander

**8:20 AM**

**Study on the Dispersion Uniformity of 3Co-Binder in Iron Ore Concentrate:** *Jin Zhang*<sup>1</sup>; Xin Zhang<sup>1</sup>; Yesheng Cheng<sup>1</sup>; Rui Song<sup>1</sup>; Chengzhi Wei<sup>1</sup>; Guanghui Li<sup>1</sup>; Tao Jiang<sup>1</sup>; <sup>1</sup>Central South University



**8:40 AM**

**Physicochemical Characterization and Alkali Dissolution of Alluvial Fe-Columbite Deposit for Formation and Separation of Soluble Niobium and Tantalum Complexes:** *Nnaemeka Nzeh*<sup>1</sup>; Patricia Popoola<sup>1</sup>; Samson Adeosun<sup>2</sup>; Abraham Adeleke<sup>1</sup>; <sup>1</sup>Tshwane University of Tech, Pretoria; <sup>2</sup>University of Lagos

**9:00 AM**

**Characterization, Thermodynamic Evaluation and Phase Evolution of Soda-ash Assisted Roast Treatment of Alluvial Columbite Mineral Deposit for Efficient Recovery of Niobium and Tantalum:** *Nnaemeka Nzeh*<sup>1</sup>; Patricia Popoola<sup>1</sup>; Abraham Adeleke<sup>1</sup>; Samson Adeosun<sup>2</sup>; Emenike Okonkwo<sup>3</sup>; <sup>1</sup>Tshwane University of Tech; <sup>2</sup>University of Lagos, Nigeria; <sup>3</sup>University of Nigeria, Nsukka

**9:20 AM**

**Microwave and Conventional Carbothermic Reduction of Chromite Ore: A Comparison:** *Huimin Tang*<sup>1</sup>; Zhiwei Peng<sup>1</sup>; Tianle Yin<sup>1</sup>; Lei Ye<sup>1</sup>; Qiang Zhong<sup>1</sup>; Mingjun Rao<sup>1</sup>; <sup>1</sup>Central South University

**9:40 AM Break****9:55 AM**

**Femtosecond Laser Drilling on Argillaceous, Kerogen-rich, and Bituminous Shale Rocks:** *Raj Patel*<sup>1</sup>; Kelvin Xie<sup>1</sup>; Shoufeng Lan<sup>1</sup>; Preston Cunha<sup>1</sup>; <sup>1</sup>Texas A&M University

**10:15 AM**

**The Effect of Alumina Content on Cell Parameter and Reference Intensity Ratio (I/I<sub>c</sub>) of SFCA and SFCA-I Solid Solution:** *Huibo Liu*<sup>1</sup>; Liangping<sup>1</sup>; Wenzheng Jiang<sup>1</sup>; Guanghui Li<sup>1</sup>; <sup>1</sup>Central South University

**10:35 AM**

**Comparative Analysis of Airfloat Gravity Separator and High-Intensity Magnetic Separator Combined with Tilt Table Shaker for the Beneficiation of Cassiterite Ore from Riruwai, Kano State, Nigeria:** *Furqan Abdulfattah*<sup>1</sup>; Ibrahim Rafukka<sup>2</sup>; Markus Bwala<sup>1</sup>; Musa Sayyadi<sup>1</sup>; Stewart Thaddeus<sup>1</sup>; Suleiman Hassan<sup>1</sup>; <sup>1</sup>Nigerian Institute of Mining and Geosciences (NIMG); <sup>2</sup>Bayero University Kano

**10:55 AM**

**Upgrading Iron Ore by Microwave Desulphurization with Reduction of Harmful SO<sub>2</sub> Emission:** Lei Ye<sup>1</sup>; Ran Tian<sup>1</sup>; Guanwen Luo<sup>1</sup>; Huimin Tang<sup>1</sup>; Jian Zhang<sup>1</sup>; Mingjun Rao<sup>1</sup>; *Zhiwei Peng*<sup>1</sup>; <sup>1</sup>Central South University

**11:15 AM**

**Characterization and Pre-concentration of a Pegmatite Columbite Ore for Niobium Extraction:** *Abraham Adeleke*<sup>1</sup>; *Samson Adegbola*<sup>1</sup>; *Abeeb Daniyan*<sup>1</sup>; <sup>1</sup>Obafemi Awolowo University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Grain Boundary Fundamentals

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

Tuesday AM | March 5, 2024  
Bayhill 25 | Hyatt

**Session Chairs:** Nikhil Admal, University of Illinois at Urbana-Champaign;  
Douglas Medlin, Sandia National Laboratories

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**8:00 AM Invited**

**Stick-slip Solute Impairment of non-Arrhenius Boundary Migration in Incoherent Twins:** *Eric Homer*<sup>1</sup>; Akarsh Verma<sup>2</sup>; Oliver Johnson<sup>1</sup>; Gregory Thompson<sup>3</sup>; Shigenobu Ogata<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>Osaka University; <sup>3</sup>University of Alabama

**8:30 AM**

**Propagation of Microstructural Uncertainty in Molecular Dynamic Simulations of Grain Growth and Comparison with Experiment 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

**8:50 AM**

**Universality of Grain Boundary Phases in [111] Tilt Boundaries of fcc Metals:** *Tobias Brink*<sup>1</sup>; Lena Langenohl<sup>1</sup>; Saba Ahmad<sup>1</sup>; Christian Liebscher<sup>1</sup>; Gerhard Dehm<sup>1</sup>; <sup>1</sup>MPI Eisenforschung

**9:10 AM**

**Pattern Formation of Grain Boundary Phases:** *Ian Winter*<sup>1</sup>; Timofey Frolov<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Lawrence Livermore National Laboratory

**9:30 AM Break**

**9:50 AM Invited**

**Revealing the Cyclic Nature of Grain Boundary Microstates via Microscopy and Deep Learning:** Emily Hopkins<sup>1</sup>; Annie Barnett<sup>1</sup>; Ryan Jacobs<sup>2</sup>; Priyam Patki<sup>3</sup>; Kevin Field<sup>3</sup>; Dane Morgan<sup>2</sup>; Jaime Marian<sup>4</sup>; David Srolovitz<sup>5</sup>; Michael Falk<sup>1</sup>; *Mitra Taheri*<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Wisconsin; <sup>3</sup>University of Michigan; <sup>4</sup>University of California, Los Angeles; <sup>5</sup>University of Hong Kong; University of Pennsylvania

**10:20 AM**

**Radiation Induced Steady State Grain Boundary Structures and Their Dynamics:** *Ian Chesser*<sup>1</sup>; Sarah Paguaga<sup>1</sup>; Peter Derlet<sup>2</sup>; Abigail Hunter<sup>1</sup>; Blas Uberuaga<sup>1</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Paul Scherrer Institute

**10:40 AM**

**Efficient Method for Investigating the Energy Anisotropy and Faceting in Cylindrical Grain Boundaries:** *Anqi Qiu*<sup>1</sup>; Ian Chesser<sup>2</sup>; Elizabeth Holm<sup>3</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of Michigan, Ann Arbor

**11:00 AM**

**Multiscale Simulations of Grain Boundary Segregation of Hydrogen and Its Impacts on Grain Boundary Dynamics:** *Younggil Song*<sup>1</sup>; Longsheng Feng<sup>1</sup>; Wonseok Jeong<sup>1</sup>; ShinYoung Kang<sup>1</sup>; Kyoung Eun Kweon<sup>1</sup>; Tae Wook Heo<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Computational Discovery and Design of Materials — Session III**

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

**Program Organizers:** Houlong Zhuang, Arizona State University; Ismaila Dabo, Pennsylvania State University; Arezoo Emdadi, Missouri University of Science and Technology; Yang Jiao, Arizona State University; Sara Kadkhodaei, University Of Illinois Chicago; Mahesh Neupane, DEVCOM Army Research Laboratory; Xiaofeng Qian, Texas A&M University; Arunima Singh, Arizona State University; Natasha Vermaak, Lehigh University

**Tuesday AM | March 5, 2024**  
**Bayhill 33 | Hyatt**

**Session Chair:** Peter Schindler, Northeastern University

**8:00 AM**

**Large-scale Ab-Initio Computation of Core Energetics of Pyramidal Dislocations in Mg and Mg-Y Alloy Using DFT-FE: Implications Towards Ductility Enhancement:** *Sambit Das*<sup>1</sup>; Vikram Gavini<sup>1</sup>; <sup>1</sup>University of Michigan

**8:20 AM**

**Machine Learning Accelerated Thermodynamic Search for Ductile Cr-based Alloys for High-Temperature Applications Complemented by Ab-Initio Simulations:** *Lassi Linnala*<sup>1</sup>; Mikko Tahkola<sup>1</sup>; Abhishek Biswas<sup>1</sup>; Matti Lindroos<sup>1</sup>; Napat Vajragupta<sup>1</sup>; Thomas Blackburn<sup>2</sup>; Kan Ma<sup>2</sup>; Alexander Knowles<sup>2</sup>; Tatu Pinomaa<sup>1</sup>; Anssi Laukkanen<sup>1</sup>; <sup>1</sup>Vtt Technical Research Centre of Finland; <sup>2</sup>University of Birmingham

**8:40 AM**

**Point Defect Engineering to Tune the Optical Absorption of Tetragonal Ytria-stabilized Zirconia:** *Shunshun Liu*<sup>1</sup>; Ryan Grimes<sup>1</sup>; Prasanna Balachandran<sup>1</sup>; <sup>1</sup>University of Virginia

**9:00 AM**

**Optimization of Vapsol Solvation Free Energy Predictions:** *Eric Fonseca*<sup>1</sup>; Richard Hennig<sup>1</sup>; Sean Florez<sup>1</sup>; <sup>1</sup>University of Florida

**9:20 AM Break**

**9:40 AM Invited**

**MISPR: A High-throughput Multi-scale Infrastructure for Automating Materials Science Computations:** *Nav Nidhi Rajput*<sup>1</sup>; <sup>1</sup>Stony Brook University

**10:05 AM**

**Accelerating Property Predictions in NiTi Shape Memory Alloys with Machine Learning and DFT:** Mehran Bahramyan<sup>1</sup>; James Carton<sup>1</sup>; *Dermot Brabazon*<sup>1</sup>; <sup>1</sup>Dublin City University

**10:25 AM**

**Enhancing Drug-target Affinity Predictions with the Binding Site-augmented DTA Framework: A Deep Learning Approach for Expedited Material Design:** *Mehdi Yazdani Jahromi*<sup>1</sup>; Ali Khodabandeh Yalabadi<sup>1</sup>; Aida Tayebi<sup>1</sup>; Niloofar Yousefi<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Craig J. Neal<sup>1</sup>; Sudipta Seal<sup>1</sup>; Ozlem Ozmen Garibay<sup>1</sup>; <sup>1</sup>University of Central Florida

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Computational Thermodynamics and Kinetics – Alloy Design**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tournet, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Tuesday AM | March 5, 2024**  
**Bayhill 29 | Hyatt**

**Session Chairs:** Mark Asta, University of California, Berkeley; Nicolas Argibay, DOE Ames Laboratory

**8:00 AM Invited**

**Barrier-free Predictions of Short-range Ordering and Clustering Kinetics in Concentrated Solid Solutions:** Anas Abu-Odeh<sup>1</sup>; Blas Uberuaga<sup>2</sup>; *Mark Asta*<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Los Alamos National Laboratory

**8:30 AM**

**Ab-Initio Thermodynamics of Multi-component Refractory Alloys:** *Yann Muller*<sup>1</sup>; Anirudh Raju Natarajan<sup>1</sup>; <sup>1</sup>EPFL

**8:50 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>NIST

**9:10 AM**

**3rd Generation Modeling of Pure Elements Down to 0 K with pycalphad and ESPEI:** *Alexander Richter*<sup>1</sup>; Allison Beese<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**9:30 AM Break**

**9:50 AM**

**Predicting Solid-state Precipitation in High-strength Aluminium Alloys:** *Shenghan Su*<sup>1</sup>; Laure Bourgeois<sup>1</sup>; Nikhil Medhekar<sup>1</sup>; <sup>1</sup>Monash University

**10:10 AM**

**Phase Prediction and Optimization of Refractory High-entropy Alloys in Data-driven Approach:** *Jiwon Park*<sup>1</sup>; Chang-Seok Oh<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

**10:30 AM**

**Thermodynamic Properties as a Function of Temperature of AlMoNbV, NbTaTiV, NbTaTiZr, AlNbTaTiV, HfNbTaTiZr, and MoNbTaVW Refractory High-entropy Alloys from First-principles Calculations:** Danielsen Moreno<sup>1</sup>; *Chelsey Hargather*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**10:50 AM Invited**

**Linking Strength to Order and Disorder in Metals:** *Nicolas Argibay*<sup>1</sup>; Michael Chandross<sup>2</sup>; Prashant Singh<sup>1</sup>; Duane Johnson<sup>1</sup>; <sup>1</sup>DOE Ames Laboratory; <sup>2</sup>Sandia National Laboratories

## MECHANICS OF MATERIALS

**Defects and Interfaces: Modeling and Experiments — Session for Richard Hoagland: Radiation Effects**

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Tuesday AM | March 5, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Blas Uberuaga, Los Alamos National Lab; Michael Demkowicz, Texas A&M Univ

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**8:20 AM Invited**

**Computational Studies of Oxidation-induced Grain Boundary Embrittlement in Nickel:** Ziqi Xiao<sup>1</sup>; *Xian-Ming Bai*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**8:40 AM Invited**

**Evolution of Disorder at Epitaxial Fe<sub>3</sub>O<sub>4</sub> / Cr<sub>2</sub>O<sub>3</sub> Interfaces under Irradiation:** *Tiffany Kaspar*<sup>1</sup>; Steven Spurgeon<sup>1</sup>; Kayla Yano<sup>1</sup>; Jijo Christudasjustus<sup>1</sup>; Bethany Matthews<sup>1</sup>; Mark Bowden<sup>1</sup>; Colin Ophus<sup>2</sup>; Hyosim Kim<sup>3</sup>; Yongqiang Wang<sup>3</sup>; M. Oskar Liedke<sup>4</sup>; Daniel Schreiber<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab; <sup>2</sup>Lawrence Berkeley National Lab; <sup>3</sup>Los Alamos National Lab; <sup>4</sup>Helmholtz-Zentrum Dresden - Rossendorf (HZDR)

**9:00 AM Invited**

**Layer Stability in Immiscible Interfaces under Heavy Ion Irradiations:** *Osman Anderoglu*<sup>1</sup>; Madhavan Radhakrishnan<sup>2</sup>; XiaTong Yang<sup>1</sup>; Justin Cheng<sup>3</sup>; Thomas Nizolek<sup>4</sup>; Nathan Mara<sup>3</sup>; Mukesh Bachhav<sup>5</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>University of North Texas; <sup>3</sup>University of Minnesota; <sup>4</sup>Los Alamos National Laboratory; <sup>5</sup>Idaho National Laboratory

**9:20 AM Invited**

**The Effects of Nitrogen on Defect Evolution in Tempered Martensitic Steels:** *Stuart Maloy*<sup>1</sup>; Benjamin Eftink<sup>2</sup>; Aaron Kohnert<sup>2</sup>; H. Kim<sup>2</sup>; C. Rietema<sup>3</sup>; Eda Aydogan<sup>4</sup>; Hi Vo<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Colorado School of Mines; <sup>4</sup>Middle East Technical University

**9:40 AM Break**

**9:55 AM Invited**

**Solubility and Short Circuit Diffusion of BCC Transition Metals in Cu Grain Boundaries:** E Sheu<sup>1</sup>; TY Liu<sup>1</sup>; JK Baldwin<sup>2</sup>; DJ Williams<sup>2</sup>; *Michael Demkowicz*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>LANL

**10:15 AM Invited**

**Grain Boundary Softening from Stress Assisted Helium Cavity Coalescence:** *Jason Trelewicz*<sup>1</sup>; Streit Cunningham<sup>1</sup>; Yang Zhang<sup>1</sup>; Spencer Thomas<sup>1</sup>; Osman El-Atwani<sup>2</sup>; Yongqiang Wang<sup>2</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Los Alamos National Laboratory

**10:35 AM Invited**

**Atomic Structure and Defect-interactions at Semi-coherent Metal/Oxide Interfaces:** *Samrat Choudhury*<sup>1</sup>; Blas Uberuaga<sup>2</sup>; <sup>1</sup>University of Mississippi; <sup>2</sup>Los Alamos National Laboratory

**10:55 AM Invited**

**High-throughput Prediction of Defect Formation and Migration at Misfit Dislocations in Mismatched Perovskite Oxide Heterostructures:** Chloe Marzano<sup>1</sup>; William Ebmeyer<sup>1</sup>; *Pratik Dholabhai*<sup>1</sup>; <sup>1</sup>Rochester Institute of Technology

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## LIGHT METALS

### Electrode Technology for Aluminum Production — Anode Raw Materials

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

**Program Organizers:** Julien Lauzon-Gauthier, Alcoa Corporation; Samuel Wagstaff, Oculatus Consulting

**Tuesday AM | March 5, 2024**  
**Windermere W-2 | Hyatt**

**Session Chair:** Christopher Kuhnt, Rain Carbon

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#### 8:00 AM Introductory Comments

#### 8:05 AM

**Alternative Binder for Carbon Anode:** Sheetal Gupta<sup>1</sup>; Dibyendu Ghosh<sup>2</sup>; Bibhuti Sahu<sup>2</sup>; *Amit Gupta*<sup>1</sup>; Vilas Tathavadkar<sup>1</sup>; <sup>1</sup>Aditya Birla Science & Technology Company, Ltd; <sup>2</sup>Hindalco Industries Ltd

#### 8:30 AM

**Effect of Mixing and Pressing Parameters on the Properties of Biopitch-based Lab-scale Carbon Anodes for Use in the Hall-Héroult Electrolytic Cell:** *Nooshin Baastani*<sup>1</sup>; Simon Laliberté-Riverin<sup>1</sup>; Marie-Aimee Tuyizere-Flora<sup>1</sup>; Guillaume Gauvin<sup>1</sup>; Julien Lauzon-Gauthier<sup>1</sup>; Houshang Alamdari<sup>1</sup>; Thierry Ollevier<sup>1</sup>; <sup>1</sup>Laval University, Regal

#### 8:55 AM

**CFD Modelling of Air Injection Nozzles in Coke Calcination Kilns, Identification of the Best Compromise Between Carbonaceous Deposit Formation and Kiln Performance:** *Marie-Josée Dion*<sup>1</sup>; Hans Darmstadt<sup>1</sup>; Louis-Michel Malouin<sup>2</sup>; Eric Duplain<sup>2</sup>; Debbie Soriano<sup>2</sup>; Sunny Huang<sup>2</sup>; <sup>1</sup>Rio Tinto; <sup>2</sup>Brais Malouin et Associés Inc.

#### 9:20 AM

**Estimation of the Coke Calcination Yield by Granulometry Analysis:** *Hans Darmstadt*<sup>1</sup>; Marie-Josée Dion<sup>1</sup>; André Bouchard<sup>1</sup>; Luc Côté<sup>1</sup>; <sup>1</sup>Rio Tinto

#### 9:45 AM Break

#### 10:00 AM

**Comparing Handling Degradation of Shaft and Rotary Cokes:** *Howard Childs*<sup>1</sup>; Austin Andrian<sup>1</sup>; Barbara Chu<sup>1</sup>; Barry Sadler<sup>2</sup>; <sup>1</sup>BP; <sup>2</sup>Net Carbon Consulting Pty Ltd

#### 10:25 AM

**Influence of Selective Crushing and Particle Shape of Shaft and Hearth Calcined Anode Coke Components on Blend Bulk Density:** *Howard Childs*<sup>1</sup>; Barbara Chu<sup>1</sup>; Barry Sadler<sup>2</sup>; <sup>1</sup>BP; <sup>2</sup>Net Carbon Consulting Pty Ltd

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials — Advanced Microelectronic Packaging Materials I

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

**Tuesday AM | March 5, 2024**  
**Bayhill 27 | Hyatt**

**Session Chairs:** Kazuhiro Nogita, University of Queensland, Australia; Xin Fu Tan, University of Queensland, Australia

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**8:00 AM**

**Corrosion Induced Fracture of Cu/Al Interconnects in Microelectronics Packages:** *Kai-chieh Chiang*<sup>1</sup>; Marisol Koslowski<sup>1</sup>; <sup>1</sup>Purdue University

**8:20 AM**

**Effect of Microstructure of Ag on the Growth of Intermetallic Compound in Ag-In System During Isothermal Reflow Process:** *Po-Hsun Yang*<sup>1</sup>; Fan-Yi OuYang<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**8:40 AM**

**Interfacial Reaction Between Electroplated Indium and Copper Substrate:** *Yu-Hsin Lin*<sup>1</sup>; Fu-Ling Chang<sup>1</sup>; C. Robert Kao<sup>1</sup>; <sup>1</sup>National Taiwan University

**9:00 AM**

**Interfacial Reactions Between the Molten Sn Solder and Cu-2.3Fe wt.% (C194) Substrate:** *Jing-ting Chou*<sup>1</sup>; Andromeda Dwi Laksono<sup>1</sup>; Jun Wen<sup>1</sup>; You-yan Li<sup>1</sup>; Yee-wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**9:20 AM**

**The Role of FeCoNiMn as a Diffusion Barrier in Solder Joints During Thermomigration:** *Yu-An Shen*<sup>1</sup>; <sup>1</sup>Feng Chia University

**9:40 AM Break**

**10:00 AM**

**Anisotropic Effects in Electromigration Enhanced Intermetallic Growth in Sn Based Solders:** *Fariha Haq*<sup>1</sup>; Andrew Pham<sup>1</sup>; Marisol Koslowski<sup>1</sup>; <sup>1</sup>Purdue University

**10:20 AM**

**Annealing Effect on the Electro-recrystallization of Tin:** *Wei-Cheng Meng*<sup>1</sup>; *Kwang-Lung Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**10:40 AM**

**Effect of Epoxy Material and Gold Wire Configuration on Light-emitting Diode Encapsulation Process:** *Mohd Sharizal Abdul Aziz*<sup>1</sup>; Jing Qi Chooi<sup>1</sup>; C.Y. Khor<sup>2</sup>; Xing Qi Lim<sup>1</sup>; M.H.H. Ishak<sup>1</sup>; Mohd Arif Anuar Mohd Salleh<sup>2</sup>; <sup>1</sup>Universiti Sains Malaysia; <sup>2</sup>Universiti Malaysia Perlis

**11:00 AM**

**Improved Lifetime of an Electrophoretic Display Based on Solvent and Sealant Engineering:** *Anne Cardenas*<sup>1</sup>; Jenny Zhou<sup>1</sup>; Alyssa Troksa<sup>1</sup>; Xioajie Xu<sup>1</sup>; Elaine Lee<sup>1</sup>; Anna Hiszpanski<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**11:20 AM**

**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

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Environmental Degradation of Multiple Principal Component Materials – Environmental Degradation

**Sponsored by:** TMS Structural Materials Division, TMS: Corrosion and Environmental Effects 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, Karlsruhe Institute of Technology (KIT); Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

**Tuesday AM | March 5, 2024**  
**Coral Spring I | Hyatt**

**Session Chairs:** Christopher Weinberger, Colorado State University; Elizabeth Opila, University of Virginia

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#### 8:00 AM

**Cracking the Code: Demystifying Early-stage Oxidation in High Entropy Alloys:** *Bharat Gwalani*<sup>1</sup>; Andrew Martin<sup>1</sup>; Elizabeth Kautz<sup>1</sup>; Sten Lambeets<sup>2</sup>; Matthew Olszta<sup>2</sup>; Anil Battu<sup>2</sup>; Thevuthasan Suntharampillai<sup>2</sup>; Martin Thuo<sup>1</sup>; Arun Devaraj<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory

#### 8:20 AM Invited

**Simulations of Chloride on Hydroxylated Passive Oxide Surfaces Related to Localized Corrosion Initialization:** Aditya Sundar<sup>1</sup>; Ganlin Chen<sup>1</sup>; *Liang Qi*<sup>1</sup>; <sup>1</sup>University of Michigan

#### 8:40 AM Invited

**Exploring the Synergy of Al-Cr in Aqueous Passivation of [FeCoNi]Cr<sub>x</sub>Al<sub>y</sub> Compositionally Complex Alloys (CCAs) Across Cr Threshold Concentrations:** *Debashish Sur*<sup>1</sup>; William Blades<sup>2</sup>; Emily Holcombe<sup>3</sup>; Howie Joress<sup>4</sup>; Jason Hattrick-Simpers<sup>5</sup>; Brian DeCost<sup>4</sup>; Kevin Ogle<sup>6</sup>; Mitra Taheri<sup>3</sup>; Karl Sieradzki<sup>2</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Arizona State University; <sup>3</sup>Johns Hopkins University; <sup>4</sup>National Institute of Standards and Technology; <sup>5</sup>University of Toronto; <sup>6</sup>Chimie ParisTech, PSL Research University

#### 9:00 AM

**Evaluation of a Nb-Si-Ti-Al-Hf Alloy as a Bond Coat for Nb-based Alloys:** *Collin Holgate*<sup>1</sup>; Melina Endsley<sup>1</sup>; Andrew Hattoon<sup>1</sup>; Akane Suzuki<sup>2</sup>; Michael Worku<sup>3</sup>; Carlos Levi<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>GE Aerospace; <sup>3</sup>GE Vernova

#### 9:20 AM Break

#### 9:35 AM

**Environmental Degradation of Polymer-based Composite Materials: Challenges and Mitigation Strategies:** *Kate Mokobia*<sup>1</sup>; Eribe Jonathan<sup>2</sup>; Glory Oyiborhoro<sup>3</sup>; Muniratu Maliki<sup>4</sup>; Ikhazuagbe Ifijen<sup>5</sup>; <sup>1</sup>Delta State Polytechnic; <sup>2</sup>Benson Idahosa University; <sup>3</sup>Delta State College of Health Sciences and Technology Ofuoma-Ughelli; <sup>4</sup>Edo State University; <sup>5</sup>Rubber Research Institute of Nigeria



**9:55 AM****Insights into Defects and Failure of Multi-component Ultra-high Temperature Carbides:***Ambreen Nisar*<sup>1</sup>; *Sohail Mohammed*<sup>1</sup>; *Gia Garino*<sup>1</sup>; *Brandon Aguiar*<sup>1</sup>; *Arvind Agarwal*<sup>1</sup>; <sup>1</sup>Florida International University**10:15 AM Invited****High-Entropy Alloys Corrosion Behaviors:***Peter Liaw*<sup>1</sup>; *Lia Amalia*<sup>1</sup>; *Yunzhu Shi*<sup>2</sup>; *Shujie Pang*<sup>3</sup>; *Tao Zhang*<sup>3</sup>; *Nengbing Hua*<sup>4</sup>; *Yanfei Gao*<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup> State Key Laboratory for Advanced Metals and Materials, University of Science and Technology Beijing; <sup>3</sup>Key Laboratory of Aerospace Materials and Performance (Ministry of Education), School of Materials Science and Engineering; <sup>4</sup>Fujian University of Technology**10:35 AM****Utilizing Small Punch Test (SPT) for Mechanical Behaviour Study of Electrochemically and Gaseous Hydrogenated Electron Beam Melting (EBM) and Wrought Ti-6Al-4V:***Noa Bitton*<sup>1</sup>; *Nissim U Navi*<sup>2</sup>; *Eyal Sabatani*<sup>2</sup>; *Brian A Rosen*<sup>1</sup>; *Shlomo Haroush*<sup>2</sup>; *Natalie Kostirya*<sup>2</sup>; *Gennadi Agronov*<sup>2</sup>; *Yizhaq Eretz-Kedosha*<sup>2</sup>; *Eitan Tiferet*<sup>3</sup>; *Noam Eliaz*<sup>1</sup>; <sup>1</sup>Tel Aviv University; <sup>2</sup>Nuclear Reserch Center Negev (NRCN); <sup>3</sup>AM Center, Rotem Industries Ltd.**10:55 AM****Environmental Impact of Multi-component Fiber-reinforced Composites: Challenges and Green Solutions:***Glory Oyiborhoro*<sup>1</sup>; *Bala Anegebe*<sup>2</sup>; *Ifeanyi Odiachi*<sup>3</sup>; *Best Atoe*<sup>4</sup>; *Ikhazuagbe Ifijen*<sup>5</sup>; <sup>1</sup>Delta State College of Health Sciences and Technology, Ofuoma-Ughelli; <sup>2</sup>Federal University; <sup>3</sup>Delta State Polytechnic; <sup>4</sup>Worldwide Healthcare; <sup>5</sup>Rubber Research Institute of Nigeria**11:15 AM****Development of Novel Light Refractory High Entropy Alloys for High Energy Accelerator Windows:***Nicholas Crnkovich*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

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**MECHANICS OF MATERIALS****Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Advanced Experimental Characterization of Microstructurally Driven Fatigue Behavior****Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; *Ashley Spear*, University of Utah; *Brian Wisner*, Ohio University**Tuesday AM | March 5, 2024****Manatee Spring II | Hyatt****Session Chair:** *Jean-Charles Stinville*, University of Illinois at Urbana-Champaign**8:00 AM Invited****Characterizing the Fatigue Behavior of Nanocrystalline Thin Films via Automated High-throughput In-situ SEM Testing:***Alejandro Barrios*<sup>1</sup>; *Cody Kunka*<sup>1</sup>; *John Nogan*<sup>1</sup>; *Khalid Hattar*<sup>2</sup>; *Brad Boyce*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of Tennessee Knoxville

**8:30 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>; Ayman Salem<sup>1</sup>; Adam Pilchak<sup>2</sup>; Thomas Broderick<sup>3</sup>; Samuel Kuhr<sup>3</sup>; <sup>1</sup>Materials Resources LLC; <sup>2</sup>Materials Resources LLC; <sup>3</sup>Air Force Research Laboratory

**8:50 AM**

**Improved High-cycle Fatigue Behavior of Nanocrystalline Pt-Au Thin Films Demonstrated Using a MEMS Based Microresonator Up to a Billion Cycles:** *Manish Jain*<sup>1</sup>; Alejandro Barrios<sup>1</sup>; David Adams<sup>1</sup>; Remi Dingreville<sup>1</sup>; Douglas Medlin<sup>1</sup>; Oliver Pierron<sup>2</sup>; Brad Boyce<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Georgia Institute of Technology

**9:10 AM**

**In-situ Characterization of Dislocation Density Evolution in Nickel-titanium Shape Memory Alloys During Load-biased Thermal Cycling Using High-energy Diffraction Microscopy:** *Wenxi Li*<sup>1</sup>; Sangwon Lee<sup>1</sup>; Tianchi Zhang<sup>1</sup>; Yuefeng Jin<sup>1</sup>; Darren Pagan<sup>2</sup>; Lee Casalena<sup>3</sup>; Michael Mills<sup>4</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>The Pennsylvania State University; <sup>3</sup>Thermo Fisher Scientific; <sup>4</sup>The Ohio State University

**9:30 AM Break****9:50 AM Invited**

**Influence of Dislocation-precipitate Interactions on Fatigue Crack Initiation in Wire Arc Additive Manufactured Nickel-Aluminum-Bronze:** *Ariel Murphy-Leonard*<sup>1</sup>; Veronika Mazanova<sup>1</sup>; <sup>1</sup>Ohio State University

**10:20 AM**

**Monitoring Defect Structure Evolution in Titanium Alloys Using High-Energy X-ray Diffraction:** *Kenneth Peterson*<sup>1</sup>; Jacob Ruff<sup>2</sup>; Adam Pilchak<sup>3</sup>; Lee Semiatin<sup>4</sup>; Darren Pagan<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>Pratt & Whitney; <sup>4</sup>Air Force Research Laboratory

**10:40 AM**

**Monitoring Vulnerable Grain Neighborhoods in Inconel-718 During Cyclic Loading Using High Energy X-ray Diffraction Microscopy:** *Dalton Shadle*<sup>1</sup>; Kelly Nygren<sup>2</sup>; Tresa Pollock<sup>3</sup>; Irene Beyerlein<sup>3</sup>; Matthew Miller<sup>1</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>University of California Santa Barbara

**11:00 AM**

**Strain Localization and Slip Irreversibility in the Grain Boundary Vicinity Studied Using In Situ Fatigue and HR-EBSD in FCC Metals:** *Yang Su*<sup>1</sup>; Josh Kacher<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

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**SPECIAL TOPICS**

**Frontiers of Materials Award Symposium: Novel Ceramics Processes for Nuclear Applications — Session I**

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

**Program Organizer:** Takaaki Koyanagi, Oak Ridge National Laboratory

**Tuesday AM | March 5, 2024**

**Celebration 16 | Hyatt**

**Session Chair:** Takaaki Koyanagi, Oak Ridge National Laboratory

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**9:00 AM Keynote**

**Development of Next-Generation Silicon Carbide Composites for Nuclear Energy:** *Takaaki Koyanagi*<sup>1</sup>; Benjamin Lamm<sup>1</sup>; Yutai Katoh<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:25 AM Invited**

**Ceramic Composite Moderators for Small Modular Reactors:** *Lance Snead*<sup>1</sup>; <sup>1</sup>Stony Brook University

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

**Flash Sintering, A Novel Technique, for Manufacturing Surrogate and Active Nuclear Materials:** Carolyn Grimley<sup>1</sup>; Samira Bostanchi<sup>2</sup>; Robert Harrison<sup>3</sup>; Dave Goddard<sup>4</sup>; Nicholas Barron<sup>4</sup>; Christopher Green<sup>4</sup>; David Pearmain<sup>2</sup>; Jonathan Morgan<sup>3</sup>; *Zhao Zhang*<sup>5</sup>; <sup>1</sup>Lucideon M+P; <sup>2</sup>Lucideon Limited; <sup>3</sup>University of Manchester; <sup>4</sup>National Nuclear Laboratory; <sup>5</sup>Lucideon

**10:35 AM Invited**

**Advancing the Manufacture of Full Length SiGA® Cladding:** *George Jacobsen*<sup>1</sup>; Lucas Borowski<sup>1</sup>; Rolf Haefelfinger<sup>1</sup>; Ivan Ivanov<sup>1</sup>; Sean Gonderman<sup>1</sup>; <sup>1</sup>General Atomics Electromagnetic Systems (GA-EMS)

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**
**Functional Nanomaterials 2024 – Functional Nanomaterials III: Additive Manufacturing**

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Tuesday AM | March 5, 2024**

**Bayhill 21 | Hyatt**

**Session Chairs:** Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Mostafa Bedewy, University of Pittsburgh

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**8:00 AM Keynote**

**Routes for Spatially and Self-directed Assembly within Additive Manufacturing Processes:** *A. John Hart*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**8:40 AM**

**Diffusiophoresis-enhanced Particles Deposition for Additive Manufacturing:** *Samannoy Ghosh*<sup>1</sup>; Saebom Lee<sup>2</sup>; Marshall Johnson<sup>3</sup>; James Hardin<sup>4</sup>; Viet Doan<sup>5</sup>; Sangwoo Shin<sup>5</sup>; Surya Kalidindi<sup>3</sup>; Jinkee Lee<sup>2</sup>; Jesse Ault<sup>6</sup>; Yong Lin Kong<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Sungkyunkwan University; <sup>3</sup>Georgia Institute of Technology; <sup>4</sup>Air Force Research Laboratory; <sup>5</sup>University at Buffalo, The State University of New York; <sup>6</sup>Brown University

**9:00 AM**

**Investigating Mechanical Properties of Polymeric Membranes with Near-field Electrospinning for Organ-on-Chip Systems:** *Noori Na*<sup>1</sup>; Jiyoung Chang<sup>1</sup>; Taegon Kim<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>KITECH

9:20 AM Break

9:40 AM Keynote

**All-carbon Nanomaterial Inks for Print-in-Place, Recyclable, and Water-based Electronics:** *Aaron Franklin*<sup>1</sup>; <sup>1</sup>Duke University

10:20 AM Invited

**Convergent Manufacturing of Polymer Nanocomposites with Two-dimensional Fillers Using In-situ Shear Exfoliation and Direct Ink Writing:** *Ali Ashraf*<sup>1</sup>; <sup>1</sup>University of Texas Rio Grande Valley

10:50 AM

**Synthesis of Three-dimensional Ceramic Microlattices by Aerosol Jet Nanoparticle Printing and Their Use in Water Purification:** *Chunshan Hu*<sup>1</sup>; Bin Yuan<sup>1</sup>; Sanjida Jahan<sup>1</sup>; Caitlyn Santiago<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

11:10 AM

**MetaJet X-ray Source for Time Resolved In-situ SAXS:** *Julius Hållstedt*<sup>1</sup>; Emil Espes<sup>1</sup>; Geethanjali Gopakumar<sup>1</sup>; <sup>1</sup>Excillum

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**High Temperature Electrochemistry: An FMD Symposium Honoring Uday B. Pal – High Temperature Electrochemistry and Sustainable Metallurgy III**

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Soumendra Basu, Boston University; Srikanth Gopalan, Boston University; Adam Powell, Worcester Polytechnic Institute; Filippos Patsiogiannis, Bridgnorth Aluminium Ltd; Xiaofei Guan, Shanghaitech University

Tuesday AM | March 5, 2024

Bayhill 24 | Hyatt

**Session Chairs:** Srikanth Gopalan, Boston University; Xiaofei Guan, Shanghaitech University

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8:00 AM Invited

**Recycling EOL-LIB's Using Thermokinetic Fundamentals in the LIFE Process for Sustainable Metallurgy:** Ju Heon Lee<sup>1</sup>; Jeongsuk Yun<sup>2</sup>; *Il Sohn*<sup>1</sup>; <sup>1</sup>Yonsei University, RDS; <sup>2</sup>RDS

8:25 AM Invited

**Unraveling the Essence of Welding Flux Sustainability Towards High Heat Input Applications:** *Cong Wang*<sup>1</sup>; Huiyu Tian<sup>1</sup>; Zhanjun Wang<sup>1</sup>; <sup>1</sup>Northeastern University

8:50 AM Invited

**Mixed Ionic and Electronic Conductors for Reactive Separation of Hydrogen:** *Srikanth Gopalan*<sup>1</sup>; <sup>1</sup>Boston University

9:15 AM

**Quantitatively Relating Reaction Site Density and Performance in Electrocatalyst-infiltrated Ni-YSZ Symmetric Cells:** *Jillian Mulligan*<sup>1</sup>; Srikanth Gopalan<sup>1</sup>; Uday Pal<sup>1</sup>; Soumendra Basu<sup>1</sup>; <sup>1</sup>Boston University

**9:35 AM Break**

**9:50 AM Invited**

**Considerations for Measuring High Electrical Conductivity Molten Salts with Concentric Electrodes:** *Thomas Villalon*<sup>1</sup>; <sup>1</sup>Phoenix Tailings

**10:15 AM Invited**

**Production of Pure Aluminum and Oxygen by Solid Oxide Membrane-based Electrolysis Using an Inert Anode:** *Shizhao Su*<sup>1</sup>; Uday Pal<sup>1</sup>; Xiaofei Guan<sup>2</sup>; <sup>1</sup>Boston University; <sup>2</sup>Shanghaitech University

**10:40 AM Invited**

**Electrolysis of Sulfides in Molten Salts:** *Huayi Yin*<sup>1</sup>; Dihua Wang<sup>1</sup>; <sup>1</sup>Wuhan University

**11:05 AM**

**The Effect of Temperature on Electrodeposition Behavior of Cobalt from Cobalt Chloride Using 2:1 Urea/ ChCl Ionic Liquid:** *Rajyashree Lenka*<sup>1</sup>; Ramana Reddy<sup>1</sup>;

<sup>1</sup>The University of Alabama

**11:25 AM**

**Electrically-enhanced Boron and Phosphorus Removal from Silicon by CaO-SiO-AlO/-MgO Slag Treatment:** *Andreas D. P. Putera*<sup>1</sup>; Katri Avarmaa<sup>1</sup>; Matthew

Humbert<sup>1</sup>; Himawan T. B. M. Petrus<sup>1</sup>; Geoffrey Brooks<sup>1</sup>; M. Akbar Rhamdhani<sup>1</sup>;

<sup>1</sup>Swinburne University of Technology

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Hume-Rothery Symposium on Alloy Microstructure Science and Engineering – Thermodynamics, Phase Field, and Alloy Design

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

**Tuesday AM | March 5, 2024**

**Bayhill 23 | Hyatt**

**Session Chairs:** Peter Gumbsch, Fraunhofer Institute for Mechanics of Materials IWM; Qigui Wang, General Motors

**8:00 AM Invited**

**Is Molar Gibbs Free Energy Always a Chemical Potential?:** *Long-Qing Chen*<sup>1</sup>;

<sup>1</sup>Pennsylvania State University

**8:30 AM Invited**

**High-Throughput Experiments for Computational Thermodynamics and Kinetics:**

*Ji-Cheng Zhao*<sup>1</sup>; <sup>1</sup>University of Maryland

**9:00 AM Invited**

**CALPHAD-based Kinetic Simulations for Metallurgical Practices:** *Fan Zhang*<sup>1</sup>;

Chuan Zhang<sup>1</sup>; Weisheng Cao<sup>1</sup>; Shuanglin Chen<sup>1</sup>; Kamalnath Kadirvel<sup>1</sup>; Songmao

Liang<sup>1</sup>; <sup>1</sup>CompuTherm LLC

9:30 AM Break

9:50 AM Invited

**Data for Quantitative Phase Field Modeling:** *Qing Chen*<sup>1</sup>; <sup>1</sup>Thermo-Calc Software AB

10:20 AM Invited

**A Specialty Alloy Manufacturer's Perspective of How Computation Modeling of Microstructure Evolution Can Help with Alloy Design and Product Development:** *Ning Zhou*<sup>1</sup>; *Tao Wang*<sup>1</sup>; *Mendoza Victor*<sup>1</sup>; *Mario Epler*<sup>1</sup>; <sup>1</sup>Carpenter Technology Corporation

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## ADDITIVE MANUFACTURING

### **Incorporating Additive Manufacturing in Material Science and Engineering Education (2024 Student-led Symposium) — Session I**

**Sponsored by:** TMS: Education Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Bryan Crossman, The Ohio State University; Elvin Beach, Ohio State University

Tuesday AM | March 5, 2024  
Celebration 2 | Hyatt

**Session Chair:** Bryan Crossman, The Ohio State University

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8:00 AM Introductory Comments

8:05 AM Invited

**Teaching Introductory Materials Engineering via Additive Manufacturing:** *Timothy Chambers*<sup>1</sup>; <sup>1</sup>University of Michigan

8:25 AM Invited

**Choose your Own Adventure: Additive Manufacturing Knowledge Development through Student-centered Experiential Learning:** *Christopher Williams*<sup>1</sup>; <sup>1</sup>Virginia Tech

8:45 AM Invited

**Recapitulating Materials Science in the Additive Manufacturing Classroom:** *Dhruv Bhate*<sup>1</sup>; <sup>1</sup>Arizona State University

9:05 AM Invited

**Importance of AM Practical Textbooks and Experiential Learning in Additive Manufacturing:** *Leila Ladani*<sup>1</sup>; *Jafar Razmi*<sup>1</sup>; <sup>1</sup>Arizona State University

9:25 AM Break

9:40 AM Invited

**Educating the Next Generation of Manufacturing Pioneers Through Focused Additive Manufacturing Curricula:** *Manyalibo Matthews*<sup>1</sup>; *Adrian Lew*<sup>2</sup>; *Wei Cai*<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Stanford University

10:00 AM Invited

**The Role of Materials Science in Additive Manufacturing Workforce Development:** *Joy Gockel*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**10:20 AM Invited**

**The Evolving Role of Additive Manufacturing in the Materials Engineering Community: A Dual National Laboratory and Academic Perspective:** *Andrew Kustas*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:40 AM Invited**

**Advancing Engineering Education through Additive Manufacturing: Empowering Academics with Simulation Software and Teaching Resources:** *János Plocher*<sup>1</sup>; *Navid Manai*<sup>2</sup>; <sup>1</sup>Ansys Germany GmbH; <sup>2</sup>Ansys UK Ltd.

**11:00 AM Invited**

**Additive Manufacturing: A Pathway to Expand Education and Research In Marginalized Communities:** *Ariel Murphy-Leonard*<sup>1</sup>; <sup>1</sup>Ohio State University

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**NUCLEAR MATERIALS**
**Irradiation Testing: Facilities, Capabilities, and Experimental Designs — Irradiated Material Characterization Capabilities**

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

**Program Organizers:** Walter Luscher, Pacific Northwest National Laboratory; Peter Hosemann, University of California, Berkeley; Andrew Hoffman, GE Research; Joris Van den Bosch, SCK CEN; Brenden Heidrich, Nuclear Science User Facilities

**Tuesday AM | March 5, 2024**

**Rainbow Spring I | Hyatt**

**Session Chairs:** Arun Devaraj, Pacific Northwest National Laboratory; Elizabeth Kautz, North Carolina State University

**8:00 AM**

**Atom Probe Tomography Examinations of Bulk Zircaloy Irradiated at Nominally 410°C:** *Brian Cockeram*<sup>1</sup>; *Bruce Kammenzind*<sup>1</sup>; *Phil Edmondson*<sup>2</sup>; <sup>1</sup>Nnl Fluor Marine Propulsion; <sup>2</sup>Oak Ridge National Laboratory

**8:20 AM**

**Atom Probe Tomography (APT) Characterization of Annular U-Zr Metallic Fuel Cladded with HT-9:** *Arnold Pradhan*<sup>1</sup>; *Sohail Shah*<sup>1</sup>; *Mukesh Bachhav*<sup>1</sup>; *Tiankai Yao*<sup>1</sup>; *Luca Capriotti*<sup>1</sup>; *Indrajit Charit*<sup>2</sup>; <sup>1</sup>INL; <sup>2</sup>University of Idaho

**8:40 AM**

**Westinghouse Hot Cell Facility and Laboratories:** *Caleb Clement*<sup>1</sup>; *Catherine Cmar*<sup>1</sup>; *Arash Parsi*<sup>1</sup>; <sup>1</sup>Westinghouse Electric Company

**9:00 AM Invited**

**Nuclear Fuel Salt Irradiation and Post-irradiation Processing Capabilities at The Ohio State University Research Reactor:** *Matt Van Zeil*<sup>1</sup>; *Andrew Kauffman*<sup>1</sup>; *Praneeth Kandlakunta*<sup>1</sup>; *Kevin Herminghuysen*<sup>1</sup>; *Susan White*<sup>1</sup>; *Lei Raymond Cao*<sup>1</sup>; <sup>1</sup>The Ohio State University

**9:30 AM Break****9:50 AM Invited**

**INL's Holistic Approach to Post-irradiation Examination of Nuclear Fuel Systems:** *Colin Judge*<sup>1</sup>; *Fabiola Cappia*<sup>1</sup>; <sup>1</sup>Idaho National Lab

**10:20 AM Invited**

**Advancing Thermo-physical Property Characterization Techniques and Methods for Irradiated Nuclear Fuels:** *Tsvetoslav Pavlov*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**10:50 AM**

**Advancing Post-irradiation Examination of Structural Materials in INL Facilities:** *Colin Judge*<sup>1</sup>; Brandon Miller<sup>1</sup>; Daniel Murray<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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## LIGHT METALS

### Magnesium Technology 2024 — Deformation Mechanisms

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

**Tuesday AM | March 5, 2024**

**Windermere Y-3 | Hyatt**

**Session Chairs:** Qianying Shi, University of Michigan; Victoria Miller, University of Florida

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**8:00 AM Keynote**

**Suppressing Twinning in Magnesium Alloys by Atomic Scale Engineering:** Xueze Jin<sup>1</sup>; Chuanyun Wang<sup>2</sup>; Srdjan Milenkovic<sup>1</sup>; Ilchat Sabirov<sup>1</sup>; Irene Beyerlein<sup>3</sup>; *Maria Teresa Perez Prado*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute; <sup>2</sup>Northwestern Polytechnical University Xian; <sup>3</sup>University of California, Santa Barbara

**8:40 AM**

**An Experimental Study on Twinning Behavior in Mg Alloys with Different Solute Elements:** *Qianying Shi*<sup>1</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan

**9:00 AM**

**In Situ Tomographic Investigation of the Combined Effect of Mechanical Load and Degradation on Mg<sub>2</sub>Y<sub>1</sub>Zn(Gd, Ag, Ca):** Paulo dos Santos Mallmann<sup>1</sup>; Birte Hindenlang<sup>1</sup>; Stefan Bruns<sup>1</sup>; Jan Bohlen<sup>2</sup>; Dietmar Christian Florian Wieland<sup>1</sup>; Fabian Wilde<sup>3</sup>; *Domonkos Tolnai*<sup>1</sup>; <sup>1</sup>Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon; <sup>2</sup>Institute of Material and Process Design, Helmholtz-Zentrum Hereon; <sup>3</sup>Institute of Materials Physics, Helmholtz-Zentrum Hereon

**9:20 AM**

**Quantifying the Role of Coarse Intermetallic Particles on Deformation Behavior:** Benjamin Anthony<sup>1</sup>; *Victoria Miller*<sup>1</sup>; <sup>1</sup>University of Florida

**9:40 AM Break**

**10:00 AM**

**Investigations on Creep Behavior of Extruded Mg-Ca-Al Alloys:** *Stefan Gneiger*<sup>1</sup>; Juergen Nietsch<sup>1</sup>; Nikolaus Papenberg<sup>1</sup>; <sup>1</sup>Light Metals Technologies Ranshofen

**10:20 AM**

**Cryogenic Deformation Behavior of a Dual-phase Mg-Li Alloy Investigated by In-situ Neutron Diffraction:** *Wu Gong*<sup>1</sup>; Reza Gholizadeh<sup>2</sup>; Takuro Kawasaki<sup>1</sup>; Kazuya Aizawa<sup>1</sup>; Stefanus Harjo<sup>1</sup>; <sup>1</sup>J-PARC Center, Japan Atomic Energy Agency; <sup>2</sup>Kyoto University



**Materials and Chemistry for Molten Salt Systems — Corrosion of Alloys in Molten Salts for Reactor Applications**

**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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

**Tuesday AM | March 5, 2024**  
**Bayhill 20 | Hyatt**

**Session Chair:** Kumar Sridharan, University of Wisconsin, Madison

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**8:00 AM Invited**

**Materials Selection and Compatibility Testing for the Development of MCRE and MCFR:** *Cody Falconer*<sup>1</sup>; Ivan Mitchell<sup>1</sup>; Karl Britsch<sup>1</sup>; Melanie Lindsey<sup>1</sup>; <sup>1</sup>TerraPower, LLC

**8:30 AM**

**Dissolution of Alloying Elements for Compatibility Assessment in Molten Fluoride Salts:** *Dino Sulejmanovic*<sup>1</sup>; Bruce Pint<sup>1</sup>; Rishi Pillai<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**8:50 AM**

**Corrosion Testing of Alloy Materials in Molten FLiBe Salt for Fusion Applications:** *Weiyue Zhou*<sup>1</sup>; Nayoung Kim<sup>1</sup>; Kevin Woller<sup>1</sup>; Michael Short<sup>1</sup>; Guiqiu (Tony) Zheng<sup>2</sup>; Caroline Sorensen<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Commonwealth Fusion Systems

**9:10 AM**

**Microstructural and Hardness Changes of Ion-irradiated Novel 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>; Soumya Nag<sup>2</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Wisconsin, Madison

**9:30 AM Break**

**9:50 AM**

**Compatibility Issues for FLiBe Fusion Blankets:** *Bruce Pint*<sup>1</sup>; Claude De Lamater-Brotherton<sup>1</sup>; Dino Sulejmanovic<sup>1</sup>; Devanshi Bhardwaj<sup>2</sup>; Lance Snead<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Stony Brook University

**10:10 AM**

**Methods to Predict Molten Salts Corrosion of Structural Materials in Thermal Convection Loops:** *Rishi Pillai*<sup>1</sup>; Dino Sulejmanovic<sup>1</sup>; Bruce Pint<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:30 AM**

**Corrosion Behavior of Advanced Ni-based Alloys in Molten Fluoride Salt:** *Ryan Gordon*<sup>1</sup>; Ryan Thier<sup>2</sup>; Adrien Couet<sup>1</sup>; Jaimie Tiley<sup>3</sup>; Soumya Nag<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

**10:50 AM**

**Stability of Novel Nickel-base Alloys in Molten Chloride Environments:** *Harjot Singh*<sup>1</sup>; Diego Ochoa<sup>1</sup>; Dilan Bautista<sup>1</sup>; Henry Olivares<sup>1</sup>; Ronald Reyes<sup>1</sup>; Ezequiel Jimenez<sup>1</sup>; Anthony Chen<sup>1</sup>; Boateng Donkor<sup>2</sup>; Sonali Ravikumar<sup>2</sup>; Naveen Nagaraja<sup>3</sup>; Govindarajan Muralidharan<sup>4</sup>; Vijay Vasudevan<sup>2</sup>; Vilupanur Ravi<sup>1</sup>; <sup>1</sup>California Polytechnic State University Pomona; <sup>2</sup>University of Cincinnati; <sup>3</sup>University of North Texas; <sup>4</sup>Oak Ridge National Laboratory

**11:10 AM**

**Phase-field Simulation of Corrosion in Molten Salt:** *Ellery Hendrix*<sup>1</sup>; W. Beck Andrews<sup>1</sup>; Yuxiang Peng<sup>2</sup>; Ankita Mohanty<sup>2</sup>; Xiaoyang Liu<sup>2</sup>; Karen Chen-Wiegart<sup>2</sup>; David Montiel<sup>1</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 — Liquid Metal Corrosion**

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

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Caitlin Huotilainen, TerraPower; Nidia Gallego, Oak Ridge National Laboratory; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison; Julie Tucker, Oregon State University

**Tuesday AM | March 5, 2024**

**Silver Spring I-II | Hyatt**

**Session Chairs:** Benjamin Adam, Oregon State University; Min Wang, Institute of Metal Research, Chinese Academy of Sciences

**8:00 AM**

**Structure-property Relationships in Long-term Thermally Aged HT9:** *Benjamin Adam*<sup>1</sup>; David Sprouster<sup>2</sup>; Adam Koziol<sup>1</sup>; Luanne Rolly<sup>1</sup>; Caitlin Huotilainen<sup>3</sup>; Julie Tucker<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Stony Brook University; <sup>3</sup>TerraPower LLC

**8:20 AM**

**Extreme Temperature Metallic Sodium Corrosion Resistance of APMT:** *Danielle Kline*<sup>1</sup>; Michael Bosley<sup>1</sup>; Mallory Zang<sup>1</sup>; *Anthony Schroeder*<sup>1</sup>; Hayley Wagreich<sup>1</sup>; Catherine Cmar<sup>1</sup>; John Lojek<sup>1</sup>; Rory Blunt<sup>1</sup>; Elizabeth Shumaker<sup>1</sup>; <sup>1</sup>Westinghouse Electric Company

**8:40 AM**

**Structure-property Relationships in Long-term Thermally Aged T91 and T92:** *Caitlin Huotilainen*<sup>1</sup>; Benjamin Adam<sup>2</sup>; Adam Koziol<sup>2</sup>; David Sprouster<sup>3</sup>; Luanne Rolly<sup>2</sup>; Julie Tucker<sup>2</sup>; *Natan Beets*<sup>1</sup>; <sup>1</sup>TerraPower LLC; <sup>2</sup>Oregon State University; <sup>3</sup>Stony Brook University

**9:00 AM**

**A Study on Stressed Ferritic/Martensitic Steel Weldments Exposed to High-temperature Liquid Sodium:** *Dustin Mangus*<sup>1</sup>; Ian Arndt<sup>1</sup>; Logan Smith<sup>2</sup>; Caitlin Huotilainen<sup>2</sup>; Guillaume Mignot<sup>1</sup>; Samuel Briggs<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>TerraPower LLC

**9:20 AM Panel Discussion:** This panel will be an in-depth discussion into the recent progress in elucidating sodium liquid metal corrosion mechanisms, facilitated by the presenters prior to this segment.

9:40 AM Break

10:00 AM

**New Insights into the Internal Oxidation Mechanism of 15-15Ti in the Lead-bismuth Eutectic Coolant:** *Min Wang*<sup>1</sup>; Cheng-xu Lu<sup>1</sup>; Ying-che Ma<sup>1</sup>; <sup>1</sup>Institute of Metal Research, Chinese Academy of Sciences

10:20 AM

**Corrosion Behavior of 316L Stainless Steel in Liquid Lead-bismuth Alloys under Proton Radiation:** *Wande Cairang*<sup>1</sup>; Weiyue Zhou<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

10:40 AM

**High Temperature Liquid Lithium Corrosion:** *Bradley Young*<sup>1</sup>; Junliang Liu<sup>1</sup>; Harry Myers<sup>1</sup>; Martha Simmonds<sup>1</sup>; Alex Leide<sup>2</sup>; Chris Grovenor<sup>1</sup>; David Armstrong<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>UKAEA

**11:00 AM Panel Discussion:** This panel will discuss emerging topics concerning elucidating corrosion mechanisms in other liquid metal environments, based on the work presented in this session.

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## MATERIALS SYNTHESIS AND PROCESSING

**Materials Processing and Kinetic Phenomena: From Thin Films and Micro/Nano Systems to Advanced Manufacturing — Honoring Carl Thompson: Group Alumni I**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

**Tuesday AM | March 5, 2024  
Celebration 11 | Hyatt**

**Session Chair:** To Be Announced

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8:00 AM Invited

**Thin Film NiCr-, TiCr- & CuNi-based Cermets for Low-temperature Ultra-low Magnetoresistance Thermometers:** *Joyce Palmer-Fortune*<sup>1</sup>; Nathanael Fortune<sup>1</sup>; Neha Kondedan<sup>2</sup>; Andreas Rydh<sup>2</sup>; <sup>1</sup>Smith College; <sup>2</sup>Stockholm University

8:30 AM Invited

**Control of Quasi-periodic Lengthscales and Morphologies in Eutectic Thin Films via Directional Laser Solidification:** Eli Sullivan<sup>1</sup>; *Jerrold Floro*<sup>1</sup>; <sup>1</sup>University of Virginia

9:00 AM Invited

**Nano-Metallurgy for Renewable Energy Conversion:** *Young-Chang Joo*<sup>1</sup>; Dae-Hyun Nam<sup>2</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Daegu Gyeongbuk Institute of Science & Technology (DGIST)

**9:30 AM Break****9:50 AM Invited**

**Application of Copper Nanoparticles in Microelectronics Packaging and Beyond:** *Chee Lip Gan*<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**10:20 AM Invited**

**Adventures in the World of Nanocarbons: From CNF Mats to SACs on CNFs for Exceptional Electrochemical Water Splitting:** *Gilbert Daniel Nessim*<sup>1</sup>; <sup>1</sup>Bar Ilan University

**10:50 AM Invited**

**Cu and Cu-M Binary Alloys for Selective and Efficient Electrochemical CO<sub>2</sub> Reduction Reaction:** *Jihun Oh*<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science & Technology (KAIST)

**BIOMATERIALS**

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Materials for Global Development - Energy and Water**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Tuesday AM | March 5, 2024  
Celebration 14 | Hyatt**

**Session Chairs:** Jingjie Hu, North Carolina State University; Ali Salifu, Boston College

**8:00 AM Keynote**

**Impact of Immersion Cooling on Thermomechanical Properties of Extremely Low Loss Substrate Core:** *Dereje Agonafer*<sup>1</sup>; TVS Venkateswar Vishnu<sup>1</sup>; Rohit Suthar<sup>1</sup>; Pratik Bansode<sup>1</sup>; Rabin Bhandari<sup>1</sup>; Akshay Lakshminarayana<sup>1</sup>; Krishna Bhavana Sivaraju<sup>1</sup>; <sup>1</sup>University of Texas at Arlington

**8:30 AM Invited**

**Transition from Biomass to Sustainable Green Energy Storage Devices:** *Balla Diop Ngom*<sup>1</sup>; <sup>1</sup>University Cheikh Anta Diop of Dakar

**8:55 AM Invited**

**Developing Manganese-rich Cathodes for Sodium Ion Batteries:** *Iwnetim Abate*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:20 AM Break****9:40 AM**

**The Influence of Surface Curvature on the Instability of Electrodeposition in Lithium Metal Batteries:** *Chih-Hung Chen*<sup>1</sup>; Chi-Jyun Ko<sup>1</sup>; Kuo-Ching Chen<sup>1</sup>; Chun-Wei Pao<sup>2</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Academia Sinica

**10:00 AM**

**Computational Study of the Bulk, Surface, and Interfacial Properties of BaZrS<sub>3</sub> for Photovoltaic Applications:** *Henry Eya*<sup>1</sup>; Nelson Dzade<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**10:20 AM Invited**

**All-natural, Eco-friendly Composite Foam for Highly Efficient Atmospheric Water Harvesting:** *Teng Li*<sup>1</sup>; Bo Chen<sup>1</sup>; Shuangshuang Jing<sup>1</sup>; <sup>1</sup>University of Maryland, College Park

**10:45 AM**

**Development of a Hybrid Powered UAS for Long-term Remote Water Resource Monitoring:** *Felix Ewere*<sup>1</sup>; <sup>1</sup>North Carolina State University

**11:05 AM**

**Rationally Designed Peptides as Emerging Fenton Catalysts:** *Jacob Freitag*<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas

**11:25 AM**

**Recycling, Reuse and Conformed of Acrylonitrile Butadiene Styrene (ABS) from Waste Electrical and Electronic Equipment (WEEE):** Carlos Acho<sup>1</sup>; *Judith Collo*<sup>1</sup>; <sup>1</sup>Universidad Mayor de San Andrés

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**MECHANICS OF MATERIALS**
**Mechanical Behavior at the Nanoscale VII – Innovations in Testing**

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Tuesday AM | March 5, 2024**

**Manatee Spring I | Hyatt**

**Session Chairs:** Changhong Cao, McGill University; Douglas Stauffer, Bruker Nano Surfaces & Metrology

**8:00 AM Invited**

**Spherical Nanoindentation for Assessing Local Flow Curves – Influence of Environment and Microstructure:** *Verena Maier-Kiener*<sup>1</sup>; Gerald Schaffar<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

**8:30 AM**

**Development of Mechanical Spectroscopy Techniques using Nanoindentation:** *Joseph Jakes*<sup>1</sup>; Donald Stone<sup>2</sup>; <sup>1</sup>USDA FS Forest Products Laboratory; <sup>2</sup>University of Wisconsin-Madison

**8:50 AM**

**Enhanced Mechanical Actuation of Nanoporous Gold Driven by Electroactive Self-assembled Monolayers:** *Olga Matts*<sup>1</sup>; Nadiia Mameka<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon, Geesthacht, Germany

**9:10 AM**

**Residual Stress Impacts on Indentation in Metallic Systems Susceptible to Fracture:** *Jia-Huei Tien*<sup>1</sup>; *David Bahr*<sup>1</sup>; <sup>1</sup>Purdue University

**9:30 AM Break**

**9:50 AM**

**Probing Fracture Toughness of Semi-brittle Materials on the Micronscale - Pitfalls and Recommendations:** *Michael Wurmshuber*<sup>1</sup>; Markus Alfreider<sup>2</sup>; Stefan Wurster<sup>3</sup>; Reinhard Pippan<sup>3</sup>; Daniel Kiener<sup>2</sup>; Mathias Göken<sup>1</sup>; <sup>1</sup>Friedrich-Alexander-University Erlangen-Nürnberg; <sup>2</sup>Montanuniversität Leoben; <sup>3</sup>Erich Schmid Institute of Materials Science

**10:10 AM**

**Micro Transfer Printing with Acoustic Radiation Force:** Hongyu Hou<sup>1</sup>; *Changhong Cao*<sup>1</sup>; <sup>1</sup>McGill University

**10:30 AM**

**Mechanical Behavior of Electrohydrodynamically Printed Nano-porous Ag: Comparative Analysis and Theoretical Investigation:** *Nikolaus Porenta*<sup>1</sup>; Rebecca Gallivan<sup>1</sup>; Christopher Stengg<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

**10:50 AM Invited**

**Anisotropy Characterization via Correlated Mechanical Microscopy and EBSD:** *Jeff Wheeler*<sup>1</sup>; Indranil Basu<sup>2</sup>; Sang-Hyeok Lee<sup>3</sup>; Sandra Korte-Kerzel<sup>3</sup>; Jörg Löffler<sup>2</sup>; <sup>1</sup>Femtotools Ag; <sup>2</sup>ETH Zurich - Laboratory of Metal Physics and Technology; <sup>3</sup>RWTH Aachen University - Institut für Metallkunde und Materialphysik

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## MECHANICS OF MATERIALS

### **Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling – Session I**

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

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

**Tuesday AM | March 5, 2024**

**Barrel Spring I | Hyatt**

**Session Chairs:** Josh Kacher, Georgia Institute of Technology; Brandon Bohanon, University of Florida

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**8:00 AM**

**In-situ TEM Deformation of High Entropy Alloys Across Multiple Temperature Regimes:** *Madelyn Payne*<sup>1</sup>; Lilian Vogl<sup>1</sup>; Peter Schweizer<sup>1</sup>; Mingwei Zhang<sup>1</sup>; Punit Kumar<sup>1</sup>; Mark Asta<sup>1</sup>; Robert Ritchie<sup>1</sup>; Andrew Minor<sup>1</sup>; <sup>1</sup>UC Berkeley/LBNL

**8:20 AM**

**In-situ Micro Tensile Test of Pure Iron Using High Resolution EBSD for the Study of Dislocation-grain Boundary Interactions:** *Dongyue Xie*<sup>1</sup>; Muh-Jang Chen<sup>2</sup>; Saryu Fensin<sup>1</sup>; Mohammed Zikry<sup>2</sup>; Nan Li<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>North Carolina State University

**8:40 AM****Understanding Edge Cracking in a Quenching and Partitioning Steel: An In-situ Study:** *Kyung-Shik Kim*<sup>1</sup>; Narayan S. Pottore<sup>2</sup>; Hong Zhu<sup>2</sup>; C. Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>ArcelorMittal**9:00 AM****Mechanical Behavior of Reactor Pressure Vessel Steel After High-Fluence Neutron Irradiation:** *Brandon Bohanon*<sup>1</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida**9:20 AM Break****9:40 AM****In Situ EBSD/HRDIC Analysis of Twin Transmission and Co-nucleation at Grain Boundaries in Mg:** *Maral Sarebanzadeh*<sup>1</sup>; Alberto Orozco-Caballero<sup>1</sup>; *Javier Llorca*<sup>2</sup>; <sup>1</sup>Technical University of Madrid; <sup>2</sup>IMDEA Materials Institute & Technical University of Madrid**10:00 AM****In-situ Study on Thermal Compression Bonding of Nanotwinned Cu Pillars:** *Ke Xu*<sup>1</sup>; Tongjun Niu<sup>2</sup>; Debargha Paul<sup>1</sup>; Chao Shen<sup>1</sup>; Carol Handwerker<sup>1</sup>; Ganesh Subbarayan<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue; <sup>2</sup>Los Alamos National Laboratory**10:20 AM****In Situ 3D Failure Mechanisms in a Pristine Chondrite Meteorite:** *Tai-Jan Huang*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Swapnil Morankar<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

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**LIGHT METALS****Melt Processing, Casting and Recycling – Liquid Metal Treatment and Melt Quality****Sponsored by:** TMS Light Metals Division, TMS: Aluminum Committee**Program Organizers:** Anne Kvithyld, SINTEF; Tao Wang, Rio Tinto; Samuel Wagstaff, Oculatus Consulting**Tuesday AM | March 5, 2024**  
**Windermere Y-1 | Hyatt****Session Chair:** Theofani Tzevelekou, ELKEME S.A.**8:00 AM****Optimization of Boron Treatment for Production of 1370 Electrically Conductive Grade Aluminium Alloy:** *Shahid Akhtar*<sup>1</sup>; Massoud Hassanabadi<sup>1</sup>; Ragnhild E Aune<sup>2</sup>; <sup>1</sup>Hydro Aluminium; <sup>2</sup>Norwegian University of Science and Technology (NTNU)**8:25 AM****Standardization of Launder Systems for Aluminum Casting:** *Michel Quintiano*<sup>1</sup>; José Hernandez<sup>1</sup>; <sup>1</sup>Alum Foundry Supplies**8:50 AM****Silicon Depletion in Ceramic Foam Filters (CFFs) during Aluminium Melt Filtration:** *Are Bergin*<sup>1</sup>; Robert Fritzsche<sup>2</sup>; *Shahid Akhtar*<sup>1</sup>; Lars Arnberg<sup>2</sup>; Ragnhild Aune<sup>2</sup>; <sup>1</sup>Hydro Aluminium AS; <sup>2</sup>Norwegian University of Science and Technology**9:15 AM****A PoDFA Benchmarking Study Between Manual and AI Supervised Machine Learning Methods to Evaluate Inclusions in Wrought and Foundry Aluminum Alloys:** *Pascal Gauthier*<sup>1</sup>; Vincent Bilodeau<sup>1</sup>; *John Sosa*<sup>2</sup>; <sup>1</sup>Riotinto Aluminium ARDC; <sup>2</sup>MIPAR Image Analysis

9:40 AM Break

9:55 AM

**Automated Metal Cleanliness Analyzer (AMCA): Improving Digital Image Analysis of PoDFA Micrographs by Combining Deterministic Image Segmentation and Unsupervised Machine Learning:** Hannes Zedel<sup>1</sup>; Eystein Vada<sup>2</sup>; Robert Fritzscht<sup>1</sup>; Shahid Akhtar<sup>2</sup>; Ragnhild Aune<sup>3</sup>; <sup>1</sup>Metallurgical Insight And Quality; <sup>2</sup>Norsk Hydro; <sup>3</sup>Norwegian University of Science and Technology

10:20 AM

**Elemental Analysis and Classification of Molten Aluminum Alloys by LIBS:** Deniz Kavrar Urk<sup>1</sup>; Arif Demir<sup>1</sup>; Gökçen Gökçe<sup>1</sup>; Murat Doğan<sup>1</sup>; Murat ali Kistan<sup>2</sup>; Omer Yalcin<sup>2</sup>; Evren Pehlivan<sup>2</sup>; Kubra Akben<sup>3</sup>; Akın Obalı<sup>1</sup>; <sup>1</sup>Sistem Teknik Industrial Furnaces LTD.; <sup>2</sup>Revolvind Teknoloji A.; <sup>3</sup>Yeditepe University

10:45 AM

**Enhancing Quantification of Inclusions in PoDFA Micrographs Through Integration of Deterministic and Deep Learning Image Analysis Algorithms:** Anish Nayak<sup>1</sup>; Hannes Zedel<sup>2</sup>; Shahid Akhtar<sup>3</sup>; Robert Fritzscht<sup>2</sup>; Ragnhild Aune<sup>1</sup>; <sup>1</sup>Norwegian University Of Science And Technology; <sup>2</sup>Metallurgical Insight and Quality; <sup>3</sup>Norsk Hydro

11:10 AM

**Formation Kinetics of TiB<sub>2</sub> in Aluminum Melt Studied Using Laser-induced Breakdown Spectroscopy:** Antonio Prudencio<sup>1</sup>; Mehdi Maghsoudi<sup>1</sup>; Kristbjorg Thorarinsdottir<sup>1</sup>; Kristjan Leosson<sup>1</sup>; <sup>1</sup>DTE

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## ADDITIVE MANUFACTURING

### Nano and Micro Additive Manufacturing – Complex Materials

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

**Program Organizers:** Wendy Gu, Stanford University; Mostafa Hassani, Cornell University; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Christoph Eberl, Fraunhofer IWM

Tuesday AM | March 5, 2024  
Gulf | Hyatt

**Session Chairs:** Chris Eberl, KIT and Fraunhofer IWM; Wendy Gu, Stanford University

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8:00 AM Invited

**3D Microarchitectures of Metals, Ceramics, and Polymers, via Droplet-based Nanoprinting for Next Generation Biomedical Devices, Li-ion Batteries, and Robotic Skins:** Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

8:30 AM

**In-situ Studies of Surface Oxide Layer Fracture Upon Powder Particles Flattening:** Qi Tang<sup>1</sup>; Yuji Ichikawa<sup>2</sup>; Mostafa Hassani<sup>1</sup>; <sup>1</sup>Sibley School of Mechanical and Aerospace Engineering, Cornell University;; <sup>2</sup>Fracture and Reliability Research Institute, Tohoku University

8:50 AM

**Micro Additive Manufacturing of Nd: YAG Ceramic with Optical-gain Properties:** Xiangfan Chen<sup>1</sup>; Luyang Liu<sup>1</sup>; <sup>1</sup>Arizona State University



**9:10 AM**

**In-situ Resource Utilization of Lunar Highlands Regolith with Graphene Nanoplatelets via Additive Manufacturing:** *Brandon Aguiar*; Ambreen Nisar<sup>1</sup>; Tony Thomas<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

**9:30 AM Break****9:50 AM Invited**

**Hydrogel-based Additive Manufacturing of Ceramics and Metals: Simple Chemistries for Advanced Materials:** *Daryl Yee*<sup>1</sup>; <sup>1</sup>École Polytechnique Fédérale de Lausanne

**10:20 AM**

**DIW 3D Printing with Micron-level Precision:** *Justin Puma*<sup>1</sup>; <sup>1</sup>McGill University

**10:40 AM**

**Liquid Metal Dealloying of Additively Manufactured Materials:** *Catherine Barrie*<sup>1</sup>; Kourtney Porsch<sup>1</sup>; Michael Brupbacher<sup>2</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins Applied Physics Laboratory

**11:00 AM**

**Digitisation of Metal AM for Part Microstructure and Property Control:** *Dermot Brabazon*<sup>1</sup>; <sup>1</sup>Dublin City University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments II – High Temperature Environment

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Tuesday AM | March 5, 2024****Bayhill 19 | Hyatt**

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

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**8:00 AM Invited**

**Phase Decomposition in Severe Plastic Deformed Complex Concentrated Alloys:** Sakshi Bajpai<sup>1</sup>; Xin Wang<sup>1</sup>; Calvin Belcher<sup>1</sup>; Vivek Verma<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Julia Ivanisenko<sup>2</sup>; Horst Hahn<sup>3</sup>; *Enrique Lavernia*<sup>1</sup>; Diran Apelian<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>KIT Germany; <sup>3</sup>University of Oklahoma

**8:25 AM Invited**

**Enhanced Strength and Thermal Stability in Oxide Dispersion Strengthened Nanostructured Aluminum Alloys:** *Jason Trelewicz*<sup>1</sup>; Wenbo Du<sup>1</sup>; Bin Cheng<sup>1</sup>; Cormac Killeen<sup>1</sup>; David Sprouster<sup>1</sup>; <sup>1</sup>Stony Brook University

**8:50 AM**

**High Temperature Stabilization of Nanostructured Tungsten Alloys Through Synergistic Compositional Complexities:** *Nicholas Olynik*<sup>1</sup>; Cormac Killeen<sup>1</sup>; Sean Mascarenhas<sup>1</sup>; David Sprouster<sup>1</sup>; Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University

**9:10 AM Invited**

**Wire-Arc Additive Manufacturing of Haynes 282 Superalloy with Designed Precipitation Strengthening for High Performance at Elevated Temperatures:** Luis Fernando Ladinos Pizano<sup>1</sup>; Xin Wang<sup>1</sup>; Soumya Sridar<sup>1</sup>; Chantal Sudbrack<sup>2</sup>; *Wei Xiong*<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>National Energy Technology Laboratory

**9:35 AM Break****9:55 AM Invited**

**Evolution of Thermally Stable CuTa Nanocrystalline Alloys:** *Billy Hornbuckle*<sup>1</sup>; Anthony Roberts<sup>1</sup>; Anit Giri<sup>1</sup>; Sean Fudger<sup>1</sup>; Tom Luckenbaugh<sup>1</sup>; Chris Marvel<sup>2</sup>; Kiran Solanki<sup>3</sup>; Kris Darling<sup>1</sup>; <sup>1</sup>DEVCOM US Army Research Lab; <sup>2</sup>Louisiana State University; <sup>3</sup>Arizona State University

**10:20 AM**

**Nanocrystalline Refractory Diborides Achieved through Alloying: Mechanical Properties and Thermal Stability:** Samyukta Shrivastav<sup>1</sup>; Dana Yun<sup>1</sup>; Kinsey Canova<sup>1</sup>; Laurent Souqui<sup>1</sup>; John Abelson<sup>1</sup>; *Jessica Krogstad*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**10:40 AM**

**Stability Screening for Amorphous and Nanostructured Ferritic Alloys:** *Kyle Russell*<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California

**11:00 AM**

**Novel High Temperature Zirconium Alloys by Near-Alpha Titanium Analogy:** *Johan Pauli Magnussen*<sup>1</sup>; Helen Swan<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>National Nuclear Laboratory Ltd.

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**ADVANCED CHARACTERIZATION METHODS**

**Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques – Session I**

**Sponsored by:** TMS Structural Materials 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

**Tuesday AM | March 5, 2024**

**Blue Spring I | Hyatt**

**Session Chairs:** Sriram Vijayan, Michigan Technological University; Rakesh Kamath, Argonne National Laboratory

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**8:00 AM**

**Probabilistic Orientation Analysis via Direct ODF Calculation from Far Field HEDM:** *Austin Gerlt*<sup>1</sup>; Stephen Niezgod<sup>1</sup>; Paul Shade<sup>2</sup>; Donald Boyce<sup>3</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Air Force Research Lab; <sup>3</sup>Cornell University

**8:20 AM**

**Deep Learning-Driven Semantic Segmentation of large 4D Lab-Scale X-ray Tomography Data for Quantification of Microstructural Features:** *Eshan Ganju*<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

**8:40 AM**

**Using Video Games for Training Data on Microstructural Design:** *Christopher Adair*<sup>1</sup>; *Oliver Johnson*<sup>1</sup>; <sup>1</sup>Brigham Young University

**9:00 AM Invited**

**Advanced Mechanical Properties Prediction of Functionally Graded Materials through High-Throughput Characterization.:** *C. Bean*<sup>1</sup>; *Y. Nie*<sup>1</sup>; *M.A. Charpagne*<sup>1</sup>; *J.C. Stinville*<sup>1</sup>; <sup>1</sup>University of Illinois Urbana-Champaign

**9:25 AM**

**A Framework for the Optimal Selection of High-Throughput Data Collection Workflows by Autonomous Experimentation Systems:** *Stephen Niezgoda*<sup>1</sup>; *Rohan Casukhela*<sup>1</sup>; *Sriram Vijayan*<sup>2</sup>; *Joerg Jinschek*<sup>3</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Michigan Technological University; <sup>3</sup>Technical University of Denmark

**9:45 AM Break**

**10:00 AM Invited**

**Hierarchical Bayesian Data Analysis for Accelerating Structural Materials Characterization:** *Brian DeCost*<sup>1</sup>; *Howie Joress*<sup>1</sup>; *Bruce Ravel*<sup>1</sup>; *Mitra Taheri*<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Johns Hopkins University

**10:25 AM Invited**

**Real-Time In-Situ Characterization with Web Technologies at Any Scale:** *Kevin Field*<sup>1</sup>; *Christopher Field*<sup>2</sup>; <sup>1</sup>University of Michigan & Theia Scientific, LLC; <sup>2</sup>Theia Scientific, LLC

**10:50 AM**

**Utilizing Advanced Computer Vision Techniques Based on Machine Learning and Artificial Neural Networks to Process Micrographs of Ni-base Superalloys:** *Pascal Thome*<sup>1</sup>; *Luis Arciniaga*<sup>1</sup>; *Alexander Richter*<sup>2</sup>; *Sammy Tin*<sup>1</sup>; <sup>1</sup>The University of Arizona; <sup>2</sup>Ruhr-University Bochum

**11:10 AM**

**Melt Pool Quantification from In Situ Radiography of Directed Energy Deposition of Nickel Superalloys:** *Imogen Cowley*<sup>1</sup>; *Kai Zhang*<sup>1</sup>; *Sebastian Marussi*<sup>1</sup>; *Shishira Bhagavath*<sup>1</sup>; *Harry Chapman*<sup>1</sup>; *Chu Lun Alex Leung*<sup>1</sup>; *Robert Atwood*<sup>2</sup>; *Martyn Jones*<sup>3</sup>; *Peter Lee*<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Diamond Light Source; <sup>3</sup>Rolls-Royce plc.

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIII — Advanced Interconnection Techniques**

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

**Tuesday AM | March 5, 2024**

**Bayhill 30 | Hyatt**

**Session Chairs:** Yu-An Shen, Feng Chia University; Hiroshi Nishikawa, Osaka University

**8:00 AM Keynote**

**Improvement of Microelectronic Joint Reliability through the Optimization of IMC Nanomechanical Properties:** *Jenn-Ming Song*<sup>1</sup>; <sup>1</sup>National Chung Hsing University

**8:30 AM Invited**

**Microalloying-induced Structural Transformation and Mechanical Improvement in Promising Electronic Packaging Materials:** *Zhiliang Pan*<sup>1</sup>; Zongyi Ma<sup>1</sup>; Frederic Sansoz<sup>2</sup>; Timothy Rupert<sup>3</sup>; <sup>1</sup>Guilin University of Electronic Technology; <sup>2</sup>University of Vermont; <sup>3</sup>University of California Irvine

**8:55 AM Invited**

**A Rapid Interconnection Technique via Solder/Porous Structures under FA Atmosphere:** *Siliang He*<sup>1</sup>; Zhiliang Pan<sup>1</sup>; Yu-An Shen<sup>2</sup>; Chuan Hu<sup>3</sup>; Hiroshi Nishikawa<sup>4</sup>; <sup>1</sup>Guilin University of Electronic Technology; <sup>2</sup>Feng Chia University; <sup>3</sup>Institute of Semiconductors, Guangdong Academy of Sciences; <sup>4</sup>Osaka University

**9:20 AM Invited**

**A Comprehensive Study of Microstructure, Texture, and Properties Evolutions in Pure Metals Induced by Electric Current Stressing:** *Chien-Lung Liang*<sup>1</sup>; Hsuan-Cheng Huang<sup>1</sup>; Meng-Chun Chiu<sup>1</sup>; Pao-Hsuan Yang<sup>1</sup>; Su-Chen Liao<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**9:45 AM Break**

**10:05 AM**

**Improving Mechanical Properties of Eutectic Sn-Zn Low-Melting Alloy by Indium Addition:** *Yu-An Shen*<sup>1</sup>; <sup>1</sup>Feng Chia University

**10:25 AM**

**Microstructure and Strength of Sn-Ag-Cu Solder Joint Using Blue Diode Laser:** *Hiroaki Tatsumi*<sup>1</sup>; Yuki Kida<sup>1</sup>; Keisuke Takenaka<sup>1</sup>; Seiji Kaneshita<sup>1</sup>; Yuji Sato<sup>1</sup>; Masahiro Tsukamoto<sup>1</sup>; Hiroshi Nishikawa<sup>1</sup>; <sup>1</sup>Osaka University

**10:45 AM**

**Ag and Cu Whiskers in the Ag-Cu-Se Ternary System:** *Yung-Chun Tsai*<sup>1</sup>; Pin-shuo Huang<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

## MATERIALS SYNTHESIS AND PROCESSING

**Phase Transformations and Microstructural Evolution — Shape Memory Alloys**

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Tuesday AM | March 5, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Sriram Vijayan, Michigan Technological University

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**8:00 AM Invited**

**Interface Compatibility for Stress-induced Transformations in Shape-memory Alloys:** *Eliana Feygin*<sup>1</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**8:30 AM**

**Hardenability and Microstructural Evolution of a Heat-Treated and Precipitation Strengthened NiTiHfAl Alloy:** *Flavia Gallo*<sup>1</sup>; Eitan Hershkovitz<sup>1</sup>; Yang Yang<sup>1</sup>; Hunter Henderson<sup>2</sup>; Michael Kesler<sup>3</sup>; Honggyu Kim<sup>1</sup>; Michele Manuel<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Oak Ridge National Laboratory

**8:50 AM**

**Characterizing the Impact of Precipitation-Induced Strain Fields on Phase Transformation in High Temperature NiTiHf-based Shape Memory Alloys:** *Eitan Hershkovitz*<sup>1</sup>; Flávia da Cruz Gallo<sup>1</sup>; Matthew Jones<sup>1</sup>; Timothy Yoo<sup>1</sup>; Michele Manuel<sup>1</sup>; Honggyu Kim<sup>1</sup>; <sup>1</sup>University of Florida

**9:10 AM**

**Microstructural and Compositional Effects on The Fracture Toughness and Fatigue Response of NiTiHf High-Temperature Shape Memory Alloys:** *Roberto Orrostieta*<sup>1</sup>; Benjamin Young<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Sandia National Laboratories

**9:30 AM Break**

**9:50 AM Invited**

**Influence of Microstructural Features on Austenite-Martensite Interfaces in NiTi Shape Memory Alloys:** *Gabriel Plummer*<sup>1</sup>; Mikhail Mendeleev<sup>1</sup>; John Lawson<sup>1</sup>; <sup>1</sup>NASA Ames Research Center

**10:20 AM**

**Stability and Microstructure of Pseudobinary (NiCu)(TiHfZr) Multicomponent High-Temperature Shape Memory Alloys:** *Cem Cakirhan*<sup>1</sup>; Daniel Salas<sup>1</sup>; Kadri Can Atli<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

**10:40 AM**

**NbRu: A Refractory Shape Memory Alloy:** *Tyler Knapp*<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**11:00 AM**

**Microstructural Processing and Phase Evolution Analysis of Off-stoichiometric Fe-Mn-Ga Shape Memory Alloy:** *Nana Adoo*<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

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**MATERIALS SYNTHESIS AND PROCESSING**

## Powder Materials Processing and Fundamental Understanding – Field-Assisted and Advanced Sintering Technologies II

**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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

**Tuesday AM | March 5, 2024**  
**Celebration 9 | Hyatt**

**Session Chairs:** Claude Estournes, CIRIMAT - CNRS; Catherine Elissalde, ICMCB - CNRS

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**8:00 AM**

**Synergistic Enhancement of Mechanical and Tribological Properties in Inconel 718-GNP Composites Fabricated by High-Energy Ball Milling and Spark Plasma Sintering:** *Sanoj Kark<sup>1</sup>*; Satyavan Digole<sup>1</sup>; Manoj Mugale<sup>1</sup>; Amit Choudhari<sup>1</sup>; Jay Desai<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

**8:20 AM**

**An Atomistic Modeling Study of Electric Field Effect on Sintering Mechanisms of Zirconia:** Kyrel Polifrone<sup>1</sup>; Colin Delaney<sup>1</sup>; Md. Shahrier Hasan<sup>1</sup>; Hadia Bayat<sup>1</sup>; Christopher Foronda<sup>1</sup>; Eugene Olevsky<sup>1</sup>; *Wenwu Xu<sup>1</sup>*; <sup>1</sup>San Diego State University

**8:40 AM Invited**

**Engineering of Ceramic Oxides Microstructures Using Low Temperature Sintering Processes:** *Claude Estournes<sup>1</sup>*; Julien de Landtsheer<sup>2</sup>; Nicolas Albar<sup>2</sup>; Melanie Rousselle<sup>3</sup>; Geoffroy Chevallier<sup>1</sup>; Alicia Weibel<sup>2</sup>; Florence Ansart<sup>2</sup>; Guillaume Fradet<sup>4</sup>; Catherine Elissalde<sup>5</sup>; Thomas Herisson de Beauvoir<sup>1</sup>; <sup>1</sup>CIRIMAT - CNRS; <sup>2</sup>CIRIMAT - UT3; <sup>3</sup>CIRIMAT - SAFRAN; <sup>4</sup>SAFRAN; <sup>5</sup>ICMCB -CNRS

**9:10 AM**

**Micromechanical Properties and Microstructures of AC and DC Flash-sintered Alumina:** *Chao Shen<sup>1</sup>*; Tongjun Niu<sup>1</sup>; Bo Yang<sup>1</sup>; Jaehun Cho<sup>2</sup>; Zhongxia Shang<sup>1</sup>; Tianyi Sun<sup>1</sup>; Anyu Shang<sup>1</sup>; R. Edwin Garcia<sup>1</sup>; Haiyan Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Kumoh National Institute of Technology

**9:30 AM Break**

**9:50 AM Invited**

**Densification of Nanostructured Functional Materials: Innovative Combinations of Low-temperature Strategies:** *Catherine Elissalde<sup>1</sup>*; U-Chan Chung<sup>1</sup>; H el ene Deb eda<sup>2</sup>; Yoan Denis<sup>1</sup>; Etienne Martin<sup>1</sup>; Julien De Landtsheer<sup>3</sup>; Christopher Castro Chavarria<sup>2</sup>; Thomas H erisson de beauvoir<sup>3</sup>; Claude Estourn es<sup>3</sup>; Sylvie Bord ere<sup>4</sup>; Matthew Suchomel<sup>1</sup>; Mario Maglione<sup>1</sup>; Graziella Goglio<sup>1</sup>; Gilles Philippot<sup>1</sup>; <sup>1</sup>ICMCB/CNRS/Bordeaux University; <sup>2</sup>IMS/ Bordeaux University; <sup>3</sup>CIRIMAT/University of Toulouse; <sup>4</sup>I2M/CNRS/Bordeaux University

**10:20 AM**

**PM Steels for New Energy Production Systems:** Facundo Masari<sup>1</sup>; Rebeca Hernandez-Pascual<sup>2</sup>; Mercedes Hernandez-Mayoral<sup>2</sup>; Jose Torralba<sup>3</sup>; *Monica Campos<sup>1</sup>*; <sup>1</sup>Universidad Carlos III Madrid; <sup>2</sup>Centro de Investigaciones Energ eticas, Medioambientales y Tecnol ogicas (CIEMAT); <sup>3</sup>Universidad Carlos III Madrid-Imdea Materials Institute

**10:40 AM****Composition-Tunable Shrinkage for Ferrous Sintering Setters and Inserts:** *Sajad Shirzad<sup>1</sup>; Osama Habbal<sup>1</sup>; Pravansu Mohanty<sup>1</sup>; Christopher Pannier<sup>1</sup>; <sup>1</sup>University of Michigan-Dearborn***11:00 AM****Loose Sintering of Physical Vapor Deposited Powders:** *Colson Miller<sup>1</sup>; Camilo Bedoya<sup>1</sup>; Santiago Vargas<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University*

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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 - Energy Storage & Dry Printing****Sponsored by:** TMS Functional Materials Division, TMS: Thin Films and Interfaces Committee, TMS: Additive Manufacturing Committee**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology**Tuesday AM | March 5, 2024****Orlando L | Hyatt****Session Chairs:** Kai Li, Oak Ridge National Laboratory; Masoud Mahjouri-Samani, Auburn University**8:00 AM Invited****Additive Manufacturing of Two-dimensional Nanomaterial Inks for Energy Harvesting, Storage and Sensing:** *Tony Valayil Varghese<sup>1</sup>; <sup>1</sup>Boise State University***8:25 AM Invited****Multi-functional Energy Storage Structures Based on Redox Polymers:** *Tse Nga Ng<sup>1</sup>; <sup>1</sup>University of California San Diego***8:50 AM Invited****Scalable Nanomanufacturing of 3D Lattice Electrodes for Electrocatalysis and Energy Storage:** *William Scheideler<sup>1</sup>; Anand Tiwari<sup>1</sup>; Julia Huddy<sup>1</sup>; <sup>1</sup>Dartmouth College***9:15 AM Break****9:35 AM****Additive Electronic Manufacturing of Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> Nanomaterial Ink for Energy Harvesting and Storage:** *Fereshteh Rajabi Kouchi<sup>1</sup>; Tony Valayil Varghese<sup>1</sup>; Naqsh E Mansoor<sup>1</sup>; Shruti Nirantar<sup>2</sup>; Alejandra Almaraz<sup>1</sup>; Myeonglok Seol<sup>3</sup>; Joshua Eixenberger<sup>1</sup>; Jessica Koehne<sup>3</sup>; David Estrada<sup>1</sup>; <sup>1</sup>Boise State University; <sup>2</sup>RMIT University; <sup>3</sup>NASA Ames Research Center***9:55 AM Invited****Laser Processing and 3D Printing of Solid State Al-air Flexible Batteries:** *Anming Hu<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville***10:20 AM Invited****Dry Printing Pure Copper for Flexile Electronics with High Electrical and Mechanical Performance:** *Zabihollah Ahmadi<sup>1</sup>; Aarsh Patel<sup>1</sup>; Curtis Hill<sup>2</sup>; Jennifer Jones<sup>3</sup>; Steven Peebles<sup>3</sup>; Matthew Boebinger<sup>4</sup>; Masoud Mahjouri-Samani<sup>1</sup>; <sup>1</sup>Auburn*

University; <sup>2</sup>NASA MSFC JSEG; <sup>3</sup>NASA Marshall Space Flight Center; <sup>4</sup>Oak Ridge National Laboratory

**10:45 AM**

**Reliability and Functionality of Dry Multimaterial Printed Electronics:** Masoud Mahjouri-Samani<sup>1</sup>; *Aarsh Patel*<sup>1</sup>; Zabihollah Ahmadi<sup>1</sup>; Adib Taba<sup>1</sup>; Suman Jaiswal<sup>1</sup>; Seungjong Lee<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

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## MATERIALS SYNTHESIS AND PROCESSING

**Process Metallurgy and Environmental Engineering: An EPD Symposium in Honor of Takashi Nakamura – Future Direction of Non-Ferrous Metal Smelting I**

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

**Program Organizers:** Takanari Ouchi, University of Tokyo; Gerardo Alvear Flores, CaEng Associates; Etsuro Shibata, Tohoku University; Leandro Andres Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

**Tuesday AM | March 5, 2024**  
**Celebration 6 | Hyatt**

**Session Chairs:** Etsuro Shibata, Tohoku University; Takanari Ouchi, The University of Tokyo

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**8:00 AM** Introductory Comments

**8:10 AM** Keynote

**The Future Direction of Non-ferrous Metal Smelting:** *Takashi Nakamura*<sup>1</sup>; <sup>1</sup>Tohoku University

**8:40 AM** Keynote

**A Journey from Japan: My Interactions with Professor Nakamura and His Support to Build a Metallurgical Journey:** *Gerardo Alvear Flores*<sup>1</sup>; <sup>1</sup>CaEng Associates

**9:10 AM** Invited

**Energy Consumptions and Environmental Performances of Modern Copper Smelting Technologies:** *Nagendra Tripathi*<sup>1</sup>; <sup>1</sup>Rio Tinto

**9:30 AM** Invited

**Metals Recycling Utilizing Mitsubishi Materials Corporation's Network of Smelters and Refineries:** *Akira Kaneda*<sup>1</sup>; <sup>1</sup>Mitsubishi Materials Corp

**9:50 AM** Break

**10:10 AM** Invited

**Non-ferrous Metals Business and Material Recycling at Mitsui Mining & Smelting Co., Ltd:** *Keizo Nakayama*<sup>1</sup>; <sup>1</sup>Mitsui Mining & Smelting Co., Ltd.

**10:30 AM** Invited

**DOWA Recycling Networks:** *Kohei Miwa*<sup>1</sup>; Hiromitsu Watanabe<sup>1</sup>; Tetsuro Tokumoto<sup>1</sup>; Satoshi Nakagawara<sup>1</sup>; <sup>1</sup>DOWA Metals & Mining Co., Ltd.

**10:50 AM** Invited

**JX Metals Corporation's Sustainable Copper Vision and Efforts to Achieve It:** *Toshihiro Kamegai*<sup>1</sup>; Hiroshi Chida<sup>1</sup>; Kai Tatamoto<sup>1</sup>; <sup>1</sup>JX Metals Corporation



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## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Biometallurgy and Flotation

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

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

**Tuesday AM | March 5, 2024**  
**Celebration 3 | Hyatt**

**Session Chairs:** Alafara Baba, University of Ilorin; Hong (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

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**8:40 AM**

**Bacteriophage-based Sorption of Rare Earth Elements from Dilute Aqueous Solutions:** Inseok Chae<sup>1</sup>; *Fiona Doyle*<sup>1</sup>; Seung-Wuk Lee<sup>1</sup>; <sup>1</sup>University of California

**9:00 AM**

**Extraction of Platinum Group Metals from Metallurgical Plant Effluent Using Bioadsorbents:** Yen Ning Lee<sup>1</sup>; *Shafiq Alam*<sup>1</sup>; <sup>1</sup>University of Saskatchewan

**9:20 AM**

**Concentrated-solar-thermal-driven Recycling of Li-ion Battery Waste through Carbothermic Reduction: Thermodynamic Assessment and Experimental Verification:** *Bintang Nuraeni*<sup>1</sup>; Deddy Nababan<sup>1</sup>; A. D. P. Putera<sup>1</sup>; M. Akbar Rhamdhani<sup>1</sup>; <sup>1</sup>Swinburne University of Technology

**9:40 AM Break**

**10:00 AM**

**Beneficiation of Low-grade Lithium Ores from Eastern Kazakhstan by Dense Media Separation (DMS) and Froth Flotation:** *Daulet Sagzhanov*<sup>1</sup>; Junichiro Ito; Batnasan Altansukh<sup>1</sup>; Labone Godirilwe<sup>1</sup>; Kazutoshi Haga<sup>1</sup>; Jeon Sanghee<sup>1</sup>; Atsushi Shibayama<sup>1</sup>; <sup>1</sup>Akita University

**10:20 AM**

**Investigating the Selectivity of Xanthates for the Flotation Separation of Base Metal and PGM Ores:** *Terence Phadi*<sup>1</sup>; Zach Sehume<sup>1</sup>; Zikhona Magaxeni<sup>1</sup>; <sup>1</sup>Mintek

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2024 — Niobium-based Alloys

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

**Program Organizers:** Christopher Thom, Rhenium Alloys, Inc.; Wolfgang Pantleon, Technical University of Denmark; Michael Kirka, Oak Ridge National Laboratory; Gaoyuan Ouyang, Ames Laboratory; Marie Charpagne, University of Illinois; Eric Taleff, University of Texas at Austin; Thomas Bieler, Michigan State University; John Perepezko, University of Wisconsin-Madison

**Tuesday AM | March 5, 2024**

**8:00 AM**

**Sintering and Densification Kinetics of Nb-W Based Alloys by Electric Field Activated Sintering:** *Jordan Contreras*<sup>1</sup>; K. S. Ravi Chandran<sup>1</sup>; <sup>1</sup>University of Utah

**8:20 AM**

**Electric Field Activated Sintering, Densification Behavior and Properties of Commercial Nb Alloy(C103):** *Md Shafiqur Rahman Jame*<sup>1</sup>; Jordan Contreras<sup>1</sup>; K.S. Ravi Chandran<sup>1</sup>; <sup>1</sup>University of Utah

**8:40 AM**

**New Niobium Alloys with High Strength and Toughness for High Temperature Applications:** *Zahra Gholami Shiri*<sup>1</sup>; Jordan Contreras<sup>1</sup>; K. S. Ravi Chandran<sup>1</sup>; <sup>1</sup>University of Utah

**9:00 AM**

**High-throughput Characterization of Dynamic Tensile Failure in Pure Niobium and Niobium-titanium Alloy:** *Arezo Zare*<sup>1</sup>; Jacob Diamond<sup>1</sup>; K.T. Ramesh<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**9:20 AM**

**The Study of High Temperature Deformation of Model Nb-Si-based Alloys at Ultra-high Temperatures:** *Sae Matsunaga*<sup>1</sup>; Kiyoshi Komamura<sup>2</sup>; Zheng Yang<sup>1</sup>; Yosuke Takayanagi<sup>1</sup>; Yoko Yamabe-Mitarai<sup>1</sup>; <sup>1</sup>University of Tokyo; <sup>2</sup>KNB Plus LLC

**9:40 AM Break**

**10:00 AM**

**The Fundamentals of Recrystallization in Binary Niobium Alloys:** *William Waliser*<sup>1</sup>; Nelson Delfino de Campos Neto<sup>1</sup>; Nathan Peterson<sup>1</sup>; Valava Sambandam Rani<sup>1</sup>; Finn Bamrud<sup>1</sup>; Ruben Ochoa<sup>1</sup>; Adam Freund<sup>1</sup>; Oliver Hesmondhalgh<sup>1</sup>; Noah Philips<sup>2</sup>; Michael Kaufman<sup>1</sup>; Kester Clarke<sup>3</sup>; Amy Clarke<sup>3</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>ATI metals; <sup>3</sup>Los Alamos National Laboratory

**10:20 AM**

**Effects of Strain Path and Surface Pinning on Recrystallization in Deformed High-purity Niobium:** *Zackery Thune*<sup>1</sup>; Thomas Bieler<sup>1</sup>; <sup>1</sup>Michigan State University

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## LIGHT METALS

**Scandium Extraction and Use in Aluminum Alloys — Scandium Extraction and Use in Aluminum Alloys**

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

**Program Organizers:** Timothy Langan, Sunrise Energy Metals; Frank Palm, Airbus Defence and Space GmbH; Thomas Dorin, Deakin University; Paul Rometsch, Rio Tinto Aluminium; Henk van der Laan, V.I.C. Van der Laan International Consultancy BV; Efthymios Balomenos, Mytilineos S.A., Metallurgy Bu; M. Akbar Rhamdhani, Swinburne University of Technology; Samuel Wagstaff, Oculatus Consulting

**Tuesday AM | March 5, 2024**  
**Windermere X-3 | Hyatt**

**Session Chair:** Timothy Langan, Sunrise Energy Metals

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**8:00 AM**

**The Role of New Aluminium-Scandium Alloys for Emission Reduction in Various Sectors:** *Thomas Dorin*<sup>1</sup>; *Timothy Langan*<sup>2</sup>; <sup>1</sup>Deakin University; <sup>2</sup>Sunrise Energy Metals

**8:50 AM**

**Sc-containing Al-Si-Mg (6xxx) Alloys for Automotive Extrusions:** *Timothy Langan*<sup>1</sup>; *Thomas Wood*<sup>2</sup>; *Paul Sanders*<sup>2</sup>; *Avishan Shomali*<sup>3</sup>; <sup>1</sup>Sunrise Energy Metals; <sup>2</sup>Michigan Technological University; <sup>3</sup>Kaiser Aluminum

**9:15 AM**

**Investigation of the Mechanical Properties of Flat Rolled Products of Aluminium Alloys Al-Mg-Sc Under Various Deformation Processing Modes:** *Alexander Alabin*<sup>1</sup>; *Sergey Valchuk*<sup>1</sup>; *Alexander Krokhin*<sup>1</sup>; *Dror Shaked*<sup>1</sup>; <sup>1</sup>UC RUSAL

**9:40 AM Break**

**9:55 AM**

**Effect of Sc and Zr Microalloying on Grain Structure After Hot Deformation and Brazing in 3xxx Alloys:** *Alyaa Bakr*<sup>1</sup>; *Paul Rometsch*<sup>2</sup>; *X.-Grant Chen*<sup>1</sup>; <sup>1</sup>UQAC; <sup>2</sup>Arvida Research and Development Centre, Rio Tinto Aluminium

**10:20 AM**

**Hot Deformation Behavior and Post Brazing Grain Structure of Dilute Al-(Sc-Zr) Alloys for Brazed Heat Exchangers:** *Alyaa Bakr*<sup>1</sup>; *Paul Rometsch*<sup>2</sup>; *X.-Grant Chen*<sup>1</sup>; <sup>1</sup>UQAC; <sup>2</sup>Arvida Research and Development Centre, Rio Tinto Aluminium

**10:45 AM**

**Investigating the Influence of Iron Content on the Microstructure and Mechanical Properties of a High Strength Al-alloy for Additive Manufacturing Additive Manufacturing:** *Matteo Turani*<sup>1</sup>; *Jannic Walter*<sup>1</sup>; *Paulo Davi Borges Esteves*<sup>1</sup>; *Enrico Tosoratti*<sup>1</sup>; *Adriaan Spierings*<sup>2</sup>; *Markus Bambach*<sup>1</sup>; <sup>1</sup>ETH Zurich; <sup>2</sup>inspire AG

**11:10 AM**

**How Can Europe Reduce Offshore Dependence of Its Supply Chain for Critical Metals like Scandium?:** *Henk van der Laan*<sup>1</sup>; *Beate Orberger*; <sup>1</sup>V.I.C. Van der Laan International Consultancy BV

**11:35 AM**

**Behavior of Yttrium and Other Impurities in the Production of Scandium Oxide from Bauxite Residue:** *Alexander Suss*<sup>1</sup>; *Alexander Kozyrev*<sup>1</sup>; *Natalia Kuznetsova*<sup>1</sup>; *Alexander Damaskin*<sup>1</sup>; *Sergey Pishchalniko*<sup>1</sup>; *Andrey Panov*<sup>1</sup>; *Sergey Ordon*<sup>2</sup>; *Oleg Milshin*<sup>3</sup>; <sup>1</sup>RUSAL; <sup>2</sup>RUSAL Engineering and Technology Center; <sup>3</sup>RUSAL Management JSC

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## NUCLEAR MATERIALS

**Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Plutonium Chemistry and Behavior**

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Tuesday AM | March 5, 2024**  
**Regency P | Hyatt**

**Session Chair:** Samantha Schrell, Oak Ridge National Laboratory

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**8:00 AM**

**Search for the Direct Pu-239 Nuclear Magnetic Resonance in Plutonium Compounds:** *Eric Bauer*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:25 AM**

**Defect Energy Storage and Release in Plutonium:** *Meghan Gibbs*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:50 AM**

**First Principles Studies on the Influence N, F and Cl Impurities on the Structural and Electronic Properties of PuO<sub>2</sub> and Pu<sub>2</sub>O<sub>3</sub>:** *Raymond Atta-Fynn*<sup>1</sup>; Sarah Hernandez<sup>1</sup>; Roxanne Tutchton<sup>1</sup>; Jon Bridgewater<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:15 AM**

**Additive Manufacturing of Ceramic Workpieces for Actinide Interaction:** *Robert Griffiths*<sup>1</sup>; Alex Wilson-Heid<sup>1</sup>; Aiden Martin<sup>1</sup>; Kiel Holliday<sup>1</sup>; Jason Jeffries<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Lab

**9:40 AM Break**

**10:00 AM**

**Experimental and Theoretical Surface Studies of Plutonium Using Time-of-Flight Secondary Ion Mass Spectroscopy and Density Functional Theory:** *Sarah Hernandez*<sup>1</sup>; Connor Dozhier<sup>1</sup>; Robert Sykes<sup>1</sup>; Thomas Venhaus<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:25 AM**

**Heavy Element Sciences at LLNL: Pushing Boundaries Across Various Fields, from Fundamental Actinide Chemistry to Nuclear Waste Management:** *Gauthier Deblonde*<sup>1</sup>; Mavrik Zavarin<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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## MECHANICS OF MATERIALS

**Structure-Property Relationships of Bulk Metallic Glasses — Atomic Structure and Dynamics II: Relaxation Dynamic**

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Tuesday AM | March 5, 2024**  
**Rock Spring I and II | Hyatt**

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

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**8:00 AM Invited**

**Chemically-resolved Dynamics in Metallic Alloy Supercooled Liquids:** Shuoyuan Huang<sup>1</sup>; Ajay Annamareddy<sup>1</sup>; Dane Morgan<sup>1</sup>; *Paul Voyles*<sup>1</sup>; <sup>1</sup>University of Wisconsin

**8:25 AM**

**Atomic-scale Dynamics in the Microplastic Regime of a Metallic Glass:** Birte Riechers<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

**8:45 AM**

**Coupling Structural, Chemical and Stress Fluctuations with Relaxation Dynamics in Metallic Glasses:** *Daniel Sopy*<sup>1</sup>; Xudong Yuan<sup>1</sup>; Florian Spieckermann<sup>2</sup>; Juergen Eckert<sup>1</sup>; <sup>1</sup>Erich Schmid Institute; <sup>2</sup>Mountainuniversität Leoben

**9:05 AM**

**Rejuvenation of Metallic Glass through Memory Effect:** *Yi Li*<sup>1</sup>; <sup>1</sup>Shenyang National Laboratory for Materials Science, Institute of Metal Research

**9:25 AM Break****9:45 AM Invited**

**Stress-accelerated Relaxation and Energy Dissipation in Metallic Glasses Revealed by Its Fractal Energy Landscape:** *Yue Fan*<sup>1</sup>; <sup>1</sup>University of Michigan

**10:10 AM Invited**

**Detecting the Exponential Relaxation Units in Glasses:** *Junqiang Wang*<sup>1</sup>; <sup>1</sup>Ningbo Institute of Materials Technology & Engineering, CAS

**10:35 AM**

**Interpreting String-excitations as Beta Relaxations in a Model Glass:** *Peter Derlet*<sup>1</sup>; Robert Maass<sup>2</sup>; <sup>1</sup>Paul Scherrer Institut; <sup>2</sup>Federal Institute of Materials Research and Testing

**10:55 AM**

**Evidence of Pre-crystallization Structures in a Metallic Glass:** *Amlan Das*<sup>1</sup>; Rui Zhao<sup>2</sup>; Eric Dufresne<sup>3</sup>; Yonghao Sun<sup>2</sup>; Robert Maass<sup>4</sup>; <sup>1</sup>Cornell High Energy Synchrotron Source; <sup>2</sup>Institute of Physics, Chinese Academy of Sciences; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory; <sup>4</sup>Federal Institute of Materials Research and Testing (BAM)

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN****Thermodynamics and Kinetics of Alloys II — Session III**

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

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Ji-Cheng Zhao, University of Maryland; Shuanglin Chen, CompuTherm LLC; Wei Xiong, University of Pittsburgh

**Tuesday AM | March 5, 2024**

**Bayhill 31 | Hyatt**

**Session Chairs:** Shuanglin Chen, Computherm; Andrew Hoffman, GE Research

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**8:00 AM Invited**

**Unlocking The Mysteries of Third and Fourth Element Effects in FeCrAl(Mo) Alloys:** *Andrew Hoffman*<sup>1</sup>; Rajnikant Umretiya<sup>1</sup>; Raul Rebak<sup>1</sup>; Haozheng Qu<sup>1</sup>; Indranil Roy<sup>1</sup>; Hamdy Saleh<sup>1</sup>; Atharva Chikhalikar<sup>2</sup>; Bhavani Nagothi<sup>1</sup>; Rupesh Rajendran<sup>1</sup>; <sup>1</sup>GE Research; <sup>2</sup>University of Minnesota

**8:30 AM****Phase Selection Rules of Multi Principal Element Alloys:** *Lin Wang*<sup>1</sup>; Bin Ouyang<sup>1</sup>; <sup>1</sup>Florida State University**8:50 AM****Effect of Composition on Prediction of Ternary Diffusion Path in Fe-Cu-Ni System at 1000 C:** *Susanta Nayak*<sup>1</sup>; Kaustubh Kulkarni<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur**9:10 AM****First-principles-based Thermodynamic Database the Cr-Zr-X System Towards Design of Layered Accident Tolerant Nuclear Fuels:** *Theresa Davey*<sup>1</sup>; Ying Chen<sup>1</sup>; <sup>1</sup>Tohoku University**9:30 AM Break****9:50 AM****Parametrizing Phase Field Models for Microstructure Evolution: AMMBER, the AI-enabled Microstructure Model BuildER:** *W. Beck Andrews*<sup>1</sup>; Shibo Tan<sup>1</sup>; Jindong Huang<sup>1</sup>; Sahana Prabhu<sup>1</sup>; Wenhao Sun<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan**10:10 AM****Preparation of Fe-Si Alloy by Molten Salt Electrolysis of Fe<sub>2</sub>SiO<sub>4</sub> Simulating Copper Slag:** *Jinglong Liang*<sup>1</sup>; *Bo Cu*<sup>1</sup>; Hui Li<sup>1</sup>; Dongxing Huo<sup>1</sup>; Chang Liu<sup>1</sup>; Yu Yang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

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**MATERIALS SYNTHESIS AND PROCESSING****Towards a Future of Sustainable Production and Processing of Metals and Alloys – Sustainable Manufacturing: Solid Phase Processing and Recycling****Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Shaping and Forming Committee, TMS: Pyrometallurgy Committee**Program Organizers:** Arun Devaraj, Pacific Northwest National Laboratory; Dierk Raabe, Max-Planck Institute; Suhas Eswarappa Prameela, Massachusetts Institute of Technology (MIT); Leora Dresselhaus-Marais, Stanford University; Petrus Pistorius, Carnegie Mellon University**Tuesday AM | March 5, 2024****Celebration 4 | Hyatt****Session Chair:** Suhas Prameela, MIT

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**8:00 AM Introductory Comments****8:05 AM Invited****Recycling of Secondary Metal Scrap by Solid Phase Processing:** Scott Whalen<sup>1</sup>; *Brandon Taysom*<sup>1</sup>; Md Reza-E-Rabby<sup>1</sup>; Nicole Overman<sup>1</sup>; Timothy Skszek<sup>1</sup>; Massimo DiCiano<sup>1</sup>; Mageshwari Komarasamy<sup>1</sup>; Mieka Clark<sup>1</sup>; Anthony Reynolds<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory**8:35 AM****Process Modeling and Microstructure Evolution Analysis for Friction Stir Processing of 316 L Stainless Steel Using Smoothed Particle Dynamics Method:** *Lei Li*<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Mayur Pole<sup>1</sup>; Kathy Nwe<sup>1</sup>; Donald Todd<sup>1</sup>; Neil Henson<sup>1</sup>; Erin Barker<sup>1</sup>; Eric Smith<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**8:55 AM**

**Residual Stresses from Solid Phase Processes: Relationships to Distortion and Process Parameters:** *Kranthi Balusu*<sup>1</sup>; avik samanta<sup>1</sup>; Shivakant Shukla<sup>1</sup>; Hrishikesh Das<sup>1</sup>; saumyadeep jana<sup>1</sup>; Piyush Upadhyay<sup>1</sup>; Aashish Rohatgi<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Lab

**9:15 AM Break****9:30 AM Invited**

**Sustainable Development for the 21st Century – Challenges and Opportunities for Materials Engineering of Post-consumer Waste:** *Diran Apelian*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**10:00 AM**

**Upcycle Aluminum Alloys via Solid Phase Alloying:** *Jorge F. dos Santos*<sup>1</sup>; Xiao Li<sup>1</sup>; Tianhao Wang<sup>1</sup>; Tingkun Liu<sup>1</sup>; Xiang Wang<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:20 AM**

**Melting Efficiently Rare Earth Steel by Whole Scrap Steel:** *Qian Long*<sup>1</sup>; Xu Gao<sup>1</sup>; Jie Zeng<sup>1</sup>; You Zhou<sup>1</sup>; Zai-Xue Zheng<sup>2</sup>; Wanlin Wang<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>Jiangsu Hengchang Casting Technology Co., Ltd

**10:40 AM**

**Repair of High-Strength Aluminum Aircraft Fastener Holes via Additive Friction Stir Deposition:** *Robert Griffiths*<sup>1</sup>; David Garcia<sup>2</sup>; Alan Timmons<sup>3</sup>; Nam Phan<sup>3</sup>; Jim Lua<sup>4</sup>; Hang Yu<sup>5</sup>; <sup>1</sup>Lawrence Livermore National Lab; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>NAVAIR; <sup>4</sup>GEM Innovation; <sup>5</sup>Virginia Tech

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## SPECIAL TOPICS

### TMS2024 All-Conference Plenary

Tuesday PM | March 5, 2024  
Plaza Int'l HIJK | Hyatt

**Session Chair:** Brad Boyce, Sandia National Laboratories

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**12:00 PM Introductory Comments****12:05 PM Presentations:**

**Translating Scientific Discovery into Impactful Innovation to Solve Critical Materials Challenges: A Panel Discussion**

The clean energy transition calls for unprecedented demand for critical materials. These materials—like lithium for electric vehicle (EV) batteries and neodymium for magnets in offshore wind turbine generators—face supply chain vulnerabilities and are often difficult to substitute. Yet, many of the technologies used to manufacture critical materials are not necessarily viable from a safety, economic, environmental, or social standpoint in the U.S. This calls for a departure from decade-old methods to meet the needs of the clean energy transition. Innovation can lead to sustainable approaches to developing critical material supply chains. This panel will discuss how innovation in all forms—from advancing our understanding of materials at the atomic level to disruptive technologies—can be accelerated through intentional partnerships to meet the needs of the clean energy industrial base while preserving the future. The panelists will bring perspectives from industry, government, and the Critical Materials Innovation Hub (CMI), a public-private partnership led by Ames National Laboratory. This session will feature an interactive Q&A session

with audience members.

**Panelists:**

**Helena Khazdozian**, Co-Chair of the Critical Materials Collaborative (CMC), Advanced Materials & Manufacturing Technologies Office, Energy Efficiency & Renewable Energy, U.S. Department of Energy

**Thomas Lograsso**, Director, Critical Materials Innovation Hub, Ames National Laboratory

**Robert Miles**, Chief Technology Officer and Co-Founder, Momentum Technologies, Inc.

**12:25 PM Panel Discussion / Q&A**

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**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; Ramana Chintalapalle, University of Texas at El Paso

**Tuesday PM | March 5, 2024**  
**Celebration 16 | Hyatt**

**Session Chairs:** Hesam Askari, University of Rochester; Sufian Abedrabbo, Khalifa University of Science & Technology

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**2:30 PM Introductory Comments**

**2:40 PM**

**A New Phase of Silicon and Its Optical, Electrical, and Magnetic Properties:** *Naveen Narasimhachar Joshi*<sup>1</sup>; Siba Sundar Sahoo<sup>1</sup>; Roger Narayan<sup>1</sup>; Jagdish Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:00 PM Invited**

**A Novel 2D van der Waals Phase-change Material Based on Transition-metal Binary Chalcogenide NbTe<sub>4</sub>:** *Yi Shuang*<sup>1</sup>; Qian Chen<sup>1</sup>; Mihyeon Kim<sup>1</sup>; Yinli Wang<sup>1</sup>; Yuta Saito<sup>2</sup>; Shogo Hatayama<sup>2</sup>; Paul Fons<sup>3</sup>; Daisuke Ando<sup>1</sup>; Momoji Kubo<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

**3:20 PM**

**Decoupling Acceleration Energy and Ion Effects in Defect Production through Ion Irradiation of Substrate Supported MoS<sub>2</sub>:** *Aaron Rabin*<sup>1</sup>; Zhihan Hu<sup>2</sup>; Preston Vargas<sup>1</sup>; Lin Shao<sup>2</sup>; Richard Hennig<sup>1</sup>; Khalid Hattar<sup>3</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Texas A&M University; <sup>3</sup>University of Tennessee Knoxville

**3:40 PM Keynote**

**Addressing Unmet Needs with 3D Printed Nanomaterials-based Electronics:** *Yong Lin Kong*<sup>1</sup>; <sup>1</sup>University of Utah



4:05 PM Break

4:25 PM

**Investigation of MoS<sub>2</sub>-coated NITINOL60 for Triboelements in Ultra-High Vacuum Environments:** *Adam DeLong*<sup>1</sup>; Tomas Babuska<sup>2</sup>; John Curry<sup>2</sup>; Steven Larson<sup>2</sup>; Christopher DellaCorte<sup>3</sup>; Samuel Howard<sup>4</sup>; William Scott<sup>5</sup>; Matthew Mazurkivich<sup>5</sup>; Annette Gray<sup>5</sup>; Sara Rengifo<sup>5</sup>; Catherine Fidd<sup>1</sup>; Tomas Lockhart<sup>1</sup>; Brandon Krick<sup>1</sup>; <sup>1</sup>Florida State University; <sup>2</sup>Sandia National Laboratory; <sup>3</sup>University of Akron; <sup>4</sup>NASA John H. Glenn Research Center; <sup>5</sup>NASA Marshall Space Flight Center

4:45 PM Invited

**Processing of 2D Transition Metal Dichalcogenide Semiconductors: Electrical Contacts and Atomic Layer Deposition:** *Suzanne Mohny*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

5:05 PM Invited

**Processing and Performance of 2D- and 3D- sensor Materials:** *Narasimha Prasad*<sup>1</sup>; Ching Su<sup>2</sup>; Meghan Brandt<sup>3</sup>; Aria Tauraso<sup>3</sup>; Nicholas Schmidt<sup>3</sup>; Krishna Machuga<sup>4</sup>; Bradley Arnold<sup>3</sup>; Fow-Sen Choa<sup>3</sup>; Narasingh Singh<sup>3</sup>; <sup>1</sup>Nasa Langley Research Center; <sup>2</sup>NASA Marshall Space Flight Center; <sup>3</sup>University of Maryland Baltimore County; <sup>4</sup>University of Maryland

5:25 PM Invited

**Optimization of the Ultrasound Liquid Phase Exfoliation of Graphite by MHz Synchrotron X-ray Imaging and Multiphysics Modelling:** Ling Qin<sup>1</sup>; Kang Xiang<sup>2</sup>; Samuel Clark<sup>3</sup>; Kamel Fezzaa<sup>3</sup>; *Jiawei Mi*<sup>2</sup>; <sup>1</sup>University of Wyoming; <sup>2</sup>University of Hull; <sup>3</sup>Advanced Photon Source

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## NUCLEAR MATERIALS

### **Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Radiation Effects II**

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Tuesday PM | March 5, 2024**

**Regency Q | Hyatt**

**Session Chairs:** Caleb Clement, Westinghouse Electric Company; Rongjie Song, Idaho National Laboratory

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2:30 PM Invited

**Gaps and Question Remained in Bridging Neutron Irradiation and Accelerator Ion Irradiation:** *Lin Shao*<sup>1</sup>; <sup>1</sup>Texas A&M University

3:00 PM

**Comparison of Cavity Microstructures from BOR-60, FFTF and Dual-ion Irradiations up to 208 dpa in T91 steel:** *Valentin Pauly*<sup>1</sup>; Stephen Taller<sup>2</sup>; Mychailo Toloczko<sup>3</sup>; Danny Edwards<sup>3</sup>; Alan Schemer-Kohrn<sup>3</sup>; Gary Was<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory

**3:20 PM**

**A Spatially Resolved Scale-bridging Model for Point-defect Clustering Under Irradiation:** Sanjoy Mazumder<sup>1</sup>; Peng Lin<sup>2</sup>; *Anter El-Azab*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Beihang University

**3:40 PM**

**Multi-scale Simulations on Preferential Absorption Behavior of Cavities in BCC Fe:** *Yuhao Wang*<sup>1</sup>; Fei Gao<sup>1</sup>; Brian Wirth<sup>2</sup>; <sup>1</sup>University Of Michigan; <sup>2</sup>University of Tennessee

**4:00 PM**

**A Hybrid Rate Theory Model of Radiation-induced Growth:** *Mahdi Mohsini*<sup>1</sup>; Peyman Saidi<sup>2</sup>; Lauren B éland<sup>1</sup>; Mark Daymond<sup>1</sup>; <sup>1</sup>Queen's University; <sup>2</sup>Canadian Nuclear Laboratories

**4:20 PM Break**

**4:40 PM**

**Evolution of Microstructures in FeCr Binary Alloys Under Low-PKA Proton Irradiation:** *Siwei Chen*<sup>1</sup>; Yajie Zhao<sup>1</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee

**5:00 PM**

**Dose Dependence of Grain Boundary Radiation-induced Segregation in Fe-Ni-Cr Alloys:** *Daniele Fatto Offidani*<sup>1</sup>; Emmanuelle Marquis<sup>1</sup>; <sup>1</sup>University of Michigan - Ann Arbor

**5:20 PM**

**Temperature Dependence of Helium Cavity Behavior in Ion-irradiated Ductile-phase-toughened Tungsten:** *Weilin Jiang*<sup>1</sup>; James Haag<sup>1</sup>; Di Chen<sup>2</sup>; Libor Kovarik<sup>1</sup>; Karen Kruska<sup>1</sup>; Dalong Zhang<sup>1</sup>; Zhihan Hu<sup>3</sup>; Lin Shao<sup>3</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>University of Houston; <sup>3</sup>Texas A&M University

**5:40 PM**

**Three-dimensional Quantitative Defect Analysis in Tungsten Heavy Alloys Under the Simulated Nuclear Fusion Environment:** *James Haag*<sup>1</sup>; Midori Ikeuchi<sup>2</sup>; Matthew Olszta<sup>1</sup>; Weilin Jiang<sup>1</sup>; Danny Edwards<sup>1</sup>; Mitsu Murayama<sup>3</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pnnl; <sup>2</sup>Kyushu University; <sup>3</sup>Virginia Tech

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## SPECIAL TOPICS

### **Acta Materialia Symposium — Acta Materialia Award Session**

**Program Organizer:** Carolyn Hansson, University of Waterloo

**Tuesday PM | March 5, 2024**  
**Regency O | Hyatt**

**Session Chair:** Carolyn Hansson, University of Waterloo

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**2:30 PM Introductory Comments**

**2:40 PM Presentation of Acta Student Awards**

**3:00 PM Invited**

**Acta Materialia Gold Medal Lecture: Nanostructure and Magnetic Materials:** *Kazuhiro Hono*<sup>1</sup>; <sup>1</sup>National Institute for Materials Science (NIMS)

**3:20 PM Question and Answer Period**

**3:30 PM Invited**

**Acta Materialia Silver Medal Lecture: Thermodynamic (in)Stability and Deformation Mechanisms of Refractory Complex Alloys:** *Jean-Philippe Couzinie*<sup>1</sup>; <sup>1</sup>University Paris Est-Créteil

**3:50 PM Question and Answer Period**

**4:00 PM Invited**

**Acta Materialia Hollomon Award for Materials and Society: Materials Research to Propel Us into an Environmentally Conscious Economy for Generations to Come:** *Iver Anderson*<sup>1</sup>; <sup>1</sup>Ames National Laboratory

**4:20 PM Question and Answer Period**

**4:30 PM Invited**

**Acta Materialia Mary Fortune Global Diversity Lecture: Prioritizing Diversity and Inclusion for Achieving Excellence: An Embedded Approach:** *Lynnette Madsen*<sup>1</sup>; <sup>1</sup>National Science Foundation and Cornell University

**4:50 PM Question and Answer Period**

**5:00 PM Brief break to prepare for reception**

**5:10 PM Wine and Cheese Reception with Posters**

**Student Award Winners in Acta Materialia Symposium:**

**Miguel Frausto de Brito Costa** - Anelastic-like Nature of the Rejuvenation of Metallic Glasses by Cryogenic Thermal Cycling.

**Fengqi Zhang** - Impact of F and S Doping on (Mn, Fe)<sub>2</sub>(P, Si) Giant Magnetocaloric Materials

**Wanquan Zhu** - Five-parameter Grain Boundary Character of Nanocrystalline Materials Revealed by Three-dimensional Orientation Mapping in the TEM

**Nicole Day** - Tissue-adhesive Hydrogel for Multimodal Drug Release to Immune Cells in Skin

**Anna Pukaluk** - An Ultrastructural 3D Reconstruction Method for Observing the Arrangement of Collagen Fibrils and Proteoglycans in the Human Aortic Wall Under Mechanical Load

**Saleem Aldajani** - Detecting Thermally-induced Spinodal Decomposition with Picosecond Ultrasonics in Cast Austenitic Stainless Steel

**Isabela Lavagnini** - Influence of Forming Methods on the Microstructure of 3YSZ Flash-sintered Ceramics

**Xue Wang** - Determination of the Friction Stir Welding Window from the Solid-state-bonding Mechanics Under Severe Thermomechanical Conditions

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## ADDITIVE MANUFACTURING

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

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

**Tuesday PM | March 5, 2024**  
**Plaza Int'l D | Hyatt**

**Session Chair:** Daniel Salazar, BCMaterials

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**2:30 PM Invited**

**Revolutionizing Engineering Design: Functionally Integrated Materials, In-situ Imaging, and Alternative Feedstock Materials in Additive Manufacturing:** *Enrique Lavernia*<sup>1</sup>; <sup>1</sup>University of California at Irvine

**3:00 PM**

**Fabrication of Functional Cu-CNT Composite Material using Laser Powder Bed Fusion Process For Medical and Biomedical Applications:** *Leila Ladani*<sup>1</sup>; Jafar Razmi<sup>1</sup>; <sup>1</sup>Arizona State University

**3:20 PM**

**Core-shell Powders as New Feedstock Material for APPD Additive Manufacturing Technique:** *James Rosero-Romo*<sup>1</sup>; Daniel Salazar<sup>1</sup>; <sup>1</sup>BCMaterials

**3:40 PM**

**Magnetic Field Assisted DED towards the Development of Functionally Graded Materials:** *Xiao Shang*<sup>1</sup>; Evelyn Li<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University Of Toronto

**4:00 PM Break**

**4:20 PM**

**Influence of SLM Printing Parameters on the Structure and Properties Functional Materials:** *Marcin Karpinski*<sup>1</sup>; Aleksandra Kolano-Burian<sup>1</sup>; Przemyslaw Zackiewicz<sup>1</sup>; Adrian Radon<sup>1</sup>; Bartosz Jozwik<sup>1</sup>; <sup>1</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals

**4:40 PM**

**Additive Manufacturing of SiC Coated Printed Tungsten and Inconel 625:** *Shir Andreev Batat*<sup>1</sup>; Vladimir Popov<sup>2</sup>; Noam Eliaz<sup>3</sup>; <sup>1</sup>Tel Aviv University; <sup>2</sup>Technion - Israel Institute of Technology; <sup>3</sup>Tel-Aviv University

**5:00 PM**

**Binder Jetting of Advanced Thermoelectric Materials:** *Babak Alinejad*<sup>1</sup>; Iman Dashtgerd<sup>1</sup>; Amir Mostafaei<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

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**ADDITIVE MANUFACTURING**

**Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification — Session III**

**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; Steve Daniewicz, University of Alabama

**Tuesday PM | March 5, 2024**  
**Plaza Int'l E | Hyatt**

**Session Chair:** Mohsen Seifi, ASTM International/Case Western Reserve University

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**2:30 PM Invited**

**Critical Initial Crack Size for AM Components: Calculations, Implications, and Applications:** *James Sobotka*<sup>1</sup>; Michael Enright<sup>1</sup>; Robert McClung<sup>1</sup>; <sup>1</sup>Southwest Research Institute

**2:50 PM**

**Influence of Post-Process Forging on Microstructure and Properties of LPBF AlSi10Mg:** *Austin Ngo*<sup>1</sup>; Svitlana Fialkova<sup>2</sup>; Noah Kohlhörst<sup>3</sup>; Glenn Daehn<sup>3</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>North Carolina Agricultural and Technical State University; <sup>3</sup>The Ohio State University

**3:10 PM**

**Comprehensive Fatigue Evaluation via Multiple Testing Methods and Loading Conditions on an LPBF F357 Alloy Processed by HIP with Rapid Quench Treatment:** *Marcus Lam*<sup>1</sup>; Ariel Rieffer<sup>1</sup>; Carla Colon Cruz<sup>1</sup>; Samuel Andrews<sup>1</sup>; Alexis Loustaunau<sup>1</sup>; Andrew Wessman<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona

**3:30 PM**

**Fatigue Crack Growth and Total Life Fatigue behaviour of 7075 Aluminium Alloy Produced by Laser Powder Bed Fusion:** *Nicolas Nothomb*<sup>1</sup>; Julien Longin<sup>1</sup>; Ignacio Rodriguez-Barber<sup>2</sup>; María Teresa Pérez Prado<sup>2</sup>; Marie-Noëlle Avettand-Fénoël<sup>3</sup>; Aude Simar<sup>1</sup>; <sup>1</sup>UCLouvain, IMMC; <sup>2</sup>IMDEA Materials Institute; <sup>3</sup>Univ. Lille, CNRS, INRAE, Centrale Lille, UMR 8207, UMET, Unité Matériaux et Transformations

**3:50 PM**

**Microstructure-Sensitive Fracture Investigation of Additively Manufactured Aluminum:** *Emine Tekerek*<sup>1</sup>; Antonios Kontsos<sup>1</sup>; <sup>1</sup>Drexel University

**4:10 PM Break**

**4:30 PM Invited**

**Defect Population Variability and Fatigue Life Estimation in Additively Manufactured Components:** *Thorsten Becker*<sup>1</sup>; Nicolas Macallister<sup>2</sup>; <sup>1</sup>University of Cape Town; <sup>2</sup>Stellenbosch University

**4:50 PM**

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

**5:10 PM**

**Fatigue and Fracture of Bi-metallic Parts Produced through Wire Arc Additive Manufacturing:** *Jose Luis Galan Argumedo*<sup>1</sup>; Aswin Suresh<sup>1</sup>; Marcel Hermans<sup>1</sup>; Vera Popovich<sup>1</sup>; <sup>1</sup>Tu Delft

**5:30 PM**

**Characterizing the Relationship between Microstructure and Mechanical Properties of Wire Arc Additively Manufactured 316LSi Samples in As-Deposited and Forged Conditions:** *Brett Ley*<sup>1</sup>; Vishnu Ramasamy<sup>1</sup>; John Lewandowski<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>; <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>The University of Tennessee Knoxville; <sup>5</sup>Northwestern University

**5:50 PM**

**Fatigue Strength of High Strength Low Alloy AF 9628 Steel Fabricated via Laser Powder Bed Fusion:** *Nemanja Kljestan*<sup>1</sup>; Marko Knezevic<sup>1</sup>; <sup>1</sup>University of New Hampshire

**ADDITIVE MANUFACTURING****Additive Manufacturing Materials in Energy Environments — Testing and Performance**

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

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

**Tuesday PM | March 5, 2024**  
**Atlantic | Hyatt**

**Session Chairs:** Kumar Sridharan, University of Wisconsin-Madison; Xiaoyuan Lou, Purdue University

**2:30 PM Invited**

**Advanced LPBF Steels with Superior Tensile and Creep Properties:** *Sebastien Dryepondt*<sup>1</sup>; Holden Hyer<sup>1</sup>; Patxi Fernandez-Zelaia<sup>1</sup>; Kinga Unocic<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Fred List<sup>1</sup>; Peeyush Nandwana<sup>1</sup>; Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:00 PM**

**AM Technology for the Development of Accident Tolerant Fuel and High-performance Nuclear Materials:** *Hyun-Gil Kim*<sup>1</sup>; Sung Chan Yoo<sup>2</sup>; Jongdae Hong<sup>2</sup>; Sung Eun Kim<sup>2</sup>; <sup>1</sup>KAERI; <sup>2</sup>Kaeri

**3:20 PM**

**Extreme Hardness at High Temperature with a Lightweight Additively Manufactured Multi-principal Element Alloy:** *Andrew Kustas*<sup>1</sup>; Morgan Jones<sup>1</sup>; Frank DelRio<sup>1</sup>; Ping Lu<sup>1</sup>; Jonathan Pegues<sup>1</sup>; Prashant Singh<sup>2</sup>; Andrey Smirnov<sup>2</sup>; Jordan Tiarks<sup>2</sup>; Eric Hintsala<sup>3</sup>; Douglas Stauffer<sup>3</sup>; Jessica Roman-Kustas<sup>1</sup>; Michael Aberer<sup>1</sup>; Emma White<sup>2</sup>; Duane Johnson<sup>2</sup>; Iver Anderson<sup>2</sup>; Nicolas Argibay<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Ames National Laboratory; <sup>3</sup>Bruker Nano Surfaces

**3:40 PM**

**Performance of Laser Deposited Inconel 625 Coating during Heat Treatment and Carbonisation:** Monnamme Tlotleng<sup>1</sup>; Paul Lekoadi<sup>1</sup>; Reneilwe Kgoahla<sup>1</sup>; Hosia Kgomo<sup>1</sup>; Kgothatso Mokomele<sup>1</sup>; Basebakhe Skhosane<sup>1</sup>; Bathusile Masina<sup>1</sup>; Sisa Pityana<sup>1</sup>; *Nana Arthur*<sup>2</sup>; <sup>1</sup>Council for Science & Industrial Research; <sup>2</sup>Council for Scientific and Industrial Research

**4:00 PM**

**Influence of AM Processing on the High Temperature Tribology of Ni-based Alloys:** *Emma White*<sup>1</sup>; *Beyza Oeztuerk*<sup>1</sup>; *Clara Schlereth*<sup>1</sup>; *Mathias Galetz*<sup>1</sup>; <sup>1</sup>DECHEMA Forschungsinstitut

**4:20 PM Break**

**4:40 PM**

**Superior High-temperature Tensile Properties of Fine Equiaxed-grained 316L Stainless Steel Fabricated by Electron Beam Powder-bed Fusion:** *Jong-Soo Bae*<sup>1</sup>; *Kwang Hyeok Lim*<sup>2</sup>; *Shubham Chandra*<sup>3</sup>; *Xipeng Tan*<sup>4</sup>; *Gi-Dong Sim*<sup>2</sup>; <sup>1</sup>Agency for Defense Development(ADD) & Korea Advanced Institute of Science and Technology(KAIST); <sup>2</sup>Korea Advanced Institute of Science & Technology; <sup>3</sup>Nanyang Technological University; <sup>4</sup>National University of Singapore

**5:00 PM**

**Unusually High Room and Elevated-Temperature Tensile Properties Observed in Direct Aged Wire-Arc Directed Energy Deposited Inconel 718:** *Jie Song*<sup>1</sup>; *Xavier Jimenez*<sup>2</sup>; *Carissa Russell*<sup>3</sup>; *Albert To*<sup>2</sup>; *Yao Fu*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University; <sup>2</sup>University of Pittsburgh; <sup>3</sup>Materials Sciences LLC

**5:20 PM**

**Multi-scale Deformation Behavior of Direct Energy Deposited Stainless Steels, from Cryogenic to Room Temperature:** *Yen Ting Chang*<sup>1</sup>; *Marie Agathe Charpagne*<sup>2</sup>; <sup>1</sup>University of Illinois Urbana-Champaign; <sup>2</sup>UIUC

**5:40 PM**

**Effects of Friction and Deformation Heating on Additively Manufactured M789 Steel during Hot Compression Tests:** *Kudakwashe Nyamuchiwa*<sup>1</sup>; *Clodualdo Aranas*<sup>1</sup>; *Ali Keshavarzkermani*<sup>2</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>voestalpine Additive Manufacturing Centre

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning – Physics-based Models II

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

**Program Organizers:** *Jing Zhang*, Indiana University – Purdue University Indianapolis; *Li Ma*, Johns Hopkins University Applied Physics Laboratory; *Charles Fisher*, Naval Surface Warfare Center - Carderock; *Brandon McWilliams*, US Army Research Laboratory; *Yeon-Gil Jung*, Korea Institute of Ceramic Engineering & Technology

**Tuesday PM | March 5, 2024**  
**Orlando N | Hyatt**

**Session Chairs:** *Charles Fisher*, Naval Surface Warfare Center; *Li Ma*, Johns Hopkins University Applied Physics Laboratory; *Jing Zhang*, Indiana University-Purdue University Indianapolis

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**2:30 PM**

**Simulation of Residual Stresses, Deformations, and the Effect of Support Removal in Additively Manufactured Thin Plates:** *Pouria Khanbolouki*<sup>1</sup>; *Rodrigo Magana-Carranza*<sup>2</sup>; *Eann Patterson*<sup>2</sup>; *Chris Sutcliffe*<sup>3</sup>; *John Lambros*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>University of Liverpool; <sup>3</sup>Meta Consulting LDA

**2:50 PM**

**Development of Simulation-based Qualification Data for Laser Powder Bed Fusion Using Modeling and Uncertainty Quantification:** *Daniel Moser*<sup>1</sup>; Kyle Johnson<sup>1</sup>; Michael Stender<sup>1</sup>; Michael Heiden<sup>1</sup>; Theron Rodgers<sup>1</sup>; Nicole Aragon<sup>1</sup>; Aashique Rezwani<sup>1</sup>; Jeffrey Horner<sup>1</sup>; David Saiz<sup>1</sup>; Helen Cleaves<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**3:10 PM**

**Multi-beam Process Modeling for Optimization of Melt Pool Shape and Build Rate for Laser Powder Bed Fusion:** *Kellis Kincaid*<sup>1</sup>; John Coleman<sup>1</sup>; Benjamin Stump<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:30 PM**

**Exascale Simulation for Additive Manufacturing:** *Sam Reeve*<sup>1</sup>; John Coleman<sup>1</sup>; Matt Rolchigo<sup>1</sup>; Robert Carson<sup>2</sup>; Mikhail Titov<sup>3</sup>; Gerry Knapp<sup>1</sup>; Kwitae Chong<sup>1</sup>; Austin Isner<sup>1</sup>; Stuart Slattery<sup>1</sup>; Alex Plotkowski<sup>1</sup>; Duan Zhang<sup>4</sup>; Lyle Levine<sup>5</sup>; Jim Belak<sup>2</sup>; Matt Bement<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Lawrence Livermore National Lab; <sup>3</sup>Brookhaven National Lab; <sup>4</sup>Los Alamos National Lab; <sup>5</sup>National Institute of Standards and Technology

**3:50 PM**

**Shape Distortion in Sintering-based Additive Manufacturing Results from Nonhomogeneous Temperature Activating a Long-range Mass Transport:** *Sandra Ritchie*<sup>1</sup>; Sasa Kovacevic<sup>1</sup>; Prithviraj Deshmukh<sup>1</sup>; Sinisa Mesarovic<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**4:10 PM Break****4:30 PM Keynote**

**Development of Process-Microstructure Relationships in Laser Powder Bed Fusion of IN718:** *Li Ma*<sup>1</sup>; Ali Ramazani<sup>1</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory

**4:50 PM**

**A Mixed Sharp and Diffusive Interface Approach for Multi-physics Modeling of Metal Additive Manufacturing:** *Jinhui Yan*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**5:10 PM**

**Multi-physics Modeling of Melt Pool with Ray-tracing in the Open-source MALAMUTE Software:** *Wen Jiang*<sup>1</sup>; <sup>1</sup>North Carolina State University

**5:30 PM**

**Numerical Model to Unravel Thermal Evolution and Material Flow Behavior in Additive Friction Stir Deposition of Mg-alloy:** *Shashank Sharma*<sup>1</sup>; K.V Mani Krishna<sup>1</sup>; Sameehan Joshi<sup>1</sup>; M Radhakrishnan<sup>1</sup>; Mangesh Pantawane<sup>1</sup>; Shreyash Patil<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

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**ADDITIVE MANUFACTURING**

**Additive Manufacturing of Refractory Metallic Materials – Additive Manufacturing of Refractory Metallic Materials: Process and Properties**



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

**Program Organizers:** Faramarz Zarandi, RTX Corporation; Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias

**Tuesday PM | March 5, 2024**  
**Rainbow Spring II | Hyatt**

**Session Chairs:** Omar Mireles, NASA Marshall Space Center; Faramarz Zarandi, RTX Technology Research Center

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**2:30 PM Invited**

**Additively Manufactured Refractory Alloys for High Temperature Environments:** *Gianna Valentino*<sup>1</sup>; <sup>1</sup>University of Maryland

**3:10 PM**

**Additive Manufacturing of Rhenium-modified Refractory Metals:** *Adriana Wrona*<sup>1</sup>; Anna Czech<sup>2</sup>; Marcin Lis<sup>2</sup>; Jacek Mazur<sup>2</sup>; Adrian Kukofka<sup>3</sup>; <sup>1</sup>Lukasiewicz Research Network Institute of Non-Ferrous Metals; <sup>2</sup>Lukasiewicz Research Network Institute of Non-Ferrous Metals; <sup>3</sup>PROGRESJA New Materials Sp. z o.o.

**3:30 PM**

**Investigating High-Temperature Mechanical Properties and Microstructures of Additively Manufactured Refractory Alloys:** *Sharon Park*<sup>1</sup>; Mo-Rigen He<sup>1</sup>; Michael Patullo<sup>1</sup>; Syed I.A. Jalali<sup>1</sup>; Alex Lark<sup>2</sup>; Gianna Valentino<sup>3</sup>; Kevin Hemker<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>JHU Applied Physics Laboratory; <sup>3</sup>University of Maryland, College Park

**3:50 PM**

**Integrated Experiment and Numerical Simulation Analysis of Densification and Cracking during Laser Powder Bed Fusion of Tungsten:** *Shashank Sharma*<sup>1</sup>; K.V Mani Krishna<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Jitesh Kumar<sup>1</sup>; M Radhakrishnan<sup>1</sup>; Selvamurugan Palaniappan<sup>1</sup>; Saikumar Dussa<sup>1</sup>; Rajarshi Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University Of North Texas

**4:10 PM Break**

**4:30 PM**

**Laser Additive Manufacturing of Tungsten-Rhenium Alloys:** *Guru Dinda*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

**4:50 PM**

**Development of W-Ti-Mo Refractory Medium Entropy Alloy via Selective Laser Melting for Extreme Environment Applications:** *Lindsey Salazar*<sup>1</sup>; Jeongwoo Lee<sup>1</sup>; Abdullah Al Masum Jabir<sup>1</sup>; Jianzhi Li<sup>1</sup>; <sup>1</sup>University of Texas Rio Grande Valley

**5:10 PM**

**Additive Manufacturing of Tungsten and Tungsten Alloys - From Printing to Cracking:** *Amaranth Karra*<sup>1</sup>; Seunghee Oh<sup>2</sup>; Andrew Chuang<sup>3</sup>; Aditya Rohan Narra<sup>1</sup>; Anthony Rollett<sup>1</sup>; Bryan Webler<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Department of Materials Science and Engineering, University of Michigan, Ann Arbor - MI; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory, Lemont - IL

**5:30 PM**

**Effect of Tungsten L-PBF Feedstock Modification on Performance in Bending:** *Eric Brizes*<sup>1</sup>; Justin Milner<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III – Microstructure and Microstructural Evolution

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

Tuesday PM | March 5, 2024

Orlando M | Hyatt

**Session Chair:** Fan Zhang, National Institute of Standards and Technology

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**2:30 PM**

**Do Dislocation Structures Evolve during Metal 3D Printing After Solidification? – An In Situ Synchrotron X-ray Diffraction Study:** Steve Gaudez<sup>1</sup>; Kouider Abdesselam<sup>1</sup>; Hakim Gharbi<sup>1</sup>; Zoltan Hegedues<sup>2</sup>; Ulrich Lienert<sup>2</sup>; *Wolfgang Pantleon*<sup>3</sup>; Manas Upadhyay<sup>1</sup>; <sup>1</sup>Ecole Polytechnique; <sup>2</sup>Deutsches Elektronen Synchrotron; <sup>3</sup>Technical University of Denmark

**2:50 PM**

**Key Hole Mode Hunting: Operando Tomographic Microscopy during Laser-based Powder Bed Fusion of Alumina:** *Malgorzata Makowska*<sup>1</sup>; Fabrizio Verga<sup>2</sup>; Steven Van Petegem<sup>1</sup>; Pablo Villanueva Perez<sup>3</sup>; Zisheng Yao<sup>3</sup>; Zhang Zhilang<sup>2</sup>; Mamzi Afrasiabi<sup>2</sup>; Federica Marone<sup>1</sup>; <sup>1</sup>Paul Scherrer Institut; <sup>2</sup>ETH Zurich; <sup>3</sup>Lund University

**3:10 PM**

**Ultrafine Ti-Fe-based Eutectics for Additive Manufacturing: Pytcho, Micro, and Operando X-ray Imaging for Characterization:** *Federico Sket*<sup>1</sup>; Katrin Bugelnig<sup>2</sup>; Joachim Gussone<sup>2</sup>; Jan Haubrich<sup>2</sup>; Akshya Pandey<sup>1</sup>; Peter Cloetens<sup>3</sup>; Ulrike Hecht<sup>4</sup>; Julio da Silva<sup>5</sup>; Manas Upadhyay<sup>6</sup>; Philip Withers<sup>7</sup>; Mark Easton<sup>8</sup>; Yunhui Chen<sup>8</sup>; Alexander Rack<sup>8</sup>; Guillermo Requena<sup>2</sup>; <sup>1</sup>IMDEA Materials Institute; <sup>2</sup>Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR); <sup>3</sup>European Synchrotron Radiation Facility (ESRF); <sup>4</sup>Access e.V.; <sup>5</sup>Institut Néel CNRS; <sup>6</sup>École Polytechnique; <sup>7</sup>School of Materials, University of Manchester; <sup>8</sup>RMIT University

**3:30 PM**

**Spatially Resolved Real-time Crystallization Kinetics during Extrusion-based 3D Printing of Semicrystalline Polymers:** *Hilmar Koerner*<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory

**3:50 PM**

**Continuous-wave Lasering Improves Strength-Ductility Tradeoff and Fatigue Response of Additively Manufactured Stainless Steels:** Juan Guillermo Santos Macías<sup>1</sup>; Kewei Chen<sup>1</sup>; Alexandre Tanguy<sup>1</sup>; *Manas Upadhyay*<sup>1</sup>; <sup>1</sup>Ecole Polytechnique, LMS, CNRS

**4:10 PM Break**

**4:20 PM**

**X-ray Synchrotron Diffraction of 14 Novel Ti-6Al-4V Microstructures Obtained From Post-Build Heat Treatments:** *Nicholas Derimow*<sup>1</sup>; Howie Jores<sup>1</sup>; Jake Benzing<sup>1</sup>; Alec Saville<sup>1</sup>; Chris Hadley<sup>2</sup>; Mahesh Waje<sup>2</sup>; Nik Hrabe<sup>1</sup>; <sup>1</sup>National Institute

of Standards and Technology; <sup>2</sup>Lynnntech

**4:40 PM**

**Insights into Sintering with Real Time Correlation of Microstructure Evolution at High-resolution Using X-ray Nano Tomography:** *Rahul Reddy Kancharla*<sup>1</sup>; Jorgen Rufner<sup>1</sup>; William Chuirazzi<sup>1</sup>; Tiankai Yao<sup>1</sup>; Joshua Kane<sup>2</sup>; Arin Preston<sup>1</sup>; Timothy Bragg<sup>1</sup>; Xianghui Xiao<sup>3</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Ultra Safe Nuclear Corporation; <sup>3</sup>Brookhaven National Laboratory

**5:00 PM**

**Unraveling Microstructural Impacts Governing the Pitting Corrosion Behavior in L-PBF 316L Stainless Steel:** *Mingxi Ouyang*<sup>1</sup>; David Sprouster<sup>1</sup>; Gary Halada<sup>1</sup>; Steven Storck<sup>2</sup>; Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Johns Hopkins Applied Physics Laboratory

**5:20 PM**

**Investigation of Microstructure Formation in Plasma Arc Additive Manufacturing Processes by SEM-Based Heating Studies:** 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

**5:40 PM**

**Controlling Microstructure of Additively Manufactured Ti-6Al-4V through In-situ Selective Laser Heat Treatment:** Reza Esmailzadeh<sup>1</sup>; Milad Hamidi-Nasab<sup>1</sup>; Charlotte deFormanoir<sup>1</sup>; Lucas Schlenger<sup>1</sup>; *Steven Van Petegem*<sup>2</sup>; Claire Navarre<sup>1</sup>; Cyril Cayron<sup>1</sup>; Nicola Casati<sup>2</sup>; Daniel Grolimund<sup>2</sup>; Roland Logé<sup>1</sup>; <sup>1</sup>EPFL; <sup>2</sup>Paul Scherrer Institut (PSI)

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Mechanical Behavior of Additively Manufactured Fe- and Ni-based Alloys

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Tuesday PM | March 5, 2024**  
**Plaza Int'l F | Hyatt**

**Session Chairs:** Tianyi Chen, Oregon State University; Sezer Özerinç, Middle East Technical University

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**2:30 PM Invited**

**Mechanical Behavior of Additively Manufactured Ni Alloys with Nanoprecipitates:** Benjamin Stegman<sup>1</sup>; Bo Yang<sup>1</sup>; William Jarosinski<sup>2</sup>; *Xinghang Zhang*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Praxair Surface Technologies Inc.

**3:00 PM**

**Quantifying the Influence of Geometry and Annealing on the Distribution of Micro- and Nano-scale Precipitates and Resulting Mechanical Properties of SLM 17-4PH Stainless Steel:** *Connor Varney*<sup>1</sup>; Paul Rottmann<sup>1</sup>; Devin Burns<sup>2</sup>; <sup>1</sup>University of Kentucky; <sup>2</sup>NASA Langley Research Center

3:20 PM

**Uncovering Dislocation-precipitate Interactions during Tensile Loading of Wire Arc Additive Manufactured Nickel-aluminum-Bronze:** *Ariel Murphy-Leonard*<sup>1</sup>; Veronika Mazanova<sup>1</sup>; <sup>1</sup>Ohio State University

3:40 PM Invited

**Microstructures and Mechanical Behavior of Laser Additively Manufactured Multiphase Fe-based Alloys:** *Amit Misra*<sup>1</sup>; <sup>1</sup>University of Michigan

4:10 PM Break

4:30 PM

**The Effect of Hydrogen on the Growth of Sub-micron Scale Porosity in Additively Manufactured 17-4PH during Environmentally Assisted Cracking:** *James Burns*<sup>1</sup>; Trevor Shoemaker<sup>2</sup>; Zzach Harris<sup>3</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>US Air Force; <sup>3</sup>University of Pittsburgh

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Process-induced Microstructures and Defects — Alloys for Extreme Conditions

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

Tuesday PM | March 5, 2024  
Florida C | Hyatt

**Session Chair:** Mohsen Asle Zaeem, Colorado School of Mines

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2:30 PM

**Additive Manufacturing in Reactive Atmospheres:** *Christian Felber*<sup>1</sup>; Eric Jäggle<sup>1</sup>; <sup>1</sup>Universität der Bundeswehr München

2:50 PM

**Characterization of Microstructure and Mechanical Property Variation in Haynes 282 as a Function of Laser Powder Bed Fusion Process Parameters:** *Nicholas Lamprinakos*<sup>1</sup>; Junwon Seo<sup>1</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

3:10 PM

**SLM-induced Microstructures and Properties of Ni Hastelloy X under Extreme Conditions:** *Shuaihang Pan*<sup>1</sup>; Yingyue Yin<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Shandong University

3:30 PM

**Flaw Type and Build Orientation Dependent Creep Strength of 316L Stainless Steel Fabricated via Laser Powder Bed Fusion:** *Nemanja Kljestan*<sup>1</sup>; Thinh Huynh<sup>2</sup>; Yongho Sohn<sup>2</sup>; Marko Knezevic<sup>1</sup>; Nathalia Vallejo<sup>2</sup>; <sup>1</sup>University of New Hampshire; <sup>2</sup>University of Central Florida

3:50 PM Break

4:10 PM

**Leveraging Metastability in High Entropy Alloys for Grain Refinement in Additive Manufacturing:** *Akane Wakai*<sup>1</sup>; Jenniffer Bustillos<sup>1</sup>; Katherine Shanks<sup>2</sup>; Amlan Das<sup>2</sup>; Noah Sargent<sup>3</sup>; Wei Xiong<sup>3</sup>; Atieh Moridi<sup>1</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Cornell High Energy Synchrotron Source; <sup>3</sup>University of Pittsburgh

**4:30 PM**

**Microstructure Analysis on Laser Remelting of Medium- and High-Entropy Alloys: Towards Enhanced Printability:** *Ajay Talbot*<sup>1</sup>; Wandong Wang<sup>1</sup>; Xiao Shang<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

**4:50 PM**

**Selective Laser Melting of High-temperature Al-TM Based Alloys:** *Amir Farkoosh*<sup>1</sup>; David Seidman<sup>1</sup>; <sup>1</sup>Northwestern University

**5:10 PM**

**Development of Process Conditions of L-PBF for a Novel High-Entropy Alloy:** *Sertaç Altnok*<sup>1</sup>; Martin Buscher<sup>2</sup>; Yunus Kalay<sup>3</sup>; <sup>1</sup>Turkish Aerospace Inc.; <sup>2</sup>3Aconity3D GmbH; <sup>3</sup>Middle East Technical University

**5:30 PM**

**Temperature and Strain Rate Behavior of Electron Beam Additively Manufactured Inconel 718:** *Franklyn Kellogg*<sup>1</sup>; Alex Butler<sup>2</sup>; Clara Mock<sup>3</sup>; Brandon McWilliams<sup>3</sup>; <sup>1</sup>SURVICE Engineering; <sup>2</sup>ORAU; <sup>3</sup>DEVCOM Army Research Laboratory

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## BIOMATERIALS

### Advanced Biomaterials for Biomedical Implants — Biomaterials Synthesis and Behavior

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

**Program Organizers:** Tolou Shokuhfar, University of Illinois at Chicago; Fariborz Tavangarian, Pennsylvania State University Harrisburg; Vinoy Thomas, University of Alabama at Birmingham

**Tuesday PM | March 5, 2024**  
**Celebration 12 | Hyatt**

**Session Chair:** Vinoy Thomas, University of Alabama at Birmingham

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**2:30 PM Invited**

**Enhancing Mechanical Properties of a Lightweight Biomimetic Structure by 3D Printing for Bone Tissue Engineering Application:** *Fariborz Tavangarian*<sup>1</sup>; Niloofar Fani<sup>1</sup>; <sup>1</sup>Pennsylvania State University Harrisburg

**3:00 PM**

**In-vivo and In-vitro Studies of the Corrosion and Mechanical Properties of a Precipitation-hardened Mg-9Al Binary Alloy:** *Sreenivas Raguraman*<sup>1</sup>; Weilue He<sup>2</sup>; Suhas Prameela<sup>3</sup>; Tram Nguyen<sup>1</sup>; Roger Guillory<sup>2</sup>; Timothy Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Michigan Technological University; <sup>3</sup>Massachusetts Institute of Technology

**3:20 PM**

**Additively Manufactured Semi-flexible Titanium and Nickel-Titanium Lattices as Hydrogel Reinforcements for Biomedical Implants with Superelastic and Shape Memory Properties:** *Enrico Tosoratti*<sup>1</sup>; <sup>1</sup>Inspire AG/ETH Zurich

**3:40 PM**

**Improving Free Flap Donor Site Stabilization with the Use of Additively Manufactured Custom Fixation Plates:** *Leila Ladani*<sup>1</sup>; *Michael Palmieri*<sup>1</sup>; <sup>1</sup>Arizona State University

4:00 PM Break

4:10 PM

**Optimizing Printing Orientation for Spicule-Inspired Structures for Biomedical Applications:** *Laura Conway*<sup>1</sup>; Fariborz Tavangarian<sup>1</sup>; <sup>1</sup>Pennsylvania State University Harrisburg

4:30 PM

**Hybrid Manufacturing of Superelastic Arterial Stents:** *Peter Ibrahim*<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham

4:50 PM

**Corrosion Behaviour of Ti-xCu Alloys for Dental Applications:** *Abdulrahman I. Alateyah*<sup>1</sup>; Marwa A. Abbas<sup>2</sup>; Majed O. Alawad<sup>3</sup>; Amal BaQais<sup>4</sup>; H. Abd El-Hafez<sup>1</sup>; Mohamed S. El-Asfoury<sup>5</sup>; Waleed El-Garaihy Nasr<sup>1</sup>; <sup>1</sup>Mechanical Engineering Department, Qassim University; <sup>2</sup>Suez University; <sup>3</sup>King Abdulaziz City for Science and Technology; <sup>4</sup>Princess Nourah bint Abdulrahman University; <sup>5</sup>Port-Said University

5:10 PM

**Biocompatibility Evaluation of TiZrNbSiMo High Entropy Alloy Coatings Fabricated by High Power Impulse Magnetron Sputtering:** *Sen-You Hou*<sup>1</sup>; Jyh-Wei Lee<sup>2</sup>; Bih-Show Lou<sup>3</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University; <sup>2</sup>Ming Chi University of Technology; <sup>3</sup>Chang Gung University

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation – Dislocations

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

Tuesday PM | March 5, 2024  
Celebration 1 | Hyatt

**Session Chairs:** Irene Beyerlein, University of California Santa Barbara; Nicolas Bertin, Lawrence Livermore National Laboratory

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2:30 PM

**Reconstructing Dislocation Avalanches via High-frequency Surface Displacement Measurements:** *Junjie Yang*<sup>1</sup>; Daniel Magagnosc<sup>2</sup>; Tamer Zaki<sup>1</sup>; Jaafar El-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>DEVCOM Army Research Laboratory

2:50 PM

**Simulating Dark-Field X-ray Microscopy Images of Complex Discrete Dislocation Structures:** *Yifan Wang*<sup>1</sup>; Nicolas Bertin<sup>2</sup>; Kento Katagiri<sup>1</sup>; Sara Irvine<sup>1</sup>; Robert Rudd<sup>2</sup>; Leora Dresselhaus-Marais<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>Lawrence Livermore National Laboratory

3:10 PM

**In Situ Characterization of Dislocation Types in 3D using Dark Field X-ray Microscopy:** *Sina Borgi*<sup>1</sup>; Grethe Winther<sup>1</sup>; Henning Poulsen<sup>1</sup>; <sup>1</sup>Technical University of Denmark

**3:30 PM**

**Mapping Dislocation Density in Additively Manufactured SS316L Specimens with Varying Aspect Ratio:** *Lucas Ravkov*<sup>1</sup>; Levente Balogh<sup>1</sup>; Don Brown<sup>2</sup>; <sup>1</sup>Queen's University; <sup>2</sup>Los Alamos National Laboratory

**3:50 PM**

**Imaging Ghosts with 4D-STEM: Diffuse Scattering, Vacancies and Vanishing Dislocations:** Sean Mills<sup>1</sup>; Yang Yang<sup>2</sup>; Jenn Donohue<sup>1</sup>; *Andrew Minor*<sup>1</sup>; <sup>1</sup>University of California-Berkeley; <sup>2</sup>Penn State University

**4:10 PM Break**

**4:30 PM**

**Advances in Characterizing Strain Dynamics and Dislocations Across Grain Boundaries: Insights from Bragg Coherent Diffraction Imaging:** *Yueheng Zhang*<sup>1</sup>; Matthew Wilkin<sup>1</sup>; Richard Sandberg<sup>2</sup>; J. Porter<sup>2</sup>; Stephan Hruszkewycz<sup>3</sup>; Mauricio Angelone<sup>3</sup>; Ross Harder<sup>3</sup>; Wonsuk Cha<sup>3</sup>; Anastasios Pateras<sup>1</sup>; Landon Schnebly<sup>2</sup>; Jason Meziere<sup>2</sup>; Robert Suter<sup>1</sup>; Anthony Rollett<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Brigham Young University; <sup>3</sup>Argonne National Laboratory

**4:50 PM**

**Predicting Dislocation Distribution from XRD Measurements through Machine Learning and 3D Discrete Dislocation Dynamics Simulations:** *Dylan Madisetti*<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

**5:10 PM**

**Quantifying Complex Defect Structures Created by Advanced Manufacturing using X-ray Diffraction:** *Levente Balogh*<sup>1</sup>; Lucas Ravkov<sup>1</sup>; Ondrej Muránsky<sup>2</sup>; <sup>1</sup>Queen's University; <sup>2</sup>Australian Nuclear Science and Technology Organisation

**5:30 PM**

**A Glide-based Cross-slip Mechanism and Explicit Separation of Edge and Screw Dislocation in BCC Single Crystal Plasticity Model:** *Cathy Bing*<sup>1</sup>; Philip Eisenlohr<sup>1</sup>; <sup>1</sup>Michigan State University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 — Functional Materials for Energy

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

**Tuesday PM | March 5, 2024**

**Celebration 13 | Hyatt**

**Session Chairs:** Surojit Gupta, University of North Dakota; Hui-Chia Yu, Michigan State University

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**2:30 PM**

**Charting the Electronic States of Intermetallic Catalysts:** *Zhengda He*<sup>1</sup>; Bin Ouyang<sup>1</sup>; <sup>1</sup>Florida State University

**2:50 PM Invited**

**Spatiotemporal Resolution of Phase Evolution of Sodium Vanadium Oxide (NaV<sub>3</sub>O<sub>8</sub>) Electrodes in Aqueous Zinc Batteries:** *Esther Takeuchi*<sup>1</sup>; Amy Marschilok<sup>1</sup>; Kenneth Takeuchi<sup>1</sup>; <sup>1</sup>Stony Brook University

**3:15 PM**

**Crystallographic Designing of Intercalation Electrodes:** *Ananya Balakrishna*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

**3:35 PM**

**Design of Novel Biocomposites for Advanced Functional Applications:** *Surojit Gupta*<sup>1</sup>; <sup>1</sup>University of North Dakota

**3:55 PM**

**Diffuse Interface Methods to Account for Grain Boundary Properties: Application to Ionic Conductors:** *W. Beck Andrews*<sup>1</sup>; Andrew Danbury<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**4:15 PM Break**

**4:35 PM**

**Electrode Design Guided by High-throughput-type Multiphysics Microstructure Electrochemical Simulations:** *Affan Malik*<sup>1</sup>; *Hui-Chia Yu*<sup>1</sup>; <sup>1</sup>Michigan State University

**4:55 PM**

**Electrovortex Flow in Liquid Gallium:** *Mohammad Abdelshafy*<sup>1</sup>; Jonathan Cheng<sup>2</sup>; Bitong Wang<sup>3</sup>; Ibrahim Mohammad<sup>1</sup>; Douglas Kelley<sup>1</sup>; <sup>1</sup>University of Rochester; <sup>2</sup>United States Naval Academy; <sup>3</sup>Institute of Physics, Chinese Academy of Sciences

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Real Time Imaging — Iron and Steelmaking

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials 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; Pranjali Nautiyal, Oklahoma State University; Jiawei Mi, University of Hull

**Tuesday PM | March 5, 2024**

**Blue Spring II | Hyatt**

**Session Chairs:** Il Sohn, Yonsei University; Bryan Webler, Carnegie Mellon University

**2:30 PM Invited**

**Visualization of High Temperature Phenomena at Interface between Metal and Oxide:** *Masashi Nakamoto*<sup>1</sup>; Toshihiro Tanaka<sup>1</sup>; <sup>1</sup>Osaka University

**2:50 PM**

**Solidification and Segregation Characteristics of S31254 Super Austenitic Stainless Steel by In-situ Observation:** *Yong Wang*<sup>1</sup>; Hua Zhang<sup>1</sup>; Hongwei Ni<sup>1</sup>; Wangzhong Mu<sup>1</sup>; Sohei Sukenaga<sup>1</sup>; Hiroyuki Shibata<sup>1</sup>; <sup>1</sup>Wuhan University of Science and Technology



**3:10 PM****In Situ Observation Study of Alumina Dissolution in Steelmaking Slags by Single Hot Thermocouple Technique (SHTT):** *Yongsug Chung*<sup>1</sup>; Sangrok Yeo<sup>1</sup>; Hyungsik Um<sup>1</sup>; <sup>1</sup>Tech University of Korea**3:30 PM****Visualization of Molten Slag Suspension by Electrical Resistance Tomography:** Masato Ogawa<sup>1</sup>; So Segawa<sup>2</sup>; Yosephus Prayitno<sup>2</sup>; Alief Luthfie<sup>2</sup>; Masahito Takei<sup>2</sup>; *Noritaka Saito*<sup>1</sup>; <sup>1</sup>Kyushu University; <sup>2</sup>Chiba University**3:50 PM Invited****Effect of Wettability on Penetration and Flotation Behavior of a Particle in Refining Process:** *Akihiro Matsuzawa*<sup>1</sup>; Katsuhiro Sasai<sup>1</sup>; Hiroshi Harada<sup>2</sup>; Mitsuhiro Numata<sup>1</sup>; <sup>1</sup>Nippon Steel Corporation; <sup>2</sup>Nagoya University**4:10 PM Break****4:30 PM Invited****What is the Viscosity of Multiphase Fluid:** *Shigeru Ueda*<sup>1</sup>; Takayuki Iwama<sup>1</sup>; Shin-ichi Shimasaki<sup>2</sup>; Noritaka Saito<sup>3</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>National Institute of Technology, Kagawa Collage; <sup>3</sup>Kyushu University**4:50 PM Invited****Sedimentation of Particles through Foaming Liquid:** *Shin'ichi Shimasaki*<sup>1</sup>; Shigeru Ueda<sup>2</sup>; Noritaka Saito<sup>3</sup>; Kenji Katoh<sup>4</sup>; <sup>1</sup>National Institute of Technology (KOSEN), Kagawa College; <sup>2</sup>Tohoku University; <sup>3</sup>Kyushu University; <sup>4</sup>Osaka Metropolitan University**5:10 PM****In-situ Observation of Decarburization with CO<sub>2</sub> and Bubble Formation in Si-containing Hot Metal:** *Gyokhang Park*<sup>1</sup>; Il Sohn<sup>1</sup>; <sup>1</sup>Yonsei University

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS****Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco — Advances in Soft Magnetic Materials****Sponsored by:** TMS Functional Materials Division, TMS: Magnetic Materials Committee**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center**Tuesday PM | March 5, 2024****Bayhill 22 | Hyatt****Session Chair:** Gaoyuan Ouyang, Ames Laboratory**2:30 PM Invited****Metal Amorphous Nanocomposite (MANC) Materials for High High Speed Axial Motors:** *Michael McHenry*<sup>1</sup>; K. Schneider<sup>1</sup>; Satoru Simizu<sup>1</sup>; James Egbu; M. DeBoer<sup>1</sup>; Eric Theisen<sup>2</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Metglas Inc.**3:00 PM Invited****Induced Magnetic Anisotropy in Soft Magnetic Nanocomposites: A Review and Recent Insights:** *Paul Ohodnicki*<sup>1</sup>; Tyler Papham<sup>1</sup>; Vladimir Keylin<sup>2</sup>; Ronald Noebe<sup>2</sup>; Alex Leary<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>NASA Glenn Research Center

**3:30 PM Invited**

**An Overview of Soft Magnetic Properties of Fe-based Alloys by Rapid Solidification and Additive Manufacturing for Sustainable Applications:** *Paola Tiberto*<sup>1</sup>; <sup>1</sup>INRIM

**4:00 PM Break**

**4:20 PM Invited**

**The Proposed Minimum Efficiency Standards for Distribution Transformers and the Impact to the Supply of Electrical and Amorphous Steels:** *Eric Theisen*<sup>1</sup>; William Coughlan<sup>1</sup>; <sup>1</sup>Metglas Inc.

**4:50 PM Invited**

**Connecting Soft Magnetic Core Performance to Power Converter Design:** *Alex Leary*<sup>1</sup>; Vladimir Keylin<sup>2</sup>; Grant Feichter<sup>2</sup>; Maria Willard<sup>1</sup>; Ron Noebe<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center; <sup>2</sup>HX5

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — Advances in Functional Ceramics: Materials and Processes

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

**Tuesday PM | March 5, 2024**  
**Celebration 10 | Hyatt**

**Session Chairs:** Ruigang Wang, University of Alabama ; Jinhong Li, China University of Geosciences (Beijing)

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**2:30 PM Introductory Comments**

**2:35 PM**

**Single-mode Microwave Processing of Functional Magnetic Ceramic Ferrites:** *Dipka Mandal*<sup>1</sup>; Christopher Bracken<sup>1</sup>; Paul Ohodnicki<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**2:55 PM**

**Assembly of Particles and Chain Formation in Aqueous Ceramic Suspensions Induced by High-frequency AC Electric Field:** *Dipankar Ghosh*<sup>1</sup>; James John<sup>1</sup>; Rohan Parai<sup>1</sup>; <sup>1</sup>Old Dominion University

**3:15 PM**

**Mapping the Creation of Nanoporous Ultra-high-temperature Ceramics:** *Catherine Ott*<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

**3:35 PM**

**MXene Derived Carbides as Templating Materials for ZrB<sub>2</sub>-based Ultra-high Temperature Ceramics (UHTCs):** Ornoba Chowdhury<sup>1</sup>; Nicola Gilli<sup>2</sup>; Ankit Kumar<sup>3</sup>; Nikhilesh Chawla<sup>3</sup>; Laura Silvestroni<sup>2</sup>; *Babak Anasori*<sup>1</sup>; <sup>1</sup>IUPUI-Purdue school of Engineering; <sup>2</sup>CNR-IMM Institute for Microelectronics and Microsystems; <sup>3</sup>Purdue University

**3:55 PM Break**

**4:10 PM**

**Pile-up Behavior of Dislocation Loops Punched Out by Nano-indentation in Wurtzite-type Ceramics:** *Shihao Zhang*<sup>1</sup>; Shigenobu Ogata<sup>1</sup>; <sup>1</sup>Osaka University

**4:30 PM**

**Transforming Ultra-high Temperature Metal Ceramic Multilayers:** Carter Stotts<sup>1</sup>; Michael Large<sup>2</sup>; Gregory Thompson<sup>2</sup>; *Christopher Weinberger*<sup>1</sup>; <sup>1</sup>Colorado State University; <sup>2</sup>University of Alabama

**4:50 PM**

**Phase Transition Behavior of Rare Earth Oxide Ce<sub>2</sub>O<sub>3</sub> in CaO-SiO<sub>2</sub>-5wt.%Al<sub>2</sub>O<sub>3</sub> System at 1673-1873K:** Rensheng Li<sup>1</sup>; Renyi Yang<sup>1</sup>; Xu Gao<sup>1</sup>; Wanlin Wang<sup>1</sup>; You Zhou<sup>1</sup>; *Hui Xu*<sup>2</sup>; <sup>1</sup>Central South University; <sup>2</sup>Central South University, School of Metallurgy and Environmental

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## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Tuesday PM | March 5, 2024**  
**Barrel Spring II | Hyatt**

**Session Chairs:** Bernd Gludovatz, UNSW Sydney; Yong-Jie Hu, Drexel University

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**2:30 PM Invited**

**On the Damage Tolerance of TRIP, TWIP and Dual-phase High-entropy Alloys:** *Bernd Gludovatz*<sup>1</sup>; Moses Paul<sup>1</sup>; Hyunseok Oh<sup>2</sup>; Eun Soo Park<sup>3</sup>; Robert Ritchie<sup>4</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>University of Wisconsin-Madison; <sup>3</sup>Seoul National University; <sup>4</sup>Lawrence Berkeley National Laboratory

**2:50 PM Invited**

**Understanding the Deformation Mechanism of an FCC Multi-principal Element Alloy via Nanoindentation:** *Kelvin Xie*<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:10 PM**

**Deformation Mechanisms and Activation Parameters in Refractory Multi-principal Element Alloy Micropillars Across the Temperature Spectrum: from Cryogenic to High-temperature:** *Nicolo Della Ventura*<sup>1</sup>; Carolina Frey<sup>1</sup>; Thomas E.J. Edwards<sup>2</sup>; Leah H. Mills<sup>1</sup>; Amit Sharma<sup>2</sup>; Chunhua Tian<sup>2</sup>; Xavier Maeder<sup>2</sup>; Johann Michler<sup>2</sup>; Tresa M. Pollock<sup>1</sup>; Daniel S. Gianola<sup>1</sup>; <sup>1</sup>UCSB; <sup>2</sup>Empa

**3:30 PM Invited**

**Design of High Entropy Alloys with Property Trade-offs through Unsupervised Data Driven Approaches:** *Scott Broderick*<sup>1</sup>; Krishna Rajan<sup>1</sup>; <sup>1</sup>University at Buffalo

**3:50 PM Invited**

**Mining Lattice Distortion, Strength, and Intrinsic Ductility of Refractory High-entropy Alloys:** *Yong-Jie Hu*<sup>1</sup>; Christopher Tandoc<sup>1</sup>; Peter Liaw<sup>2</sup>; Liang Qi<sup>3</sup>; <sup>1</sup>Drexel University; <sup>2</sup>University of Tennessee; <sup>3</sup>University of Michigan

**4:10 PM Break****4:30 PM Invited**

**Heterostructured High Entropy Alloys: A Perspective:** *Yuntian Zhu*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**4:50 PM Invited**

**Evaluation of Mechanical Properties and Serration Deformation Mechanisms at 20K:** *Soo Yeol Lee*<sup>1</sup>; You Sub Kim<sup>1</sup>; Soon-Ku Hong<sup>1</sup>; Wanchuck Woo<sup>2</sup>; Young Sang Na<sup>3</sup>; Wu Gong<sup>4</sup>; Stefanus Harjo<sup>4</sup>; E-Wen Huang<sup>5</sup>; Peter Liaw<sup>6</sup>; <sup>1</sup>Chungnam National University; <sup>2</sup>Korea Atomic Energy Research Institute; <sup>3</sup>Korea Institute of Materials Science; <sup>4</sup>Japan Atomic Energy Agency; <sup>5</sup>National Yang Ming Chiao Tung University; <sup>6</sup>The University of Tennessee

**5:10 PM**

**Deformation Substructures in a Multi-component bcc Refractory Alloy Encompassing Inverse Superalloy-like Microstructure with Disordered Precipitates in a Continuous Ordered Matrix: Cause of Brittleness and Mitigation Prospects:** *G. Babu Viswanathan*<sup>1</sup>; Zachary Kloenne<sup>1</sup>; Brian Welk<sup>1</sup>; Pariac O'Kelly<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>Ohio State University

**5:30 PM Invited**

**Magnificent Tensile Strength and Ductility Synergy in a NiCoCr-based High-entropy Alloy at Elevated Temperatures:** *Shuying Chen*<sup>1</sup>; Yanfei Gao<sup>2</sup>; Peter Liaw<sup>2</sup>; <sup>1</sup>Yantai University; <sup>2</sup>The University of Tennessee

**LIGHT METALS****Advances in Titanium Technology — Session IV**

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

**Tuesday PM | March 5, 2024**

**Windermere X-1 | Hyatt**

**Session Chairs:** Iman Ghamarian, University of Oklahoma; Yanqing Su, Utah State University

**2:30 PM Invited**

**Graded Titanium Alloys: Their Manufacture, Characterization, and Modeling:** Jonathan Zaugg<sup>1</sup>; Katie O'Donnell<sup>1</sup>; Maria Quintana<sup>1</sup>; Thomas Ales<sup>1</sup>; Eric Faierson<sup>1</sup>; Sid Pathak<sup>1</sup>; *Peter Collins*<sup>1</sup>; <sup>1</sup>Iowa State University

**2:55 PM Invited**

**A Conformable High Temperature Nitride Coating for Ti Alloys in Harsh Environments:** *Zhaohu Gao*<sup>1</sup>; <sup>1</sup>University of Birmingham

**3:20 PM**

**Microstructure Evolution during Laser Shock Peening in Titanium:** *Uthman Mahmud*<sup>1</sup>; Yijun Liu<sup>2</sup>; David Gilbert<sup>2</sup>; Yu-Lung Chiu<sup>1</sup>; Ian Jones<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Manufacturing Technology Centre

**3:40 PM**

**Sinter-based Additive Manufacturing of Titanium:** *Pei Sun*<sup>1</sup>; Nathan Jump<sup>1</sup>; Chengshang Zhou<sup>1</sup>; Z.Zak Fang<sup>1</sup>; <sup>1</sup>University of Utah

**4:00 PM Break**

**4:20 PM**

**Influence of Deformability of Interlayer Metals on Ultrasonic Spot Welding of Commercially Pure Titanium Sheets With Heterogeneous Interface.:** *Jheyu Lin*<sup>1</sup>; Kuan-Chieh Hu<sup>1</sup>; Tung-Ling Hsieh<sup>1</sup>; <sup>1</sup>National Taipei University of Technology

**4:40 PM**

**Electropolishing and Roughness Analysis of Additively Manufactured Ti64 With Ethylene Glycol and Sodium Chloride Solutions:** *Timothy Duffy*<sup>1</sup>; Jamie Stull<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**5:00 PM**

**Role of Texture and Latent Hardening on the Plastic Anisotropy of Ti64 Materials During Uniaxial Loading:** *Rajib Halder*<sup>1</sup>; Anthony Rollett<sup>1</sup>; Luca Corallo<sup>2</sup>; Leo Kestens<sup>2</sup>; Patricia Verleysen<sup>2</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Ghent University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification – Session IV

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Tuesday PM | March 5, 2024**  
**Bayhill 32 | Hyatt**

**Session Chair:** Saaketh Desai, Sandia National Laboratories

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**2:30 PM**

**Learning Incremental Forging Policies for Robotic Blacksmithing:** *Michael Groeber*<sup>1</sup>; Stephen Niezgod<sup>1</sup>; Josh Groves<sup>1</sup>; Anahita Khojandi<sup>1</sup>; Glenn Daehn<sup>1</sup>; <sup>1</sup>Ohio State University

**2:50 PM**

**Inferring Defect Distributions in Additive Manufacturing - A Stochastic Inverse Approach to Multiscale Direct Numerical Simulations:** *Anh Tran*<sup>1</sup>; Philip Eisenlohr<sup>2</sup>; Jay Carroll<sup>1</sup>; Tim Wildey<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Michigan State University

**3:10 PM**

**Biases and Limitations in Reported Data of Laser Powder Bed Fusion: Implications for the Learning:** *Raymond Wong*<sup>1</sup>; Anh Tran<sup>2</sup>; Bogdan Dovggy<sup>1</sup>; Claudia Santos Maldonado<sup>1</sup>; Minh-Son Pham<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>Sandia National Laboratories

**3:30 PM****Machine Learning Guided Friction Stir Welding of AA7075-T6 Aluminum Alloy:** *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**3:50 PM****Invertible Temper Modeling Using Normalizing Flows:** *Tegan Emerson*<sup>1</sup>; *Sylvia Howland*<sup>1</sup>; *Keerti Sahithi Kappagantula*<sup>1</sup>; *Henry Kvinge*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory**4:10 PM Break****4:20 PM****Machine Learning Towards Predicting Hot Crack Susceptibility:** *Mustafa Megahed*<sup>1</sup>; *Klaus Buessenschuett*<sup>2</sup>; *Philipp Stich*<sup>3</sup>; *Markus Apel*<sup>4</sup>; *Ludo Bautmans*<sup>5</sup>; *Christian Haase*<sup>2</sup>; <sup>1</sup>ESI Group; <sup>2</sup>RWTH Aachen; <sup>3</sup>EOS GmbH; <sup>4</sup>Access Technology; <sup>5</sup>Oerlikon**4:40 PM****Reduced-Dimension Surrogate Modeling for Microstructure Prediction:** *Arulmurugan Senthilnathan*<sup>1</sup>; *Paromita Nath*<sup>2</sup>; *Pranav Karve*<sup>1</sup>; *Sankaran Mahadevan*<sup>1</sup>; <sup>1</sup>Vanderbilt University; <sup>2</sup>Rowan University**5:00 PM****A Practical Deep Learning Fiber Segmentation Approach in a Manufacturing Setting:** *Akira Matsui*<sup>1</sup>; *Yu Okano*<sup>1</sup>; *Yoshihige Okuno*<sup>1</sup>; <sup>1</sup>Resonac Corporation**5:20 PM****Optimizing the Thermal Management of Hot Metal Ladle Cars Through Artificial Intelligence:** *Carl Schwarz*<sup>1</sup>; *Hilbrand Kuiken*<sup>1</sup>; *Maria Campos*<sup>2</sup>; *Bruno Luchini*<sup>2</sup>; *Paul Van Beurden*<sup>2</sup>; <sup>1</sup>Quantillion; <sup>2</sup>Tata Steel Netherlands

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN****Algorithm Development in Materials Science and Engineering – Algorithm Development for Crystal Plasticity and Damage Mechanics II*****Sponsored by:******Program Organizers:*** *Adrian Sabau*, Oak Ridge National Laboratory; *Douglas Spearot*, University of Florida; *Eric Homer*, Brigham Young University; *Hojun Lim*, Sandia National Laboratories; *Vimal Ramanuj*, Oak Ridge National Laboratory; *Richard Hennig*, University of Florida; *Arunima Singh*, Arizona State University; *Jeremy Mason*, University of California, Davis**Tuesday PM | March 5, 2024****Bayhill 28 | Hyatt*****Session Chair:*** *Hojun Lim*, Sandia National Laboratories

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**2:30 PM****Crystal Plasticity Simulations Using Cubic Interpolation Method:** *Milica Letic*<sup>1</sup>; *Mark Lyon*<sup>1</sup>; *Marko Knezevic*<sup>1</sup>; <sup>1</sup>University of New Hampshire**2:50 PM Invited****Current Advances on FFT-based Algorithms for Micromechanical Modelling of Crystalline Materials:** *Ricardo Lebensohn*<sup>1</sup>; *Miroslav Zecevic*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:20 PM**

**Influence of Cross Slip Based Dynamic Recovery during Plane Strain Compression of Aluminum:** *Chaitali Patil*<sup>1</sup>; Supriyo Chakraborty<sup>1</sup>; Stephen Niezgoda<sup>1</sup>; <sup>1</sup>Ohio State University

**3:40 PM**

**Physics-based Strategies to Mitigate Crystal Plasticity Parameter Uncertainty:** *Gustavo Castelluccio*<sup>1</sup>; <sup>1</sup>Cranfield University

**4:00 PM**

**Towards Experimental Validation of Microstructure -Sensitive Models of Statistically Varied Plastic Response with PRISMS-Indentation:** Dharmanshu Kundal<sup>1</sup>; Mohammadreza Yaghoobi<sup>2</sup>; *Aaron Tallman*<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>University of Michigan

**4:20 PM Break**

**4:40 PM**

**Modeling Chemical Reactions in Stabilization Process of Polyacrylonitrile-based Carbon Fiber Based on Molecular Dynamics:** *Shukai Yao*<sup>1</sup>; Chunyu Li<sup>1</sup>; Matthew Jackson<sup>2</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Solvay Composite Materials

**5:00 PM Invited**

**Quantum Approximate Bayesian Optimization Algorithm for Design of High-entropy Alloys:** Jungin Kim<sup>1</sup>; *Yan Wang*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**5:20 PM**

**Development of a Semi-empirical Potential for Ni-based Superalloys:** *Mikhail Mendeleev*<sup>1</sup>; Valery Borovikov<sup>2</sup>; Jacob Tavenner<sup>2</sup>; John Lawson<sup>1</sup>; Timothy Smith<sup>3</sup>; <sup>1</sup>NASA ARC; <sup>2</sup>KBR; <sup>3</sup>NASA GRC

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XII – Session I

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

**Tuesday PM | March 5, 2024**

**Bayhill 26 | Hyatt**

**Session Chair:** Hsin-Jay Wu, National Chiao Tung University

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**2:30 PM Introductory Comments**

**2:35 PM Invited**

**Hierarchical Phonon Scattering from Nano to Macro Scale in Bismuth Telluride Bulk Composites and Cost-effective Module Structure:** *Jong-Soo Rhyee*<sup>1</sup>; Pooja Rawat<sup>1</sup>; Anil Kumar<sup>1</sup>; <sup>1</sup>Kyung Hee University

**2:55 PM Invited**

**Phase Diagram, Whisker and Miscibility Gap of the Ag-Cu-Te Ternary System:** *Sinn-wen Chen*<sup>1</sup>; Yung-Chun Tsai<sup>1</sup>; Pin-shuo Huang<sup>1</sup>; Yohanes Hutabalian<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**3:15 PM Invited**

**Low Thermal Conductivity Materials: Understanding the Structure-thermal Property Relationships for Potential Thermoelectric Applications:** *George Nolas*<sup>1</sup>; <sup>1</sup>University of South Florida

**3:35 PM Invited**

**Engineering Electronic Properties of Thermoelectric Semiconductors:** *G. Jeffrey Snyder*<sup>1</sup>; <sup>1</sup>Northwestern University

**3:55 PM Invited**

**N-type Bi<sub>2</sub>Te<sub>3</sub> Crystals with Ultrahigh Thermoelectric Performance Near Room Temperature:** *Hsin-Jay Wu*<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**4:15 PM Break**

**4:30 PM Invited**

**Se Free n-type Bi<sub>2</sub>Te<sub>3</sub>: Synthesis, Sintering and Doping:** *Franck Gascoin*<sup>1</sup>; *Amélie Galodé*<sup>1</sup>; <sup>1</sup>Cnrs Crismat Unicaen

**4:50 PM Invited**

**Power Generation Thermoelectric Materials and Devices for Below 300 Degree C:** *Zhifeng Ren*<sup>1</sup>; <sup>1</sup>University of Houston

**5:10 PM Invited**

**Thermoelectric Properties of Layered AMX Compounds with Tunable Vacancy Concentrations and Interlayer Bonding:** *Alexandra Zevalkink*<sup>1</sup>; <sup>1</sup>Michigan State University

**5:30 PM Invited**

**High-throughput Combinatorial Printing and Discovery of High-performance and Flexible Thermoelectric Materials and Devices:** *Yanliang Zhang*<sup>1</sup>; <sup>1</sup>University of Notre Dame

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## LIGHT METALS

**Aluminum Alloys: Development and Manufacturing – Solidification, Casting and Cast Alloys**

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

**Tuesday PM | March 5, 2024**

**Windermere W-1 | Hyatt**

**Session Chairs:** Clement Ekaputra, Northwestern University; Jaime Perez Coronado, University of Michigan

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**2:30 PM**

**Correlation of Thermodynamic Calculations and Mechanical Properties of an Al-Si Cast Alloy:** *Alice Siemund*<sup>1</sup>; *Tobias Beyer*<sup>1</sup>; *Peer Decker*<sup>1</sup>; *Marcel Rosefort*<sup>1</sup>; <sup>1</sup>TRIMET Aluminium SE

**2:55 PM**

**Design and Characterization of Hierarchically-strengthened, Cast Al-Ce-Ni-Mn-Sc-Zr Alloys for High-temperature Applications:** *Clement Ekaputra*<sup>1</sup>; *Jovid Rakhmonov*<sup>2</sup>; *Ekin Senvardarli*<sup>1</sup>; *David Weiss*<sup>3</sup>; *Jon-Erik Mogonye*<sup>4</sup>; *David Dunand*<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Eck Industries; <sup>4</sup>Army



Research Laboratory

**3:20 PM**

**Developing Banding Microstructures in Directional Solidification of Aluminum Metal Matrix Composites:** *Jaime Perez Coronado*<sup>1</sup>; Aramanda Shanmukha Kiran<sup>1</sup>; Jonathan Goettsch<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Alan Taub<sup>1</sup>; <sup>1</sup>University of Michigan

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## LIGHT METALS

**Aluminum Reduction Technology – Cell Operations/ Fundamental Studies / Developments / Research**

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Tuesday PM | March 5, 2024**

**Windermere Y-2 | Hyatt**

**Session Chairs:** Nancy Holt, Hydro Aluminium AS; Jayson Tessier, Alcoa Corporation

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**2:30 PM**

**Restart of AP30 Cells at Boyne Smelters:** *Daniel Whitfield*<sup>1</sup>; Murray Ure<sup>1</sup>; Rashmi Jena<sup>1</sup>; Evan Andrews<sup>1</sup>; Shashidhar Ghatnatti<sup>2</sup>; <sup>1</sup>Boyne Smelters Limited; <sup>2</sup>Transformation and Technical Support

**2:55 PM**

**Application of SAMI Energy-saving and Current-intensifying Technology in a 330kA Potline:** *Jinlong Hou*<sup>1</sup>; Yafeng Liu<sup>1</sup>; Hongwu Hu<sup>1</sup>; Wei Liu<sup>1</sup>; Xuan Wang<sup>1</sup>; Xi Cao<sup>1</sup>; Michael Ren<sup>2</sup>; <sup>1</sup>Shenyang Aluminum & Magnesium Engineering & Research Institute Co. Ltd(SAMI); <sup>2</sup>Sunlightmetal Consulting Inc

**3:20 PM**

**Pot Failure Prediction at Emirates Global Aluminum (EGA):** *Shaikha Al Shehhi*<sup>1</sup>; Satheesh Mani<sup>1</sup>; Jose Blasques<sup>1</sup>; <sup>1</sup>Emirates Global Aluminium

**3:45 PM**

**SMARTCrane, a Fives' Digital Solution for Aluminium Production Optimization:** *Clement Pessemesse*<sup>1</sup>; Vianney Boyer<sup>1</sup>; Vincent Delcourt<sup>1</sup>; Jean Paul Leroy<sup>1</sup>; Frederic Moreira Pereira<sup>1</sup>; <sup>1</sup>Fives ECL

**4:10 PM Break**

**4:25 PM**

**A Review of Challenges and Solutions in Ledge Control and Measurement in Aluminium Electrolysis Cell:** *Bazoumana Sanogo*<sup>1</sup>; Lukas Dion<sup>2</sup>; Sébastien Gaboury<sup>2</sup>; Laszlo Kiss<sup>2</sup>; Thomas Roger<sup>2</sup>; Jean-François Bilodeau<sup>3</sup>; Sébastien Guérard<sup>3</sup>; <sup>1</sup>Regroupement Aluminium-Université du Québec à Chicoutimi (REGAL-UQAC); <sup>2</sup>GRIPS-UQAC; <sup>3</sup>Arvida Research and Development Center

**4:50 PM**

**Accurate Measurement of Anode Current in Aluminum Electrolysis: From Ideal to Reality:** Yi Meng<sup>1</sup>; Jun Tie<sup>1</sup>; Chun Li<sup>1</sup>; Rentao Zhao<sup>1</sup>; Hongwei Jiang<sup>1</sup>; Xingzu Peng<sup>1</sup>; Hao Xiao<sup>2</sup>; Dongwei Liu<sup>2</sup>; *Jun Lei*<sup>2</sup>; <sup>1</sup>North China University of Technology; <sup>2</sup>Beijing SIO Technology Co., Ltd

5:15 PM

**Correlation Between Corrosion Rate and Electrochemical Parameters of Anode Process on a Metallic Electrode in Molten Oxyfluorides:** *Andrey Yasinskiy*<sup>1</sup>; Thomas Jamieson<sup>2</sup>; Kamaljeet Singh<sup>3</sup>; Guðmundur Gunnarsson<sup>3</sup>; Jon Magnússon<sup>4</sup>; Dominic Feldhaus<sup>5</sup>; Roman Düssel<sup>5</sup>; Isabella Gallino<sup>2</sup>; Bernd Friedrich<sup>1</sup>; <sup>1</sup>RWTH Aachen University; <sup>2</sup>Saarland University; <sup>3</sup>Reykjavik University; <sup>4</sup>Arctus Metals; <sup>5</sup>TRIMET ALUMINIUM

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## LIGHT METALS

**An Atoms to Autos Approach for Materials Innovations for Lightweighting: An LMD Symposium in Honor of Anil K. Sachdev – Accelerating Material Development via ICME**

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

*Program Organizers:* Alan Luo, Ohio State University; Michele Manuel, University of Florida; Yue Qi, Brown University

Tuesday PM | March 5, 2024  
Windermere X-2 | Hyatt

*Session Chair:* Qigui Wang, General Motors

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2:30 PM Keynote

**Accelerated Development of Materials Using High-throughput Strategies and AI/ML:** *Surya Kalidindi*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

2:50 PM Invited

**High-Throughput Methodology for Alloy Development of Aluminum Sheet Products:** *Monica Kapoor*<sup>1</sup>; John Carsley<sup>1</sup>; <sup>1</sup>Novelis, Inc.

3:10 PM Invited

**Macro- and Micro-modeling on Squeeze Casting of Aluminum and Magnesium Alloys:** *Zhiqiang Han*<sup>1</sup>; <sup>1</sup>Tsinghua University

3:30 PM Invited

**Applications of Interdiffusion Studies in Lightweight Materials Design and Dissimilar Metal Joining:** *Kaustubh Kulkarni*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur

3:50 PM Invited

**Application of Integrated Computational Materials Engineering (ICME) in Light Metal Casting:** *Qigui Wang*<sup>1</sup>; <sup>1</sup>General Motors Corporation

4:10 PM Break

4:30 PM Keynote

**Using the PRISMS Center Framework to Accelerate the Design of Alloys and Processes for Formable Mg Sheet:** T. Berman<sup>1</sup>; M. Yaghoobi<sup>2</sup>; M. Philipchuck<sup>1</sup>; S. Lee<sup>1</sup>; D. Montiel<sup>1</sup>; K. Thornton<sup>1</sup>; V. Sundararaghavan<sup>1</sup>; A. Bucsek<sup>1</sup>; *John Allison*<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Intel Corp.

4:50 PM Invited

**Molecular Dynamics Simulation of the Atomic Mechanisms of Deformation and Phase Transformation in Titanium:** *Dongsheng Xu*<sup>1</sup>; Zhichao Meng<sup>1</sup>; Hui Guo<sup>1</sup>; Anil Sachdev<sup>2</sup>; Rui Yang<sup>1</sup>; <sup>1</sup>Institute of Metal Research, Chinese Academy of Sciences; <sup>2</sup>General Motors Research & Development Center

**5:10 PM**

**Modeling and Validating Hydrogen Porosity Formation in Aluminum Laser Welding:** *Nicole Trometer*<sup>1</sup>; Michael Moodispaw<sup>1</sup>; Wayne Cai<sup>2</sup>; Teresa Rinker<sup>2</sup>; Shardul Kamat<sup>3</sup>; Zachary Velasco<sup>2</sup>; Alan Luo<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>General Motors; <sup>3</sup>Northwestern University

**5:30 PM**

**Evaluation of Additively Manufactured Parts Using a Single Constitutive Parameter:** *Ryan Holdsworth*<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Seung Min Ha<sup>1</sup>; Joshua Yee<sup>2</sup>; Alan Jankowski<sup>2</sup>; Diran Apelian<sup>1</sup>; Enrique Lavernia<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>Sandia National Laboratories

**5:50 PM**

**Atomistic Kinetics in the Early Stage of Aluminum Alloy Natural Aging:** *Harold Smith-Perez*<sup>1</sup>; Penghao Xiao<sup>1</sup>; XiaoXiang Yu<sup>2</sup>; <sup>1</sup>Dalhousie University; <sup>2</sup>Novelis

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## BIOMATERIALS

### Biological Materials Science — Biological Materials Science IV

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

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

**Tuesday PM | March 5, 2024**

**Celebration 15 | Hyatt**

**Session Chairs:** Debora Lyn Porter, University of California, Merced; Yuxiao Zhou, Texas A&M University

**2:30 PM**

**An Amphibious Amazon Freshwater Sponge: Cauxi:** *Haocheng Quan*<sup>1</sup>; Marc Meyers<sup>2</sup>; Birgit Nothdurf<sup>1</sup>; Marcus Koch<sup>1</sup>; Niebuur Bart-Jan<sup>1</sup>; Sheron Tavares<sup>2</sup>; Eduard Arzt<sup>1</sup>; <sup>1</sup>INM – Leibniz Institute for New Materials; <sup>2</sup>University of California-San Diego

**2:50 PM**

**Water-resistant Enzymatic Construction Materials:** *Shuai Wang*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**3:10 PM**

**Ultra-compliant Lattices Inspired by the Venus Flower Basket: From Structural Study to Design Insights:** *Dhruv Bhate*<sup>1</sup>; Yash Mistry<sup>1</sup>; Swapnil Morankar<sup>2</sup>; Oliver Weeger<sup>3</sup>; Nikhilesh Chawla<sup>2</sup>; Clint Penick<sup>4</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Purdue University; <sup>3</sup>TU Darmstadt; <sup>4</sup>Kennesaw State University

**3:30 PM Invited**

**A Self-healing Enzymatic Carbon-negative Structural Material:** *Nima Rahbar*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**4:00 PM Break****4:20 PM Invited**

**Interpretable Data-constrained Machine Learning Model for Predicting the Mechanical Properties of Protein-based Fibers:** Akash Pandey<sup>1</sup>; Wei Chen<sup>1</sup>; *Sinan Keten*<sup>1</sup>; <sup>1</sup>Northwestern University

4:50 PM

**Exploring the Structure-mechanical Property-function Relationship of Flexible Goose Tracheae:** *Chien-Chih Lin*<sup>1</sup>; Pei-Rong Lin<sup>1</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

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## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Metallurgical Processing Analysis and Characterization**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Tuesday PM | March 5, 2024**  
**Windermere X-3 | Hyatt**

**Session Chairs:** Juan P. Escobedo-Diaz, University of New South Wales; John S. Carpenter, Los Alamos National Laboratory

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2:30 PM

**Effect of Pretreatment During Leaching of Chambishi Copper - Cobalt Air Roast – Leach Calcine Residue:** Yotamu Hara<sup>1</sup>; *Alexander Old*<sup>1</sup>; Phenny Mwaanga<sup>1</sup>; Gershom Mwandila<sup>1</sup>; Bawemi Mtonga<sup>1</sup>; <sup>1</sup>Copperbelt University

2:50 PM

**Rapidslag Analysis - With Digital Sample Homogenization to Slag Analysis in Under One Minute and Efficient In-situ Furnace Management:** *Sergio Montoya*

3:10 PM

**Separation of Iron and Phosphorus From High-phosphorus Oolitic Hematite Using Direct Reduction and Magnetic Separation:** *Guangheng Ji*<sup>1</sup>; Xu Gao<sup>1</sup>; Wanlin Wang<sup>1</sup>; <sup>1</sup>Central South University

3:30 PM

**Production of Zinc Oxide From Willemite Containing Ore From Kabwe Town in Zambia:** *Yotamu Hara*<sup>1</sup>; Daliso Tembo<sup>1</sup>; Ronald Hara<sup>1</sup>; Rainford Hara<sup>1</sup>; Alexander Old<sup>1</sup>; <sup>1</sup>Copperbelt University

3:50 PM

**Characterization of Archeometallurgical Slags from Smithing and Smelting Sites Obtained from Indiana and Uzbekistan:** Kaushik Yanamandra<sup>1</sup>; Eshan Ganju<sup>1</sup>; Swapnil Morankar<sup>1</sup>; Cassie Apuzzo<sup>1</sup>; Harold Cooper<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Chemistry and Physics of Interfaces — Interfacial Response: Corrosion, Irradiation, Mechanical and Thermal Stimuli**

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

**Tuesday PM | March 5, 2024**  
**Bayhill 25 | Hyatt**

**Session Chairs:** Janelle Wharry, Purdue University; Prashant Singh, Ames Laboratory

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**2:30 PM Invited**

**Influence of Grain Boundary Chemistry on Hydrogen Embrittlement and High Temperature Water Corrosion of Stainless Steels:** *Arun Devaraj*<sup>1</sup>; Tingkun Liu<sup>1</sup>; Zehao Li<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Jinhui Tao<sup>1</sup>; Matthew Olszta<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:00 PM**

**Fundamental Corrosion Mechanisms at the Mg-water Interface: An Ab Initio Approach:** *Mira Todorova*<sup>1</sup>; Sudarsan Surendralal<sup>1</sup>; Florian Deissenbeck<sup>1</sup>; Stefan Wippermann<sup>2</sup>; Joerg Neugebauer<sup>1</sup>; <sup>1</sup>Max-Planck-Institut fuer Eisenforschung; <sup>2</sup>Philipps University Marburg

**3:20 PM Invited**

**Grain Boundary Doping and Precipitation to Enhance Nanostructured Materials:** *Daniel Kiener*<sup>1</sup>; Julius Keckes<sup>1</sup>; Klemens Schmuck<sup>1</sup>; Hannah Lichtenegger<sup>1</sup>; Michael Burtscher<sup>1</sup>; Markus Alfreider<sup>1</sup>; <sup>1</sup>University of Leoben

**3:50 PM Break**

**4:10 PM Invited**

**On the Structure and Properties of the Spinel/Corundum Interface:** *Blas Uberuaga*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:40 PM**

**Mechanistic-Design of Multilayered Nanolaminates: Hierarchical Metal-MAX Materials for Tunable Strength and Toughness:** *Siddhartha (Sid) Pathak*<sup>1</sup>; Skye Supakul<sup>1</sup>; Garritt Tucker<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Baylor university

**5:00 PM**

**The Effect of Grain Boundary Facet Junctions on Segregation and Embrittlement:** *Miguel Fernandez*<sup>1</sup>; Remi Dingreville<sup>2</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University Of Florida; <sup>2</sup>Sandia National Laboratories

**5:20 PM**

**Role of Defects on the Properties of PbTe/PbSe Interfaces:** *Nicholas Taormina*<sup>1</sup>; Yang Li<sup>1</sup>; Youping Chen<sup>1</sup>; <sup>1</sup>University of Florida

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## **ADDITIVE MANUFACTURING**

**Cold Spray Additive Manufacturing: Part Quality and Performance — Process Development and Optimization**

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

**Program Organizers:** Ahmed Alade Tiamiyu, University Of Calgary, Canada; Tanaji Paul, Florida International University; Julio Villafuerte, CenterLine Windsor Ltd; Aaron Nardi, VRC Metal Systems; Joseph Heelan, Solvus Global

**Tuesday PM | March 5, 2024**  
**Gulf | Hyatt**

**Session Chairs:** Julio Villafuerte, CenterLine (Windsor) Limited ; Bradley Richards, Solvus Global

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**2:30 PM Invited**

**The Effects of In-situ and Post-process Heat Treatment on the Properties of Cold Spray Deposits Using N<sub>2</sub>-Gas:** Ahmad Nourian-Avval<sup>1</sup>; *Sinan Muftu*<sup>1</sup>; Ozan Ozdemir<sup>1</sup>; Samuel Boese<sup>1</sup>; Aiden Sevinsky<sup>1</sup>; <sup>1</sup>Northeastern University

**3:00 PM**

**A Through-Process Experimental Approach to Optimization of Aluminum Feedstock Powder for Cold Spray Additive Manufacturing:** *Kyle Tsaknopoulos*<sup>1</sup>; Bryer Sousa<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**3:20 PM**

**Tailoring Devitrification in High Strength Aluminum High Entropy and Al 6061 Composite Cold Sprayed Deposits:** *Denny John*<sup>1</sup>; Tanaji Paul<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

**3:40 PM**

**Many-particle Impact Bonding with Quantitative Single-particle Experiments:** *Alain Reiser*<sup>1</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:00 PM Break**

**4:20 PM**

**Investigating the Bonding Types and Impact Modes in Cold Spray Deposition of AlCoCrFeNi on Steel Substrate:** *Aisa Grace Custodio*<sup>1</sup>; Marvin Tolentino<sup>1</sup>; Gobinda Saha<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick

**4:40 PM**

**Localized Surface Modification of HPDC Magnesium Alloys Using Cold Spray to Enhance Surface Properties:** *Sridhar Niverty*<sup>1</sup>; Rajib Kalsar<sup>1</sup>; Lei Li<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Glenn Grant<sup>1</sup>; Darrell Herling<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>PNNL

**5:00 PM**

**The Erosion Regime and the Associated Microstructural Evolution: A Site-specific Study of a High-velocity Copper Microparticle Impacting Copper:** *Ahmed Alade Tiamiyu*<sup>1</sup>; Christopher Schuh<sup>2</sup>; <sup>1</sup>University of Calgary, Canada; <sup>2</sup>Massachusetts Institute of Technology

**5:20 PM**

**Using Thermal Pre- and Post-treatment to Affect the Mechanical Behavior of Cold Sprayed AA7050:** *Lorena Perez*<sup>1</sup>; Luke Brewer<sup>1</sup>; Jacob Williamson<sup>1</sup>; <sup>1</sup>University of Alabama

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Computational Discovery and Design of Materials — Session IV**

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

**Program Organizers:** Houlong Zhuang, Arizona State University; Ismaila Dabo, Pennsylvania State University; Arezoo Emdadi, Missouri University of Science and Technology; Yang Jiao, Arizona State University; Sara Kadkhodaei, University Of Illinois Chicago; Mahesh Neupane, DEVCOM Army Research Laboratory; Xiaofeng Qian, Texas A&M University; Arunima Singh, Arizona State University; Natasha Vermaak, Lehigh University

**Tuesday PM | March 5, 2024**  
**Bayhill 33 | Hyatt**

**Session Chair:** Natasha Vermaak, Lehigh University

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**2:30 PM**

**Modeling the Morphological Dependent Performance of an All Solid-state Battery:** Kalyan Chivukula<sup>1</sup>; Fiyanshu Kaka<sup>1</sup>; <sup>1</sup>Educational Institution

**2:50 PM**

**Strengthening Glass Fiber-Epoxy Composites with Cellulose Nanocrystals: A Molecular Dynamics Investigation:** Xiawa Wu<sup>1</sup>; <sup>1</sup>Penn State Behrend

**3:10 PM**

**Systematic Method for Material Selection for Nuclear Applications:** Matt Brand<sup>1</sup>; Patrick Burr<sup>1</sup>; Edward Obbard<sup>1</sup>; <sup>1</sup>University of New South Wales

**3:30 PM Invited**

**Incorporating Spatial and Temporal Constraints into Neural Networks:** Aditi Krishnapriyan<sup>1</sup>; <sup>1</sup>UC Berkeley

**3:55 PM Break**

**4:15 PM**

**Tailoring Oxidation Resistance of Refractory High Entropy Alloys by a Combined First-principles and CALPHAD Approach:** Shuang Lin<sup>1</sup>; Shun-Li Shang<sup>1</sup>; Allison M. Beese<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Penn State University

**4:35 PM**

**Influence of the Local Environment on the Formation of Sulfur Vacancies in Calcium Lanthanum Sulfide:** Cassidy Atkinson<sup>1</sup>; Pamir Alpay<sup>1</sup>; Matthew Guziewski<sup>2</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Army Research Laboratory

**4:55 PM**

**Modeling the Impact of Ionizing Radiation on Electrical Performance of Semiconductor Devices:** Xiaoyu Guan<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Computational Thermodynamics and Kinetics — Mechanical, Electronic and Magnetic Properties**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Turret, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Tuesday PM | March 5, 2024**  
**Bayhill 29 | Hyatt**

**Session Chairs:** Anderson Nascimento, University of California, Santa Barbara; Mingda Li, Massachusetts Institute of Technology

**2:30 PM 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

**3:00 PM**

**Explicit Modeling of Deformation Twinning Applied to High Purity hcp Titanium:** *Anderson Nascimento*<sup>1</sup>; *Akhilesh Pedgaonkar*<sup>2</sup>; *Curt Bronkhorst*<sup>2</sup>; *Irene Beyerlein*<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>University of Wisconsin-Madison

**3:20 PM**

**First-principles Calculation of the Pressure Derivative of the Bulk Modulus from Second- and Third-order Elastic Constants:** *Angelo Bongiorno*<sup>1</sup>; <sup>1</sup>College of Staten Island (CUNY)

**3:40 PM**

**Ferroelastic Domain Switching during Deformation of Yttria-stabilized Zirconia: A Phase-field Study:** *Avisor Bhattacharya*<sup>1</sup>; *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**4:00 PM Break**

**4:20 PM**

**Controlling the Electronic Conductivity of Hematite (-Fe<sub>2</sub>O<sub>3</sub>) via Biaxial Mechanical Strain: A Density Functional Theory Study:** *Mostafa Youssef*<sup>1</sup>; *Sheriff Abdulmutalib*<sup>1</sup>; <sup>1</sup>The American University In Cairo

**4:40 PM Invited**

**Machine Learning Magnetic Ordering Prediction:** *Mingda Li*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**5:10 PM**

**Resonant Interaction between Phonons and PbTe/PbSe (001) Misfit Dislocation Networks:** *Yang Li*<sup>1</sup>; *Zexi Zheng*<sup>2</sup>; *Adrian Diaz*<sup>3</sup>; *Simon Phillpot*<sup>1</sup>; *David McDowell*<sup>4</sup>; *Youping Chen*<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Shanghai for Science and Technology; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Georgia Institute of Technology

**5:30 PM**

**Misfit Dislocation Structure and Thermal Boundary Conductance of GaN/AlN Interfaces:** *Jiaqi Sun*<sup>1</sup>; *Yang Li*<sup>1</sup>; *Yenal Karaaslan*<sup>2</sup>; *Cem Sevik*<sup>2</sup>; *Youping Chen*<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Eskisehir Technical University

## MECHANICS OF MATERIALS

**Defects and Interfaces: Modeling and Experiments — Session for Richard Hoagland: Interface Chemistry**



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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Tuesday PM | March 5, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Shen Dillon, University of California, Irvine; Ricardo Castro, Lehigh University

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**2:30 PM Keynote**

**The Role of Chemical Disorder on Stability of Grain Boundaries in Spinel:** Peter Hatton<sup>1</sup>; Blas Uberuaga<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:00 PM Invited**

**Grain Boundary Doping in Magnesium Aluminate Spinel Nanoceramics for Improved Toughness:** Isabella Costa<sup>1</sup>; Ghanshyam Pilia<sup>2</sup>; Blas Uberuaga<sup>2</sup>; Ricardo Castro<sup>3</sup>; <sup>1</sup>University of California, Davis; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>University of California, Davis; Lehigh University

**3:25 PM**

**Understanding the Interface Strain Induced hcpbcc Phase Transformation in Nanolaminate Mg:** Kevin Jacob<sup>1</sup>; Krishna Yaddanapudi<sup>2</sup>; Manish Jain<sup>3</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of California; <sup>3</sup>Sandia National Laboratories

**3:45 PM**

**Physical Properties of Accumulative Roll Bonded Cu/Nb Nanolamellar Composites:** Jared Justice<sup>1</sup>; Aidana Bauyrzhan<sup>1</sup>; Marat Khafizov<sup>2</sup>; Nathan Mara<sup>3</sup>; Filip Ronning<sup>4</sup>; Osman Anderoglu<sup>1</sup>; <sup>1</sup>University of New Mexico; <sup>2</sup>Ohio State University; <sup>3</sup>University of Minnesota; <sup>4</sup>Los Alamos National Laboratory

**4:05 PM Break**

**4:20 PM Invited**

**High Temperature In Situ TEM Characterization of Metal-oxide Interfacial Deformation: The Importance of Interfacial Line Defect Character:** Shen Dillon<sup>1</sup>; <sup>1</sup>University of California, Irvine

**4:45 PM**

**Plastic Co-deformation of Aluminum and Silicon at Nano-scale:** Arkajit Ghosh<sup>1</sup>; Wenqian Wu<sup>2</sup>; Bibhu Sahu<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

**5:05 PM**

**Alloy Effects on Grain Boundary Kinetics and Disconnection Nucleation:** Spencer Thomas<sup>1</sup>; Jason Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University

**5:25 PM**

**Finite-deformation Sharp Interface Model for Void Evolution Under Irradiation:** Sreekar Rayaprolu<sup>1</sup>; Kyle Starkey<sup>1</sup>; Anter El-Azab<sup>1</sup>; <sup>1</sup>Purdue University

**5:45 PM**

**Work Hardening in Colloidal Crystals:** Seongsoo Kim<sup>1</sup>; Ilya Svetlizky<sup>1</sup>; David Weitz<sup>1</sup>; Frans Spaepen<sup>1</sup>; <sup>1</sup>Harvard University

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## MECHANICS OF MATERIALS

### Dynamic Behavior of Materials X — Spall

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

**Tuesday PM | March 5, 2024**  
**Coral Spring I | Hyatt**

**Session Chairs:** Marc Meyers, University of California-San Diego; Eric Brown, Los Alamos National Laboratory

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#### 2:30 PM

**Effects of Micro- and Macro-scale Heterogeneities on Spall Failure of Materials:** Greg Kennedy<sup>1</sup>; Taylor Sloop-Cabral<sup>1</sup>; Katie Koube<sup>1</sup>; Andrew Boddorff<sup>1</sup>; Josh Kacher<sup>1</sup>; Naresh Thadhani<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

#### 2:50 PM

**Rapid Quantification of Dynamic and Spall Strength of Metals Across Strain Rates:** *Suhas Eswarappa Prameela*<sup>1</sup>; Christopher Walker<sup>2</sup>; Christopher DiMarco<sup>3</sup>; Debjoy Mallick<sup>4</sup>; Xingsheng S Sun<sup>5</sup>; Taisuke Sasaki<sup>6</sup>; Justin Wilkerson<sup>2</sup>; KT Ramesh<sup>3</sup>; George Pharr<sup>2</sup>; Timothy Weihs<sup>3</sup>; <sup>1</sup>Massachusetts Institute of Technology (MIT); <sup>2</sup>TAMU; <sup>3</sup>Johns Hopkins University; <sup>4</sup>US Army Research Laboratory; <sup>5</sup>University of Kentucky ; <sup>6</sup>NIMS

#### 3:10 PM

**Dynamic Fracture Response of Cantor-derived Medium Entropy Alloys:** *Sheron Tavares*<sup>1</sup>; Marc Meyers<sup>1</sup>; Jesse Callanan<sup>2</sup>; David Jones<sup>2</sup>; Daniel Martinez<sup>2</sup>; Saryu Fensin<sup>2</sup>; <sup>1</sup>University of California-San Diego; <sup>2</sup>Los Alamos National Laboratory

#### 3:30 PM

**Effects of Controlled Porosity on Shock Mitigation in Additively Manufactured 316L Stainless Steel:** *Taylor Sloop*<sup>1</sup>; Elias Winterscheidt<sup>1</sup>; Kevin Lamb<sup>2</sup>; Sudarsanam Sheikh<sup>3</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; <sup>3</sup>University of Tennessee and ORNL

#### 3:50 PM

**The Influence of Microstructure on the Dynamic Shock Response of 1045 Steel:** *Virginia Euser*<sup>1</sup>; David Jones<sup>1</sup>; Daniel Martinez<sup>1</sup>; James Valdez<sup>1</sup>; Carl Trujillo<sup>1</sup>; Carl Cady<sup>1</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 4:10 PM Break

#### 4:30 PM

**A Coupled Twinning and Damage Model Based on the Dislocation Kinetics for Polycrystalline Beryllium Under Shock Loading Conditions:** *Nitin Daphalapurkar*<sup>1</sup>; Darby Luscher<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 4:50 PM

**Identification of Primary Variables in Multi-grain Simulations for Stress Conditions Leading to Void Nucleation:** *Samuel Dunham*<sup>1</sup>; William Powell<sup>1</sup>; Curt Bronkhorst<sup>1</sup>; Nan Chen<sup>1</sup>; Marko Knezevic<sup>2</sup>; Siddhartha Pathak<sup>3</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of New Hampshire; <sup>3</sup>Iowa State University

**5:10 PM**

**Numerical Analysis of Spalling at Micro and Continuum Scales:** *Andrew Ruggiero*<sup>1</sup>; Nicola Bonora<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Sara Ricci<sup>1</sup>; Gabriel Testa<sup>1</sup>; Guido Zucca<sup>2</sup>; <sup>1</sup>University of Cassino and Southern Lazio; <sup>2</sup>Italian Air Force

**5:30 PM**

**A Porous Crystal Plasticity Finite Element Model for Void Evolution in Aluminum Alloys under Multiaxial Loading:** *S K Gargeya Bhamidipati*<sup>1</sup>; Somnath Ghosh<sup>1</sup>; <sup>1</sup>Johns Hopkins University

## LIGHT METALS

### Electrode Technology for Aluminum Production — Anode Production

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

**Program Organizers:** Julien Lauzon-Gauthier, Alcoa Corporation; Samuel Wagstaff, Oculatus Consulting

**Tuesday PM | March 5, 2024**  
**Windermere W-2 | Hyatt**

**Session Chair:** Gøril Jahrsengene, SINTEF

## 2:30 PM Introductory Comments

**2:35 PM**

**Effect of Boron on the Evolution of Petroleum Coke Active Pore Size Under Air Oxidation:** *Ramzi Ishak*<sup>1</sup>; Francois Chevarin<sup>2</sup>; Gaétan Laroche<sup>2</sup>; Donald Ziegler<sup>1</sup>; Houshang Alamdari<sup>2</sup>; <sup>1</sup>Alcoa Corporation; <sup>2</sup>Laval University

**3:00 PM**

**Measurement of SO<sub>3</sub> in Flue Gas From Anode Baking Furnace:** *Ole Kjos*<sup>1</sup>; Thor Aarhaug<sup>1</sup>; Thomas Park Simonsen<sup>1</sup>; <sup>1</sup>Sintef As

**3:25 PM**

**Performance Improvement of the Anode Baking Process in Horizontal Furnaces:** *Emmily Fonseca*<sup>1</sup>; Marcus Brasiliense<sup>1</sup>; Paulo Teixeira<sup>1</sup>; Leonardo Campos<sup>1</sup>; Fernando Von Schaffelw<sup>1</sup>; Paulo Nogueira<sup>1</sup>; Alexandre Aquino<sup>1</sup>; Douglas Almeida<sup>1</sup>; <sup>1</sup>Albras

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials — Low Temperature Soldering and Thermal Management

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

**Tuesday PM | March 5, 2024**  
**Bayhill 27 | Hyatt**

**Session Chairs:** Albert Wu, National Central University, Taiwan; Chien-Lung Liang, National Taiwan University of Science and Technology

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**2:30 PM**

**Effect of Sb and Ag Addition on the Melting and Solidification of Near-eutectic Sn-Bi Solder Alloys:** *Yifan Wu*<sup>1</sup>; Hannah Fowler<sup>1</sup>; Nathaniel Weddington<sup>1</sup>; Sean Yenyu Lai<sup>1</sup>; Sukshitha Achar Puttur Lakshminarayana<sup>1</sup>; Sui Xiong Tay<sup>1</sup>; Aleena Masaeng<sup>1</sup>; John Blendell<sup>1</sup>; Ganesh Subbarayan-Shastri<sup>1</sup>; <sup>1</sup>Purdue University

**2:50 PM**

**Effects of Sb Addition on the Mechanical Behavior of Eutectic Sn-Bi Solder Alloys:** *Hannah Fowler*<sup>1</sup>; Sukshitha Achar Puttur Lakshminarayana<sup>1</sup>; Sean Lai<sup>1</sup>; David Bahr<sup>1</sup>; Ganesh Subbarayan<sup>1</sup>; John Blendell<sup>1</sup>; Carol Handwerker<sup>1</sup>; <sup>1</sup>Purdue University

**3:10 PM**

**In-situ Characterisation of the Time-temperature Dependent Structural Changes in Sn-Bi Alloys:** *Xin Tan*<sup>1</sup>; Qichao Hao<sup>1</sup>; Jiye Zhou<sup>1</sup>; Qinfen Gu<sup>2</sup>; Stuart McDonald<sup>1</sup>; Keith Sweatman<sup>3</sup>; Kazuhiro Nogita<sup>1</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>ANSTO; <sup>3</sup>Nihon Superior Co., Ltd

**3:30 PM**

**Impact of Current Induced Joule Heat Variation on Low Melting Temperature Solder Joint Stability:** *Tae-Kyu Lee*<sup>1</sup>; Jimmy-Bao Le<sup>2</sup>; Chuanhao Nie<sup>2</sup>; Young-Woo Lee<sup>3</sup>; Hui-Joong Kim<sup>3</sup>; Seul-Gi Lee<sup>3</sup>; Greg Baty<sup>4</sup>; Gnyaneshwar Ramakrishna<sup>1</sup>; Choong-Un Kim<sup>2</sup>; <sup>1</sup>Cisco Systems; <sup>2</sup>University of Texas, Arlington; <sup>3</sup>MK Electron; <sup>4</sup>Portland State University

**3:50 PM**

**Surface Precipitation and Growth Mechanisms of Bismuth Particles in Sn-Bi Solder:** *John Wu*<sup>1</sup>; Amey Luktuke<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University

**4:10 PM Break**

**4:30 PM**

**Impact of Microstructure on the Joule Heat Behaviors of Solder Interconnects:** *Choong-un Kim*<sup>1</sup>; Chuanhao Nie<sup>1</sup>; Dharani Sholapur<sup>1</sup>; Tae-Kye Lee<sup>2</sup>; Gnyaneshwar Ramakrishna<sup>2</sup>; <sup>1</sup>University of Texas at Arlington; <sup>2</sup>CISCO

**4:50 PM**

**Cryogenic Mechanical Properties and Time-temperature Dependent Phase Transformations of Ultra-low Temperature In-Sn-Bi Solder Alloys:** *Jiye Zhou*<sup>1</sup>; Xin Fu Tan<sup>1</sup>; Qinfen Gu<sup>2</sup>; Stuart McDonald<sup>1</sup>; Kazuhiro Nogita<sup>1</sup>; <sup>1</sup>The University of Queensland; <sup>2</sup>Australian Synchrotron

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## **MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

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

**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 5, 2024**  
**Bayhill 17 | Hyatt**

**Session Chairs:** Reiner Kirchheim, Georg-August Universität Göttingen; Dierk Raabe, Max-Planck Institute

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**2:30 PM Invited**

**Plastic Deformation and Fracture Within the Defactant Concept:** *Reiner Kirchheim*<sup>1</sup>; <sup>1</sup>University of Goettingen

**3:00 PM Invited**

**Multiscale Modeling of Fatigue Crack Growth and Environmental Effects:** *Ting Zhu*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**3:20 PM**

**Hydrogen Embrittlement of Nickel-based Superalloys: Some Impacts of  $\gamma$ -Ni<sub>3</sub>Al Precipitate States on Hardening Mechanisms and Damage Processes.:** *Feaugas Xavier*<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Siva Murugan<sup>1</sup>; <sup>1</sup>La Rochelle Université

**3:40 PM**

**Multiscale Study of the Impact of Hydrogen-grain Boundaries Interaction on Plasticity Mechanisms in Pure Nickel:** *Yasmine Ben Jedidia*<sup>1</sup>; Xavier Feaugas<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; <sup>1</sup>La Rochelle Université - LASIE

**4:00 PM Break**

**4:20 PM Invited**

**Hydrogen Embrittlement in Ni-Alloys:** *Dierk Raabe*<sup>1</sup>; <sup>1</sup>Max-Planck Institute

**4:50 PM**

**Consequences of Micro-alloying Elements and Microstructure on the Hydrogen Embrittlement Sensitivity of Carbon Steels:** *Alexia D'Orazio*<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Patrick Girault<sup>1</sup>; Jamaa Bouhattate<sup>1</sup>; Cyril Berziou<sup>1</sup>; Guillaume Lotte<sup>1</sup>; Stéphane Cohendoz<sup>1</sup>; Lucie Leclair<sup>2</sup>; Bernard Resiak<sup>2</sup>; Bruno Cofino<sup>2</sup>; Xavier Feaugas<sup>1</sup>; <sup>1</sup>La Rochelle University, LaSIE UMR CNRS 7356; <sup>2</sup>ArcelorMittal Maizières Research

**5:10 PM**

**Insights of Hydrogen Embrittlement for Austenitic Stainless Steels and Their Welds:** *Namhyun Kang*<sup>1</sup>; Jimin Nam<sup>1</sup>; Donghyun Choi<sup>1</sup>; Sourav Kumar Saha<sup>1</sup>; Byungrok Moon<sup>1</sup>; Jaeseok Yoo<sup>2</sup>; Seung-gun Lee<sup>3</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>Production Innovation R&D Center, Hanwha Ocean; <sup>3</sup>Korea Institute of Materials Science

**5:30 PM**

**Hydrogen Content and Charpy Toughness of Pipeline Steels With Different Hydrogen Charging Processes:** *Xin Pang*<sup>1</sup>; Su Xu<sup>1</sup>; <sup>1</sup>Canmetmaterials

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## MECHANICS OF MATERIALS

**Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Studies and Design Under the Process-Microstructure-Properties-Performance Paradigm**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; Ashley Spear, University of Utah; Brian Wisner, Ohio University

**Tuesday PM | March 5, 2024**  
**Manatee Spring II | Hyatt**

**Session Chair:** Orion Kafka, National Institute of Standards and Technology

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**2:30 PM**

**Atomic-scale Examination of the Film Rupture Model for Fatigue Crack Growth:** *Mingjie Zhao*<sup>1</sup>; *Derek Warner*<sup>2</sup>; <sup>1</sup>Exponent Inc; <sup>2</sup>Cornell University

**2:50 PM**

**Dislocation Microstructure Evolution and Plastic Deformation at Crack Tips: A Continuum Dislocation Dynamics Investigation:** *Khaled Abdelaziz*<sup>1</sup>; *Peng Lin*<sup>1</sup>; *Ben Anglin*<sup>1</sup>; *Anter El-Azab*<sup>1</sup>; <sup>1</sup>Purdue University

**3:10 PM**

**Crystal Plasticity Modeling of Superelastic Behavior 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

**3:30 PM**

**Crystal Plasticity Fatigue Modeling of Additively Manufactured Materials With Various Pore Defect Morphology:** *Krzysztof Stopka*<sup>1</sup>; *Michael Sangid*<sup>1</sup>; <sup>1</sup>Purdue University

**3:50 PM Break**

**4:10 PM**

**Comparison of Hardening Behavior and Yield surface in Ti6Al4V Made using Laser Powder Bed Process and Traditional Methods:** *Leila Ladani*<sup>1</sup>; *Venkateshwaran Ravi Narayanan*<sup>1</sup>; <sup>1</sup>Arizona State University

**4:30 PM**

**In-situ Characterization of Functional Fatigue in CuAlNi Shape Memory Alloys Using X-ray Topotomography, Diffraction Contrast Tomography, and 3D X-ray Diffraction:** *Janice Moya*<sup>1</sup>; *Wolfgang Ludwig*<sup>2</sup>; *Yuefeng Jin*<sup>1</sup>; *Timothy Thompson*<sup>1</sup>; *Jonathan Wright*<sup>2</sup>; *Adam Creuziger*<sup>3</sup>; *Ashley Bucsek*<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>European Synchrotron Radiation Facility; <sup>3</sup>U.S National Institute of Standards and Technology

**4:50 PM Invited**

**Fatigue Crack Nucleation Mechanisms in AZ31 Mg Alloy: Experiments and Simulations:** *Abbas Jamali*<sup>1</sup>; *Anxin Ma*<sup>2</sup>; *Javier Llorca*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>IMDEA Materials Institute

**5:20 PM**

**Mitigating Localized Plastic Strain Accumulation in Cyclic Loading of Shape Memory Ceramics: A Phase-field Modeling Study:** *Amirreza Lotfolahpour*<sup>1</sup>; *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials IV: Thin Films and Interfaces

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Tuesday PM | March 5, 2024**  
**Bayhill 21 | Hyatt**

**Session Chairs:** Changhong Cao, McGill University; Seungha Shin, University of Tennessee; Mostafa Bedewy, University of Pittsburgh

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#### 2:30 PM Keynote

**Engineering the Fracture Toughness of Polymer-infiltrated Nanoparticle Films:** *Kevin Turner*<sup>1</sup>; *Yiwel Qiang*<sup>1</sup>; *Daeyeon Lee*<sup>1</sup>; <sup>1</sup>University of Pennsylvania

#### 3:10 PM Invited

**Science and Technology of Nanocrystalline Diamond Films: Synthesis, Characterization and Applications:** *Ashok Kumar*<sup>1</sup>; <sup>1</sup>University of South Florida

#### 3:40 PM

**Compressing Gold to the Atomically Thin Extreme: Characterization of EAM Potentials:** *Tanuj Gupta*<sup>1</sup>; *Cai Wang*<sup>2</sup>; *Huijuan Zhao*<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>University of South Florida

#### 4:00 PM Break

#### 4:20 PM Invited

**Exploring the Morphology Transformation of Gold Nanoparticles to the 2D Extreme:** *Huijuan Zhao*<sup>1</sup>; <sup>1</sup>Clemson University

#### 4:50 PM Invited

**Revealing Quantum Functionality of Thin Films by In Situ Characterization with Materials Cluster System:** *Wonhee Ko*<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

#### 5:20 PM

**Solar-driven Interfacial Water Evaporation Using Nanomaterials:** *Woochul Lee*<sup>1</sup>; <sup>1</sup>University of Hawaii at Manoa

#### 5:40 PM

**Ultra-high Vacuum (UHV) Molecular Beam Synthesis of 2D Molybdenum Ditellurides (MoTe<sub>2</sub>) via van der Waals Epitaxy:** *Ossie Douglas*<sup>1</sup>; *Quang Ho*<sup>1</sup>; *Daniela Zamora Alviarez*<sup>1</sup>; *Md Rubayat-E Tanjil*<sup>1</sup>; *Zhewen Yin*<sup>1</sup>; *Daiyue Wei*<sup>1</sup>; *Michael Cai Wang*<sup>1</sup>; <sup>1</sup>University of South Florida

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Steel Design

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

**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

**Tuesday PM | March 5, 2024**  
**Bayhill 31 | Hyatt**

**Session Chairs:** Cem Tasan, MIT; Tadashi Furuhashi, Tohoku University

**2:30 PM**

**High Throughput Approaches for Sublattice Alloy Design of High Performance Nitriding Steels:** *Tadashi Furuhashi*<sup>1</sup>; *Yulin Xie*<sup>1</sup>; *Goro Miyamoto*<sup>2</sup>; <sup>1</sup>Tohoku University;

<sup>2</sup>Institute for Materials Research, Tohoku University

**3:00 PM**

**Development of Advanced High Modulus Steels for Automotive Applications:**

*Sulayman Khan*<sup>1</sup>; *Eric Palmiere*<sup>1</sup>; *Martin Jackson*<sup>1</sup>; *Ralf Rablbauer*<sup>2</sup>; <sup>1</sup>The University of Sheffield; <sup>2</sup>Volkswagen DE

**3:20 PM**

**Development of Creep Resistant Ferritic-martensitic Steels for Operation at**

**650°C:** *Martin Detrois*<sup>1</sup>; *Jeffrey Hawk*<sup>2</sup>; *Paul Jablonski*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Retired

**3:40 PM**

**Digital Design of a Lightweight and Low-cost UHS Steel:** *Antonio Vazquez*

*Prudencio*<sup>1</sup>; *Unnur Þórðardóttir*<sup>1</sup>; *Lu Meng*<sup>1</sup>; *Robiul Haque Shaikh*<sup>1</sup>; *Qing Chen*<sup>2</sup>; <sup>1</sup>KTH, Sweden; <sup>2</sup>Thermo-Calc Software AB, Sweden

**4:00 PM Break**

**4:15 PM**

**Engineering Non-equilibrium L12-NiAl Phase to Form a Nano-precipitate**

**Strengthened 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>; <sup>1</sup>US Naval Research Laboratory

**4:35 PM**

**A Novel Design of 2000 MPa Grade Press Hardening Steel:** *Yanqi Ma*<sup>1</sup>; *Hongliang*

*Yi*<sup>1</sup>; *Dapeng Yang*<sup>1</sup>; *Peter Hedström*<sup>2</sup>; *Tao Zhou*<sup>2</sup>; <sup>1</sup>Northeastern University, Shenyang;

<sup>2</sup>KTH Royal Institute of Technology

**4:55 PM**

**Influence of Rare Earth Ce Additions on Microstructure and Mechanical Properties**

**of HSLA Steels:** *Richard Oleksak*<sup>1</sup>; *Martin Detrois*<sup>1</sup>; *Paul Jablonski*<sup>1</sup>; *Kyle Rozman*<sup>1</sup>;

*Ömer Doğan*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**High Temperature Electrochemistry: An FMD Symposium Honoring Uday B. Pal  
— High Temperature Electrochemistry of Solid Oxide Cells**



**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Soumendra Basu, Boston University; Srikanth Gopalan, Boston University; Adam Powell, Worcester Polytechnic Institute; Filippos Patsiogiannis, Bridgnorth Aluminium Ltd; Xiaofei Guan, Shanghaitech University

**Tuesday PM | March 5, 2024**  
**Bayhill 24 | Hyatt**

**Session Chairs:** Xiao-Dong Zhou, University of Connecticut; Xingbo Liu, West Virginia University

**2:30 PM Invited**

**Improving Performance and Durability of Intermediate Temperature Protonconducting Solid Oxide Electrolysis Cells via Materials Design and Catalyst Surface Engineering:** Hanchen Tian<sup>1</sup>; Wenyuan Li<sup>1</sup>; *Xingbo Liu*<sup>1</sup>; <sup>1</sup>West Virginia University

**2:55 PM Invited**

**On Electrochemically Driven Phase Change and Accelerated Test Protocols in Solid Oxide Cells:** *Xiao-Dong Zhou*<sup>1</sup>; Yudong Wang<sup>1</sup>; Emir Dogdibegovic<sup>2</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Nexceris

**3:20 PM Invited**

**Highly Active and Thermally Stable Single-atom Electrocatalysts for High-temperature Solid Oxide Cells:** *Kyung Joong Yoon*<sup>1</sup>; <sup>1</sup>Kist

**3:45 PM Invited**

**Grain-boundary Engineering to Boost the Electrode Reaction Kinetics of SOFC:** *Hailei Zhao*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**4:10 PM Break**

**4:25 PM Invited**

**The Effect of A-site Doping Elements and Concentrations on the Diffusivity and Ionic Conductivity of La<sub>2</sub>NiO<sub>4</sub><sup>+</sup> Studied by Ab Initio Calculations:** *Yu Zhong*<sup>1</sup>; Songge Yang<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**4:50 PM Invited**

**Dynamic Operation of Metal-supported Solid Oxide Electrolysis Cells:** *Zhikuan Zhu*<sup>1</sup>; BoXun HU<sup>1</sup>; Michael Tucker<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

**5:15 PM**

**Analysis of Operating Parameters Affecting SOEC Performance:** *John-In Lee*<sup>1</sup>; Emily Gosh<sup>1</sup>; Jillian Mulligan<sup>1</sup>; Soumendra Basu<sup>1</sup>; Srikanth Gopalan<sup>1</sup>; Uday Pal<sup>1</sup>; <sup>1</sup>Boston University

**5:35 PM**

**Mitigating Fuel Electrode Degradation in SOECs by Infiltrated of Nanoscale GDC Catalyst:** *Emily Ghosh*<sup>1</sup>; John-In Lee<sup>1</sup>; Jillian Mulligan<sup>1</sup>; Uday Pal<sup>1</sup>; Srikanth Gopalan<sup>1</sup>; Soumendra Basu<sup>1</sup>; <sup>1</sup>Boston University

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Hume-Rothery Symposium on Alloy Microstructure Science and Engineering — Phase Transformation Theory and Modeling**

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

**Tuesday PM | March 5, 2024**  
**Bayhill 23 | Hyatt**

**Session Chairs:** Yufeng Zheng, University of North Texas; Chen Shen, General Electric

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**2:30 PM Invited**

**Characterization and Modeling of Concurrent Precipitation in Mg-Al-Sn Alloys Using an Improved Kampmann-Wagner Numerical (KWN) Model:** *Alan Luo*<sup>1</sup>; *Jiashi Miao*<sup>1</sup>; *Chuan Zhang*<sup>2</sup>; *Jianyue Zhang*<sup>1</sup>; *Fan Zhang*<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>CompuTherm LLC

**3:00 PM Invited**

**Self-assembled Nanostructures in Coherent Two-phase Systems: Crystallography Theory:** *Yongmei Jin*<sup>1</sup>; <sup>1</sup>Michigan Technological University

**3:30 PM Invited**

**Nucleation Mechanisms of GP Zones and Precipitates in Al-Zn-Mg Alloys:** *Sha Liu*<sup>1</sup>; *Javier Llorca*<sup>2</sup>; <sup>1</sup>Yanshan University; <sup>2</sup>IMDEA Materials Institute & Technical University of Madrid

**4:00 PM Break**

**4:20 PM Invited**

**Explore the Shear Component in Precipitate Plate Formation in Light Alloys:** *Jian-Feng Nie*<sup>1</sup>; <sup>1</sup>Monash University

**4:50 PM Invited**

**The Role of Disclinations and Dislocation-Disclination Reactions in Metallic Materials:** *Yipeng Gao*<sup>1</sup>; <sup>1</sup>Jilin University

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## ADDITIVE MANUFACTURING

### **Incorporating Additive Manufacturing in Material Science and Engineering Education (2024 Student-led Symposium) — Session II**

**Sponsored by:** TMS: Education Committee, TMS: Additive Manufacturing Committee

**Program Organizers:** Bryan Crossman, The Ohio State University; Elvin Beach, Ohio State University

**Tuesday PM | March 5, 2024**  
**Celebration 2 | Hyatt**

**Session Chair:** Bryan Crossman, The Ohio State University

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**2:30 PM Introductory Comments**

**2:35 PM Invited**

**Teaching the Tetrahedron: Additive Manufacturing for MSE Sophomores:** *Timothy Chambers*<sup>1</sup>; <sup>1</sup>University of Michigan

**2:55 PM**

**Using Additive Manufacturing and Active Methods for Teaching Materials and Processes:** *Henry Colorado*<sup>1</sup>; <sup>1</sup>Universidad de Antioquia

**3:15 PM Invited**

**Incorporating Additive Manufacturing in Materials Science & Engineering Laboratory-based Courses:** *Elvin Beach*<sup>1</sup>; <sup>1</sup>Ohio State University

**3:35 PM Invited**

**Additive Manufacturing at Central State University:** *Saleh Almestiri*<sup>1</sup>; <sup>1</sup>Central State University

**3:55 PM Break**

**4:10 PM**

**Additive Manufacturing for Aerospace Engineers:** *Zachary Cordero*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:30 PM**

**Make-and-measure Spaces as a Tool for Materials Education:** *Elias Winterscheidt*<sup>1</sup>; *Mark Losego*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**4:50 PM Concluding Comments**

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## **NUCLEAR MATERIALS**

### **Irradiation Testing: Facilities, Capabilities, and Experimental Designs – Test Vehicles and In-Situ Monitoring**

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

**Program Organizers:** Walter Luscher, Pacific Northwest National Laboratory; Peter Hosemann, University of California, Berkeley; Andrew Hoffman, GE Research; Joris Van den Bosch, SCK CEN; Brenden Heidrich, Nuclear Science User Facilities

**Tuesday PM | March 5, 2024**

**Rainbow Spring I | Hyatt**

**Session Chair:** Brenden Heidrich, Idaho National Laboratory

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**2:30 PM Invited**

**Irradiation Vehicles for Materials Separate Effects Experiments Supporting the Tritium Modernization Program:** *David Senior*<sup>1</sup>; *Walter Luscher*<sup>1</sup>; *Robert Gates*<sup>1</sup>; *Gary Hoggard*<sup>2</sup>; *Kevin Clayton*<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Idaho National Laboratory

**3:00 PM Invited**

**Harnessing HFIR Neutron Irradiations: Innovative Experiments and Standardized Capabilities:** *Kory Linton*<sup>1</sup>; *Annabelle Le Coq*<sup>1</sup>; *Jacob Gorton*<sup>1</sup>; *Nick Russell*<sup>1</sup>; *Adrian Schrell*<sup>1</sup>; *Chris Petrie*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:30 PM****Irradiation Testing of 316H Stainless Steel at Oak Ridge National Laboratory:***Annabelle Le Coq*<sup>1</sup>; Caleb Massey<sup>1</sup>; Patrick Champain<sup>1</sup>; Richard Howard<sup>1</sup>; Kory Linton<sup>1</sup>;<sup>1</sup>Oak Ridge National Laboratory**3:50 PM****Neutron Irradiation as a Function of Temperature – Experiment (NIFT-E):***Simon Pimblott*<sup>1</sup>; David Armstrong<sup>2</sup>; Matthew Arrowood<sup>1</sup>; Karina Assis<sup>3</sup>; Chris Grovenor<sup>2</sup>;Abbie Jones<sup>4</sup>; Susan Ortner<sup>5</sup>; Nassia Tzelepi<sup>5</sup>; Stuart Maloy<sup>6</sup>; Janelle Wharry<sup>7</sup>; <sup>1</sup>IdahoNational Laboratory; <sup>2</sup>University of Oxford; <sup>3</sup>Westinghouse Electric Company; <sup>4</sup>TheUniversity of Manchester; <sup>5</sup>UK National Nuclear Laboratory; <sup>6</sup>Pacific NorthwestNational Nuclear Laboratory; <sup>7</sup>Purdue University**4:10 PM Break****4:30 PM****Measurement of Hydrogen Vapor Pressure Over Two-phase Zirconium/****Zirconium Hydride Material between 275°C and 400°C Under the Effects of****Neutron Irradiation:** *Kenneth Geelhood*<sup>1</sup>; Samuel Goodrich<sup>1</sup>; Travis Zipperer<sup>1</sup>; EricChoi<sup>1</sup>; Walter Luscher<sup>1</sup>; Corey Hines<sup>2</sup>; Hillary Bennett<sup>2</sup>; <sup>1</sup>Pacific Northwest NationalLaboratory; <sup>2</sup>Washington State University**4:50 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>;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>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>MIT**5:10 PM****Post-irradiation Examination of AGR-5/6/7 TRISO Fuel with Micro X-ray****Computed Tomography:** William Chuirazzi<sup>1</sup>; Rahul Kancharla<sup>1</sup>; John Stempien<sup>1</sup>;*Swapnil Morankar*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN****Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion – Characterization of Local Ordering****Sponsored by:** TMS Structural Materials Division, TMS: Chemistry and Physics of Materials Committee, TMS: Nuclear Materials Committee, TMS: Corrosion and Environmental Effects Committee**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley**Tuesday PM | March 5, 2024****Bayhill 30 | Hyatt****Session Chairs:** Yang Yang, The Pennsylvania State University; Fadi Abdeljawad, Clemson University; Penghui Cao, University of California, Irvine; Irene Beyerlein, University of California, Santa Barbara

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**2:30 PM Invited****The Question of Short Range Order and Its Impact on Deformation Mechanisms in CrCoNi:** *Andrew Minor*<sup>1</sup>; <sup>1</sup>University of California-Berkeley

**3:00 PM Invited**

**Short-range Structure and Dynamics in Disordered Materials from 4D STEM:** Shuoyuan Huang<sup>1</sup>; Carter Francis<sup>1</sup>; *Paul Voyles*<sup>1</sup>; <sup>1</sup>University of Wisconsin

**3:30 PM**

**Machine Learning-enabled Tomographic Imaging of Chemical Short-range Order in Fe-based Alloys:** *Yue Li*<sup>1</sup>; Baptiste Gault<sup>1</sup>; <sup>1</sup>Max-Planck Institut für Eisenforschung GmbH

**3:50 PM**

**Sharpening Our Focus on Diffuse Scattering: Partial Ordering and Nanoscale Planar Defects in Multi-principal Element Alloys:** *Po-Cheng Kung*<sup>1</sup>; Kaijun Yin<sup>1</sup>; Jian-Min Zuo<sup>1</sup>; Jessica Krogstad<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign

**4:10 PM Break**

**4:30 PM Invited**

**Interfacial Free Volume Redistribution during Relaxation of a Spray Deposited Amorphous Alloy:** *Jason Trelewicz*<sup>1</sup>; Jonathan Gentile<sup>1</sup>; Bin Cheng<sup>1</sup>; David Sprouster<sup>1</sup>; <sup>1</sup>Stony Brook University

**5:00 PM**

**Exploration of Local Structural Effects in NiCoCr to Cryogenic Temperatures: A Total Scattering Investigation:** *Benjamin Jolly*<sup>1</sup>; Helen Playford<sup>2</sup>; Howard Stone<sup>3</sup>; Lewis Owen<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>ISIS Neutron and Muon Source; <sup>3</sup>University of Cambridge

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## LIGHT METALS

### **Magnesium Technology 2024 — Advanced Processing**

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

**Tuesday PM | March 5, 2024**  
**Windermere Y-3 | Hyatt**

**Session Chairs:** Sridhar Niverty, Pacific Northwest National Laboratory; Benjamin Schuessler, Pacific Northwest National Laboratory

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**2:30 PM Keynote**

**Magnesium Wheels:** *Jian-Feng Nie*<sup>1</sup>; Jianfeng (Jeff) Wang<sup>2</sup>; Henry Zhan<sup>2</sup>; <sup>1</sup>Monash University; <sup>2</sup>China Science Lab, General Motors Global Research and Development

**3:10 PM**

**Investigations on the Forging Behavior of Mg-Ca-Al Alloys:** *Nikolaus Papenberg*<sup>1</sup>; Stefan Gneiger<sup>1</sup>; <sup>1</sup>Light Metals Technologies Ranshofen

**3:30 PM**

**Ultrafine-grained Magnesium Alloys Manufactured by Multi-axial Forging: Elucidating Mechanisms of Achieving Both High Strength and High Ductility:** *Andres Maldonado*<sup>1</sup>; Mathew Weaver<sup>1</sup>; Devesh Misra<sup>1</sup>; <sup>1</sup>University of Texas El Paso

3:50 PM Break

4:10 PM

**Enhancement of Mechanical Properties of Rolled AZ31 Alloy by Utilizing Ultrasonic Nano-crystalline Surface Modification (UNSM) Treatment and Heat Treatment:** *Hyun Ji Kim*<sup>1</sup>; *Sumi Jo*<sup>1</sup>; *Auezhan Amanov*<sup>2</sup>; *Sung Hyuk Park*<sup>1</sup>; <sup>1</sup>Kyungpook National University; <sup>2</sup>Sun Moon University

4:30 PM

**Research Towards Sintering Improvement During Press and Sinter Processing of Mg and Mg Alloy Powders:** *Steven Johnson*<sup>1</sup>; *William Caron*<sup>1</sup>; <sup>1</sup>Central Connecticut State University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Advanced Molten Salt Structural/Chemical Measurement Techniques and Approaches

**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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

Tuesday PM | March 5, 2024  
Bayhill 20 | Hyatt

**Session Chair:** Nathaniel Hoyt, Argonne National Laboratory

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2:30 PM

**The Complex Structure of Molten 2LiF-BeF<sub>2</sub> Using Neutron Scattering, X-ray Scattering, and Neural Network Molecular Dynamics:** *Sean Fayfar*<sup>1</sup>; *Rajni Chahal*<sup>2</sup>; *Haley Williams*<sup>3</sup>; *D. Gardner*<sup>3</sup>; *Guiqiu Zheng*<sup>1</sup>; *David Sprouster*<sup>4</sup>; *Joerg Neuefeind*<sup>5</sup>; *Dan Olds*<sup>6</sup>; *Andrea Hwang*<sup>3</sup>; *Joanna Mcfarlane*<sup>5</sup>; *Ryan Gallagher*<sup>5</sup>; *Mark Asta*<sup>3</sup>; *Stephen Lam*<sup>2</sup>; *Raluca Scarlat*<sup>3</sup>; *Boris Khaykovich*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>University of Massachusetts Lowell; <sup>3</sup>University of California Berkeley; <sup>4</sup>Stony Brook University; <sup>5</sup>Oak Ridge National Laboratory; <sup>6</sup>Brookhaven National Laboratory

2:50 PM

**Correlative Analysis of Coordination Complexes of Metal Ions in Molten Salts Using Advanced Spectroscopy Techniques:** *Ruchi Gakhar*<sup>1</sup>; *Simerjeet Gill*<sup>2</sup>; *Nirmalendu Patra*<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Brookhaven National Lab

3:10 PM

**Time Series 2D Parametric Study of Ni-20Cr Corrosion in Molten LiCl-KCl:** *Bonita Goh*<sup>1</sup>; *Kailee Buttice*<sup>1</sup>; *Bruce Ravel*<sup>2</sup>; *Karen Chen-Wiegart*<sup>3</sup>; *Adrien Couet*<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Stony Brook University

3:30 PM

**Thermal and Radiation Induced Ni Magnetic Nanoparticle Formation on ZnCl<sub>2</sub> and ZnI<sub>2</sub>:** *Alejandro Ramos Ballesteros*<sup>1</sup>; *Ruchi Gakhar*<sup>1</sup>; *Gregory Holmbeck*<sup>1</sup>; *Simerjeet Gill*<sup>2</sup>; *Jay LaVerne*<sup>3</sup>; *Nirmalendu Patra*<sup>2</sup>; *James Wishart*<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>University of Notre Dame

**3:50 PM**

**Structure-properties Relations in Molten FLiBe from Molecular-dynamics Simulations Based on Machine-learned Potentials:** *Andrea Hwang*<sup>1</sup>; Nicholas Winner<sup>1</sup>; Yury Lysogorskiy<sup>2</sup>; Anton Bochkarev<sup>2</sup>; Siamak Attarian<sup>3</sup>; Sean Fayfar<sup>4</sup>; Boris Khaykovich<sup>4</sup>; Dane Morgan<sup>3</sup>; Izabela Szlufarska<sup>3</sup>; Ralf Drautz<sup>2</sup>; Raluca Scarlat<sup>5</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>ICAMS, Ruhr-Universität Bochum; <sup>3</sup>University of Wisconsin, Madison; <sup>4</sup>Nuclear Reactor Laboratory, Massachusetts Institute of Technology; <sup>5</sup>University of California, Berkeley

**4:10 PM Break**

**4:30 PM**

**Investigating Local Structure of Metal Solutes in Iodide Molten Salt Systems:** *Simerjeet Gill*<sup>1</sup>; Nirmalendu Patra<sup>1</sup>; Mehmet Topsakal<sup>1</sup>; Alejandro Ramos Ballesteros; Ruchi Gakhar<sup>2</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Idaho National Lab

**4:50 PM**

**Deposition of Model Fuel and Fission Products in Fluoride Salts:** *Diego Macias*<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan

**5:10 PM**

**Solubility Study of Oxides in Molten Chloride Salts:** Qiufeng Yang<sup>1</sup>; Guoping Cao<sup>1</sup>; *Ruchi Gakhar*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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## NUCLEAR MATERIALS

**Materials Corrosion Behavior in Advanced Nuclear Reactor Environments — Materials Corrosion Behavior in Light Water Reactors: A Joint Session with Phase Stability in Extreme Environments II**

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

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Caitlin Huotilainen, TerraPower; Nidia Gallego, Oak Ridge National Laboratory; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison; Julie Tucker, Oregon State University

**Tuesday PM | March 5, 2024**

**Silver Spring I-II | Hyatt**

**Session Chairs:** Junliang Liu, University of Wisconsin–Madison; Adrien Couet, University of Wisconsin-Madison

**2:30 PM**

**Characterization of Oxide Structures on Zirconium Alloys:** *Junliang Liu*<sup>1</sup>; Hongliang Zhang<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin–Madison

**2:50 PM**

**The Effect of Using KOH Instead of LiOH on Corrosion Behavior of Inconel 600 in Simulated PWR Water Chemistry:** *Fu-Yun Tsaï*<sup>1</sup>; Chuanzhen Zhou<sup>1</sup>; Minsung Hong<sup>2</sup>; Kayla Yano<sup>3</sup>; Daniel Schreiber<sup>3</sup>; Mukesh Bachhav<sup>4</sup>; Peter Hosemann<sup>2</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>University of California at Berkeley; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Idaho National Laboratory

**3:10 PM**

**Investigation of Oxidation Behavior on Mo-doped FeCrAl Alloys in Low-temperature (400°C) and High-temperature (1200°C) Steam Environments:** *Haozheng Qu*<sup>1</sup>; Hamdy Abouelella<sup>1</sup>; Indranil Roy<sup>1</sup>; Andrew Hoffman<sup>1</sup>; Raul Rebak<sup>1</sup>;

Rajnikant Umretiya<sup>1</sup>; <sup>1</sup>GE Global Research

**3:30 PM**

**Corrosion Behaviour of Laser Powder Bed Fused Inconel 625 in Hydrogenated High Temperature Water:** *Emily Lewis*<sup>1</sup>; Alexandra Dickinson-Lomas<sup>1</sup>; Jonathan Duff<sup>2</sup>; Amanda Cruchley<sup>3</sup>; Nick Cruchley<sup>4</sup>; Yu-Lung Chiu<sup>1</sup>; Fabio Scenini<sup>2</sup>; Moataz Attallah<sup>1</sup>; Sam Cruchley<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>University of Manchester; <sup>3</sup>Manufacturing Technology Centre; <sup>4</sup>Reaction Engines

**3:50 PM Break**

**4:10 PM**

**Impact of Pre-irradiation and Water Chemistry on In-situ Irradiation-corrosion Behavior of Zircaloy-4:** *Peng Wang*<sup>1</sup>; <sup>1</sup>University of Michigan

**4:30 PM**

**Coatings for LWR Control Rod Assembly for Improved Accident Tolerance and High Burnup Fuel Cycle:** *Noah Anderson*<sup>1</sup>; Hwasung Yeom<sup>1</sup>; Kasturi Sasidhar<sup>1</sup>; Bennett LaSalle<sup>1</sup>; William Ward<sup>1</sup>; Hakan Ozaltun<sup>2</sup>; Radu Pomirleanu<sup>3</sup>; Mohamed Ouisloumen<sup>3</sup>; Ho Lam<sup>3</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin, Madison; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Westinghouse Electric Company

**4:50 PM Panel Discussion:** This panel will discuss emerging topics concerning elucidating corrosion mechanisms in light-water reactor environments, based on the work presented in this session.

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## MATERIALS SYNTHESIS AND PROCESSING

**Materials Processing and Kinetic Phenomena: From Thin Films and Micro/Nano Systems to Advanced Manufacturing — Honoring Carl Thompson: Group Alumni II**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

**Tuesday PM | March 5, 2024**

**Celebration 11 | Hyatt**

**Session Chair:** To Be Announced

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**2:30 PM Invited**

**Kinetic Limitations in the Aluminum-lithium Electrochemical System for Lithium-ion Batteries:** *Steven Boles*<sup>1</sup>; Tianye Zheng<sup>2</sup>; Dominik Kramer<sup>3</sup>; Reiner Mönig<sup>3</sup>; <sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>The Hong Kong Polytechnic University; <sup>3</sup>Karlsruhe Institute of Technology

**3:00 PM Invited**

**Deformation-based Additive Manufacturing as A Scalable Non-equilibrium Processing Tool:** *Hang Yu*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute And State University

**3:30 PM Invited**

**Ultrastrong and Tough Stainless Steel Fabricated with Novel Additive Manufacturing Method:** *Changquan Lai*<sup>1</sup>; <sup>1</sup>Nanyang Technological University



**4:00 PM Break**

**4:20 PM Invited**

**Grain Growth by Defect Engineering: From Thin Films to Bulk Metal Alloys:** *Matteo Seita*<sup>1</sup>; <sup>1</sup>University of Cambridge

**4:50 PM Invited**

**Solid-state Dewetting in Strongly Anisotropic Systems:** *Maxwell Letoile*<sup>1</sup>; Carl Thompson<sup>2</sup>; <sup>1</sup>Aluminio; <sup>2</sup>MIT

**5:20 PM**

**Ambient-controlled Solid-State Dewetting of Copper and Nickel Thin Films:** *Misong Ju*<sup>1</sup>; Yoon Ah Shin<sup>1</sup>; Maxwell L'Etoile<sup>1</sup>; Baoming Wang<sup>1</sup>; Carl Thompson<sup>1</sup>; Dohee Kim<sup>2</sup>; Jihun Oh<sup>2</sup>; <sup>1</sup>MIT; <sup>2</sup>KAIST

**5:40 PM Concluding Comments**

## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Iron and Steel Production — New Processes

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

**Program Organizers:** Samuel Wagstaff, Oculatus Consulting; Alexandra Anderson, Gopher Resource; Chukwunwike Iloeje, Argonne National Laboratory; Adrian Sabau, Oak Ridge National Laboratory

**Tuesday PM | March 5, 2024**

**Celebration 8 | Hyatt**

**Session Chairs:** Chukwunwike Iloeje, Argonne National Laboratory; Gwendolyn Bracker, UMass Department of Mechanical Engineering

**2:30 PM Introductory Comments**

**2:35 PM**

**Chromium-Nickel-Molybdenum Ferroalloys for Stainless Steel Production via Sulfide Chemistry:** Caspar Stinn<sup>1</sup>; *Antoine Allanore*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**2:55 PM**

**Influence of High Magnetic Fields on Diffusion of C in Fe for Energy-efficient Processing of Steel:** *Ramon Padin-Monroig*<sup>1</sup>; Steven Flynn<sup>1</sup>; Megan Hurley<sup>1</sup>; Zhongwei Li<sup>1</sup>; Luke Wirth<sup>2</sup>; Zachary Tener<sup>3</sup>; Victoria Miller<sup>1</sup>; Dallas Trinkle<sup>2</sup>; Michael Tonks<sup>1</sup>; James Hamlin<sup>1</sup>; Mark Meisel<sup>1</sup>; Michael Kelser<sup>3</sup>; Michele Manuel<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>Oak Ridge National Laboratory

**3:15 PM**

**Thermodynamic Analysis of Vacuum Carbothermal Reduction for Synthesis of Ferrosilicon Alloy from Pickling Sludge:** *Gangqiang Fan*<sup>1</sup>; Jianfen Tan<sup>1</sup>; Qun Yang<sup>1</sup>; Xiaoqian Peng<sup>1</sup>; <sup>1</sup>Chongqing Wangbian Electric (Group) Corp., Ltd.

**3:35 PM**

**Production of Soft Magnetic Composites Using Cold Sintering Technique for Metals:** *Linsea Foster*<sup>1</sup>; Ramakrishnan Rajagopalan<sup>1</sup>; Jennifer Gray<sup>1</sup>; <sup>1</sup>Penn State University

3:55 PM Break

4:10 PM

**Removing the Inclusions in Four-strand Asymmetrical Tundish by Using a Crutch-shaped Baffle:** *Weining Shi*<sup>1</sup>; Mingzai Ye<sup>1</sup>; Hongxing Li<sup>2</sup>; Jun Wang<sup>3</sup>; Qing Fang<sup>4</sup>; cheng yao<sup>5</sup>; <sup>1</sup>Xiangtan Iron & Steel Group Co., Ltd. Steelmaking Plant; <sup>2</sup>Xiangtan Iron & Steel Group Co., Ltd. Steel Research Institute; <sup>3</sup>Xiangtan Iron & Steel Group Co., LTD. Steel Research Institute; <sup>4</sup>Wuhan University of Science and Technology; <sup>5</sup>University of Science and Technology Beijing

4:30 PM

**Study on the Phase Transformation Mechanism of Continuous Casting Mold Flux Controlled by Electric Pulse:** *Xianzheng Si*<sup>1</sup>; Wanlin Wang<sup>1</sup>; Lejun Zhou<sup>1</sup>; <sup>1</sup>Central South University

4:50 PM

**Low Carbon Smelting Practice of Large Blast Furnaces by Using of High Pellet Ratio:** Kai Wang<sup>1</sup>; *Gele Qing*<sup>1</sup>; Jianlong Wu<sup>1</sup>; <sup>1</sup>Shougang Group

5:10 PM

**Utilizing Hybrid Hot-Wire Laser DED to Repair Fractured Surfaces of H-13 Tool Steel:** *Holly Martin*<sup>1</sup>; Aayush Alok<sup>1</sup>; Bharat Yelamanchi<sup>1</sup>; Andrew Prokop<sup>1</sup>; Brian Vuksanovich<sup>1</sup>; John Carballo<sup>1</sup>; Jackie Ruller<sup>1</sup>; Pedro Cortes<sup>1</sup>; <sup>1</sup>Youngstown State University

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## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Materials for Global Development - Metal**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Tuesday PM | March 5, 2024**

**Celebration 14 | Hyatt**

**Session Chairs:** Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute

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2:30 PM Keynote

**Discrete Defect Plasticity and Implications for Dissipation:** *Alan Needleman*<sup>1</sup>; <sup>1</sup>Texas A&M University

3:00 PM Keynote

**Microstructural Black Swans:** *Brad Boyce*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

3:30 PM Keynote

**Review of Fatigue Behavior of High-entropy Alloys:** Shiyi Chen<sup>1</sup>; Xuesong Fan<sup>1</sup>; Hugh Shortt<sup>1</sup>; Baldur Steingrímsson<sup>2</sup>; Weidong Li<sup>1</sup>; *Peter Liaw*<sup>1</sup>; <sup>1</sup>University of Tennessee in Knoxville; <sup>2</sup>Imagars LLC

4:00 PM Break

4:20 PM

**Mechanistic Origin of the Enhanced Strength and Ductility in Mg-rare Earth Alloys:** *Henry Ovri*<sup>1</sup>; Juergen Markmann<sup>2</sup>; Juri Barthel<sup>3</sup>; Maximilian Kruth<sup>3</sup>; Hajo Dieringa<sup>4</sup>; Erica Lilleodden<sup>5</sup>; <sup>1</sup>Helmholtz Zentrum Hereon; <sup>2</sup>Helmholtz Zentrum Hereon; <sup>3</sup>Ernst Ruska-Centre (ER-C 2) Forschungszentrum Juelich GmbH; <sup>4</sup>Helmholtz-Zentrum Hereon; <sup>5</sup>Fraunhofer Institute for Microstructure of Materials and Systems

4:40 PM Invited

**Conjoint Influence of Thermal and Stress Cycling on Functional Fatigue Behavior of the NiTiZr Shape Memory Alloys:** Santosh Sampath<sup>1</sup>; *Srivatsan T S*<sup>1</sup>; <sup>1</sup>Sri Sivasubramaniya Nadar College of Engineering

5:05 PM

**Fatigue Crack Growth Rate Behavior of the Additive Manufactured Nickel-base Superalloy Inconel 718:** Anilchandra Adamane<sup>1</sup>; Bharath Bhushan<sup>1</sup>; Sreekanth Nagar<sup>1</sup>; Sharanabasavaraja J<sup>1</sup>; *Tirumalai Srivatsan*<sup>2</sup>; Manjunatha M<sup>3</sup>; <sup>1</sup>B M S College of Engineering; <sup>2</sup>The University of Akron; <sup>3</sup>CSIR-National Aerospace Laboratories

5:25 PM

**Harnessing the Power of Machine Learning to Solve Global Problems:** Stephen Price<sup>1</sup>; Winston Soboyejo<sup>1</sup>; *Rodica Neamtu*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

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## MATERIALS SYNTHESIS AND PROCESSING

**Measurement and Control of High-temperature Processes – Industrial Applications of Improved Process Control: A Joint Session with Advances in Pyrometallurgy**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

**Program Organizers:** Alexandra Anderson, Gopher Resource; Matthew Zappulla, Los Alamos National Laboratory; Dean Gregurek, RHI Magnesita; Stuart Nicol, Glencore Technology; Kristian Mackowiak, Kingston Process Metallurgy Inc.

Tuesday PM | March 5, 2024

Celebration 5 | Hyatt

**Session Chairs:** Alexandra Anderson, Gopher Resource; Kris Mackowiak, Kingston Process Metallurgy Inc.

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2:30 PM Introductory Comments

2:35 PM

**Zero Waste Processing of Zinc Containing Waste – Example Lead Slag Fuming:** *Juergen Antrekowitsch*<sup>1</sup>; <sup>1</sup>University of Leoben

2:55 PM

**On-line Control, Optimization and Automation of Pierce Smich Converters with FLOGEN CONTOP Expert System:** *Florian Kongoli*<sup>1</sup>; Marcos Henrique Carlos de Souza<sup>2</sup>; Redouane Merdjani<sup>1</sup>; <sup>1</sup>FLOGEN Technologies Inc., Mont-Royal, Canada; <sup>2</sup>FLOGEN Technologies Inc., Sao Paulo, Brazil

3:15 PM

**MPOT® Advanced Measurement and Control Applications in Rotary Furnace Melters:** *Curtis Bermel*<sup>1</sup>; Michael Potesser<sup>1</sup>; <sup>1</sup>MPOT LLC

3:35 PM

**MPOT® Cutting Edge Technology Integration in Old Smelters A Focus on Reverb Melters:** *Curtis Berme1; Michael Potesser1; 1MPOT LLC*

3:55 PM

**An Overview of the Methods to Inspection and Monitor Furnace Refractory Lining; the Various Reasons for Failures and How to Manage the Lining to Have a Continuous Operation:** *Afshin Sadri1; 1Hatch*

4:15 PM Break

4:35 PM

**A Digital Twin for Management of Molten Material Containment in Furnaces:** *Melvin Pong1; Bien Ferrer1; Frans Hannemann1; Afshin Sadri1; Yale Zhang1; 1Hatch*

4:55 PM

**Metallurgical Production Process Improvement with Probes and Measuring Systems:** *Jean-Francois Stumper1; Marvin Schmidt1; Filipe Rodrigues1; Mark Kruessmann1; Marc Flammang1; 1Tmt - Tapping Measuring Tech*

5:15 PM Concluding Comments

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## MECHANICS OF MATERIALS

### Mechanical Behavior at the Nanoscale VII – High Strain Rate Effects

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Tuesday PM | March 5, 2024**  
**Manatee Spring I | Hyatt**

**Session Chairs:** Yu Zou, University of Toronto; Daniel Kiener, Montanuniversität Leoben

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2:30 PM Invited

**High Throughput Multi-Objective Optimization of FCC Complex Concentrated Alloys for Extreme Conditions:** *Raymundo Arroyave1; Mrinalini Mulukutla1; Danial Khatamsaz1; Daniel Salas1; Trevor Hastings1; Daniel Lewis1; Nicole Person1; Wenle Xu1; James Paramore1; Brady Butler; Douglas Allaire1; Ibrahim Karaman1; Raymundo Arroyave1; 1Texas A&M University*

3:00 PM

**What is the Maximum Constant Strain Rate Achievable by a Given Indentation System?:** *Warren Oliver1; Phani Sudharshan2; 1KLA Corporation; 2ARCI*

3:20 PM

**Nanoindentation Testing at High Strain Rates: Bottlenecks and Progress in Instrumentation:** *Benoit Merle1; 1University of Kassel*

3:40 PM

**High Strain Rate Nanoindentation – Recent Advances and Perspectives:** *Remo Widmer1; Nicholas Randall1; Renato Pero1; 1Alemnis AG*

**4:00 PM Break**

**4:20 PM**

**Exploring Micro-/Nano- Mechanical Behavior at Extreme Strain Rates:** *Lalith Bhaskar*<sup>1</sup>; Bárbara Bellón<sup>1</sup>; Dipali Sonawane<sup>1</sup>; Hendrik Holz<sup>1</sup>; Damian Frey<sup>2</sup>; Laszlo Petho<sup>3</sup>; Johann Michler<sup>3</sup>; Gaurav Mohanty<sup>4</sup>; Gerhard Dehm<sup>1</sup>; Rajaprakash Ramachandramoorthy<sup>1</sup>; <sup>1</sup>Max-Planck-Institut für Eisenforschung; <sup>2</sup>Alemnis AG; <sup>3</sup>Empa Swiss Federal Laboratories for Materials Science and Technology; <sup>4</sup>Tampere University

**4:40 PM**

**Dynamic Testing of Nanoporous Gold Adhesive Strength Using a Shock Tube:** *Jasdeep Singh*<sup>1</sup>; Hooman Rahmani<sup>1</sup>; Sean Cooper<sup>1</sup>; Eric Petersen<sup>1</sup>; Ankit Srivastava<sup>1</sup>; Michael Demkowicz<sup>1</sup>; <sup>1</sup>Texas A&M University

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## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling – Session II

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

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

**Tuesday PM | March 5, 2024**

**Barrel Spring I | Hyatt**

**Session Chair:** Kaitlynn Fitzgerald, Sandia National Laboratory

**2:30 PM**

**Effect of Grain Interaction on the Evolution of Cube Texture during Thermo-mechanical Processing of Medium to High SFE FCC Metals:** *Supriyo Chakraborty*<sup>1</sup>; Chaitali Patil<sup>2</sup>; Stephen Niezgodá<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>University of Michigan

**2:50 PM**

**A Mesoscale-continuum Modeling Method to Predict the Acceleration of Laser-driven Flyers:** *Ching Chen*<sup>1</sup>; Roshan Sebastian<sup>1</sup>; Jacob Diamond<sup>2</sup>; Kalia Ramesh<sup>2</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Johns Hopkins University

**3:10 PM**

**A Study on Slip Band Evolution and Its Relationship with Local Dislocation Glide Resistance in Polycrystalline Materials:** *Chamara Herath*<sup>1</sup>; Hubert Bilan<sup>1</sup>; Kavindu Wijesinghe<sup>1</sup>; Janith Wann<sup>1</sup>; Ajit Achuthan<sup>1</sup>; <sup>1</sup>Clarkson University

**3:30 PM**

**Crystal Plasticity Modeling of Microstructure Clones:** *Hojun Lim*<sup>1</sup>; Kaitlynn Fitzgerald<sup>1</sup>; Nicole Aragon<sup>1</sup>; Tim Ruggles<sup>1</sup>; William Gilliland<sup>1</sup>; Jay Carroll<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**3:50 PM**

**Calcium Dependent Twin Type Selection in Texture Weakened Mg Alloys:**

*Mohammed Said*<sup>1</sup>; James Ball<sup>1</sup>; Emily Jenkins<sup>1</sup>; Himanshu Vashishtha<sup>1</sup>; David Collins<sup>1</sup>;

<sup>1</sup>University of Birmingham

**4:10 PM Break**

**4:20 PM**

**A Concurrent Atomistic-continuum Study on the Peierls Stress of Screw**

**Dislocations in BCC Iron:** *Jiaqi Sun*<sup>1</sup>; Yang Li<sup>1</sup>; Rigelesaiyin Ji<sup>2</sup>; Liming Xiong<sup>2</sup>; Youping

Chen<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Iowa State University

**4:40 PM**

**Defect-based Damage Model via a Mesoscale Defect Dynamics Modeling:** Phu

Cuong Nguyen<sup>1</sup>; *Ill Ryu*<sup>1</sup>; <sup>1</sup>University of Texas at Dallas

**5:00 PM**

**How Can We Benchmark Discrete Dislocation Dynamics? – A Comparison**

**to Movies of Dislocation Structure Evolution Obtained from Dark-field X-ray**

**Microscopy:** *Felix Frankus*<sup>1</sup>; Yash Pachaury<sup>2</sup>; Henning Friis Poulsen<sup>1</sup>; Anter El-Azab<sup>2</sup>;

Grethe Winther<sup>1</sup>; <sup>1</sup>Technical University of Denmark; <sup>2</sup>Purdue University

**5:20 PM**

**Uncertainties in Estimating Hardening Model Parameters and Their Influence**

**on the Flow Stress and the Hole Expansion Tests of Dual-Phase (DP600) Steel**

**Specimens:** *Dilip Banerjee*<sup>1</sup>; Kali Prasad<sup>2</sup>; Deepak Kumar<sup>2</sup>; Hariharan Krishnaswamy<sup>2</sup>;

<sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>IIT Madras

**5:40 PM**

**Microstructure Clones:** *Kaitlynn Fitzgerald*<sup>1</sup>; Jay Carroll<sup>1</sup>; Tim Ruggles<sup>1</sup>; William

Gilliland<sup>1</sup>; Hojun Lim<sup>1</sup>; Philip Noell<sup>1</sup>; <sup>1</sup>Sandia National Laboratory

## LIGHT METALS

### **Melt Processing, Casting and Recycling – Melt Quality and Solidification I**

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

**Program Organizers:** Anne Kvithyld, SINTEF; Tao Wang, Rio Tinto; Samuel

Wagstaff, Oculatus Consulting

**Tuesday PM | March 5, 2024**

**Windermere Y-1 | Hyatt**

**Session Chairs:** Pascal Gauthier, Riotinto Aluminium ARDC; Alexandre Maltais,

Rio Tinto

**2:30 PM**

**On the Importance of Measurement and Process Uncertainty in Certifying the**

**Quality of Aluminum-based Products:** *Varuzan Kevorkijan*<sup>1</sup>; Sandi Žist<sup>1</sup>; Lucija

Skledar<sup>1</sup>; <sup>1</sup>Impol R in R d.o.o.

**2:55 PM**

**Thermomechanical Modeling on AirSlip® Billet DC Casting of High-strength**

**Crack-prone Aluminum Alloys:** *Bin Zhang*<sup>1</sup>; Gary Grealy<sup>1</sup>; <sup>1</sup>Wagstaff Inc.

**3:20 PM**

**A Passive Approach to Butt Swell Management:** *Samuel Wagstaff*<sup>1</sup>; Robert

Wagstaff<sup>1</sup>; Brent Opdendries<sup>1</sup>; Alexandros Anestis<sup>2</sup>; Spyros Pinis<sup>2</sup>; George Pashos<sup>3</sup>;

Andreas Mavroudis<sup>2</sup>; Epameinondas Xenos<sup>2</sup>; <sup>1</sup>Oculatus Consulting; <sup>2</sup>Elval; <sup>3</sup>Elkeme

**3:45 PM**

**Characterization of Cr-Bearing Intermetallics Causing Pinhole Formation in Twin Roll Cast 8079 Aluminum Alloy Thin Foils:** *Yusuf Ozcetin*<sup>1</sup>; Ali Ulus<sup>1</sup>; Onur Birbasar<sup>1</sup>; Feyza Denizli<sup>1</sup>; <sup>1</sup>Asas Aluminum

**4:10 PM Break**

**4:25 PM**

**Corrosion of EN-AW 3105 Aluminum Strip Produced via Twin-roll Casting With a Steel/Copper Roll Pair:** *Seval Aksoy Aydın*<sup>1</sup>; *Cemil Isiksacan*<sup>2</sup>; Ece Harputlu<sup>2</sup>; Hikmet Kayaçetin<sup>2</sup>; Erdem Atar<sup>1</sup>; <sup>1</sup>Gebze Technical University; <sup>2</sup>Assan Alüminyum

**4:50 PM**

**In Situ Experimental Study of Nucleation and Growth of Fe-Al Based Intermetallics: An Insight for Designing Next-generation Recycling Friendly Aluminium Alloys:** *Georges Salloum-Abou-Jaoude*<sup>1</sup>; Kuan Hong Cheong<sup>1</sup>; Silvere Akamatsu<sup>2</sup>; Philippe Jarry<sup>1</sup>; Sabine Bottin-Rousseau<sup>2</sup>; <sup>1</sup>Constellium C-Tec; <sup>2</sup>Sorbonne Université

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments II – Mechanical Environment

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Tuesday PM | March 5, 2024**  
**Bayhill 19 | Hyatt**

**Session Chair:** Jessica Krogstad, University of Illinois Urbana-Champaign

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**2:30 PM Invited**

**High Temperature Deformation of Metal-oxide Interfaces Characterized by In Situ TEM:** *Shen Dillon*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**2:55 PM Invited**

**Defect Engineering of Structural and Chemical Short-range Order to Enable Materials for Extreme Environments:** *Timothy Rupert*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**3:20 PM Invited**

**Extreme Strengthening of Ferritic (R)M54(R) Alloy via Hierarchical Microstructural Engineering:** Joshua Edwards<sup>1</sup>; Thomas Kozmel<sup>2</sup>; Jeffrey Lin<sup>3</sup>; *Suveen Mathaudhu*<sup>4</sup>; <sup>1</sup>University of California, Riverside and Colorado School of Mines; <sup>2</sup>Questek Innovations Llc; <sup>3</sup>Questek Innovations, LLC; <sup>4</sup>Colorado School of Mines

**3:45 PM Invited**

**Direct Observation of Extreme Mechanical Energy Transfer and Healing of Damage from Repeat Shock-loading in Stabilized Nanocrystalline Cu-Ta Alloys:** *Anit Giri*<sup>1</sup>; Phil Jannotti<sup>1</sup>; Chad Hornbuckle<sup>1</sup>; Kiran Solanki<sup>2</sup>; Naresh Thadhani<sup>3</sup>; Greg

Kennedy<sup>3</sup>; Nicholas Lorenzo<sup>1</sup>; Kris Darling<sup>1</sup>; <sup>1</sup>DEVCOM Army Research Laboratory; <sup>2</sup>Arizona State University; <sup>3</sup>Georgia Institute of Technology

#### 4:10 PM Break

#### 4:30 PM 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

#### 4:55 PM Invited

**Mechanical Characterization of Thin Films via High-throughput Membrane Deflection Experiments:** Hojang Kim<sup>1</sup>; Jae-Hoon Choi<sup>1</sup>; Zhuo Feng Lee<sup>1</sup>; *Gi-Dong Sim*<sup>1</sup>; <sup>1</sup>KAIST

#### 5:20 PM

**Micro-tensile Behavior of Niobium Single Crystals at Cryogenic Temperatures:** *Seok-Woo Lee*<sup>1</sup>; Shuyang Xiao<sup>1</sup>; Gyuho Song<sup>1</sup>; <sup>1</sup>University of Connecticut

#### 5:40 PM Invited

**Relative Mobility of Screw versus Edge Dislocations Controls the Ductile-to-Brittle Transition in Metals:** *Weizhong Han*<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University

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### ADVANCED CHARACTERIZATION METHODS

#### **Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques – Session II**

**Sponsored by:** TMS Structural Materials 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

**Tuesday PM | March 5, 2024**  
**Blue Spring I | Hyatt**

**Session Chairs:** Rakesh Kamath, Argonne National Laboratory; Sarshad Rommel, University of Connecticut; Fan Zhang, NIST

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#### 2:30 PM Invited

**HPC+AI@Edge Enabled Real-Time Materials Characterization:** *Mathew Cherukara*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 2:55 PM

**Data-driven Discovery of Dynamics from Time-resolved Coherent Scattering:** Nina Andrejevic<sup>1</sup>; Tao Zhou<sup>1</sup>; Qingteng Zhang<sup>1</sup>; Suresh Narayanan<sup>1</sup>; *Mathew Cherukara*<sup>1</sup>; Maria Chan<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 3:15 PM

**Understanding Relaxation Dynamics Beyond Equilibrium Using AI-Informed X-ray Photon Correlation Spectroscopy:** *James Horwath*<sup>1</sup>; Xiao-Min Lin<sup>1</sup>; Hongrui He<sup>1</sup>; Qingteng Zhang<sup>1</sup>; Eric Dufresne<sup>1</sup>; Miaoqi Chu<sup>1</sup>; Subramanian Sankaranarayanan<sup>1</sup>; Wei Chen<sup>1</sup>; Suresh Narayanan<sup>1</sup>; *Mathew Cherukara*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 3:35 PM Invited

**Streamlining Engineering Diffraction Analysis Using the MAUD Interface Language Kit (MILK):** *Daniel Savage*<sup>1</sup>; Zhangxi Feng<sup>1</sup>; Christopher Biber<sup>1</sup>; Michael



McKerns<sup>1</sup>; Sven Vogel<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 4:00 PM Break

#### 4:15 PM

**Galaxy: A Critical Framework for Large Data Volumes and Data-intensive Processing in the Synchrotron World:** *Kelly Nygren<sup>1</sup>; Werner Sun<sup>1</sup>; Rolf Verberg<sup>1</sup>; Keara Soloway<sup>1</sup>; Valentin Kuznetsov<sup>1</sup>; Devin Bougie<sup>1</sup>; Matthew Miller<sup>1</sup>; Katherine Shanks<sup>1</sup>; <sup>1</sup>Cornell University*

#### 4:35 PM

**Enabling Uninterrupted In-situ X-ray Experiments through Rapid Data Feedback and On-the-fly Experiment Optimization:** *Sven Gustafson<sup>1</sup>; Paul Dawson<sup>1</sup>; Matthew Miller<sup>1</sup>; Kelly Nygren<sup>1</sup>; <sup>1</sup>Cornell University*

#### 4:55 PM Invited

**New Strong and Ductile Titanium-oxygen-iron Alloys Enabled by AM and Insights from Multiscale Microscopy:** *Simon Ringer<sup>1</sup>; <sup>1</sup>The University of Sydney*

#### 5:20 PM

**Quantitative 2D and 3D Characterization of Precipitates Microstructure in the Additively Manufactured Titanium Alloy:** *Sydney Fields<sup>1</sup>; Deepak Pillai<sup>1</sup>; Dian Li<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas*

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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:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Tuesday PM | March 5, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Sriswaroop Dasari, Idaho National Laboratory

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#### 2:30 PM Invited

**Influence of Cr/Ni Ratio on Phase Stability and  $\gamma$ -phase Precipitation Kinetics in CrMnFeCoNi High-entropy Alloys:** *Guillaume Laplanche<sup>1</sup>; <sup>1</sup>Ruhr-University Bochum*

#### 3:00 PM

**Designing CrMnFeCoNi Multi-principal Element Alloys with Shape Memory Effect:** *Je In Lee<sup>1</sup>; Jinsurang Lim<sup>1</sup>; Hyun Seok Oh<sup>2</sup>; Eun Soo Park<sup>3</sup>; Koichi Tsuchiya<sup>4</sup>; <sup>1</sup>Pusan National University; <sup>2</sup>University of Wisconsin–Madison; <sup>3</sup>Seoul National University; <sup>4</sup>National Institute for Materials Science*

#### 3:20 PM

**Effect of Heat Treatment on Spinodal Morphology in Cu-rich High Entropy Alloys:** *Deeksha Mishra<sup>1</sup>; Shavi Agarwal<sup>2</sup>; Priyanka Saini<sup>3</sup>; Aditya Balpande<sup>1</sup>; Lakshmi Ramasubramanian<sup>3</sup>; Jaiveer Singh<sup>1</sup>; Saurabh Nene<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur; <sup>2</sup>Indian Institute of Science, Bangalore; <sup>3</sup>Indian Institute of Technology, Delhi*

**3:40 PM**

**Effect of Annealing Temperature on the Structural and Mechanical Properties of the Multi-principal Element Alloy W5Mo15Fe40Ni40:** *Zahidur Rahman*<sup>1</sup>; Michael J. Detisch<sup>1</sup>; Thomas John Balk<sup>1</sup>; <sup>1</sup>University of Kentucky

**4:00 PM Break****4:20 PM Invited**

**Phase Transformation Pathways in B2/bcc Refractory HEAs:** *Zachary Kloenne*<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Brian Welk<sup>1</sup>; Shalini Roy Koneru<sup>1</sup>; Kamalnath Kadirvel<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>Ohio State University

**4:50 PM**

**Phase Stability in Refractory High Entropy Superalloys:** *Vishal Soni*<sup>1</sup>; SriSwaroop Dasari<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Advika Chesetti<sup>1</sup>; Oleg Senkov<sup>2</sup>; Daniel Miracle<sup>3</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>MRL Materials Resources LLC; <sup>3</sup>Air Force Research Laboratory

**5:10 PM**

**Effect of Zr and V Additions to the Refractory Multi-principal Element MoNbTi System in Terms of Resulting Microstructure and Radiation Resistance:** Djamel Kaoumi<sup>1</sup>; *Saikumaran Ayyappan*<sup>1</sup>; Lucia Hurtado<sup>1</sup>; Geoffrey Beausoleil<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory

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**MATERIALS SYNTHESIS AND PROCESSING**

**Powder Materials Processing and Fundamental Understanding – Sintering Assisted Additive Manufacturing**

**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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

**Tuesday PM | March 5, 2024**

**Celebration 9 | Hyatt**

**Session Chairs:** Marco Zago, University of Trento; Elisa Torresani, San Diego State university

**2:30 PM**

**Anisotropy in the Binder Jetting and Sintering Process of 316 Stainless Steel:** Runjian Jiang<sup>1</sup>; *Thomas Grippi*<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

**2:50 PM Invited**

**Influence of Printing Parameters on Sintering Shrinkage and its Anisotropy in Binder Jetting 3D Printing of AISI 316L Steel:** *Alberto Molinari*<sup>1</sup>; Giacomo Segata<sup>1</sup>; Marco Zago<sup>1</sup>; Martin Regolini<sup>2</sup>; Matteo Perina<sup>2</sup>; Elisa Torresani<sup>3</sup>; <sup>1</sup>University of Trento; <sup>2</sup>Mimest SpA; <sup>3</sup>San Diego State University

**3:20 PM Invited**

**Plateau-Rayleigh Instability with a Grain Boundary Twist:** *Fadi Abdeljawad*<sup>1</sup>; Omar Hussein<sup>1</sup>; Keith Coffman<sup>2</sup>; Khalid Hattar<sup>3</sup>; Shen Dillon<sup>4</sup>; <sup>1</sup>Clemson University; <sup>2</sup>University of Illinois; <sup>3</sup>University of Tennessee; <sup>4</sup>University of California, Irvine

**3:50 PM**

**Binder Jet Additive Manufacturing of Cemented Tungsten Carbide: Phase Evolution and Mechanical Response:** Kunal Patel<sup>1</sup>; Sameehan Joshi; Rajarshi Banerjee<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University of North Texas

**4:10 PM Break**

**4:20 PM Invited**

**Keeping Dimensional and Geometrical Precision of Holes in 316L Parts Produced by Metal Binder Jetting – Study of the Influence of Size and Inclination:** Marco Zago<sup>1</sup>; Marco Mariani<sup>2</sup>; Nora Lecis<sup>2</sup>; Ilaria Cristofolini<sup>1</sup>; <sup>1</sup>University of Trento; <sup>2</sup>Politecnico di Milano

**4:50 PM Invited**

**Development of Powder Materials for Metal AM:** Eduard Hryha<sup>1</sup>; <sup>1</sup>Chalmers University of Tech

**5:20 PM**

**Tungsten Carbide with Low Metallic Binder Contents via Binder Jetting:** Zhuqing Wang<sup>1</sup>; Paul Prichard<sup>1</sup>; Matthew Bonidie<sup>1</sup>; <sup>1</sup>Kennametal

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications – Additive Manufacturing & 3D Printing**

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

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

**Tuesday PM | March 5, 2024**

**Orlando L | Hyatt**

**Session Chairs:** Pooran Joshi, Elbit Systems of America; Bruno Azeredo, Arizona State University

**2:30 PM Invited**

**Additive Manufacturing of Soft and Permanent Magnets for Electrical Machines:** Mariappan Paranthaman<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**2:55 PM Invited**

**Binder-based 3d Printing of High-surface Area Copper Electrodes:** Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University

**3:20 PM**

**On the Magnetic Behaviours of Laser Powder Bed Fabricated Ni-Mn-Ga Magnetic Shape Memory Alloys:** Anastassia Milleret<sup>1</sup>; Ville Laitinen<sup>2</sup>; Nour-eddine Fenineche<sup>3</sup>; Kari Ullakko<sup>2</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>LUT University; <sup>3</sup>UTBM

**3:40 PM Invited**

**Rubbery Electronics: Electronic Devices and Circuits Entirely Based on Rubbers:** Cunjiang Yu<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**4:05 PM Break**

**4:25 PM Invited**

**Dynamic 3D Printing of Structure Color:** *Ying Diao*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign

**4:50 PM**

**3D Printed Holographic Fresnel Lenses for Sensing Applications:** Murad Ali<sup>1</sup>; *Murad Ali*<sup>1</sup>; <sup>1</sup>Khalifa University

**5:10 PM**

**Advancing Coaxial Direct Ink Writing for Flexible Electronics Manufacturing:** *Fahrettin Kilic*<sup>1</sup>; Derrick Banerjee<sup>1</sup>; Chih-Hung Chang<sup>2</sup>; Curtis Hill<sup>3</sup>; Jennifer Jones<sup>3</sup>; Edward Sabolsky<sup>1</sup>; Konstantinos Sierros<sup>1</sup>; <sup>1</sup>West Virginia University; <sup>2</sup>Oregon State University; <sup>3</sup>NASA Marshall Space Flight Center

**5:30 PM**

**Design and Fabrication of Nacre-inspired, Polymer-based Composites with Enhanced Tear Resistance and Toughness by a Multi-material 3D Printer:** *Jie Yang*<sup>1</sup>; Po-Yu Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

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## MATERIALS SYNTHESIS AND PROCESSING

**Process Metallurgy and Environmental Engineering: An EPD Symposium in Honor of Takashi Nakamura – Future Direction of Non-Ferrous Metal Smelting II**

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

**Program Organizers:** Takanari Ouchi, University of Tokyo; Gerardo Alvear Flores, CaEng Associates; Etsuro Shibata, Tohoku University; Leandro Andres Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

**Tuesday PM | March 5, 2024**

**Celebration 6 | Hyatt**

**Session Chairs:** Gerardo Flores, CaEng Associates; Leandro Voisin, University of Chile

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**2:30 PM Keynote**

**Metallurgy in a Low-carbon World: A Review of New Technology Developments:** *Phillip Mackey*<sup>1</sup>; <sup>1</sup>P.J. Mackey Technology

**3:00 PM Keynote**

**Advances in Hydrometallurgical Copper Extraction: New Developments:** *David Dreisinger*<sup>1</sup>; <sup>1</sup>University of British Columbia

**3:30 PM Invited**

**Arsenic Reduction from Copper Resources by Mineral Beneficiation Technique:** *Taro Kamiya*<sup>1</sup>; Tatsuhiro Ono<sup>1</sup>; Refilwe Magwaneng<sup>1</sup>; Taisuke Sakakibara<sup>1</sup>; Koichi Hashimoto<sup>1</sup>; Hisatoshi Furuya<sup>1</sup>; Kazuya Sunada<sup>1</sup>; <sup>1</sup>Japan Organization for Metals and Energy Security

**3:50 PM Break**

**4:10 PM Invited**

**Zinc Oxide Production from EAF Dust Using Electrothermic Furnace at Onahama Refinery:** *Ishibashi Katsuyuki*<sup>1</sup>; Yamaguchi Takuya<sup>1</sup>; Numata Kenji<sup>1</sup>; <sup>1</sup>Toho Zinc Co.,

Ltd.

**4:30 PM**

**Obtaining Lead-silver by Carbothermal Reduction of Concentrates from the Karachipampa Metallurgical Company:** *Richard Chipana*<sup>1</sup>; <sup>1</sup>UMSA

**4:50 PM**

**Pilot Trials on Zinc Fuming with Hydrogen Gas:** *Ida Heintz*<sup>1</sup>; Magnus Heintz<sup>1</sup>; Magnus Ek<sup>2</sup>; David Muren<sup>3</sup>; Jill Sundberg<sup>1</sup>; <sup>1</sup>Swerim AB; <sup>2</sup>Boliden AB; <sup>3</sup>Linde AB

**5:10 PM**

**Electro-winning in Basic Medium, for the Recovery of Tin from By-products Generated by the Harris I Process, of the Karachipampa Metallurgical Company:** *Maria Quispe Ticona*<sup>1</sup>; <sup>1</sup>Universidad Mayor de San Andres

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## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Separation and Purification

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

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

**Tuesday PM | March 5, 2024**  
**Celebration 3 | Hyatt**

**Session Chairs:** Kerstin Forsberg, KTH Royal Institute of Technology; Gisele Azimi, University of Toronto; Shafiq Alam, University of Saskatchewan

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**2:30 PM**

**Innovative Solvent Extraction Processes for the Separation of Indium, Germanium and Gallium from Iron:** *Toni Helbig*<sup>1</sup>; *Norman Kelly*<sup>1</sup>; *Ajay Patil*<sup>1</sup>; <sup>1</sup>HZDR, HIF

**2:50 PM**

**Separation of Critical Metals Using Supported Liquid Membranes PTFE-Cyanex 272:** *Amilton Botelho Junior*<sup>1</sup>; *Ana Carolina Miyashita*<sup>1</sup>; *Jorge Tenório*<sup>1</sup>; *Denise Espinosa*<sup>1</sup>; <sup>1</sup>University of Sao Paulo

**3:10 PM**

**Solvent Extraction of Fe<sup>3+</sup> with 2-Octanol from Wastewater after Gallium Recovery:** *Zhou Xiaozhou*<sup>1</sup>; <sup>1</sup>Central South University

**3:30 PM Invited**

**Manipulating Iron Precipitation and Gold Deposition during Pressure Oxidation:** *James Vaughan*<sup>1</sup>; *Peter Legge*<sup>1</sup>; *James Gudgeon*<sup>1</sup>; *Hong (Marco) Peng*<sup>1</sup>; <sup>1</sup>University of Queensland

**3:50 PM Break**

**4:10 PM**

**Selective Precipitation of Valuable Metals from Steel Slag Leach Liquor: Experimental and Theoretical Approaches:** *Jihye Kim*<sup>1</sup>; *Gisele Azimi*<sup>2</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>University of Toronto

4:30 PM

**Purification of an Indigenous Molybdenite for Enhanced Steel Production:** *Alafara Baba*<sup>1</sup>; Mamata Mohapatra<sup>2</sup>; Christianah Adeyemi<sup>3</sup>; Abdul Ganiyu Alabi<sup>4</sup>; Rasheed Agava<sup>5</sup>; Jimoh Abdul<sup>6</sup>; Bernard Ozigi<sup>5</sup>; <sup>1</sup>University of Ilorin; <sup>2</sup>CSIR-IMMT, Bhubaneswar; <sup>3</sup>Federal Polytechnic, Offa; <sup>4</sup>Kwara State University, Malete; <sup>5</sup>National Agency for Science and Engineering Infrastructure (NASENI); <sup>6</sup>Kwara State Polytechnic, Ilorin

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2024 — Tantalum-containing Alloys and General Contributions

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

**Program Organizers:** Christopher Thom, Rhenium Alloys, Inc.; Wolfgang Pantleon, Technical University of Denmark; Michael Kirka, Oak Ridge National Laboratory; Gaoyuan Ouyang, Ames Laboratory; Marie Charpagne, University of Illinois; Eric Taleff, University of Texas at Austin; Thomas Bieler, Michigan State University; John Perepezko, University of Wisconsin-Madison

Tuesday PM | March 5, 2024  
Bayhill 18 | Hyatt

**Session Chair:** Eric Taleff, University of Texas at Austin

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2:30 PM

**Understanding the Role of Thermally Activated Dislocation Motion on the Brittle to Ductile Transition in BCC Metals:** 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

2:50 PM

**High Temperature Deformation of Refractory Alloys:** *Samuel Kuhr*<sup>1</sup>; Todd Butler<sup>1</sup>; Byron McArthur<sup>1</sup>; Oleg Senkov<sup>2</sup>; Satish Rao<sup>2</sup>; Dan Miracle<sup>1</sup>; Noah Philips<sup>3</sup>; <sup>1</sup>Air Force Research Laboratory; <sup>2</sup>Materials Resources, LLC; <sup>3</sup>ATI Specialty Alloys and Components

3:10 PM

**Development of a Cr-Mo-Si Refractory Metal Alloy for High (>1100°C) Temperature Service:** *Lisa Koliotassis*<sup>1</sup>; Emma M. H. White<sup>1</sup>; Mathias C. Galetz<sup>1</sup>; <sup>1</sup>DECHEMA-Forschungsinstitut

3:30 PM

**Phase Stability in the Tantalum-nitrogen System From First Principles:** *Jeremiah Thomas*<sup>1</sup>; Anton Van der Ven<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara

3:50 PM

**Destructive Oxidation of Ta and its Alloys at Temperatures up to 1000 °C:** *Christopher Finfrock*<sup>1</sup>; Zahra Ghanbari<sup>1</sup>; Norm Bartelt<sup>1</sup>; Peter Sharma<sup>1</sup>; Josh Sugar<sup>1</sup>; Michael Rene Lopez-Duran<sup>1</sup>; Charles Robino<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

4:10 PM Break

4:30 PM

**Influence of Doping on the Scale Growth and Oxidation Resistance of CrTaO<sub>4</sub> Forming Alloys:** *Fabian Lanoy*<sup>1</sup>; Emma White<sup>1</sup>; Björn Schäfer<sup>2</sup>; Bronislava Gorr<sup>2</sup>; Mathias Galetz<sup>1</sup>; <sup>1</sup>DECHEMA Research Institute; <sup>2</sup>Karlsruhe Institute of Technology

4:50 PM

**Alloy Designs and Manufacturing of High Temperature Mo-Si-B Alloys:** *John Perepezko*<sup>1</sup>; Dan Thoma<sup>1</sup>; Longfei Liu<sup>1</sup>; Fan Zhang<sup>2</sup>; Liam Wood<sup>1</sup>; Phalgun Nelaturu<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Computherm LLC

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## NUCLEAR MATERIALS

### **Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Seaborg Institute Informational Session**

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Tuesday PM | March 5, 2024**  
**Regency P | Hyatt**

**Session Chairs:** Don Wood, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Gauthier Deblonde, Lawrence Livermore National Laboratory; Rory Kennedy, GTSI - Idaho National Laboratory; Zachary Levin, Oak Ridge National Laboratory

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2:30 PM Panel Discussion

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## MECHANICS OF MATERIALS

### **Structure-Property Relationships of Bulk Metallic Glasses — Glass-Forming Ability, Glass Transition, Crystallization**

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Tuesday PM | March 5, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chair:** Robert Maass, Federal Institute of Materials Research and Testing (BAM)

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2:30 PM Invited

**On the Size Dependent Vitrification of Metallic Glasses:** *Isabella Gallino*<sup>1</sup>; <sup>1</sup>Berlin Institute of Technology

2:55 PM

**Transition from Collective to Individual Atomic Transport in Nanosized Amorphous Metals:** *Sungwoo Sohn*<sup>1</sup>; Najia Liu<sup>2</sup>; Minyoung Na<sup>3</sup>; Gihoon Park<sup>3</sup>; Arindam Raj<sup>1</sup>; Guannan Liu<sup>1</sup>; Sebastian Kube<sup>4</sup>; Fusen Yuan<sup>5</sup>; Yanhui Liu<sup>5</sup>; Jan Schroers<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>Northwestern University; <sup>3</sup>KIST; <sup>4</sup>University of California Santa Barbara; <sup>5</sup>Chinese Academy of Sciences

**3:15 PM**

**In-situ Processing of Metallic Glasses via Fast Scanning Calorimetry:** *Yonghao Sun*<sup>1</sup>; <sup>1</sup>The Chinese Academy of Sciences

**3:35 PM**

**Devitrification, Phase Transformations and Properties of Rapidly Annealed Metallic Glasses:** *Ivan Kaban*<sup>1</sup>; <sup>1</sup>Leibniz IFW Dresden

**3:55 PM Break**

**4:15 PM Invited**

**Strain-enhanced Crystallization of Amorphous Hard-sphere Aggregates in Colloidal Gels:** *Zhencheng Jiang*<sup>1</sup>; *David Weitz*<sup>1</sup>; *Frans Spaepen*<sup>1</sup>; <sup>1</sup>Harvard University

**4:40 PM**

**The L-G Phase Transition in Binary Cu-Zr Metallic Liquids:** *Qi An*<sup>1</sup>; *Yidi Shen*<sup>1</sup>; *William Johnson*<sup>2</sup>; *Konrad Samwer*<sup>3</sup>; *Sydney Corona*<sup>2</sup>; *William Goddard*<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Caltech; <sup>3</sup>University of Goettingen

**5:00 PM**

**Novel Nucleation Model for Primary Crystallization in Al-based Metallic Glass:** *Tianrui Duan*<sup>1</sup>; *John Perepezko*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**5:20 PM**

**From Metallic Liquids to Metallic Glasses: In-situ Insights from Ultrafast Synchrotron X-ray Diffraction:** *Martin Stiehler*<sup>1</sup>; *Mark Jolly*<sup>1</sup>; *Konstantinos Georgarakis*<sup>1</sup>; <sup>1</sup>Cranfield University

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## MATERIALS SYNTHESIS AND PROCESSING

**Towards a Future of Sustainable Production and Processing of Metals and Alloys – Sustainable Manufacturing: Digitization and Hydrogen**

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

**Program Organizers:** *Arun Devaraj*, Pacific Northwest National Laboratory; *Dierk Raabe*, Max-Planck Institute; *Suhas Eswarappa Prameela*, Massachusetts Institute of Technology (MIT); *Leora Dresselhaus-Marais*, Stanford University; *Petrus Pistorius*, Carnegie Mellon University

**Tuesday PM | March 5, 2024**

**Celebration 4 | Hyatt**

**Session Chairs:** *Petrus Pistorius*, Carnegie Mellon University; *Tanvi Ajantiwalay*, Pacific Northwest National Laboratory

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**2:30 PM Introductory Comments**

**2:35 PM**

**Advancing Sustainability in the Metallurgical Industry through Innovation and Digitalization:** *Elien Haccuria*<sup>1</sup>; *Karolien Vasseur*<sup>1</sup>; *Ryohei (Hachi) Yagi*<sup>2</sup>; <sup>1</sup>Umicore Nv; <sup>2</sup>Umicore

**2:55 PM**

**Environmentally Friendly Synthesis of Anhydrous Rare Earth Fluorides Derived from e-wastes for Rare-earth Metallization:** *Anirudha Karati*<sup>1</sup>; *Ikenna Nlebedim*<sup>1</sup>; *Denis Prodius*<sup>1</sup>; <sup>1</sup>Critical Materials Institute



**3:15 PM**

**Identifying Strong Hydrogen Trapping Site Induced by Deformation in Pearlitic Steels:** Zehao Li<sup>1</sup>; *Taisuke Sasaki*<sup>1</sup>; Rintaro Ueji<sup>1</sup>; Yuuji Kimura<sup>1</sup>; Akinobu Shibata<sup>1</sup>; Tadakatsu Ohkubo<sup>1</sup>; Kazuhiro Hono<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

**3:35 PM**

**High-resolution Hydrogen Mapping for Understanding Hydrogen Interaction with Steel Microstructure:** Pang-Yu Liu<sup>1</sup>; Ranming Niu<sup>1</sup>; Patrick Burr<sup>2</sup>; *Yi-Sheng Chen*<sup>1</sup>; Julie Cairney<sup>1</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>The University of New South Wales

**3:55 PM Break**

**4:15 PM**

**Suppressing Surface Hot Shortness in Sheet Production from High Cu Containing Recycled Steels Using Metal Peeling:** *Ravi Srivatsa Bindiganavile Narasimhan*<sup>1</sup>; Prabhakar Pagilla<sup>1</sup>; Dinakar Sagapuram<sup>1</sup>; <sup>1</sup>Texas A&M University

**4:35 PM**

**Solid-state Recycling of Aluminum Alloys, an Innovative Process for Enhanced Sustainability:** *Xukai Zhang*<sup>1</sup>; Théo Duchateau<sup>1</sup>; Lola Lilensten<sup>1</sup>; Mathilde Laurent Brocq<sup>2</sup>; André Schulze<sup>3</sup>; A. Erman Tekkaya<sup>3</sup>; <sup>1</sup>PSL Research University, Chimie ParisTech, Institut de Recherche de Chimie Paris; <sup>2</sup>Université Paris-Est Créteil, CNRS, ICMPE; <sup>3</sup>Institute of Forming Technology and Lightweight Components, TU Dortmund University

**4:55 PM**

**Sustainable Production of Chromite Pellets: Enhancing Pre-reduction Efficiency with Methane-hydrogen Gas Mixtures:** *Shaowen Wu*<sup>1</sup>; Yanling Zhang<sup>2</sup>; <sup>1</sup>University Science and Technology of Beijing; <sup>2</sup>University of Science and Technology Beijing

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### 2D Materials – Preparation, Properties, Modeling & Applications – Processing, Characterization & Applications II

**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; Ramana Chintalapalle, University of Texas at El Paso

**Wednesday AM | March 6, 2024**  
**Celebration 16 | Hyatt**

**Session Chairs:** Ritesh Sachan, Oklahoma State University; Ramana Chintalapalle, University of Texas at El Paso

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**8:30 AM Introductory Comments**

**8:40 AM**

**Novel 2D Materials Generated through LASiS:** *Devyn Duryea*<sup>1</sup>; Nirmala Kandadai<sup>1</sup>; <sup>1</sup>Oregon State University

**9:00 AM Invited**

**Manufacturing and Characterization of Hybrid 2D Foams/ High-temperature Epoxy Nanocomposites:** *Luiza Benedetti*<sup>1</sup>; Kazue Orikasa<sup>1</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University

**9:20 AM Invited**

**Mechanism of II-IV Semiconductor 2D Growth Facilitated by Crystallographic Anisotropy in Growth Kinetics in Wet Solution:** *Choong-un Kim*<sup>1</sup>; <sup>1</sup>University of Texas at Arlington

**9:40 AM**

**Radioluminescence Response and Catalytic Activity of Lanthanide-based Nanocomposites Upon X-ray Excitation:** *Santiago Bermudez Naranjo*<sup>1</sup>; Jessika Rojas<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**10:00 AM Break**

**10:20 AM Invited**

**Quantifying Thickness and Defects in 2D Materials:** *Danielle Reifsnyder Hickey*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**10:40 AM Invited**

**Strain Engineering of 2D van der Waals Materials for Nano-electronic and Quantum Devices:** *Hesam Askari*<sup>1</sup>; <sup>1</sup>University of Rochester

**11:00 AM Invited**

**Structural Distortions and Optoelectronic Properties of Charged Point Defects and Dopants in 2D Materials:** *Richard Hennig*<sup>1</sup>; Preston Vargas<sup>1</sup>; Anne Marie Tan<sup>2</sup>; Biswas Rijal<sup>1</sup>; Christoph Freysoldt<sup>3</sup>; Bruno Schuler<sup>4</sup>; Joshua Robinson<sup>5</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Florida; Institute of High Performance Computing, Agency for Science, Technology and Research, Singapore; <sup>3</sup>Max-Planck-Institut für Eisenforschung; <sup>4</sup>Swiss Federal Laboratories for Materials Science and Technology; <sup>5</sup>2D Crystal Consortium, Pennsylvania State University

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## NUCLEAR MATERIALS

### Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Fuel Qualification I

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Wednesday AM | March 6, 2024**

**Regency Q | Hyatt**

**Session Chairs:** Assel Aitkaliyeva, University of Florida; Walt Williams, Nuclear Regulatory Commission

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**8:30 AM Invited**

**Fission Accelerated Steady-state Testing Experimental-BISON Comparison:** *Geoffrey Beausoleil*<sup>1</sup>; Luca Capriotti<sup>1</sup>; Kyle Paaren<sup>1</sup>; Sobhan Patnaik<sup>1</sup>; Alex Swearingen<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**9:00 AM**

**Physics-informed Smart Scaling for Accelerated Fuel Testing:** *Anant Raj*<sup>1</sup>; Charlie Owen<sup>1</sup>; Hany Abdel-Khalik<sup>1</sup>; Khafizov Marat<sup>2</sup>; Colby Jensen<sup>3</sup>; Aysenur Toptan<sup>3</sup>; Jason Hales<sup>3</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Ohio State University; <sup>3</sup>Idaho National Lab

**9:20 AM**

**Dynamical System Analysis of Time-accelerated UO<sub>2</sub> Fission-gas-release During Power Ramp Transients:** *Ian Ferguson*<sup>1</sup>; Tianyi Chen<sup>1</sup>; Daniel Wachs<sup>2</sup>; Charles Folsom<sup>2</sup>; Anthony Cowan<sup>1</sup>; Maxwell Kavanagh<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Idaho National Laboratory

**9:40 AM**

**Accelerated Fuel Qualification using In Situ Neutron Diffraction:** *Edward Obbard*<sup>1</sup>; Jennifer Stansby<sup>1</sup>; Vanessa Peterson<sup>2</sup>; Denise Adorno Lopes<sup>3</sup>; Patrick Burr<sup>1</sup>; Joseph Bevitt<sup>2</sup>; Anna Paradowska<sup>2</sup>; Elizabeth Sooby<sup>4</sup>; Joshua White<sup>5</sup>; Pär Olsson<sup>3</sup>; <sup>1</sup>University Of New South Wales; <sup>2</sup>Australian Nuclear Science and Technology Organisation (ANSTO); <sup>3</sup>KTH Royal Institute of Technology; <sup>4</sup>University of Texas at San Antonio (UTSA); <sup>5</sup>Los Alamos National Laboratory

**10:00 AM**

**A Study in the Thermal Transport Properties Related to Microstructure of Irradiated Annular U-Zr Metallic Fuels:** *Cynthia Adkins*<sup>1</sup>; Daniele Salvato<sup>1</sup>; Tiankai Yao<sup>1</sup>; Luca Capriotti<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**10:20 AM Break****10:40 AM**

**Phonon Dispersion, Lifetimes, and Thermal Transport in Nuclear Fuel Materials:** *Michael Manley*<sup>1</sup>; Hao Ma<sup>1</sup>; Zilong Hua<sup>2</sup>; Amrita Sen<sup>3</sup>; Tiankai Yao<sup>2</sup>; Matthew Bryan<sup>1</sup>; Ahmet Alatas<sup>4</sup>; Enda Xiao<sup>5</sup>; Chris Marianetti<sup>5</sup>; Marat Khafizov<sup>6</sup>; David Hurley<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Purdue University; <sup>4</sup>Argonne National Laboratory; <sup>5</sup>Columbia University; <sup>6</sup>The Ohio State University

**11:00 AM**

**Implications of Defect Induced Thermal Conductivity Degradation on Accelerated Irradiation of Nuclear Fuels:** *Marat Khafizov*<sup>1</sup>; Joshua Ferrigno<sup>1</sup>; Tsvetoslav Pavlov<sup>2</sup>; Pierre-Clement Simon<sup>2</sup>; Anant Raj<sup>3</sup>; Hany Abdel-Khalik<sup>3</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>Purdue University

**11:20 AM**

**U(X)N-based SIMFUEL with X= Zr, Nb, Mo and Ru: Fabrication, Characterization and Phase Equilibria Evaluation:** *Denise Adorno Lopes*<sup>1</sup>; Faris Sweidan<sup>2</sup>; Jennifer Stansby<sup>3</sup>; Yulia Mishchenko<sup>2</sup>; <sup>1</sup>Westinghouse; <sup>2</sup>KTH; <sup>3</sup>UNSW

**11:40 AM**

**A Diffusion-controlled Creep Model in Monolithic Umo Fuels Under Irradiation:** *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

**ADDITIVE MANUFACTURING**

**Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification — Session IV**

**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; Steve Daniewicz, University of Alabama

**Wednesday AM | March 6, 2024**  
**Plaza Int'l E | Hyatt**

**Session Chairs:** Newell Moser, National Institute of Standards and Technology; Nik Hrabe, National Institute of Standards and Technology

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**8:30 AM Invited**

**Critical Defects in Laser Powder Bed Fusion- Surface, Sub-Surface, Geometric and Microstructure Effects:** *Joy Gockel*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**8:50 AM**

**A New Transient Surface Remelting Process for Smoothing AM Metals:** *Kendall Yetter*<sup>1</sup>; Kyle Jung<sup>2</sup>; Andrew Chuang<sup>3</sup>; Michael Sangid<sup>2</sup>; William LePage<sup>1</sup>; <sup>1</sup>University of Tulsa; <sup>2</sup>Purdue University; <sup>3</sup>Argonne National Laboratory

**9:10 AM**

**Effects of Printer Manufacturer, Contour Pass, Print Angle, Hot Isostatic Pressing, and Surface Texture on the Fatigue Performance of PBF-L/IN-718:** *Agustin Diaz*<sup>1</sup>; Patrick McFadden<sup>1</sup>; <sup>1</sup>REM Surface Engineering

**9:30 AM**

**Elevated Temperature Fatigue Mechanisms of the LPBF IN718 Alloy Densified by HIP with High CSL Density:** *Marcus Lam*<sup>1</sup>; Carla Colon Cruz<sup>1</sup>; Mariah Farmer<sup>1</sup>; Alexis Loustau<sup>1</sup>; Andrew Wessman<sup>1</sup>; Sammy Tin<sup>1</sup>; <sup>1</sup>University of Arizona

**9:50 AM**

**Investigating the Influence of Part Geometry on the Fatigue Resistance of SLM Thin-Wall Inconel 718:** *Connor Varney*<sup>1</sup>; Paul Rottmann<sup>1</sup>; <sup>1</sup>University of Kentucky

**10:10 AM Break**

**10:30 AM Invited**

**Fatigue Properties of Specimens Fabricated via Metal Additive Manufacturing:** *Ola Harrysson*<sup>1</sup>; Harvey West<sup>1</sup>; Satya Konala<sup>1</sup>; <sup>1</sup>North Carolina State University

**10:50 AM**

**An Exploration of Process Parameters and Process-induced Defects in LPBF Ti-6Al-4V via Fatigue and Fracture Characterization:** *Austin Ngo*<sup>1</sup>; David Scannapieco<sup>1</sup>; Francisco Medina<sup>2</sup>; Christian Gobert<sup>3</sup>; Anthony Rollett<sup>3</sup>; Jack Beuth<sup>3</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>University of Texas El Paso; <sup>3</sup>Carnegie Mellon University

**11:10 AM**

**High-Cycle and Very-High-Cycle Fatigue Behavior of Additively Manufactured Ti-6Al-4V Alloys and Methods for Rapid Qualification:** *Jake Scarponi*<sup>1</sup>; Anthony Spangenberg<sup>1</sup>; Cory Cunningham<sup>2</sup>; Austin Mann<sup>2</sup>; Diana Lados<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>Boeing

**11:30 AM**

**Fatigue Behavior of Additively Manufactured Ti-5553:** *Jay Carroll*<sup>1</sup>; Zachary Casias<sup>1</sup>; Pankaj Kumar<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of New Mexico

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Materials in Energy Environments — Material Behavior and Characterization

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

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

**Wednesday AM | March 6, 2024**  
**Atlantic | Hyatt**

**Session Chairs:** Subhashish Meher, Pacific Northwest National Laboratory; Michael Kirka, Oakridge National Laboratory

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#### 8:30 AM Invited

**Friction Surfacing Layer Deposition of a High Entropy Alloy:** *Jorge F. dos Santos*<sup>1</sup>; D. Garcia<sup>1</sup>; T. Wang<sup>1</sup>; Subhashish Meher<sup>1</sup>; Mohan Sai Kiran Nartu<sup>1</sup>; Isabella Van Rooyen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 9:00 AM Invited

**Properties and Microstructure Evolution of Water Atomized Stainless Steel 316L Fabricated Using Binder Jet Additive Manufacturing:** *Peeyush Nandwana*<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Rajendra Kelkar<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 9:30 AM

**A Discussion on Microstructural and Mechanical Characteristics of ShAPE Extruded PM2000 FeCrAl tubes:** *Chinthaka Silva*<sup>1</sup>; Mageshwari Komarasamy<sup>1</sup>; Julian Atehortua<sup>1</sup>; Shalini Tripathi<sup>1</sup>; Ramprashad Prabhakaran<sup>1</sup>; Matthew Olszta<sup>1</sup>; Tanvi Ajantiwalay<sup>1</sup>; Isabella Van Rooyen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 9:50 AM

**Additive Manufacturing of 316H for High-Temperature Nuclear Applications:** *Xuan Zhang*<sup>1</sup>; Srinivas Mantri<sup>1</sup>; George Vukovic<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

#### 10:10 AM

**Characterization of Novel P91&304H Graded Composite Transition Joint with Enhanced Creep Performance:** *Yuying Wen*<sup>1</sup>; Shanshan Hu<sup>1</sup>; Xingbo Liu<sup>1</sup>; <sup>1</sup>West Virginia University

#### 10:30 AM Break

#### 10:50 AM

**Effects of Ti and Si Additions on Precipitate Number Density and Radiation Resistance of Additively Manufactured Oxide Dispersion Strengthened FeCrAl:** *Thomas Siggillino*<sup>1</sup>; Ty Austin<sup>1</sup>; Steve Zinkle<sup>1</sup>; Caleb Massey<sup>2</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>Oak Ridge National Laboratory

#### 11:10 AM

**Additive Manufacturing Nickel Base Alloy Characterization in Hydrogen Environment for Gas Turbine Applications:** *Iacopo Giovannetti*<sup>1</sup>; Massimiliano Buccioni<sup>1</sup>; *Angelo Donato*<sup>1</sup>; Filippo Cappuccini<sup>1</sup>; <sup>1</sup>Baker Hughes

**11:30 AM**

**3D Printing of Inconel 718 with Enhanced Boron Composition as a Novel Solar Absorber Tube Material in the Concentrated Solar Power (CSP) System:** Jeongwoo Lee<sup>1</sup>; Hernan Aparicio<sup>1</sup>; Jianzhi Li<sup>1</sup>; Ben Xu<sup>2</sup>; Peiwen Li<sup>3</sup>; Mathew Farias<sup>2</sup>; Haomin Li<sup>3</sup>; Liping Wang<sup>4</sup>; <sup>1</sup>University of Texas Rio Grande Valley; <sup>2</sup>University of Houston; <sup>3</sup>University of Arizona; <sup>4</sup>Arizona State University

**11:50 AM**

**Uncertainty of Microstructure in Additively Manufactured Heat Exchangers and Solar Receivers for CSP 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 Modeling, Simulation and Machine Learning – Physics-based Models III

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**Wednesday AM | March 6, 2024**  
**Orlando N | Hyatt**

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center; Jing Zhang, Indiana University-Purdue University Indianapolis

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**8:30 AM**

**The Development of Grain Structure During Additive Manufacturing: A Comparison Between Experiment and Simulation:** Alexander Chadwick<sup>1</sup>; Juan Guillermo Santos Macias<sup>2</sup>; Arash Samaei<sup>1</sup>; Gregory Wagner<sup>1</sup>; Manas Upadhyay<sup>2</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Solid Mechanics Laboratory (LMS), CNRS, Ecole Polytechnique, Institut Polytechnique de Paris

**8:50 AM**

**Grain Structure Control Through Modeling of Laser Beam Shaping and Multibeam Solidification:** Matt Rolchigo<sup>1</sup>; John Coleman<sup>1</sup>; Kellis Kincaid<sup>1</sup>; Benjamin Stump<sup>1</sup>; Gerry Knapp<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:10 AM**

**Hybrid Model Guided Additively Manufactured Aerospace Heat Exchanger Development:** Ranadip Acharya<sup>1</sup>; Nitin Chandola<sup>1</sup>; Vijay Jagdale<sup>1</sup>; <sup>1</sup>Collins Aerospace

**9:30 AM**

**Digital Twin Framework for Identifying Microstructure Heterogeneity in an As-built Powder Bed Fusion Part:** Gerry Knapp<sup>1</sup>; Benjamin Stump<sup>1</sup>; Luke Scime<sup>1</sup>; Andres Marquez Rossy<sup>1</sup>; Chase Joslin<sup>1</sup>; William Halsey<sup>1</sup>; Alex Plotkowski<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:50 AM**

**An ICME Workflow to Identify the Root Cause of Properties Variations of AM Parts:** Shengyen Li<sup>1</sup>; Jaehyuk Kim<sup>1</sup>; Zhuo Yang<sup>1</sup>; Yan Lu<sup>1</sup>; Paul Witherell<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

10:10 AM Break

10:30 AM

**Revealing the Role of Volumetric Defect's Geometry on Fatigue Crack Initiation in Additively Manufactured Materials:** *Sajith Soman*<sup>1</sup>; Mohammad Aquib Anis<sup>1</sup>; Shuai Shao<sup>1</sup>; Nima Shamsaei<sup>1</sup>; <sup>1</sup>Auburn University

10:50 AM

**Coupling of Microscopy and Thermomechanical Models to Explain the Extent and Location of TRIP Product in Simulated PBF-LB of Ti-1023:** *Chris Jasien*<sup>1</sup>; Alec Saville<sup>1</sup>; Kamel Fezzaa<sup>2</sup>; Tao Sun<sup>2</sup>; John Foltz<sup>3</sup>; Kester Clarke<sup>1</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Advanced Photon Source, Argonne National Laboratory; <sup>3</sup>Allegheny Technologies Incorporated Specialty Materials

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Metallic Materials: Nb-Based Alloys

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

**Program Organizers:** Faramarz Zarandi, RTX Corporation; Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias

Wednesday AM | March 6, 2024  
Rainbow Spring II | Hyatt

**Session Chairs:** Matthew Osborne, Global Advanced Metals; Joao Pedro Oliveira, Faculdade Ciencias Tecnologias

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8:30 AM Invited

**Material Characterization of Bulk Feature C103 for Laser Powder Directed Energy Deposition:** *Brandon Colón*<sup>1</sup>; Kurtis Watanabe<sup>1</sup>; Noah Phillips<sup>2</sup>; Franklin Kellog<sup>3</sup>; Brandon McWilliams<sup>3</sup>; Francisco Medina<sup>1</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>ATI Specialty Alloys and Components; <sup>3</sup>U.S. Army CCDC Army Research Laboratory

9:10 AM

**Heat Treatment Optimization of Laser Powder Bed Fusion Additive Manufacture C103:** *Fernando Reyes Tirado*<sup>1</sup>; Omar Mireles<sup>2</sup>; <sup>1</sup>NASA Marshall Space Flight Center; <sup>2</sup>Nasa Marshall Space Flight Center

9:30 AM

**Elevated Temperature Mechanical Properties of L-PBF Niobium Alloy C103:** *Justin Milner*<sup>1</sup>; Eric Brizes<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

9:50 AM

**Effect of Laser Powder Bed Fusion Processing on the Microstructure and Mechanical Properties of Nb:** *Advika Chesett*<sup>1</sup>; Sucharita Banerjee<sup>1</sup>; Venkata Mani Krishna Karri<sup>1</sup>; Vishal Soni<sup>1</sup>; Abhishek Sharma<sup>1</sup>; S. M Varahabhatla<sup>1</sup>; Zane Hughes<sup>1</sup>;

Srinivas Aditya Mantri<sup>1</sup>; Narendra Dahotre<sup>1</sup>; Raj Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas

### 10:10 AM Break

### 10:30 AM

**Design for Additive Manufacturing of C103 Propulsion Components for L – PBF and LP – DED:** *Brandon Colón*<sup>1</sup>; Omar Mireles<sup>2</sup>; Francisco Medina<sup>1</sup>; <sup>1</sup>University of Texas at El Paso; <sup>2</sup>NASA Marshall Space Flight Center

### 10:50 AM

**Post-Processing of Laser Powder Bed Fusion and Laser Powder Directed Energy Deposition Additive Manufacture C103:** *Brandon Colón*<sup>1</sup>; Omar Mireles<sup>2</sup>; <sup>1</sup>University of Texas, El Paso; <sup>2</sup>Nasa Marshall Space Flight Center

### 11:10 AM

**Rapid Screening of the Defect Susceptibility of Nb-base Alloys Under Laser Melting Conditions:** *Kaitlyn Mullin*<sup>1</sup>; Sophia Wu<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

### 11:30 AM

**Nb-1ZrL-PBF In-situ Alloying and Elevated Temperature Mechanical Performance:** *Eric Brizes*<sup>1</sup>; Justin Milner<sup>1</sup>; <sup>1</sup>NASA Glenn Research Center

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — High Speed X-ray Imaging

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

**Wednesday AM | March 6, 2024**  
**Orlando M | Hyatt**

**Session Chair:** Tao Sun, Northwestern University

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### 8:30 AM

**In-situ Melt Pool Monitoring Using Synchrotron X-ray Imaging and Ultrasound for Laser-based Additive Manufacturing:** *Nathan Kizer*<sup>1</sup>; Lauren Katch<sup>1</sup>; Lovejoy Mutswatiwa<sup>1</sup>; Tao Sun<sup>2</sup>; Samuel Clark<sup>3</sup>; Xiaoyu Xie<sup>4</sup>; Wing Liu<sup>4</sup>; Jordan Lum<sup>5</sup>; David Stobbe<sup>5</sup>; Christopher Kube<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>University of Virginia; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>Northwestern University; <sup>5</sup>Lawrence Livermore National Laboratory

### 8:50 AM

**Machine Learning-driven In Situ Detection of Laser Powder Bed Fusion through Synchrotron and Lab-scale Techniques:** *Zhongshu Ren*<sup>1</sup>; Tao Sun<sup>1</sup>; Samuel Clark<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Argonne National Laboratory

### 9:10 AM

**AI-powered In-situ Pore Generation and Evolution Dynamics for Laser Powder Bed Fusion Process:** *Sen Liu*<sup>1</sup>; Vivek Thampy<sup>2</sup>; Peiyu Quan<sup>2</sup>; Nick Calta<sup>3</sup>; Christopher Tassone<sup>2</sup>; <sup>1</sup>SLAC National Accelerator Laboratory; <sup>2</sup>SLAC SSRL; <sup>3</sup>LLNL



**9:30 AM**

**Reveal Pore Dynamics during Additive Manufacturing of Oxidized Powders Using Synchrotron X-ray Imaging:** *Kwan Kim*<sup>1</sup>; *Samy Hocine*<sup>1</sup>; *Wei Li*<sup>1</sup>; *Anna Getley*<sup>1</sup>; *Ruben Lambert-Garcia*<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

**9:50 AM**

**Shining Light on LPBF: Schlieren and X-ray Imaging for Melt Pool Dynamics and Process Optimisation:** *Ioannis Bitharas*<sup>1</sup>; *Kyle Perkins*<sup>1</sup>; *Tao Sun*<sup>2</sup>; *Anthony Rollett*<sup>3</sup>; *Andrew Moore*<sup>1</sup>; <sup>1</sup>Heriot-Watt University; <sup>2</sup>University of Virginia; <sup>3</sup>Carnegie-Mellon University

**10:10 AM Break**

**10:20 AM**

**Leveraging In Situ Synchrotron Radiation Based Imaging to Understand the Impact of Laser Defocusing on Laser Powder Bed Fusion:** *Maureen Fitzpatrick*<sup>1</sup>; *Samy Hocine*<sup>2</sup>; *Marta Majkut*<sup>1</sup>; *Ruben Lambert-Garcia*<sup>2</sup>; *Elena Ruckh*<sup>2</sup>; *Anna Getley*<sup>2</sup>; *Kwan Kim*<sup>2</sup>; *Wei Li*<sup>2</sup>; *Chu Lun Alex Leung*<sup>2</sup>; *Alexander Rack*<sup>1</sup>; *Peter D Lee*<sup>2</sup>; <sup>1</sup>ESRF; <sup>2</sup>UCL

**10:40 AM**

**Refinement Mechanisms of Tantalum-inoculated Aluminum Subjected to Simulated Laser Powder Bed Fusion:** *Adriana Eres-Castellanos*<sup>1</sup>; *Kamel Fezzaa*<sup>2</sup>; *Hunter Martin*<sup>3</sup>; *Amy Clarke*<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>HRL Laboratories

**11:00 AM**

**An Electron Beam Melting System for In-situ Synchrotron X-ray Monitoring:** *Luis Escano*<sup>1</sup>; *Samuel Clark*<sup>2</sup>; *Andrew Chuang*<sup>2</sup>; *Jiandong Yuan*<sup>1</sup>; *Qilin Guo*<sup>1</sup>; *Minglei Qu*<sup>1</sup>; *William Dong*<sup>1</sup>; *Xinhang Zhang*<sup>1</sup>; *Junye Huang*<sup>1</sup>; *Kamel Fezzaa*<sup>2</sup>; *Peter Kenesei*<sup>2</sup>; *Brandon Walker*<sup>3</sup>; *Tao Sun*<sup>4</sup>; *Kevin Eliceiri*<sup>3</sup>; *Lianyi Chen*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>Morgridge Institute for Research; <sup>4</sup>University of Virginia

**11:20 AM**

**Controlling Bubble Dynamics Mechanisms during Directed Energy Deposition Additive Manufacturing:** *Kai Zhang*<sup>1</sup>; *Shishira Bhagavath*<sup>1</sup>; *Sebastian Marussi*<sup>1</sup>; *Imogen Cowley*<sup>1</sup>; *Xianqiang Fan*<sup>1</sup>; *Harry Chapman*<sup>1</sup>; *Alexander Rack*<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>European Synchrotron Radiation Facility; <sup>3</sup>Rolls Royce plc.

**11:40 AM**

**Novel Photometrics Toolbox to Quantify Performance of Versatile X-ray Microscopes:** *Zane Taylor*<sup>1</sup>; *Sen Liu*<sup>2</sup>; *Lichao Fang*<sup>1</sup>; *Christopher Tassone*<sup>2</sup>; *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford; <sup>2</sup>SLAC

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Mechanical Behavior of Additively Manufactured Ti and Al Alloys**

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Wednesday AM | March 6, 2024**  
**Plaza Int'l F | Hyatt**

**Session Chairs:** Eda Aydogan, Middle East Technical University; Wendy Gu, Stanford University

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**8:30 AM Invited**

**Alloying Paradigm Shift: Exploring Grand Alloys for Enhancing Mechanical Performance of Titanium Alloy:** Jenniffer Bustillos<sup>1</sup>; Amlan Das<sup>2</sup>; Kate Shanks<sup>2</sup>; Atieh Moridi<sup>1</sup>; <sup>1</sup>Cornell University; <sup>2</sup>Cornell High Energy Synchrotron Source

**9:00 AM**

**Characterization of Size and Geometry Dependency at Elevated Temperatures in Additively Manufactured Titanium Alloy:** Daniel June<sup>1</sup>; Mehrdad Pourjam<sup>1</sup>; Andrew Wessman<sup>1</sup>; Kavan Hazeli<sup>1</sup>; <sup>1</sup>The University of Arizona

**9:20 AM**

**Experimental Analysis of Various Microscopic Deformation Mechanisms of Directed Energy Deposited Ti-6Al-4V:** Kavindu Wijesinghe<sup>1</sup>; Ajit Achuthan<sup>1</sup>; <sup>1</sup>Clarkson University

**9:40 AM**

**Clarifying the Relationships between Ductility, Microstructure and Strain Localization in Additively Manufactured Ti-6Al-4V:** Francois Bourdin<sup>1</sup>; Damien Texier<sup>2</sup>; Florence Pettinari<sup>3</sup>; Joel Douin<sup>3</sup>; Samuel Hemery<sup>4</sup>; <sup>1</sup>Airbus; <sup>2</sup>Institut Clement Ader; <sup>3</sup>CEMES; <sup>4</sup>Institute Prime - Ensma

**10:00 AM Break**

**10:20 AM Invited**

**Pushing the Limits of Thin-walled Additive Structures for Use in Ultra-low Mass Rover Wheels for Planetary Exploration:** Douglas Hofmann<sup>1</sup>; Daniel Oropeza<sup>2</sup>; Scott Howe<sup>1</sup>; <sup>1</sup>NASA Jet Propulsion Laboratory; <sup>2</sup>UC Santa Barbara

**10:50 AM**

**Morphology over Microstructure: As-printed Thin Wall Mechanics in Laser Powder Bed Fusion:** Dhruv Bhate<sup>1</sup>; Paul Paradise<sup>1</sup>; Tyler Smith<sup>1</sup>; Mandar Shinde<sup>1</sup>; <sup>1</sup>Arizona State University

**11:10 AM**

**Dynamic Strength of Additively Repaired 1100 Aluminum:** Jesse Callanan<sup>1</sup>; Daniel Martinez<sup>1</sup>; Kendall Hollis<sup>1</sup>; Saryu Fensin<sup>1</sup>; David Jones<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**11:30 AM**

**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>; Rajiv Mishra<sup>1</sup>; Clara Mock<sup>1</sup>; Kyu Cho<sup>1</sup>; Brandon McWilliams<sup>1</sup>; <sup>1</sup>University of North Texas

11:50 AM

**Effect of Impurities in Titanium on Hydrogen Uptake and Mechanical Property Variation Probed by Nanoindentation:** *Seth Blackwell*<sup>1</sup>; Zachary Levin<sup>1</sup>; Mary O'Brien<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Materials Design and Alloy Development VI – Closed-Loop Alloy Design – Light Weight Alloys

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

**Program Organizers:** Behrang Poorganji, University of Toledo; James Saal, Citrine Informatics; Hunter Martin, HRL Laboratories LLC; Orlando Rios, University of Tennessee; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC; S. Mohadeseh Taheri-Mousavi, Carnegie Mellon University

Wednesday AM | March 6, 2024  
Plaza Int'l D | Hyatt

**Session Chairs:** Jiadong Gong, QuesTek; Hunter Martin, HRL

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8:30 AM Invited

**Grand Alloying: Enabling Multi-phase Co-existence in Additive Manufactured Titanium Alloys:** *Jennifer Bustillos*<sup>1</sup>; Akane Wakai<sup>1</sup>; Kaushalendra Singh<sup>1</sup>; Atieh Moridi<sup>1</sup>; <sup>1</sup>Cornell University

9:00 AM

**Development of Additively Manufactured Al-based Superalloys:** *Ying Yang*<sup>1</sup>; Alex Plowkowski<sup>1</sup>; ke An<sup>1</sup>; Alice perrin<sup>1</sup>; Weicheng zhong<sup>1</sup>; QQ Ren<sup>1</sup>; Indranil Roy<sup>1</sup>; Yuri Osetskiy<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:20 AM

**Microcrack Mechanisms during Additive Manufacturing of  $\gamma/\gamma'$  Ni-base Superalloy and Alloy Design to Eliminate Cracking:** *Nathaniel Badgett*<sup>1</sup>; John O'Connell<sup>1</sup>; Bhaskar Majumdar<sup>1</sup>; Kevin Garber<sup>2</sup>; Mohammad Chowdhury<sup>1</sup>; Timothy Nice<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology; <sup>2</sup>Sandia National Labs Center for Integrated Nano Technologies

9:40 AM

**Enhancing 3D Printability of High Strength Aluminum Alloys for LPBF Applications by Mechanical Mixing of Commercial 2024 and Al10SiMg Powders:** *John O'Connell*<sup>1</sup>; Timothy Nice<sup>1</sup>; Nathaniel Badgett<sup>1</sup>; Bhaskar Majumdar<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

10:00 AM Break

10:15 AM Invited

**Tailoring Metastability Due to Rapid Solidification to Achieve High-strength Printable Al Alloys:** *S. Mohadeseh Taheri-Mousavi*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

10:45 AM

**Fine-grained and Texture-free Microstructure of AISI 304L Steel Obtained by Alloy Adjustment for Electron Beam Additive Manufacturing Process:** Christina Burkhardt<sup>1</sup>; *Anja Weidner*<sup>1</sup>; Marco Wendler<sup>1</sup>; Olena Volkova<sup>1</sup>; Horst Biermann<sup>1</sup>; <sup>1</sup>TU Bergakademie Freiberg

**11:05 AM**

**The Development of Novel Al-Si-Cu-Mg Compositions with High Copper Content for PBF-LB/M Processing:** *Alessandra Martucci*<sup>1</sup>; Mirko Trovato<sup>1</sup>; Enrico Virgillito<sup>1</sup>; Fabrizio Marinucci<sup>1</sup>; Federico Gobber<sup>1</sup>; Emilio Bassini<sup>1</sup>; Alberta Aversa<sup>1</sup>; Diego Manfredi<sup>1</sup>; Paolo Fino<sup>1</sup>; Mariangela Lombardi<sup>1</sup>; <sup>1</sup>Politecnico di Torino

**11:25 AM**

**Machine Learning Discovery of Optimal Processing Zones in Laser Powder Bed Fusion via High Throughput Mechanical Experiments:** *Sal Nimer*<sup>1</sup>; Mary Daffron<sup>1</sup>; Steven Storck<sup>1</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory

**11:45 AM**

**Novel, Elevated Temperature Al-Ce-Mo Alloys for Additive Manufacturing:** *Kevin Graydon*<sup>1</sup>; Thinh Huynh<sup>1</sup>; David Hicks<sup>2</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>ALMMII

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Process-induced Microstructures and Defects — ODS and Titanium Alloys

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

**Wednesday AM | March 6, 2024**  
**Florida C | Hyatt**

**Session Chair:** Jonathan Pegues, Castheon

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**8:30 AM Invited**

**Dispersoid Coarsening and Slag Formation during Melt-based Additive Manufacturing of ODS Superalloys:** *Zachary Cordero*<sup>1</sup>; Roger Hou<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**9:00 AM**

**Solid State Additive Manufacturing of ODS FeCrAl – Sintering Process Optimization:** *Amrita Lall*<sup>1</sup>; Zachary Kennedy<sup>1</sup>; Michelle Fenn<sup>1</sup>; Saumyadeep Jana<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**9:20 AM**

**Custom-Post-Process Heat Treatments to Eliminate Columnar Microstructure in W-DED Ti-6Al-4V:** *Hannah Sims*<sup>1</sup>; Jonathan Pegues<sup>1</sup>; Shaun Whetten<sup>1</sup>; LaRico Treadwell<sup>1</sup>; Andrew Kustas<sup>1</sup>; <sup>1</sup>Sandia National Labs

**9:40 AM**

**Influence of LPBF Build Parameters on Process-induced Defect Characteristics and Mechanical Properties in Ti-6Al-4V:** *Austin Ngo*<sup>1</sup>; David Scannapieco<sup>1</sup>; Oluwatuminu Adeeko<sup>1</sup>; Tharun Reddy<sup>2</sup>; Christian Gobert<sup>2</sup>; Sneha Narra<sup>2</sup>; Anthony Rollett<sup>2</sup>; Jack Beuth<sup>2</sup>; John Lewandowski<sup>2</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>Carnegie Mellon University

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

**Processing of Novel and Commercial Titanium Alloys by Laser Track Melting and the Role of Phase Stability on As-built Microstructure:** *Chris Jasien*<sup>1</sup>; Alec Saville<sup>1</sup>; Jessica Buckner<sup>2</sup>; John Foltz<sup>3</sup>; Kester Clarke<sup>1</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of

Mines; <sup>2</sup>Sandia National Laboratories; <sup>3</sup>Allegheny Technologies Incorporated Specialty Materials

**10:40 AM**

**Gleeble Dilatometry to Resolve Microstructure Evolution in W-DED Ti-6Al-4V:** *Christopher Finfrock*<sup>1</sup>; Jessica Buckner<sup>1</sup>; Jonathon Pegues<sup>1</sup>; Hannah Sims<sup>1</sup>; Jack Herrmann<sup>1</sup>; Anthony Marcon<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**11:00 AM**

**Understanding the Geometry-dependent Microstructure in Complex Ti-6Al-4V Parts Fabricated by Laser Powder Bed Fusion:** *Chengshang Zhou*<sup>1</sup>; Pei Sun<sup>1</sup>; Tristan Armstrong<sup>1</sup>; Noah Garcia<sup>1</sup>; Zak Fang<sup>1</sup>; <sup>1</sup>The University of Utah

**11:20 AM**

**The Effects of Novel Heat Treatments on The Microstructure of PBF-L Ti-6Al-4V:** *Nicholas Derimow*<sup>1</sup>; Jake Benzing<sup>1</sup>; Nik Hrabe<sup>1</sup>; Newell Moser<sup>1</sup>; Orion Kafka<sup>1</sup>; Chad Beamer<sup>2</sup>; Ryan Fishel<sup>3</sup>; Chris Hadley<sup>4</sup>; Mahesh Waje<sup>4</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Quintus Technologies; <sup>3</sup>3D Systems - Healthcare; <sup>4</sup>Lynntech

**11:40 AM**

**Isolating The Effects of Microstructure on the Mechanical Performance of PBF-L Ti-6Al-4V:** *Jake Benzing*<sup>1</sup>; Nik Hrabe<sup>1</sup>; Nicholas Derimow<sup>1</sup>; Newell Moser<sup>1</sup>; Orion Kafka<sup>1</sup>; Chad Beamer<sup>2</sup>; Ryan Fishel<sup>3</sup>; Chris Hadley<sup>4</sup>; Mahesh Waje<sup>4</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Quintus Technologies; <sup>3</sup>3D Systems; <sup>4</sup>Lynntech

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation – Low Symmetry Materials

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

**Wednesday AM | March 6, 2024  
Celebration 1 | Hyatt**

**Session Chairs:** Laurent Capolungo, Los Alamos National Laboratory; Lei Cao, University of Nevada Reno

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**8:30 AM**

**Investigating the Energetics Underlying the Co-nucleation of Adjoining Twin Pairs at Grain Boundaries in Hexagonal Close-packed Materials:** *Darshan Bamney*<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:50 AM**

**Structure and Properties of bcc Mg Synthesized Using Interface Strain Engineering:** *Siddhartha (Sid) Pathak*<sup>1</sup>; Kevin Jacob<sup>1</sup>; Manish Jain<sup>2</sup>; Krishna Yaddanapudi<sup>3</sup>; Marko Knezevic<sup>4</sup>; Irene Beyerlein<sup>5</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Sandia National Laboratory; <sup>3</sup>University of California, Davis; <sup>4</sup>University of New Hampshire; <sup>5</sup>University of California at Santa Barbara

**9:10 AM**

**Transformation-mediated Twin Nucleation in Hexagonal Close-packed Metals:** *Lei Cao*<sup>1</sup>; <sup>1</sup>University of Nevada

**9:30 AM**

**On the Accommodation of Twin Transformations In Metals: Elastic Shielding Mediated by Twin Facets:** *Hi Vo*<sup>1</sup>; Darshan Bamney<sup>1</sup>; Rod McCabe<sup>1</sup>; M.M. Schneider<sup>1</sup>; Khanh Dang<sup>1</sup>; M Pettes<sup>1</sup>; Carlos Tomé<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:50 AM**

**On the Temperature and Strain Rate Dependency of Flow Stress of Ti834:** *Maureen Aceves*<sup>1</sup>; <sup>1</sup>University of Oxford

**10:10 AM Break**

**10:30 AM**

**Assessing Prismatic-to-prismatic Slip Transfer Across Grain Boundaries in Pure Ti via High Resolution Digital Image Correlation:** *Eugenia Nieto Valeiras*<sup>1</sup>; Alberto Orozco-Caballero<sup>2</sup>; Maral Sarebanzadeh<sup>1</sup>; Jun Sun<sup>3</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>Imdea Materials Institute; <sup>2</sup>Department of Mechanical Engineering, Chemistry and Industrial Design, Polytechnic University of Madrid; <sup>3</sup>Xnovo Technology ApS

**10:50 AM**

**Towards a Predictive Criterion for Slip Transfer in Alpha Ti:** Thomas Yvinec<sup>1</sup>; Valery Valle<sup>1</sup>; Florence Hamon<sup>1</sup>; *Samuel Hemery*<sup>1</sup>; <sup>1</sup>Institut Pprime

**11:10 AM**

**Understanding Corrosion of AM Ti Alloys for Custom Orthopaedic Implants:** *Jessica Tjandra*<sup>1</sup>; Minh-son Pham<sup>1</sup>; Enrique Alabort<sup>2</sup>; Daniel Barba<sup>3</sup>; Stella Pedrazzini<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>Alloyed Ltd; <sup>3</sup>Polytechnic University of Madrid

**11:30 AM**

**Instability-induced Deformation in MAX Phases:** *Milos Dujovic*<sup>1</sup>; Mayank Chouksey<sup>1</sup>; Miladin Radovic<sup>1</sup>; Ankit Srivastava<sup>1</sup>; <sup>1</sup>Texas A&M University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 — Sustainability and Energy

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

**Wednesday AM | March 6, 2024**  
**Celebration 13 | Hyatt**

**Session Chairs:** Leon Shaw, Illinois Institute of Technology; Shuang Cui, University of Texas at Dallas; Jung Pyung Choi, Pacific Northwest National Laboratory

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**8:30 AM**

**Electrostatic Effect of Anion on Potential-dependent Reactivity of Solvent at Mg-alloy Anodes Interfaces: A Potential-dependent DFT Study:** *Hyemin Kim*<sup>1</sup>; Daniel Höche<sup>1</sup>; Denis Kramer<sup>2</sup>; Min Deng<sup>1</sup>; Tim Würger<sup>1</sup>; Mikhail Zheludkevich<sup>1</sup>; <sup>1</sup>Helmholtz-Zentrum Hereon; <sup>2</sup>Helmut-Schmidt University

**8:50 AM****A Scalable Top-Down Strategy for the Development of Nano-tubular Architecture with Superlative Performance as Supercapacitor Electrodes:** *Arpit Thomas*<sup>1</sup>; Harpreet Singh<sup>1</sup>; <sup>1</sup>Shiv Nadar Institute of Eminence, Delhi NCR, India**9:10 AM****Carbon-Coated NaCrO<sub>2</sub> with Ultrahigh Specific Capacity for Na-ion Batteries:** Ziyong Wang<sup>1</sup>; Zhepu Shi<sup>1</sup>; *Leon Shaw*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology**9:30 AM****Discovery of Ultrahigh Efficient PbZrO<sub>3</sub>-based Bulk Ceramic Capacitors via High-throughput Synthesis:** *Anand P S Gaur*<sup>1</sup>; Binzhi Liu<sup>1</sup>; Renu R<sup>1</sup>; Duane D. Johnson<sup>1</sup>; Jun Cui<sup>1</sup>; Xiaoli Tan<sup>1</sup>; <sup>1</sup>Iowa State University**9:50 AM Break****10:10 AM****Gaining Fundamental Insights into Materials Degradation of Fielded Photovoltaic Modules by Combining Multiscale Characterization and Modern Data Science Methods:** *Kristopher Davis*<sup>1</sup>; Dylan Colvin<sup>1</sup>; Max Liggett<sup>1</sup>; Jarod Kaltenbaugh<sup>1</sup>; Mengjie Li<sup>1</sup>; Balaashwin Babu<sup>1</sup>; William Oltjen<sup>2</sup>; Xuanji Yu<sup>2</sup>; Manjunath Matam<sup>1</sup>; Hubert Seigneur<sup>1</sup>; Andrew Gabor<sup>3</sup>; Philip Knodle<sup>3</sup>; Craig Neal<sup>1</sup>; Sudipta Seal<sup>1</sup>; Laura Bruckman<sup>2</sup>; Roger French<sup>2</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Case Western Reserve University; <sup>3</sup>BrightSpot Automation**10:30 AM****Model-driven Development of Durable and Scalable Thermal Energy Storage Materials for Buildings:** *Shuang Cui*<sup>1</sup>; <sup>1</sup>University of Texas at Dallas/National Renewable Energy Laboratory**10:50 AM****Operando Visualization of Zinc Deposition and Dissolution of the Anode in Zinc Flow Battery:** *Masatsugu Morimitsu*<sup>1</sup>; Yusuke Tachida<sup>1</sup>; <sup>1</sup>Doshisha University

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**ADVANCED CHARACTERIZATION METHODS****Advanced Real Time Imaging — Energy, Environmental, and Biomaterials****Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Alloy Phases Committee, TMS: Biomaterials 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**Wednesday AM | March 6, 2024****Blue Spring II | Hyatt****Session Chair:** Wangzhong Mu, KTH Royal Institute of Technology

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**8:30 AM****Temperature Sensing with Fiber Bragg Gratings Integrated into Stainless Steels by Spark Plasma Sintering:** *Xinchang Zhang*<sup>1</sup>; Zilong Hua<sup>1</sup>; Austin Fleming<sup>1</sup>; Jorgen Rufner<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**8:50 AM**

**Handheld Ultrasound Device for Characterization of Soft Materials:** *Leila Ladan*<sup>1</sup>; Erik Maas<sup>1</sup>; <sup>1</sup>Arizona State University

**9:10 AM**

**Enhanced Raman Spectroscopy for Trace Environmental Contaminant Detection and Quantification.:** *Kayode Fesomade*<sup>1</sup>; Robert Walker<sup>1</sup>; <sup>1</sup>Montana State University

**9:30 AM**

**Multimodal Characterization of Sn-Bi Alloy Solidification using Synchrotron X-ray Microtomography and Energy Dispersive Diffraction:** Amey Luktuke<sup>1</sup>; John Wu<sup>1</sup>; Alan Kastengren<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

**9:50 AM Break**

**10:10 AM**

**Ultrafast Synchrotron X-ray Imaging and Modelling of Ultrasound-driven Bubble-particle Dynamics:** *Ling Qin*<sup>1</sup>; Jiawei Mi<sup>2</sup>; <sup>1</sup>University Of Wyoming; <sup>2</sup>University of Hull

**10:30 AM**

**Wetting Interactions of Anode and Electrolyte in Liquid Metal Batteries:** *Athan Sanders*<sup>1</sup>; Douglas Kelley<sup>1</sup>; <sup>1</sup>University of Rochester

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco – Instrumental Applications of Magnetic Materials**

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

**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center

**Wednesday AM | March 6, 2024**

**Bayhill 22 | Hyatt**

**Session Chair:** Alex Leary, NASA Glenn Research Center

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**8:30 AM Invited**

**Magneto-optics, Revisited:** *Rudolf Schaefer*<sup>1</sup>; <sup>1</sup>Ifw Dresden

**9:00 AM Invited**

**Evaluation of Martensite Transformation Temperatures Using Magnetometry:** *Nicholas Jones*<sup>1</sup>; Paul Lambert<sup>2</sup>; Jin Yoo<sup>1</sup>; Suok Na<sup>1</sup>; Charles Fisher<sup>1</sup>; <sup>1</sup>Naval Surface Warfare Center, Carderock Division; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory

**9:30 AM Invited**

**Entropy Change at a Demagnetization Broadened First Order Transition:** *Christian Binek*<sup>1</sup>; Syed Shah<sup>1</sup>; Balamurugan Balasubramanian<sup>2</sup>; <sup>1</sup>University of Nebraska-Lincoln; <sup>2</sup>GKN Hoeganaes

**10:00 AM Break**

**10:20 AM Invited**

**4f-electrons Driven Giant Magnetic and Optical Anisotropy in Site-substituted M-type Strontium-hexaferrite:** *Durga Paudyal*<sup>1</sup>; <sup>1</sup>Ames Laboratory



**10:50 AM Invited**

**Fe Based Magnetic Carbon Composites:** *Cristina Gómez-Polo*<sup>1</sup>; Laura Cervera-Gabalda<sup>2</sup>; <sup>1</sup>Universidad Publica de Navarra; <sup>2</sup>Instituto de Ciencia de Materiales de Madrid, CSIC

**11:20 AM Invited**

**Magnetic Materials for Energy Efficient Applications: Studying Materials Out of Their Comfort Zone:** *Victorino Franco*<sup>1</sup>; <sup>1</sup>Universidad de Sevilla

**MATERIALS SYNTHESIS AND PROCESSING****Advances in Ceramic Materials and Processing — Advances in Ceramic Structure-Process Relations**

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

**Wednesday AM | March 6, 2024  
Celebration 10 | Hyatt**

**Session Chairs:** Kathy Lu, Virginia Polytechnic Institute and State University; Sriram Vijayan, Michigan Technological University

**8:30 AM Introductory Comments****8:35 AM**

**Microstructure and Properties of Novel Al<sub>2</sub>O<sub>3</sub>/Ti/Al<sub>2</sub>TiO<sub>5</sub> Composites Fabricated via Slip Casting:** *Marcin Wachowski*<sup>1</sup>; <sup>1</sup>Military University of Technology

**8:55 AM**

**Silicon Carbide Composites by Liquid Silicon Infiltration - Fundamentals:** *Jerry LaSalvia*<sup>1</sup>; Anthony DiGiovanni<sup>2</sup>; S. Walck<sup>3</sup>; C Garcia<sup>4</sup>; Thomas Scharf<sup>5</sup>; B Matthey<sup>6</sup>; S Kunze<sup>6</sup>; M Herrmann<sup>6</sup>; <sup>1</sup>DEVCOM Army Research Laboratory; <sup>2</sup>US Army Research Lab; <sup>3</sup>DEVCOM Army Research Laboratory and SURVICE Engineering; <sup>4</sup>DEVCOM Army Research Laboratory and University of North Texas; <sup>5</sup>University of North Texas; <sup>6</sup>Fraunhofer IKTS

**9:15 AM**

**A Combined DFT and NPD Approach to Determine the Phase Boundaries of the -phase of Tungsten Boride:** Samaneh Sadat Setayandeh<sup>1</sup>; Patrick Burr<sup>1</sup>; Jennifer Stansby<sup>1</sup>; Edward Obbard<sup>1</sup>; Jack Astbury<sup>2</sup>; Kevin Laws<sup>1</sup>; David Miskovic<sup>1</sup>; Chris Wilson<sup>2</sup>; Vanessa Peterson<sup>3</sup>; Sandeep Irukuvarghula<sup>2</sup>; Matt Brand<sup>1</sup>; *Sercan Cetinkaya*<sup>1</sup>; <sup>1</sup>UNSW; <sup>2</sup>Tokamak Energy; <sup>3</sup>ANSTO

**9:35 AM**

**Comparative Study of Aluminium Grain-refinement with Conventional and Glass Fiber Modified Ceramic Shell in the Investment Casting Process:** *Sanjay Kumar*<sup>1</sup>; Dagarapu Karunakar<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

9:55 AM Break

10:10 AM

**Effect of Multi-axial Forging on Mechanical Properties and Microstructure of AA7075/TaC Composites:** John Khalkho<sup>1</sup>; *Dagarapu Karunakar*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

10:30 AM

**Microstructure and Chemical Composition of Al<sub>2</sub>O<sub>3</sub>-, Cr<sub>2</sub>O<sub>3</sub>- and MgO-rich Refractories Exposed to Plastic Ashes:** *Xiaotian Fang*<sup>1</sup>; Hugh Thomas<sup>1</sup>; James Bennett<sup>1</sup>; Griffin Patterson<sup>2</sup>; Omer Dogan<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Harbison Walker International

10:50 AM

**Chemical Tempering of Soda Lime Silicate Glass by Electric Field Assisted Techniques:** *Redae Fisseha Asfaw*<sup>1</sup>; Vincenzo M. Sglavo<sup>1</sup>; <sup>1</sup>University of Trento

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials – Permanent Magnets

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

**Program Organizers:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

Wednesday AM | March 6, 2024  
Bayhill 27 | Hyatt

**Session Chair:** Yongmei Jin, Michigan Technological University

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8:30 AM Invited

**Critical Rare Earth Free NdFeB Magnet Competitors – A Materials Science ‘Grand Challenge’:** *David Parker*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

9:00 AM

**Correlative Microscopic Analysis of Grain Boundary Decorated Nb-alloyed Nd-Fe-B Permanent Magnets:** *Sadhasivam Murali*<sup>1</sup>; D Sivakumar<sup>1</sup>; K G Pradeep<sup>1</sup>; <sup>1</sup>IIT-Madras

9:20 AM

**Microstructure Engineering of Sm-Fe based ThMn<sub>12</sub>-type Anisotropic Sintered Magnets:** *Srinithi AK*<sup>1</sup>; Xin Tang<sup>2</sup>; Hossein Sepehri-Amin<sup>2</sup>; Jiasheng Zhang<sup>2</sup>; Tadakatsu Ohkubo<sup>2</sup>; Kazuhiro Hono<sup>2</sup>; <sup>1</sup>University of Tsukuba; <sup>2</sup>National Institute for Materials Science, Japan

9:40 AM

**New, High-Tc Iron Rich Ferromagnets in Ce – Fe – RM Alloys (RM = Refractory Metals):** *Olena Palasyuk*<sup>1</sup>; Akila Raja<sup>1</sup>; Andriy Palasyuk<sup>1</sup>; <sup>1</sup>Critical Materials Institute

10:00 AM Break

10:15 AM

**Correlating the Degree of Alignment and Physical Interactions during the Processing of Anisotropic Bonded Magnets:** *Ikenna Nlebedim*<sup>1</sup>; Xubo Liu<sup>1</sup>; Huseyin Ucar<sup>2</sup>; Parans Paranthaman<sup>3</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>California State Polytechnic University-Pomona; <sup>3</sup>Oak Ridge National Laboratory

**10:35 AM****Protecting Magnetic Properties of Ultrafine-grained Dy-free Nd-Fe-B Sintered Magnets:** *Belle Finney*<sup>1</sup>; *Wei Tang*<sup>1</sup>; *Jun Cui*<sup>1</sup>; *Matthew Kramer*<sup>1</sup>; *Iver Anderson*<sup>1</sup>; <sup>1</sup>Ames Lab**10:55 AM****Studies of Sintered (NdMM)-(FeCo)-B Based Magnets Substituted Nd by Mischmetal (MM):** *Wei Tang*<sup>1</sup>; *Harshida Parmar*<sup>1</sup>; *Jing Wang*<sup>1</sup>; *Harika Dasari*<sup>2</sup>; *Ikenna Nlebedim*<sup>1</sup>; *Jun Cui*<sup>2</sup>; <sup>1</sup>Ames National Laboratory of USDOE; <sup>2</sup>Iowa State University**11:15 AM****Thermal Stability of Magnetic Properties of Ce doped Sm<sub>2</sub>Fe<sub>17</sub>N<sub>3</sub> Magnets:** *Akihide Hosokawa*<sup>1</sup>; *Wataru Yamaguchi*<sup>1</sup>; *Yusuke Hirayama*<sup>1</sup>; *Kimihiro Ozaki*<sup>1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology**11:35 AM****(Nd,LRE)-Fe-B Permanent Magnets with Excellent Comprehensive Properties Suitable for Variable Magnetic Force Motor Application:** *Srinithi A K*<sup>1</sup>; *Xin Tang*<sup>2</sup>; *Hossein Sepehri-Amin*<sup>2</sup>; *Tadakatsu Ohkubo*<sup>2</sup>; *Kazuhiro Hono*<sup>2</sup>; <sup>1</sup>University of Tsukuba; <sup>2</sup>National Institute for Materials Science, Japan

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**MECHANICS OF MATERIALS****Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical**Wednesday AM | March 6, 2024****Barrel Spring II | Hyatt****Session Chairs:** Michael Gao, National Energy Technology Lab; Chelsey Hargather, New Mexico Institute of Mining and Technology**8:30 AM Invited****Competition between 110 and 112 Slip in BCC High Entropy Alloys:** *William Curtin*<sup>1</sup>; *Xin Liu*<sup>1</sup>; <sup>1</sup>Swiss Federal Institute Of Technology**8:50 AM Invited****Improved Resistance to Grain Growth In Multi Principal Element Alloys:** *Diana Farkas*<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute**9:10 AM Invited****Atomistic Simulation Study on the Short-range Chemical Ordering and Dislocation Behaviors in the Refractory NbTaTiV High-Entropy Alloy:** *Chin-Lung Kuo*<sup>1</sup>; <sup>1</sup>National Taiwan University**9:30 AM****Ab Initio Study of Screw Dislocation Core Structure and Energy Landscape in bcc Nb-Ta-Ti-Hf 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

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

**Dislocation Properties in BCC NbMoTaW Alloy:** *Haixuan Xu*<sup>1</sup>; Juntan Li<sup>1</sup>; <sup>1</sup>University of Tennessee

**10:30 AM Invited**

**A First-principles Study of Calculation Parameters Affecting Diffusion and Creep Activation Energy in the CoCrNi Medium-entropy Alloy:** Christopher Lafferty<sup>1</sup>; Peter Liaw<sup>2</sup>; *Chelsey Hargather*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology; <sup>2</sup>University of Tennessee

**10:50 AM Invited**

**Negative Stacking Fault Energy in Medium to High Entropy Alloys - Its Implications:** *Huseyin Sehitoglu*<sup>1</sup>; Daegun You<sup>1</sup>; Orcun Celebi<sup>1</sup>; Sameer Mohammed<sup>1</sup>; <sup>1</sup>University of Illinois

**11:10 AM Invited**

**Comprehensive Evaluation of Al-Co-Cr-Fe-Ni High-Entropy Alloys via Composition and Structural Analysis – 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

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**LIGHT METALS****Advances in Titanium Technology – Session V**

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

**Wednesday AM | March 6, 2024**

**Windermere X-1 | Hyatt**

**Session Chair:** Babu Viswanathan, The Ohio State University

**8:30 AM**

**Ultrafine Grain Formation and Mechanical Properties in Commercial Pure Titanium Through Thermomechanical Processing Near Transus Temperature:** *Hyung-Won Park*<sup>1</sup>; Kyunghyun Kim<sup>2</sup>; Hyeon-Woo Park<sup>3</sup>; Yuki Shimomura<sup>3</sup>; Taichi Kitajima<sup>1</sup>; Jun Yanagimoto<sup>3</sup>; <sup>1</sup>Komatsu University; <sup>2</sup>Makino Milling Machine Co., Ltd.; <sup>3</sup>The University of Tokyo

**8:50 AM**

**Magnetron Sputtering for Advanced Sintering and Alloy Design:** *Camilo Bedoya Lopez*<sup>1</sup>; Santiago Vargas<sup>1</sup>; Colson Miller<sup>1</sup>; Gil Rubia<sup>1</sup>; Diana Galeano<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**9:10 AM Invited**

**Effect of Trace Elements for Hydrogen Ingress and Hydride Formation in Commercially Pure Titanium:** *Stoichko Antonov*<sup>1</sup>; Qing Tan<sup>2</sup>; Wei Chen<sup>3</sup>; Baptiste Gault<sup>2</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>Max Planck Institute für Eisenforschung GmbH; <sup>3</sup>Illinois Institute of Technology

**9:35 AM**

**Rapidly Assessing Strain Rate Sensitivity of Titanium Alloys via Nanoindentation:** *James Paramore*<sup>1</sup>; Daniel Lewis<sup>1</sup>; Nicole Person<sup>1</sup>; Brady Butler<sup>2</sup>; Matthew Dunstan<sup>3</sup>; Michael Hurst<sup>1</sup>; George Pharr<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Texas A&M University;

DEVCOM Army Research Laboratory; <sup>3</sup>DEVCOM Army Research Laboratory

**9:55 AM**

**Microstructure and Mechanical Properties of Quenched and Partitioned Ti-6Al-4V:** *Valava Sambandam Rani*<sup>1</sup>; Alec Saville<sup>1</sup>; Benjamin Ellyson<sup>2</sup>; Amy Clarke<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Lawrence Livermore National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session V**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Wednesday AM | March 6, 2024**  
**Bayhill 32 | Hyatt**

**Session Chair:** Ali Shargh, Johns Hopkins University

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**8:30 AM**

**Enhancing Materials Discovery in Vast Composition Spaces: Integrating ML Techniques with FUSE:** *Hasan Muhammad Sayeed*<sup>1</sup>; Chris Collins<sup>2</sup>; Matthew Rosseinsky<sup>2</sup>; Taylor D. Sparks<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Liverpool

**8:50 AM**

**Active Learning for Inverse Problems: Bridging Anisotropy to Materials Structure:** *Michael Buzzy*<sup>1</sup>; David Montes de Oca Zapiain<sup>2</sup>; Surya Kalidindi<sup>1</sup>; Hojun Lim<sup>2</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Sandia National Labs

**9:10 AM**

**An Explanatory Model for Microhardness in Friction Stir Processing of 316L Stainless Steel:** *Mohammad Fuad Nur Taufique*<sup>1</sup>; Moses Obiri<sup>1</sup>; Keerti Kappagantula<sup>1</sup>; David Garcia<sup>1</sup>; Kenneth Ross<sup>1</sup>; Julia Nguyen<sup>1</sup>; Angel Ortiz<sup>1</sup>; Donald Todd<sup>1</sup>; Tianhao Wang<sup>1</sup>; Hrishikesh Das<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**9:30 AM**

**Enhancing Corrosion Resistant Alloy Design Through Natural Language Processing and Deep Learning:** *Kasturi Sasidhar*<sup>1</sup>; Nima Siboni<sup>1</sup>; Jaber Mianroodi<sup>1</sup>; Michael Rohweder<sup>1</sup>; Jörg Neugebauer<sup>1</sup>; Dierk Raabe<sup>1</sup>; <sup>1</sup>Max-Planck Institut für Eisenforschung, Düsseldorf, Germany

**9:50 AM**

**Experimentally Validated High-dimensional Bayesian Optimization of Dental Adhesives via Adaptive Design:** *Ramsey Issa*<sup>1</sup>; Taylor Sparks<sup>1</sup>; <sup>1</sup>University of Utah

**10:10 AM Break**

**10:30 AM**

**Genetic Programming Derived Stress-rupture Model for Lifetime Estimation of Alloy 617:** *Md Abir Hossain*<sup>1</sup>; Calvin Stewart<sup>1</sup>; <sup>1</sup>The Ohio State University

**10:50 AM**

**High-throughput Micromechanical Simulations Framework and Its Applications to Predict Microstructure-property Relationships Using a Machine Learning Approach:** *Napat Vajragupta*<sup>1</sup>; Abhishek Biswas<sup>1</sup>; Jihad Zraibi<sup>2</sup>; Hitesh Walia<sup>2</sup>; Marzuk Kamal<sup>2</sup>; Tatu Pinomaa<sup>1</sup>; Matti Lindroos<sup>1</sup>; Sicong Ren<sup>1</sup>; Tom Andersson<sup>1</sup>; Anssi Laukkanen<sup>1</sup>; <sup>1</sup>VTT Technical Research Centre of Finland Ltd; <sup>2</sup>AeonX AI SAS

**11:10 AM**

**A Deep Learning Framework for Designing BCC Refractory Multi-principal Element Alloys with Optimized Strength:** *Ali Shargh*<sup>1</sup>; Jing Luo<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

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Algorithm Development in Materials Science and Engineering – Algorithm Development for Atomistic Simulations**

**Sponsored by:**

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

**Wednesday AM | March 6, 2024**  
**Bayhill 28 | Hyatt**

**Session Chair:** Douglas Spearot, University of Florida

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**8:30 AM**

**Transferable Machine Learning Potentials for Extreme Environments:** *Jan Janssen*<sup>1</sup>; Danny Perez<sup>1</sup>; <sup>1</sup>Los Alamos National Lab

**8:50 AM**

**Understanding Diffusion Processes in a Multicomponent Alloy Using a Variational Approach:** *Dallas Trinkle*<sup>1</sup>; Soham Chattopadhyay<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**9:10 AM**

**Yield Surfaces of Face-centered Cubic Copper from Discrete Dislocation Dynamics and Geometric Prior Approach:** *Wu-Rong Jian*<sup>1</sup>; Mian Xiao<sup>2</sup>; WaiChing Sun<sup>2</sup>; Wei Cai<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>Columbia University

**9:30 AM**

**Machine Learning-guided MEAM Interatomic Potential Development for Predicting Melting Point Properties:** *Sepideh Kavousi*<sup>1</sup>; Mohsen Asle Zaeem<sup>1</sup>; <sup>1</sup>Colorado School of Mines

9:50 AM Break

10:10 AM

**Investigating the Uncertainty in Multi-fidelity Machine Learning Interatomic Potentials:** *Ilgar Baghishov*<sup>1</sup>; Jan Janssen<sup>2</sup>; Aparna Subramanyam<sup>2</sup>; Graeme Henkelman<sup>1</sup>; Danny Perez<sup>2</sup>; <sup>1</sup>University of Texas at Austin; <sup>2</sup>Los Alamos National Laboratory

10:30 AM

**Concurrent Atomistic-continuum Modeling of Materials Synthesis, Structure, and Properties:** *Youping Chen*<sup>1</sup>; Yang Li<sup>1</sup>; Adrian Diaz<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Los Alamos National Lab

10:50 AM

**Development of a Monte Carlo Potts Anisotropic Grain Growth Model That Considers GB Energy Dependence on Both Misorientation and Inclination:** *Lin Yang*<sup>1</sup>; Vishal Yadav<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

11:10 AM

**Bayesian Optimization Driven Atomistic Simulation Alloy Co-design for Additive Manufacturing:** *Sk Md Ahnaf Akif Alvi*<sup>1</sup>; Jan Janssen<sup>2</sup>; Danial Khatamsaz<sup>3</sup>; Douglas Allaire<sup>3</sup>; Danny Perez<sup>2</sup>; Raymundo Arroyave<sup>3</sup>; <sup>1</sup>Texas A&M University; Los Alamos National Laboratory; <sup>2</sup>Los Alamos National laboratory; <sup>3</sup>Texas A&M University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XII — Session II

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

Wednesday AM | March 6, 2024

Bayhill 26 | Hyatt

**Session Chairs:** I-Lun Jen, National Yang Ming Chiao Tung University; Bo-Chia Chen, National Yang Ming Chiao Tung University

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8:30 AM Invited

**Contribution of Thermoelectric Property Variations Over Time and Temperature for Several RTG Technologies:** *Thierry Caillat*<sup>1</sup>; <sup>1</sup>Jet Propulsion Laboratory/California Institute of Technology

8:50 AM Invited

**Crystal Chemistry of Metal Pnictides: Tunable Systems for Energy Applications:** *Kirill Kovnir*<sup>1</sup>; <sup>1</sup>Iowa State University

9:10 AM

**Defect Evolution from Dislocation Network to Solid Solution in SnTe Alloys:** *Bo-Chia Chen*<sup>1</sup>; Szu-Chien Wu<sup>1</sup>; Kuang-Kuo Wang<sup>2</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang-Ming Chiao Tung University; <sup>2</sup>National Sun Yat-sen University

9:30 AM

**Development of Ag-to-Ag Direct Bonding Technique for Ge-Pb-Te Thermoelectric Materials and Cu Electrodes:** *Yu-En Tsaï*<sup>1</sup>; Cheng-Lin Shieh<sup>1</sup>; Chien-Neng Liao<sup>1</sup>;

<sup>1</sup>National Tsing Hua University

**9:50 AM**

**Fast Synthesis on n-type  $\text{Ag}_2\text{Se}$  with Improved Thermoelectric Performance:** *I-Lun Jen*<sup>1</sup>; You-Cheng Du<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**10:10 AM Break**

**10:30 AM Invited**

**Material Design for Thermal Conductivity Reduction and Modulation:** *Takayoshi Katase*<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology

**10:50 AM**

**Thermal Conductivity Reduction and Thermoelectric Performance Enhancement of  $\text{SrTiO}_3$  by Hydride Anion Substitution:** *Xinyi He*<sup>1</sup>; Seiya Nomoto<sup>1</sup>; Takayoshi Katase<sup>1</sup>; Terumasa Tadano<sup>2</sup>; Toshio Kamiya<sup>1</sup>; <sup>1</sup>MDX Research Center for Element Strategy, International Research Frontiers Initiative, Tokyo Institute of Technology; <sup>2</sup>Research Center for Magnetic and Spintronic Materials, National Institute for Materials Science

**11:10 AM**

**Silver Whisker Formation in Liquid-like Phase Transition Materials:** *Yun-Han Huang Lu*<sup>1</sup>; I-Lun Jen<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**11:30 AM**

**Unveiling the effect of Aging on the Crystallinity and Thermoelectric Efficiency of GeTe Thin Films:** *Jyun-Yong Huang*<sup>1</sup>; Albert T. Wu<sup>1</sup>; <sup>1</sup>National Central University

**11:50 AM Invited**

**Novel Zintl Phases  $\text{Na}_2\text{CaCdSb}_2$ ,  $\text{Na}_2\text{SrCdSb}_2$  and  $\text{Na}_2\text{EuCdSb}_2$ :** *Svilen Bobev*<sup>1</sup>; <sup>1</sup>University of Delaware

## LIGHT METALS

### Alumina & Bauxite — Process Impurity Management and Calcination Technologies

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

**Program Organizers:** Michael Coley, University of the West Indies; Samuel Wagstaff, Oculatus Consulting

**Wednesday AM | March 6, 2024**

**Windermere X-3 | Hyatt**

**Session Chair:** James Vaughan, The University of Queensland, Australia

**8:30 AM Introductory Comments**

**8:35 AM**

**Chemical Thermodynamics and Reaction Kinetics of Bayer Process Desilication:** *Hong (Marco) Peng*<sup>1</sup>; James Vaughan<sup>1</sup>; Sicheng Wang<sup>1</sup>; John Vogrin<sup>1</sup>; Dilini Seneviratne<sup>1</sup>; <sup>1</sup>University of Queensland

**9:00 AM**

**Challenges with Characterizing and Processing Goethite-rich Jamaican Bauxites:** *Michael Coley*<sup>1</sup>; Anthony Greenaway<sup>1</sup>; Alicia Buckley<sup>1</sup>; Khadeen Henry<sup>1</sup>; Jheanell James<sup>1</sup>; Jason Brown<sup>1</sup>; <sup>1</sup>University of the West Indies



9:25 AM

**Sugar-derived Causticization Additives for the Bayer Process:** *Amit Desai*<sup>1</sup>; Jun Su An<sup>1</sup>; LoongYi Tan<sup>1</sup>; <sup>1</sup>Solugen Inc.

9:50 AM Break

10:05 AM

**Unveiling the Potential: A Paradigm Shift in Energy Reduction at Hindalco Renukoot Alumina Refinery:** *Paul Gupta*<sup>1</sup>; Nitya Roy<sup>1</sup>; <sup>1</sup>Hindalco Industries Ltd

10:30 AM

**An Innovative Approach to Smelter Grade Alumina Calcination Using Renewable Energy:** *Michael Wheatland*<sup>1</sup>; Jerry Fu<sup>1</sup>; <sup>1</sup>Calix Limited

10:55 AM

**Numerical Simulations for Performance Optimization of Circulating Fluidized Bed Calciner:** Bharathesh Kumar<sup>1</sup>; Abhishek Seth<sup>1</sup>; Chandrakala Kari<sup>1</sup>; Vilas Tathavadkar<sup>1</sup>; Ashish Mishra<sup>2</sup>; Prasanta Bose<sup>2</sup>; *Amit Gupta*<sup>1</sup>; <sup>1</sup>Aditya Birla Science & Technology; <sup>2</sup>Hindalco Industries Ltd.

11:20 AM

**Improving the Operational Availability of Hydro Alunorte Calciners by Proper Refractories Maintenance Management:** *Mariana A L Braulio*<sup>1</sup>; Thais A Novais<sup>1</sup>; Thiago Macedo<sup>2</sup>; Veridiano Gomes<sup>2</sup>; Jessika Silva<sup>2</sup>; Thiago Iwanaga<sup>2</sup>; Victor Pandolfelli<sup>3</sup>; <sup>1</sup>Cast Technical Assistance and Consultancy on Refractories; <sup>2</sup>Hydro Alunorte; <sup>3</sup>Federal University of São Carlos

**11:45 AM Panel Discussion:** Bayer Process Research: Charting the path from Cross-cutting challenges to shared innovative solutions

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## LIGHT METALS

**Aluminum Alloys: Development and Manufacturing — Manufacturing, Joining and Performance**

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

**Wednesday AM | March 6, 2024**

**Windermere W-1 | Hyatt**

**Session Chairs:** Lei Li, Pacific Northwest National Laboratory; Maximilian Bachmann, Institute for Metal Forming Technology University of Stuttgart

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8:30 AM

**Effect of Shot Peening on Fatigue Properties of A20X Fabricated by Laser Powder Bed Fusion:** Heidar Karimialavijeh<sup>1</sup>; Apratim Chakraborty<sup>1</sup>; Martin Proebstle<sup>2</sup>; *Etienne Martin*<sup>1</sup>; <sup>1</sup>Polytechnique Montreal; <sup>2</sup>GE Additive

8:55 AM

**Investigations on the Solid-state Additive Manufacturing of Al Alloy: Process, Microstructure, and Crystallographic Texture:** *Abhishek Pariyar*<sup>1</sup>; Dikai Guan<sup>1</sup>; <sup>1</sup>University of Southampton

9:20 AM

**Evaluating Three - Point Bending Behavior of Aluminum Extruded Thin Walled Structure:** *Melih Caylak*<sup>1</sup>; Tolgahan Cali<sup>1</sup>; Berat Bayramoglu<sup>1</sup>; Gorkem Ozcelik<sup>1</sup>; <sup>1</sup>ASAS Aluminum

**9:45 AM**

**Meshfree Process Modeling and Experimental Validation of Friction Riveting of Aluminum 5052 to Aluminum 6061:** *Lei Li*<sup>1</sup>; Mayur Pole<sup>1</sup>; Hrishikesh Das<sup>1</sup>; Sridhar Niverty<sup>1</sup>; Md Reza-E-Rabby<sup>1</sup>; Jorge Dos Santos<sup>1</sup>; Ayoub Soulami<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:10 AM Break****10:25 AM**

**Influence of Welding Tool Material and Type of Joint on the Formability of Friction Stir Welded Tailored Blanks:** *Maximilian Bachmann*<sup>1</sup>; Robin Göbel<sup>2</sup>; Kim Riedmüller<sup>1</sup>; Mathias Liewald<sup>1</sup>; <sup>1</sup>Institute for Metal Forming Technology University of Stuttgart; <sup>2</sup>Materials Testing Institute University of Stuttgart

**10:50 AM**

**Parameters Controlling Drilling and Tapping Characteristics of Aluminum Based Alloys:** *Fawzy Samuel*<sup>1</sup>; <sup>1</sup>ETS-Montreal

**11:15 AM**

**Determining the Corrosion Speed of Welded AA 5005 Alloy with AA5356 Filler Metals According to Weld Rate Using by MIG Welding Technique:** Hüseyin Müstak<sup>1</sup>; Günhan Bayrak<sup>2</sup>; *Yusuf Özçetin*<sup>1</sup>; <sup>1</sup>Asas Alüminyum Tic. A.S; <sup>2</sup>Sakarya University of Applied Sciences

**11:40 AM**

**Investigating the Corrosion Performance of EN-AW-8006 Alloy With Mn and Cu Additions:** *Ece Harputlu*<sup>1</sup>; Cemil Işıksaçan<sup>1</sup>; Mert Günyüz<sup>1</sup>; Erdem Atar<sup>2</sup>; <sup>1</sup>Assan Alüminyum; <sup>2</sup>Gebze Technical University

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## LIGHT METALS

### Aluminum Reduction Technology – Fundamental Studies / Developments / Research

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Wednesday AM | March 6, 2024**

**Windermere Y-2 | Hyatt**

**Session Chairs:** Jayson Tessier, Alcoa Corporation; Michel Reverdy, Emirates Global Aluminium

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**8:30 AM**

**Direct Production of Al-Mn Alloys during the Electrodeposition of Aluminium in a Laboratory Cell:** *Omar Awaysa*<sup>1</sup>; Geir Martin Haarberg<sup>1</sup>; Gudrun Sævarsdóttir<sup>1</sup>; Rauan Meirbekova<sup>1</sup>; <sup>1</sup>United Arab Emirates University

**8:55 AM**

**Electrowinning of Al-Sc Master Alloys in the LiF-AlF<sub>3</sub>-Sc<sub>2</sub>O<sub>3</sub> Melts:** *Andrey Yasinskiy*<sup>1</sup>; Ilya Moiseenko<sup>2</sup>; Dmitriy Varyukhin<sup>2</sup>; Anastasia Saparova<sup>2</sup>; Aleksandr Samoilo<sup>2</sup>; Pavel Yuryev<sup>2</sup>; Youjian Yang<sup>3</sup>; Zhongning Shi<sup>3</sup>; Zhaowen Wang<sup>3</sup>; Peter Polyakov<sup>2</sup>; Bernd Friedrich<sup>1</sup>; <sup>1</sup>RWTH Aachen University; <sup>2</sup>Siberian Federal University; <sup>3</sup>Northeastern University

**9:20 AM**

**Factors Affecting the Performance of Oxygen Evolving Ni-Fe-Cu Anodes in Low Temperature Molten Fluoride Electrolyte for Aluminium Electrowinning:** *Gudrun Saevarsdottir*<sup>1</sup>; Geir Martin Haarberg<sup>2</sup>; Kamaljeet Singh<sup>1</sup>; Sai Krishna Padamata<sup>1</sup>; <sup>1</sup>Reykjavik University; <sup>2</sup>Norwegian University of Science and Technology

**9:45 AM**

**Dimensional Analysis Applied to the Dissolution and Disintegration of Alumina Rafts: The Riddle of Dissolving Alumina Rafts Solved:** *Jonathan Alarie*<sup>1</sup>; László Kiss<sup>1</sup>; Lukas Dion<sup>1</sup>; Sébastien Guérard<sup>2</sup>; Jean-François Bilodeau<sup>2</sup>; Martin Truchon<sup>1</sup>; <sup>1</sup>University of Quebec-Chicoutimi; <sup>2</sup>Arvida Research and Development Centre, Rio Tinto

**10:10 AM Break****10:25 AM**

**Fundamental Loss of Current Efficiency During Aluminium Electrolysis and its Correlation With Sodium Content Dissolved in the Aluminium:** *Lukas Dion*<sup>1</sup>; Paul Desclaux<sup>2</sup>; <sup>1</sup>Université du Québec à Chicoutimi; <sup>2</sup>Consultant

**10:50 AM**

**Novel Developments for Inert Anodes and Wettable Cathodes in Aluminium Electrolysis:** *David Jarvis*<sup>1</sup>; Rosanna van den Blik<sup>1</sup>; Rosie Mellor<sup>1</sup>; Alf Bjørseth<sup>1</sup>; <sup>1</sup>VSCA

**11:15 AM**

**Online Monitoring of Metal Oxides in Molten Fluoride Electrolytes:** *Wojciech Gebarowski*<sup>1</sup>; *Samuel Senanu*<sup>2</sup>; Arne Petter Ratvik<sup>2</sup>; Ole Kjos<sup>2</sup>; Henrik Gudbrandsen<sup>2</sup>; Egil Skybakmoen<sup>2</sup>; <sup>1</sup>vLab; <sup>2</sup>SINTEF

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## LIGHT METALS

**An Atoms to Autos Approach for Materials Innovations for Lightweighting: An LMD Symposium in Honor of Anil K. Sachdev — Materials Processing and Vehicle Electrification**

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

**Program Organizers:** Alan Luo, Ohio State University; Michele Manuel, University of Florida; Yue Qi, Brown University

**Wednesday AM | March 6, 2024**

**Windermere X-2 | Hyatt**

**Session Chair:** Yue Qi, Brown University

**8:30 AM Keynote**

**Liquid Metallurgy Processing for Reuse of Al Scrap:** *Diran Apelian*<sup>1</sup>; Shri Shankar<sup>1</sup>; Raquel Jaime<sup>1</sup>; <sup>1</sup>University of California-Irvine

**8:50 AM Invited**

**Lightweighting Solutions Enabled by Sustainable Low-Carbon Footprint Alloys and Processes:** *Jianfeng Wang*<sup>1</sup>; Henry Zhan<sup>1</sup>; Zhou Wang<sup>1</sup>; Ming Liu<sup>1</sup>; <sup>1</sup>General Motors Global Research and Development

**9:10 AM**

**Influence of Recycled Alloy Additions on the Microstructure and Plane Strain Deformation of Wrought Aluminum Alloys:** *Chaitali Patil*<sup>1</sup>; Tracy Berman<sup>1</sup>; Minju Kang<sup>2</sup>; Chal Park<sup>2</sup>; John Allison<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Novelis

**9:30 AM Invited****Solidification Processing of Metal Matrix Composites for Transportation**

**Applications:** Pradeep Rohatgi<sup>1</sup>; *Dave Weiss*<sup>2</sup>; Tirumalai Srivatsan<sup>3</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>Intelligent Composites; <sup>3</sup>The University of Akron

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

**Battery500 Consortium: Understanding and Addressing the Fundamental Challenges in Rechargeable Lithium Metal Batteries:** *Jie Xiao*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:30 AM Invited**

**Magnetic Materials for EV Traction Motors:** *Jun Cui*<sup>1</sup>; Jun Cui<sup>2</sup>; Gaoyuan Ouyang<sup>2</sup>; Iver Anderson<sup>2</sup>; Matt Kramer<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Ames National Laboratory

**10:50 AM Invited**

**Multiscale Simulations of Thin Passivation Layers --- From Aluminum Forming to Lithium-Ion Battery Durability:** *Yue Qi*<sup>1</sup>; <sup>1</sup>Brown University

**11:10 AM**

**Micro-mechanics of Li Metal for High Energy Battery Applications: A Full-field Crystal Plasticity Approach:** *Supriyo Chakraborty*<sup>1</sup>; <sup>1</sup>Max-Planck-Institut für Eisenforschung GmbH

**11:30 AM Invited**

**Understanding Chemical and Structural Organization in Cation Disordered Rocksalt Oxides for Li-ion Batteries:** *Megan Butala*<sup>1</sup>; John Langhout<sup>1</sup>; <sup>1</sup>University of Florida

**11:50 AM Invited**

**High Entropy Alloys: A Path Toward Wider Alloy Variety for Future Recycled Lightweight Alloys:** *Mitra Taheri*<sup>1</sup>; Emily Holcombe<sup>1</sup>; Sebastian Lech<sup>1</sup>; Deb Sur<sup>2</sup>; John Scully<sup>2</sup>; Jason Hattrick-Simpers<sup>3</sup>; Howard Joress<sup>4</sup>; Brian DeCost<sup>4</sup>; Loic Perriere<sup>5</sup>; Jean-Philippe Couzinie<sup>5</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Virginia; <sup>3</sup>University of Toronto; <sup>4</sup>National Institute of Standards and Technology; <sup>5</sup>University of Paris-EST (UPEC)

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**BIOMATERIALS****Biological Materials Science — Biological Materials Science V**

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

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

**Wednesday AM | March 6, 2024**

**Celebration 15 | Hyatt**

**Session Chairs:** Ning Zhang, Baylor University; Steven Naleway, University of Utah

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**8:30 AM Invited**

**Recent Advances in Understanding Material Properties of Secondary Lignocellulosic Cell Walls:** *Joseph Jakes*<sup>1</sup>; <sup>1</sup>USDA FS Forest Products Laboratory

**9:00 AM**

**Nanoscale Strengthening and Toughening Mechanisms of Coconut Endocarp:** *Ning Zhang*<sup>1</sup>; Sharmi Mazumder<sup>1</sup>; <sup>1</sup>Baylor University

**9:20 AM**

**Multiscale Analysis and Modeling of Filamentous Fungi:** *Debora Lyn Porter*<sup>1</sup>; <sup>1</sup>UC Merced

**9:40 AM Invited**

**Mucus-mimicking Selective-permeable Hydrogels:** *Shaoting Lin*<sup>1</sup>; <sup>1</sup>Michigan State University

**10:10 AM Break**

**10:30 AM**

**Evolution-Structure-Property Relationships of Damage Tolerant Horse Enamel:** *Tomas Grejtak*<sup>1</sup>; Tyler Hunt<sup>2</sup>; Tomas Babuska<sup>3</sup>; Stephen Kuhn-Hendricks<sup>2</sup>; Mark Norell<sup>4</sup>; Gregory Erickson<sup>2</sup>; Brandon Krick<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Florida State University; <sup>3</sup>Lehigh University; <sup>4</sup>American Museum of Natural History

**10:50 AM**

**Time-resolved Interface Mismatch Between Cells in the Apis Mellifera Honeycomb Characterized by X-ray Microscopy:** *Rahul Franklin*<sup>1</sup>; Eshan Ganju<sup>1</sup>; Brock Harpur<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University

**11:10 AM**

**'Evaluation of Spine Biomechanics Using Micro-computed Tomography:** *Hutomo Tanoto*<sup>1</sup>; Donggi Ha<sup>1</sup>; Yuxiao Zhou<sup>1</sup>; <sup>1</sup>Texas A&M University

**11:30 AM**

**Exploring the Impact of Polymer Functional Groups on the Viability of Gamete Cells With Microfluidics:** *Jeffrey Bates*<sup>1</sup>; <sup>1</sup>University of Utah

## NUCLEAR MATERIALS

### **Ceramics and Ceramic-based Composites for Nuclear Fission Applications — Nuclear Fuels I**

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

**Program Organizers:** Dong Liu, University of Oxford; Assel Aitkaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory; Konstantina Lambrinou, University of Huddersfield; Cynthia Adkins, Idaho National Laboratory; Scarlett Widgeon Paisner, Los Alamos National Laboratory

**Wednesday AM | March 6, 2024**

**Rainbow Spring I | Hyatt**

**Session Chairs:** Cynthia Adkins, INL; Assel Aitkaliyeva, University of Florida

**8:30 AM**

**Impact of Grain Boundary and Surface Diffusion on Predicted Fission Gas Bubble Microstructural Evolution Behavior and Release in UO<sub>2</sub> Nuclear Fuel:** *Md Ali Muntaha*<sup>1</sup>; Sourav Chatterjee<sup>2</sup>; Michael Tonks<sup>2</sup>; Larry Aagesen<sup>3</sup>; David Andersson<sup>4</sup>; Brian Wirth<sup>5</sup>; Sophie Blondel<sup>5</sup>; <sup>1</sup>Purdue University; <sup>2</sup>University of Florida; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Los Alamos National Laboratory; <sup>5</sup>University of Tennessee

**9:10 AM**

**Multiphysics and Multiscale Modeling of Micro- and Macro- cracking in High Burnup UO<sub>2</sub> Fuels:** *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 William Donald Cooper<sup>3</sup>; Larry K. Agesen<sup>4</sup>; Wen Jiang<sup>4</sup>; Jason Harp<sup>5</sup>; Karim Ahmed<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Electric Power Research Institute; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Idaho National Laboratory; <sup>5</sup>Oak Ridge National Laboratory

**9:30 AM**

**Response of the U<sub>3</sub>Si<sub>2</sub> + 50 wt%UB<sub>2</sub> Composite Alloyed with Al, Al<sub>2</sub>O<sub>3</sub>, Y and Y<sub>2</sub>O<sub>3</sub> in High-Temperature Oxidizing Atmospheres:** *Geronimo Robles*<sup>1</sup>; Scarlett Widgeon Paisner<sup>2</sup>; Joshua White<sup>2</sup>; Elizabeth Sooby<sup>1</sup>; <sup>1</sup>The University of Texas at San Antonio; <sup>2</sup>Los Alamos National Laboratory

**9:50 AM**

**Radially Resolved Thermo-physical Modelling in High Burnup Oxide Nuclear Fuel:** *Joshua Ferrigno*<sup>1</sup>; Pierre-Clement Simon<sup>2</sup>; Marat Khafizov<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Idaho National Laboratory

**10:10 AM Break****10:25 AM**

**Radiation Effects in Ceramics for Immobilization of Actinide-containing Nuclear Waste:** *William Weber*<sup>1</sup>; <sup>1</sup>University of Tennessee

**10:45 AM**

**Thermal Conductivity Suppression in Uranium-doped Thorium Dioxide Due to Phonon Resonant Scattering:** *Zilong Hua*<sup>1</sup>; Saqeeb Adnan<sup>2</sup>; Cody Dennett<sup>3</sup>; Amey Khanolkar<sup>1</sup>; Karl Rickert<sup>4</sup>; David Turner<sup>5</sup>; Timothy Prusnick<sup>4</sup>; James Mann<sup>6</sup>; Marat Khafizov<sup>2</sup>; David Hurley<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>the Ohio State University; <sup>3</sup>Commonwealth Fusion System; <sup>4</sup>KBR; <sup>5</sup>Azimuth Corporation; <sup>6</sup>Air Force Research Laboratory

**11:05 AM**

**Uranium Enrichment Homogeneity Study on HALEU/LEU UO<sub>2</sub> Fuel Pellets:** *Jennifer Watkins*<sup>1</sup>; Adrian Wagner<sup>1</sup>; Daniel Murray<sup>1</sup>; Uriel Santoro<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>GE Vernova

**11:25 AM**

**Exploring Hydrogen Absorption with High-density Fuels:** *Adrian Gonzales*<sup>1</sup>; Elizabeth Sooby<sup>2</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>The University of Texas at San Antonio

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## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Materials Processing Analysis and Characterization**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Wednesday AM | March 6, 2024  
Celebration 2 | Hyatt**

**Session Chairs:** Andrew D. Brown, DEVCOM ARL Army Research Office; Shadia Jamil Ikhmayies, Isra University

**8:30 AM**

**Boron Removal from Prepared Rice Hulls Ash Metallurgical-grade Silicon via Solvent Refining Process:** *Benedict Ayomanor*<sup>1</sup>; *Cookey Iyen*<sup>2</sup>; *Godswill Ofualagba*<sup>1</sup>; *Judith Umukoro*<sup>1</sup>; *Oghenekevwe Enamuotor*<sup>3</sup>; *Onajite Omughele*<sup>4</sup>; <sup>1</sup>Federal University of Petroleum Resources Effurun; <sup>2</sup>Federal University Wukari; <sup>3</sup>Dennis Osadebay University; <sup>4</sup>Delta State University

**8:50 AM**

**Purification of Rutile Ore by HCl and HF Leaching:** *Tong Zhang*<sup>1</sup>; *Zhiwei Peng*<sup>1</sup>; *Shangyong Zuo*<sup>1</sup>; <sup>1</sup>Central South University

**9:10 AM**

**Deformation Dependent Electrical Conductivity Mapping of [Fe(Htrz)<sub>2</sub>(trz)](BF<sub>4</sub>):** *Rifat Mahbub*<sup>1</sup>; *Kayleigh McElveen*<sup>1</sup>; *Binny Tamang*<sup>1</sup>; *Rebecca Lai*<sup>1</sup>; *Lanping Yue*<sup>1</sup>; *Jeffrey Shield*<sup>1</sup>; <sup>1</sup>University of Nebraska-Lincoln

**9:30 AM**

**Assessing Degradation of Molybdenum Alloys via Non-destructive and Destructive Techniques:** *Ishan Joshipura*<sup>1</sup>; *Vasant Vuppuluri*<sup>1</sup>; *Gabriel Ponon*<sup>1</sup>; *Jordan Lum*<sup>1</sup>; *Edward Benavidez*<sup>1</sup>; *Cora Lutes*<sup>1</sup>; *Owen Mays*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**9:50 AM**

**Density Measurement of Molten Chloride Mixtures:** *Alexandra Brusq*<sup>1</sup>; *Mathieu Gibilaro*<sup>1</sup>; *Laurent Massot*<sup>1</sup>; *Pierre Chamelot*<sup>1</sup>; <sup>1</sup>Laboratoire de Génie Chimique

**10:10 AM Break**

**10:25 AM**

**Elevated Temperature Mechanical Properties of Diffusion Welded Alloy 617 Fabricated by Electric Field Assisted Sintering:** *Xinchang Zhang*<sup>1</sup>; *Michael McMurtrey*<sup>1</sup>; *Tate Patterson*<sup>1</sup>; *Ryann Bass*<sup>1</sup>; *Andrew Gorman*<sup>1</sup>; *Jorgen Rufner*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**10:45 AM**

**Characterization of Multi-material Joints Formed via High Velocity Riveting:** *Benjamin Schuessler*<sup>1</sup>; *Lei Li*<sup>1</sup>; *Krishna Chaitanya Pitike*<sup>1</sup>; *Sridhar Niverty*<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

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Chemistry and Physics of Interfaces — Surface and Interface Chemistry**

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

**Wednesday AM | March 6, 2024**  
**Bayhill 25 | Hyatt**

**Session Chairs:** Blas Uberuaga, Los Alamos National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory

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**8:30 AM Invited**

**Environmentally-induced Degradation of Friction in Molybdenum Disulfide Films:** *Michael Chandross*<sup>1</sup>; N. Scott Bobbitt<sup>1</sup>; John Curry<sup>1</sup>; Taisuke Ohta<sup>1</sup>; Frank DelRio<sup>1</sup>; Philip Mantos<sup>1</sup>; Morgan Jones<sup>1</sup>; Tomas Babuska<sup>1</sup>; Michael Dugger<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**9:00 AM Invited**

**Tribochemistry: How Evolving Chemistry, Structure and Composition Dynamically Change the Properties of Solid Materials in Unlubricated Sliding Interfaces:** *Brandon Krick*<sup>1</sup>; <sup>1</sup>FAMU-FSU College of Engineering

**9:30 AM**

**Tribochemical Reaction of Molybdenum Dithiocarbamate Revealed by Neural Network Potential-based Molecular Dynamics Simulations:** *Kento Hosono*<sup>1</sup>; Takuya Tozawa<sup>1</sup>; Arisa Chiba<sup>1</sup>; Ryutaro Kudo<sup>1</sup>; Mizuho Yokoi<sup>1</sup>; Masayuki Kawamura<sup>1</sup>; Yixin Su<sup>1</sup>; Shogo Fukushima<sup>1</sup>; Yuta Asano<sup>1</sup>; Yusuke Ootani<sup>1</sup>; Nobuki Ozawa<sup>1</sup>; Momoji Kubo<sup>1</sup>; <sup>1</sup>Tohoku University

**9:50 AM Break**

**10:10 AM Invited**

**Energetic, Focused, Beam-induced Surface Chemistry: A Nanofabrication Perspective:** *Steven Randolph*<sup>1</sup>; John Lassetter<sup>2</sup>; Spencer Gellerup<sup>2</sup>; Nickolay Lavrik<sup>1</sup>; Ivan Kravchenko<sup>1</sup>; Philip Rack<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee, Knoxville

**10:40 AM**

**Prediction of Solute Segregation at Metal/Oxide Interfaces Using Machine Learning Approach:** *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

**11:00 AM**

**Understanding How Modifying the Thermal History Influences Abnormal Grain Growth in SrTiO<sub>3</sub>:** *Vivekanand Muralikrishnan*<sup>1</sup>; Jackson Langhout<sup>2</sup>; Amanda Krause<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>University of Florida

**11:20 AM Invited**

**Grain Boundary Chemistry and Electrical Potential in BaTiO<sub>3</sub>:** *Elizabeth Dickey*<sup>1</sup>; Seonghwan Hong<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## ADDITIVE MANUFACTURING

**Cold Spray Additive Manufacturing: Part Quality and Performance — Additive Manufacturing Process**



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

**Program Organizers:** Ahmed Alade Tihamiyu, University Of Calgary, Canada; Tanaji Paul, Florida International University; Julio Villafuerte, CenterLine Windsor Ltd; Aaron Nardi, VRC Metal Systems; Joseph Heelan, Solvus Global

**Wednesday AM | March 6, 2024**  
**Gulf | Hyatt**

**Session Chairs:** Aaron Nardi, VRC Metal Systems; Ahmed Tihamiyu, University of Calgary

**8:30 AM Invited**

**Powder Engineering for High Performance Cold Spray Materials:** *Brad Richards*<sup>1</sup>; Joe Heelan<sup>1</sup>; Ben Young<sup>2</sup>; <sup>1</sup>Powders On Demand; <sup>2</sup>Solvus Global

**9:00 AM**

**Role of Carrier Gas on Microstructure and Anisotropic Properties of Cold Sprayed Scalmalloy:** *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

**9:20 AM**

**Cold Spray Additive Manufacturing of High Purity Tantalum and Niobium Rare Metals; Fabrication, Microstructure, Room and High Temperature Mechanical Properties:** *Kee-Ahn Lee*<sup>1</sup>; Young-Kyun Kim<sup>2</sup>; Yu-Jin Whang<sup>1</sup>; <sup>1</sup>Inha University; <sup>2</sup>Korea Institute of Materials Science

**9:40 AM Invited**

**Cold Spray Path Planning for Superalloy Structures with High As-deposited Strength and Consolidation:** *Marius Ellingsen*<sup>1</sup>; Bharat Jasthi<sup>2</sup>; <sup>1</sup>VRC Metal Systems; <sup>2</sup>South Dakota Mines

**10:10 AM Break**

**10:30 AM**

**Investigating the Microstructure and Mechanical Behavior of the Particle-particle and Substrate-particle Interfaces in Cold Sprayed Coatings:** *Tanvi Ajantiwalay*<sup>1</sup>; Sridhar Niverty<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

**10:50 AM**

**A Hybrid Molecular Dynamics/Finite Element Approach to Studying the Bonding Process of Cold Sprayed Metal Particles:** *Scott Julien*<sup>1</sup>; Mark DelloStritto<sup>2</sup>; Jason Pattis<sup>2</sup>; Akul Chaudhuri<sup>1</sup>; Enqiang Lin<sup>1</sup>; Qiyong Chen<sup>1</sup>; Ozan Ozdemir<sup>1</sup>; Michael Klein<sup>2</sup>; Sinan Muftu<sup>1</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>Temple University

**11:10 AM**

**Residual-stress-based Crystal Plasticity Model for Simulation of Cold Spray Al6061:** *Aulora Rusk*<sup>1</sup>; YubRaj Paudel<sup>1</sup>; Shiraz Mujahid<sup>1</sup>; Marc Pepi<sup>2</sup>; Peter Czech<sup>3</sup>; Haitham El Kadiri<sup>1</sup>; Hongjoo Rhee<sup>1</sup>; <sup>1</sup>Mississippi State University; <sup>2</sup>Army Research Labs; <sup>3</sup>American Lightweight Materials Manufacturing Innovation Institute

**11:30 AM**

**Novel Application of SST Cold Spray Technology in High Volume Production of Polyamide (PA) Thermal Barrier Profiles for Industrial and Residential Window and Facade Manufacturing:** *Julio Villafuerte*<sup>1</sup>; <sup>1</sup>Centerline Windsor Ltd

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**MATERIALS SYNTHESIS AND PROCESSING**

## Composite Materials: Sustainable and Eco-Friendly Materials and Application — Eco Friendly and Sustainable Composite Materials: Mechanical Performance

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

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

**Wednesday AM | March 6, 2024**  
**Celebration 4 | Hyatt**

**Session Chair:** Brian Wisner, Ohio University

### 8:30 AM

**Additive Manufacturing of Polymer Matrix Composites With Natural Fibers:** *Henry Colorado*<sup>1</sup>; *Gabriela Nunes Sales Barreto*<sup>2</sup>; *Felipe Perisse*<sup>2</sup>; *Afonso Rangel Garcez de Azevedo*<sup>2</sup>; *Sergio Neves*<sup>3</sup>; *Carlos Fontes Vieira*<sup>2</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF); <sup>3</sup>Instituto Militar de Engenharia

### 8:50 AM

**Analysis of the Incorporation of Industrial Granite Waste in an Epoxy Matrix on Compression Performance:** *David Coverdale Velasco*<sup>1</sup>; *José Alexandre Linhares Junior*<sup>1</sup>; *Felipe Perisse Lopes*<sup>1</sup>; *Markssuel Marvila*<sup>2</sup>; *Afonso de Azevedo*<sup>1</sup>; *Carlos Maurício Vieira*<sup>1</sup>; <sup>1</sup>UENF - State University of the Northern Rio de Janeiro; <sup>2</sup>UFV - Federal University of Viçosa, CRP - Rio Paranaíba campus

### 9:10 AM

**Assessment of the Tensile and Thermal Properties of Recycled Waste Plastics Composites:** *Olu Ekebafé*<sup>1</sup>; *Adetoun Akitoye*<sup>1</sup>; <sup>1</sup>University of Lagos

### 9:30 AM

**Characterization of Polymeric Composites for Piping Repair by Mechanical Testing:** *Aline de Bessa Schinkoeth Reis*<sup>1</sup>; *David Coverdale Rangel Velasco*<sup>1</sup>; *Noan Tonini Simonassi*<sup>1</sup>; *Eduardo Atem de Carvalho*<sup>1</sup>; *Carlos Fontes Vieira*<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

### 9:50 AM

**Comparative Analysis of Flexural Resistance of Epoxy Composites Reinforced With Acai Fiber Powder:** *Jaqueline Moreira de Oliveira*<sup>1</sup>; *David Coverdale Rangel Velasco*<sup>1</sup>; *Carlos Fontes Vieira*<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; *Geovana Girondi Delaqua*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

### 10:10 AM Break

### 10:30 AM

**Design and Characterization of Kevlar/Epoxy Composites Infused with Silicon Carbide (SiC) - Zinc Oxide (ZnO) Nanofillers:** *Bupesh Kumar Karunagaran*<sup>1</sup>; *B Rajaprakash*<sup>2</sup>; <sup>1</sup>University Visvesvaraya College of Engineering, Bangalore University.; <sup>2</sup>University of Visvesvaraya College of Engineering (UVCE)

### 10:50 AM

**Impact Evaluation of Corn Husk Reinforced Epoxy Composites:** *Rogério Rabello*<sup>1</sup>; *Darcy Oliveira*<sup>1</sup>; *Felipe Lopes*<sup>1</sup>; *Noan Simonassi*<sup>1</sup>; *Carlos Maurício Vieira*<sup>1</sup>; *Sergio Monteiro*<sup>1</sup>; <sup>1</sup>UENF - State University of the Northern Rio de Janeiro

**11:10 AM****Nanoparticle Reinforced Lightweight Metal Composites and Their Characterisation: A Summary:** *Qianqian Li*<sup>1</sup>; Zhuocheng Xu<sup>1</sup>; Milo Shaffer<sup>1</sup>; <sup>1</sup>Imperial College London**11:30 AM****Study of the Impact Behavior of Epoxy Matrix Composites With Granite Waste:** José Alexandre Linhares Junior<sup>1</sup>; David Coverdale Velasco<sup>1</sup>; *Felipe Perisse Lopes*<sup>1</sup>; Carlos Maurício Vieira<sup>1</sup>; Afonso de Azevedo<sup>1</sup>; Markssuel Marvila<sup>2</sup>; <sup>1</sup>UENF - State University of the Northern Rio de Janeiro; <sup>2</sup>UFV - Federal University of Viçosa

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN****Computational Thermodynamics and Kinetics — New Methods & Accelerated Simulations****Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Turret, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University**Wednesday AM | March 6, 2024****Bayhill 29 | Hyatt****Session Chairs:** Axel Forslund, Universität Stuttgart; Yasushi Shibuta, University of Tokyo**8:30 AM Invited****Accurate Ab Initio Thermodynamic Properties with Direct Upsampling:** *Axel Forslund*<sup>1</sup>; Jong Hyun Jung<sup>1</sup>; Prashanth Srinivasan<sup>1</sup>; Yuji Ikeda<sup>1</sup>; Blazej Grabowski<sup>1</sup>; <sup>1</sup>Universität Stuttgart**9:00 AM****Way To Go! — Optimizing Materials Gradients via a Novel Pathfinder Framework:** *Samuel Price*<sup>1</sup>; Ian McCue<sup>1</sup>; Zhaoxi Cao<sup>1</sup>; <sup>1</sup>Northwestern University**9:20 AM****The Alloy Optimization Software (TAOS): Application to Eutectic and Ordered HEAs:** *Aurelien Perron*<sup>1</sup>; Nicholas Ury<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Vincenzo Lordi<sup>1</sup>; Thomas Voisin<sup>1</sup>; Joseph McKeown<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory**9:40 AM****Normalizing Flows for Accelerating Atomistic Simulation of Rare Events:** *Rasool Ahmad*<sup>1</sup>; Wei Cai<sup>1</sup>; <sup>1</sup>Stanford University**10:00 AM Break****10:20 AM****Foundations of a Finite Non-equilibrium Statistical Thermodynamics:** *Jeremy Mason*<sup>1</sup>; Ozan Ericok<sup>1</sup>; <sup>1</sup>University of California, Davis**10:40 AM****Thermodynamic and Kinetic Studies of Coupled Composition, Strain, and Configurational Order Effects Using CASM:** *Brian Puchala*<sup>1</sup>; Sessa Sai Behara<sup>2</sup>; Anton Van der Ven<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of California, Santa Barbara

**11:00 AM Invited**

**Prediction of Material Properties by Integrating Molecular Dynamics and Machine Learning Approaches:** *Yasushi Shibuta*<sup>1</sup>; <sup>1</sup>The University Of Tokyo

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## MECHANICS OF MATERIALS

### Defects and Interfaces: Modeling and Experiments — Interface-related Deformation

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Wednesday AM | March 6, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Yanfei Gao, University of Tennessee; Liming Xiong, NC State University

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**8:30 AM Invited**

**Dispersive Shear Bands on the Surface of Layered Heterostructured Materials:** *Yanfei Gao*<sup>1</sup>; *Yanchun Zhao*<sup>2</sup>; *Yuntian Zhu*<sup>3</sup>; <sup>1</sup>University of Tennessee-Knoxville; <sup>2</sup>Lanzhou University of Technology; <sup>3</sup>City University of Hong Kong

**9:00 AM**

**Void Nucleation in a through Silicon via (TSV): Unraveling the Role of Tilt Grain Boundaries through Atomistic Investigation:** *Armin Shashaani*<sup>1</sup>; *Panthea Sepehrband*<sup>1</sup>; <sup>1</sup>Santa Clara University

**9:20 AM**

**CRSS Determination in -Titanium: Skewed Dislocation Core Structures:** *Orcun Koray Celebi*<sup>1</sup>; *Gorkem Gengor*<sup>1</sup>; *Tolga Berkay Celebi*<sup>1</sup>; *Ahmed Sameer Khan Mohammed*<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

**9:40 AM**

**Atomistic Simulation of Hydrogen-defect Interactions in Palladium Nanoparticles Across Multiple Time Scales:** *Xingsheng Sun*<sup>1</sup>; *Youyun Xu*<sup>1</sup>; <sup>1</sup>University of Kentucky

**10:00 AM Break**

**10:15 AM Invited**

**Integrating Atomistic-to-Microscale Simulations with Experiments for Understanding Slip Transfer in Heterogeneous Metallic Materials and Solid Oxides:** *Thanh Phan*<sup>1</sup>; *Liming Xiong*<sup>1</sup>; <sup>1</sup>North Carolina State University

**10:45 AM**

**Linear Complexions in FCC Alloys and Their Impact on Mechanical Properties:** *Hannah Howard*<sup>1</sup>; *W. Streit Cunningham*<sup>1</sup>; *Divya Singh*<sup>2</sup>; *Pulkit Garg*<sup>3</sup>; *Edward Li*<sup>3</sup>; *Benoit Merle*<sup>4</sup>; *Timothy Rupert*<sup>3</sup>; *Daniel Gianola*<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>Utah Tech University; <sup>3</sup>University of California Irvine; <sup>4</sup>University of Kassel

**11:05 AM**

**Microstructural Induced Defects and Failure Modes in Crystalline Materials:** *Muh-Jang Chen*<sup>1</sup>; *Dongyue Xie*<sup>2</sup>; *Nan Li*<sup>2</sup>; *Mohammed Zikry*<sup>1</sup>; <sup>1</sup>North Carolina State

University; <sup>2</sup>Los Alamos National Laboratory

**11:25 AM**

**Studying Grain Boundary Regions in Polycrystalline Tantalum Using Spherical Nano-indentation:** *Olajesu Olanrewaju*<sup>1</sup>; Manish Kumar<sup>1</sup>; Jacob Kevin<sup>1</sup>; Curt Bronkhorst<sup>2</sup>; Marko Knezevic<sup>3</sup>; Nan Chen<sup>2</sup>; William Musinsky<sup>4</sup>; Manny Gonzales<sup>4</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; <sup>4</sup>Air Force Research Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Defects and Properties of Cast Metals – Defect I - Porosity & Cracks

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

**Program Organizers:** Lang Yuan, University of South Carolina; Andrew Kao, University of Greenwich; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Kyle Fezi, Fort Wayne Metals

**Wednesday AM | March 6, 2024**  
**Celebration 8 | Hyatt**

**Session Chairs:** Lang Yuan, University of South Carolina; Etienne Martin, Polytechnique de Montréal

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**8:30 AM Invited**

**Experimental Validation of Advanced Shrinkage Porosity Simulations for Steel Castings:** Robert Donahue<sup>1</sup>; Richard Hardin<sup>1</sup>; *Christoph Beckermann*<sup>1</sup>; <sup>1</sup>University of Iowa

**8:55 AM Invited**

**The Beneficial Effect of Minor Iron Additions on the Crack Susceptibility of Rapidly Solidified Aluminum Alloy 6060 Towards Additive Manufacturing Applications:** Michael Benoit<sup>1</sup>; Mark Whitney<sup>2</sup>; Suming Zhu<sup>3</sup>; Duyao Zhang<sup>3</sup>; Matthew Field<sup>3</sup>; *Mark Easton*<sup>3</sup>; <sup>1</sup>University of British Columbia; <sup>2</sup>University of Waterloo; <sup>3</sup>RMIT University

**9:20 AM**

**Systematic Variation of Clustered Porosity through Casting Parameter Modification:** *Matthew Binkley*<sup>1</sup>; Matthew Krane<sup>1</sup>; Kevin Trumble<sup>1</sup>; <sup>1</sup>Purdue University

**9:40 AM**

**Defects and Grain Structure Predictions of Nickel-base Superalloy Investment Castings:** *Shutaro Matsuura*<sup>1</sup>; Kosuke Fujiwara<sup>1</sup>; <sup>1</sup>Mitsubishi Heavy Industries, Ltd.

**10:00 AM**

**Analyzing the Impact of Pore Defects on the Mechanical Behavior of Metal Parts Through Micromechanical Analysis:** *Nannan Song*<sup>1</sup>; Shenghua Wu<sup>1</sup>; Flavio Souza<sup>1</sup>; Luiz Lima<sup>1</sup>; Rajesh Jeyachandran<sup>1</sup>; <sup>1</sup>Siemens

**10:20 AM Break**

**10:40 AM**

**A Machine Learning Approach for Prediction of the Size and Locations of Porosity in High Pressure Die Casting:** *Utkarsh Godwal*<sup>1</sup>; Shishira Bhagavath<sup>2</sup>; Supriyo Roy<sup>1</sup>; Bita Ghaffari<sup>3</sup>; Larry Godlewski<sup>3</sup>; Mei Li<sup>3</sup>; Peter Lee<sup>2</sup>; Shyamprasad Karagadde<sup>1</sup>; <sup>1</sup>IIT Bombay; <sup>2</sup>University College London; <sup>3</sup>Ford Motor Company

11:00 AM

**Crack Risk Prediction of Continuous Casting Process with Solidification End Reduction:** *Ji Cheng*<sup>1</sup>; *Miaoyong Zhu*<sup>1</sup>; <sup>1</sup>Northeastern University

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## MECHANICS OF MATERIALS

### Dynamic Behavior of Materials X — New Techniques and Diagnostics

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

Wednesday AM | March 6, 2024

Coral Spring I | Hyatt

**Session Chairs:** Taylor Sloop, Georgia Institute of Technology; Sara Ricci, University of Cassino

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8:30 AM

**Pores Collapse and Spall Fracture: A Direct Observation Using Fast X-ray Imaging:**

*Jose Rodriguez-Martinez*<sup>1</sup>; *Thomas Virazels*<sup>1</sup>; *Federico Sket*<sup>2</sup>; *Bratislav Lukić*<sup>3</sup>; *Alexander Rack*<sup>3</sup>; *David Pedroche*<sup>1</sup>; *Sergio Puerta*<sup>1</sup>; *Javier Garcia*<sup>2</sup>; <sup>1</sup>University Carlos III of Madrid; <sup>2</sup>IMDEA Materials; <sup>3</sup>European Synchrotron Radiation Facility

8:50 AM

**Evaluation of Compound Refractive Lenses during Hypervelocity Impact Experiments:**

*Emilio Loera*<sup>1</sup>; *Brian Schuster*<sup>1</sup>; *Waruna Kulatilaka*<sup>2</sup>; *Thomas Lacy*<sup>2</sup>; <sup>1</sup>The University of Texas at El Paso; <sup>2</sup>Texas A&M University

9:10 AM

**Effects of Local Length Scales on Estimation of Void Fraction Distribution from X-ray Tomography of Spall Damage in Metallic Samples:**

*Sharmila Nimbkar*<sup>1</sup>; *Pedro Peralta*<sup>1</sup>; <sup>1</sup>Arizona State University

9:30 AM

**Laser Shock Compression of Diamond, Olivine, and Perovskite:**

*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 Break

10:10 AM

**In-situ Full-field Imaging of Hypervelocity Impacts and Shock Compression Deformations Using Time-resolved Raman Spectroscopy:**

*Mahavir Singh*<sup>1</sup>; *Esteban Campos*<sup>1</sup>; *Abhijeet Dhiman*<sup>2</sup>; *Vikas Tomar*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Intel Corporation

10:30 AM

**In-situ X-ray Diffraction of Nanolamellar High-entropy Alloys under Shock Compression and Release:**

*Kento Katagiri*<sup>1</sup>; *Sara Irvine*<sup>1</sup>; *Laura Madril*<sup>1</sup>; *Jie Ren*<sup>2</sup>; *Alexis Amouretti*<sup>3</sup>; *Ryosuke Kodama*<sup>3</sup>; *Hiroataka Nakamura*<sup>3</sup>; *Norimasa Ozaki*<sup>3</sup>; *Kohei Miyanishi*<sup>4</sup>; *Keiichi Sueda*<sup>4</sup>; *Tadashi Togashi*<sup>4</sup>; *Makina Yabashi*<sup>4</sup>; *Toshinori Yabuuchi*<sup>4</sup>; *Vohra Yogesh*<sup>5</sup>; *Wen Chen*<sup>2</sup>; *Leora Dresselhaus-Marais*<sup>1</sup>; <sup>1</sup>Stanford University; <sup>2</sup>University of Massachusetts; <sup>3</sup>Osaka University; <sup>4</sup>RIKEN; <sup>5</sup>University of Alabama at Birmingham

**10:50 AM**

**Local Deformation and Recrystallization during High-velocity Impact of Metallic Particles:** *Chongxi Yuan*<sup>1</sup>; Marisol Koslowski<sup>1</sup>; <sup>1</sup>Purdue University

**11:10 AM**

**Identifying the Precursors of Ductile Failure via Void Nucleation and Coalescence:** *Jose Solano*<sup>1</sup>; Sven Gustafson<sup>1</sup>; Philip Noell<sup>2</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>Argonne National Laboratory

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## LIGHT METALS

**Electrode Technology for Aluminum Production — Workshop - Step Changes Required for Carbon Anodes**

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

**Program Organizers:** Julien Lauzon-Gauthier, Alcoa Corporation; Samuel Wagstaff, Oculatus Consulting

**Wednesday AM | March 6, 2024**  
**Windermere W-2 | Hyatt**

**Session Chairs:** Barry Sadler, Net Carbon Consulting; Alan Tomsett, Rio Tinto

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**8:30 AM Introductory Comments:** This session is designed to encourage interaction between attendees. The general topic of step changes required for carbon anodes was identified by Barry Welch in his 2023 Honorary Symposium. For each sub-topic, a panel of experienced industry representatives has been identified to present ideas and facilitate discussion.

**8:40 AM Panel Discussion:** What is the ideal carbon anode + assembly design for modern aluminium reduction cells? What is the potential to improve anode and cell performance from a bottom-up redesign of the current anode assembly (i.e., rod and anode) from the customers perspective?

Carbon anode requirements identified by smelter customers will be presented. Panel members include Pascal Lavoie (Alcoa) and Daniel Whitfield (Boyne Smelters).

**9:25 AM Panel Discussion:** Are we measuring the right things the right way in Carbon Plants? What are the development pathways for anode quality instrumentation systems? What is stopping more rapid, universal adoption of these technologies? Panel members to present/participate in the discussion include Markus Meier from R+D Carbon and several industry expert representatives.

**10:10 AM Break**

**10:30 AM Panel Discussion:** What incremental and large step changes can be made to green, baked, and rodded anode production processes so the anodes add value to potlines? Including future decarbonisation requirements, what changes to carbon anode production technology are needed to reduce variation, improve consumption rates, reduce GHG emissions, etc?

Panel members to present/participate in the discussion include Markus Meier from R+D Carbon and several industry expert representatives.

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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:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Metals Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong (Marco) Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Onuralp Yucel, Istanbul Technical University; Alafara Baba, University of Ilorin

**Wednesday AM | March 6, 2024**  
**Bayhill 33 | Hyatt**

**Session Chairs:** Chukwunwike Iloeje, Argonne National Laboratory; Hong (Marco) Peng, University of Queensland

**8:30 AM Introductory Comments**

**8:40 AM**

**Research and Development on Low Carbon Technologies of Modern Blast Furnace Ironmaking:** *Zhang Fuming*<sup>1</sup>; Xiangfeng Cheng<sup>1</sup>; Zhizheng Wang<sup>1</sup>; Yanbo Chen<sup>1</sup>; <sup>1</sup>Shougang Group Co. Ltd.

**9:00 AM**

**Innovation and Application on Low-carbon Ironmaking Technologies at Shougang:** *Zhang Fuming*<sup>1</sup>; <sup>1</sup>Shougang Group Co. Ltd.

**9:20 AM**

**Pathways to Reduce Operational Carbon Footprint in Secondary Aluminum Melting:** Anand Makwana<sup>1</sup>; *Valmiro Sa*<sup>1</sup>; Jason Kabarowski<sup>1</sup>; Yue Huang<sup>1</sup>; Renato Pereira da Silva Junior<sup>1</sup>; Xiaoyi He<sup>1</sup>; <sup>1</sup>Air Products & Chemicals Inc

**9:40 AM**

**A Strategy for Reaching Net Zero:** *Alexander Wimmer*<sup>1</sup>; <sup>1</sup>Constantia Teich GmbH

**10:00 AM Break**

**10:20 AM**

**An App to Set the Path to Net Zero in Foundries:** *Emanuele Pagone*<sup>1</sup>; Rylan Cox<sup>1</sup>; Tim Birch<sup>2</sup>; <sup>1</sup>Cranfield University; <sup>2</sup>Foseco International

**10:40 AM**

**Reduction and Carbonization of Iron Concentrate With Hydrogen-rich Gas:** *Run Zhang*<sup>1</sup>; Chao Wang<sup>1</sup>; Yang You<sup>1</sup>; Jie Dang<sup>1</sup>; <sup>1</sup>Chongqing University

**11:00 AM Concluding Comments**

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

**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

**Wednesday AM | March 6, 2024**  
**Bayhill 17 | Hyatt**

**Session Chairs:** Nikhilesh Chawla, Purdue University; Jenifer Locke, Ohio State University

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**8:30 AM Invited**

**Elucidation of Corrosion and Freeze/Thaw Mechanisms in Light Alloys by In situ X-ray Micro and Nanotomography:** *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue University

**9:00 AM Invited**

**Oxidation Mechanism Transitions in Tungsten Driven by Scale Cracking:** *Samuel Humphry-Baker*<sup>1</sup>; *Dora Nagy*<sup>1</sup>; *Yusha Lin*<sup>1</sup>; *James Davidson*<sup>1</sup>; *Sercan Cetinkaya*<sup>2</sup>; *Vanessa Peterson*<sup>3</sup>; *Edward Obbard*<sup>2</sup>; *Kevin Laws*<sup>2</sup>; *Patrick Burr*<sup>2</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>University of New South Wales; <sup>3</sup>Australian Nuclear Science and Technology Organisation

**9:30 AM**

**Impact of Helium Bubbles on Fracture Stress From Phase Field Simulations:** *An Ta*<sup>1</sup>; *Yixi Shen*<sup>1</sup>; *Michael Tonks*<sup>1</sup>; *Doug Spearot*<sup>1</sup>; *Simon Phillpot*<sup>1</sup>; <sup>1</sup>University of Florida

**9:50 AM Invited**

**The Need for Understanding of the Differences Between Environment Assisted Fracture in Conventional Full Immersion Environments and Atmospheric Environments and how Newly Developed Crack Tip In-situ Techniques may Provide Insights:** *Jenifer Locke*<sup>1</sup>; *Brandon Free*<sup>1</sup>; <sup>1</sup>Ohio State University

**10:20 AM Break**

**10:40 AM Invited**

**Cold Spray of Metallic Coatings for Improving Resistance of Materials to Environmental Degradation:** *Pin Lu*<sup>1</sup>; <sup>1</sup>Solvus Global

**11:10 AM**

**Phase-field Model Incorporating Large Inelastic Strain With Application to the Oxidation of High-temperature Coating Systems:** *Tianle Cheng*<sup>1</sup>; *Fei Xue*<sup>1</sup>; *Yinkai Lei*<sup>1</sup>; *Omer Dogan*<sup>2</sup>; *Youhai Wen*<sup>2</sup>; <sup>1</sup>National Energy Technology Laboratory / NETL Support Contractor; <sup>2</sup>National Energy Technology Laboratory

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## **MECHANICS OF MATERIALS**

**Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue Deformation Processes**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; Ashley Spear, University of Utah; Brian Wisner, Ohio University

**Wednesday AM | March 6, 2024**  
**Manatee Spring II | Hyatt**

**Session Chair:** Garrett Pataky, Clemson University

**8:30 AM**

**Critical Microstructural Features for Fatigue Crack Initiation at Basal Twist Grain Boundaries in Ti Alloys:** D. Iabbaden<sup>1</sup>; Julien Guénoles<sup>1</sup>; Azdine Nait-Ali<sup>2</sup>; Chris Bean<sup>3</sup>; Jean-Charles Stinville<sup>3</sup>; Joseph Wendorf<sup>4</sup>; Tresa Pollock<sup>4</sup>; *Samuel Hemery*<sup>2</sup>; <sup>1</sup>LEM3; <sup>2</sup>Institut Pprime; <sup>3</sup>UIUC; <sup>4</sup>UCSB

**8:50 AM**

**Microstructure Engineering to Disrupt Slip Localization: A New Approach to Enhance Fatigue Strength?:** *Yuheng Nie*<sup>1</sup>; Dhruv Anjaria<sup>2</sup>; Robert Hayes<sup>3</sup>; J.C. Stinville<sup>2</sup>; Marie-Agathe Charpagne<sup>2</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>Metals Technology, Inc.

**9:10 AM**

**Exploring Effects of Cold-dwell Fatigue on the Growth of Long Cracks in Alpha+Beta Ti-6Al-4V:** *James Larsen*<sup>1</sup>; Andrew Rosenberger<sup>1</sup>; Adam Pilchak<sup>2</sup>; N. Young<sup>3</sup>; Phillip Sherer<sup>2</sup>; Patrick Golden<sup>1</sup>; Reji John<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory; <sup>2</sup>Pratt & Whitney; <sup>3</sup>Carnegie Mellon University

**9:30 AM Invited**

**Post-processing Strategies to Improve Fatigue and Fracture Behavior of Additively Manufactured Metals:** *Jake Benzing*<sup>1</sup>; Orion Kafka<sup>1</sup>; Nicholas Derimow<sup>1</sup>; Nik Hrabe<sup>1</sup>; Sara Randall<sup>2</sup>; Julius Bonini<sup>2</sup>; Whitney Poling<sup>3</sup>; Tyson Brown<sup>3</sup>; Donald Godfrey<sup>4</sup>; Philipp Schumacher<sup>4</sup>; Frank DelRio<sup>5</sup>; Chad Beamer<sup>6</sup>; Ryan Fishel<sup>7</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Lucideon; <sup>3</sup>General Motors; <sup>4</sup>SLM Solutions; <sup>5</sup>Sandia National Laboratories; <sup>6</sup>Quintus Technologies; <sup>7</sup>3D Systems

**10:00 AM**

**Reduction in Fatigue Life Scatter of Additive Manufactured AlSi10Mg Using Laser Shock Peening:** Jacob Biddlecom<sup>1</sup>; Yuxin Li<sup>1</sup>; Xin Zhao<sup>1</sup>; Thomas Berfield<sup>2</sup>; *Garrett Pataky*<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>University of Louisville

**10:20 AM Break**

**10:30 AM Invited**

**The effect of R-ratio of the High Cycle Fatigue Behaviour of Precipitate-strengthened Al Alloys:** Yixin Wang<sup>1</sup>; *Christopher Hutchinson*<sup>1</sup>; <sup>1</sup>Monash University

**11:00 AM**

**Fatigue Crack Propagation in Rotary Friction Welded Inconel 600 and SS316L Joint:** *Jignesh Nakrani*<sup>1</sup>; Neeraj K. Mishra<sup>1</sup>; Wenyi Yan<sup>2</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay; <sup>2</sup>Monash University

**11:20 AM**

**On the Cyclic Elastoplastic Shakedown Response of an Auxetic Structure:** *Natasha Vermaak*<sup>1</sup>; Shen Wang<sup>1</sup>; <sup>1</sup>Lehigh University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials V: From Laser Processing to Bioelectronics

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Wednesday AM | March 6, 2024**

**Bayhill 21 | Hyatt**

**Session Chairs:** Michael Cai Wang, University of South Florida; Mostafa Bedewy, University of Pittsburgh; Woochul Lee, University of Hawaii at Manoa

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#### 8:30 AM Keynote

**Wearable Graphene Biosensors for Microfluidic Sweat Analysis:** *Wei Gao*<sup>1</sup>; <sup>1</sup>California Institute of Technology

#### 9:10 AM Invited

**Multifunctional Porous Soft Bioelectronics Built from Nanomaterials:** *Zheng Yan*<sup>1</sup>; <sup>1</sup>University of Missouri Columbia

#### 9:40 AM

**Combining Laser-induced Graphene with Kirigami for Transparent Flexible Electromagnetic Interference Shielding:** *Mirza Sahaluddin*<sup>1</sup>; Mingxuan Li<sup>1</sup>; Mehdi Zarei<sup>1</sup>; Paul Leu<sup>1</sup>; Mostafa Bedewy<sup>1</sup>; <sup>1</sup>University of Pittsburgh

#### 10:00 AM Break

#### 10:20 AM Invited

**Fusing Atoms with Bits through Hybrid Nanomanufacturing of Skin-interfaced Sensors:** *Wenzhuo Wu*<sup>1</sup>; <sup>1</sup>Purdue University

#### 10:50 AM Invited

**Laser-assisted Synthesis and Processing of 2D Materials:** Nurul Azam<sup>1</sup>; Suman Jaiswal<sup>1</sup>; Zabihollah Ahmadi<sup>1</sup>; Parvin Fathi-Hafshejani<sup>1</sup>; Matthew Boebinger<sup>2</sup>; *Masoud Mahjouri-Samani*<sup>1</sup>; <sup>1</sup>Auburn University; <sup>2</sup>Oak Ridge National Laboratory

#### 11:20 AM

**Surface Morphology Control at Nanometric Scale by Ultrashort Laser Pulses for Energy Storage Application:** *Anthony Nakhoul*<sup>1</sup>; Alixe Dréano<sup>1</sup>; Frédéric Christien<sup>2</sup>; Jean-Philippe Colombarier<sup>3</sup>; Florence Garrelie<sup>3</sup>; <sup>1</sup>Laboratoire Georges Friedel, Mines Saint-Etienne; <sup>2</sup>École nationale supérieure des mines de Saint-Étienne; <sup>3</sup>Laboratoire Hubert Curien, Université Jean Monnet

#### 11:40 AM

**Microwave Carbothermal Shock Synthesis of SERS Sensor for Microplastics Detection:** *FNU Joshua*<sup>1</sup>; Lei Zhai<sup>1</sup>; <sup>1</sup>University of Central Florida

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Steel Design II

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

**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

**Wednesday AM | March 6, 2024**

**Bayhill 31 | Hyatt**

**Session Chairs:** Pello Uranga, CEIT; Hyunseok Oh, University of Wisconsin-Madison

**8:30 AM**

**Microstructure and Mechanical Properties of a Stainless Steel Designed for Additive Manufacturing:** *Amir Farkoosh*<sup>1</sup>; Dieter Isheim<sup>1</sup>; Vyas Sharma<sup>2</sup>; Vladimir Popov<sup>2</sup>; Noam Eliaz<sup>2</sup>; David Seidman<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Tel Aviv University

**8:50 AM**

**High-performance Laminated Steels with Superior Strength-ductility Synergy via Additive Manufacturing:** *Xipeng Tan*<sup>1</sup>; Mingzhang Chen<sup>1</sup>; <sup>1</sup>National University of Singapore

**9:10 AM**

**Enhancing Microstructural and Mechanical Properties of Structural Sheet Steels by Metal Peeling:** *Ashish Devkota*<sup>1</sup>; Saryu Fensin<sup>2</sup>; Osman El-Atwani<sup>3</sup>; Dinakar Sagapuram<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory

**9:30 AM**

**Effects of Cerium Content on the Microstructure and Mechanical Properties of Steel:** *Run-Hua Ma*<sup>1</sup>; Jyun-Hua Chang<sup>2</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>Department of Materials Science and Engineering, National Taiwan University; <sup>2</sup>Walsin Lihwa Corporation

**9:50 AM**

**Effects of Si and Al on Microstructures and Properties of As-cast AHSS Slabs:** *Nhu Ngo*<sup>1</sup>; Bryan Webler<sup>1</sup>; Chris Pistorius<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**10:10 AM Break**

**10:25 AM**

**Effect of Mo Segregation in Hot-rolled Ferritic-bainitic Steels with Nb and Mo Alloying:** *Renan Melo Correia Lima*<sup>1</sup>; Flavia Tereza dos Santos Fernandes Tolomelli<sup>2</sup>; Harison Da Silva Ventura<sup>2</sup>; Jully Ramos Soares<sup>2</sup>; Melina Gamis da Silva<sup>2</sup>; Fernando Cosme Rizzo<sup>1</sup>; <sup>1</sup>PUC-Rio; <sup>2</sup>CSN

**10:45 AM**

**Effect of Cerium on the Nucleation and Microstructure of High-strength Low-alloy Steel during Solidification:** *Fei Huang*<sup>1</sup>; Jing Li<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**11:05 AM**

**Effect of Vanadium on the Mechanical and Microstructural Properties of Medium-Mn Steels:** Felisters Zvavamwe<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; *Kudakwashe Nyamuchiwa*<sup>1</sup>; Minkyu Paek<sup>1</sup>; <sup>1</sup>University of New Brunswick

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

## Hume-Rothery Symposium on Alloy Microstructure Science and Engineering — Advanced Alloy and Manufacturing

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

**Wednesday AM | March 6, 2024**  
**Bayhill 23 | Hyatt**

**Session Chairs:** Jian-Feng Nie, Monash University; Ning Zhou, Carpenter Technology Corp

### 8:30 AM Invited

**Determination of Mechanistic Information for Simulation Schemes of Transformation Pathways and Deformation Behavior in B2/BCC Refractory Complex Concentrated Alloys:** Zachary Kloenne<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Brian Welk<sup>1</sup>; Shalini Koneru<sup>1</sup>; Jean-Philippe Couzinié<sup>2</sup>; Steven Niezgodá<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Hamish Fraser<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University Paris-Est Creteil

### 9:00 AM Invited

**Ordering Induced Phase Stabilities and Transformation Pathways in FCC Based Complex Concentrated Alloys or High Entropy Alloys:** Sriswaroop Dasari<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Bharat Gwalani<sup>2</sup>; Stephane Gorsse<sup>3</sup>; Rajarshi Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>North Carolina State University; <sup>3</sup>University of Bordeaux

### 9:30 AM Invited

**Unlocking the Versatility of Additive Manufacturing: Alloy Development and Materials Discovery for Resource-constrained Environments Based on Commercial Feedstock Materials:** Wei Xiong<sup>1</sup>; <sup>1</sup>University of Pittsburgh

### 10:00 AM Break

### 10:20 AM Invited

**Revisiting Classic Recrystallization Experiments with Modern Simulation: Understanding the Mechanisms Behind the Development of Cube Orientation in Medium to High Stacking-fault Energy FCC Metals:** Supriyo Chakraborty<sup>1</sup>; Chaitali Patil<sup>2</sup>; Stephen Niezgodá<sup>3</sup>; <sup>1</sup>Max Plank Institute for Eisenforschung; <sup>2</sup>University of Michigan; <sup>3</sup>Ohio State University

### 10:50 AM Invited

**Thermodynamic and Kinetic Studies on Microstructure Changes in Additive Manufacturing:** Kaisheng Wu<sup>1</sup>; Magnus Anderson<sup>2</sup>; Johan Jeppsson<sup>2</sup>; Paul Mason<sup>1</sup>; <sup>1</sup>Thermo-Calc Software Inc; <sup>2</sup>Thermo-Calc Software AB

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion — Impact of Local Ordering on Mechanical Properties**

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

**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley

**Wednesday AM | March 6, 2024**  
**Bayhill 30 | Hyatt**

**Session Chairs:** Penghui Cao, University of California, Irvine; Irene Beyerlein, University of California, Santa Barbara; Yang Yang, The Pennsylvania State University; Robert Ritchie, University of California, Berkeley

**8:30 AM Invited**

**Tuning the Interplay between Local Chemical Order with Lattice Distortion in Planar Slip Bands to Increase Strain Hardening and Ductility in HEAs:** *Evan Ma*<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University

**9:00 AM Invited**

**Impact of Short-range Order on Planar Slips in High-entropy Alloys:** K.J. Yin<sup>1</sup>; H.W. Hsiao<sup>1</sup>; Y. Hu<sup>1</sup>; R. Feng<sup>2</sup>; Peter Liaw<sup>3</sup>; Y.-T. Shao<sup>4</sup>; *Jian Min Zuo*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Tennessee; <sup>4</sup>University of Southern California

**9:30 AM**

**Neural Network Potential-based Molecular Dynamics Nanoindentation and Machine Learning-based Kinetic Monte-Carlo Simulations of the Impact of Chemical Order in CrCoNi Medium-entropy Alloy:** *Jun-Ping Du*<sup>1</sup>; Shigenobu Ogata<sup>1</sup>; <sup>1</sup>Osaka University

**9:50 AM Break**

**10:05 AM Invited**

**Dislocations in Complex Alloys:** *William Curtin*<sup>1</sup>; Terrence Moran<sup>1</sup>; Bastien Aymon<sup>1</sup>; Xin Liu<sup>1</sup>; <sup>1</sup>Swiss Federal Institute of Technology

**10:35 AM Invited**

**Abnormal Tension-compression Asymmetry in Terms of Anelasticity and Yield Strength of Amorphous Si:** *Yuecun Wang*<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University

**11:05 AM**

**Discerning Chemical Short-range Ordering from Nanoindentation Pop-in Loads in a BCC Refractory Complex Concentrated Alloy:** *Jonathan Cappola*<sup>1</sup>; Glenn Balbus<sup>2</sup>; Todd Butler<sup>3</sup>; Lin Li<sup>1</sup>; <sup>1</sup>Arizona State University; <sup>2</sup>Lehigh University; <sup>3</sup>Air Force Research Laboratory

**11:25 AM**

**Dislocation Plasticity in Inhomogeneous FeCrAl Alloys:** *Yash Pachaury*<sup>1</sup>; *Anter El-Azab*<sup>1</sup>; <sup>1</sup>Purdue University

**11:45 AM**

**Short-range Ordering Mechanics in FCC Materials:** *Daegun You*<sup>1</sup>; *Orcun Celebi*<sup>1</sup>; *Ahmed Sameer Khan Mohammed*<sup>1</sup>; *Gorkem Gengor*<sup>1</sup>; *Huseyin Sehitoglu*<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

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**LIGHT METALS**

## Magnesium Technology 2024 — Primary Production, Recycling, and Modeling

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

**Wednesday AM | March 6, 2024**

**Windermere Y-3 | Hyatt**

**Session Chairs:** Wim Silekens, European Space Agency - ESTEC; Vineet Joshi, Pacific Northwest National Laboratory

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**8:30 AM Keynote**

**Developing a New Generation of Electrolytic Technology for Making Magnesium Metal:** *Alexander Grant*<sup>1</sup>; <sup>1</sup>Magrathea

**9:10 AM**

**A Succinct Method to Recycle WE43 Mg Alloys – From Wasted Chips to Consolidated Billets:** *Xingjian Zhao*<sup>1</sup>; *Dikai Guan*<sup>1</sup>; <sup>1</sup>The University of Southampton

**9:30 AM**

**Recycling of Magnesium Alloy Using the Gravity-driven Multiple Effect Thermal System (G-METS):** *Daniel Mc Arthur Sehar*<sup>1</sup>; *Armaghan Telgerafchi*<sup>1</sup>; *Artem Lurkovskyi*<sup>1</sup>; *Emmanuel Opoku*<sup>1</sup>; *Adam Powell*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**9:50 AM Break**

**10:10 AM**

**Production of Mg-Mg<sub>2</sub>Si Composites:** *Jessica Neuhaus*<sup>1</sup>; *Björn Wiese*<sup>2</sup>; *Norbert Hort*<sup>2</sup>; <sup>1</sup>Helmut-Schmidt-Universität; <sup>2</sup>Helmholtz-Zentrum Hereon

**10:30 AM Invited**

**Recent Advances in PRISMS-Plasticity Software for Simulation of Deformation in Mg Alloys:** *Mohammadreza Yaghoobi*<sup>1</sup>; *Tracy Berman*<sup>1</sup>; *Zhe Chen*<sup>1</sup>; *Aaron Tallman*<sup>2</sup>; *Duncan Greeley*<sup>1</sup>; *Michael Pilipchuk*<sup>1</sup>; *John E. Allison*<sup>1</sup>; *Veera Sundararaghavan*<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Florida International University

**10:55 AM**

**Thermodynamics of Mg-Y-O Alloys and Segregation at the Mg/MgO Interface:** *Rainer Schmid-Fetzer*<sup>1</sup>; *Shihao Wang*<sup>2</sup>; *Zhongyun Fan*<sup>3</sup>; <sup>1</sup>Clausthal University of Technology; <sup>2</sup>SuperSTEM Laboratory; <sup>3</sup>BCAST, Brunel University London

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

**Materials and Chemistry for Molten Salt Systems — Lanthanide and Actinide Molten Salt Chemistry**

**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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

**Wednesday AM | March 6, 2024**  
**Bayhill 20 | Hyatt**

**Session Chair:** Adam Burak, University of Michigan

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**8:30 AM**

**Reaction of Uranium Metal with  $\text{NH}_4\text{Cl}$  Molten  $\text{LiCl-KCl}$ :** *Nathan Rood*<sup>1</sup>; Krista Carlson<sup>2</sup>; Michael Simpson<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Nevada at Reno

**8:50 AM Invited**

**Electrochemical Measurement of Activity of  $\text{UCl}_3$  in  $\text{NaCl-UCl}_3$  and  $\text{NaCl-MgCl}_2\text{-UCl}_3$ :** *Jacob Yankey*<sup>1</sup>; Marisa Monreal<sup>2</sup>; Matt Jackson<sup>2</sup>; Michael Simpson<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Los Alamos National Laboratory

**9:20 AM**

**Cerium Trifluoride Solubility in Fluoride Salts:** *Nagihan Karakaya*<sup>1</sup>; Jinsuo Zhang<sup>1</sup>; <sup>1</sup>Virginia Tech

**9:40 AM**

**Evaluation and Thermodynamic Modeling of Molten Salt Reactor Fuel Compositions Applications: Study of Case of  $\text{NaCl-UCl}_3\text{-PuCl}_3$  and  $\text{LiF-BeF}_2\text{-ZrF}_4\text{-UF}_4$  Systems:** *Juliano Schorne Pinto*<sup>1</sup>; Mina Aziziha<sup>1</sup>; Jacob Yingling<sup>1</sup>; Johnathon Ard<sup>1</sup>; Jorge Paz Soldan Palma<sup>1</sup>; Amir Mofrad<sup>1</sup>; Theodore Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

**10:00 AM Break**

**10:15 AM**

**Electrochemical Formation of Tb Alloys in Molten Chloride Systems:** *Hirokazu Konishi*<sup>1</sup>; <sup>1</sup>Osaka University

**10:55 AM**

**Waste Treatment in Actinide-containing Salt:** *Mathieu Gibilaro*<sup>1</sup>; Julien Claquesin<sup>2</sup>; Olivier Lemoine<sup>3</sup>; Laurent Massot<sup>1</sup>; Pierre Chamelot<sup>1</sup>; Gilles Bourges<sup>3</sup>; <sup>1</sup>University of Toulouse; <sup>2</sup>University of Toulouse/CEA DAM; <sup>3</sup>CEA DAM

**10:35 AM**

**Advancements in Sustainable Strategies and Reactor Design for Cladding Recovery from Spent Fuel:** *Kunal Mondal*<sup>1</sup>; Richard Mayes<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## NUCLEAR MATERIALS

**Materials Informatics to Accelerate Nuclear Materials Investigation — Machine Learning Enhanced Modeling & Simulation**



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

**Program Organizers:** Miaomiao Jin, Pennsylvania State University; Yongfeng Zhang, University of Wisconsin; Tiankai Yao, Idaho National Laboratory; Anjana Talapatra, Los Alamos National Laboratory; Luca Messina, CEA Cadarache; Fei Xu, Idaho National Laboratory; Benjamin Afflerbach, University of Wisconsin-Madison

**Wednesday AM | March 6, 2024**  
**Silver Spring I-II | Hyatt**

**Session Chairs:** Jilang Miao, Pennsylvania State University; Benjamin Afflerbach, University of Wisconsin-Madison

**8:30 AM**

**Influence of Empirical Potentials on Data Quality in Computational Studies of Zr Alloys:** Oliver Nicholls<sup>1</sup>; Vidur Tuli<sup>1</sup>; *Patrick Burr*<sup>1</sup>; <sup>1</sup>The University of New South Wales

**8:50 AM**

**Modeling Cascade Damage in Tungsten Using Machine Learning SNAP Interatomic Potential: Electron-Phonon Interaction Model:** *Omar Hussein*<sup>1</sup>; Fadi Abdeljawad<sup>2</sup>; Timofey Frolov<sup>3</sup>; Artur Tamm<sup>4</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Lehigh University; <sup>3</sup>Lawrence Livermore National Laboratory; <sup>4</sup>University of Tartu

**9:10 AM Invited**

**Utilizing Mechanistic Modeling and Uncertainty Analysis to Support Nuclear Fuel Qualification:** *Christopher Matthews*<sup>1</sup>; Michael Cooper<sup>1</sup>; Pieterjan Robbe,<sup>2</sup>; Habib Najm<sup>2</sup>; David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Sandia National Laboratory

**9:40 AM Invited**

**Neural Networks of Defect Kinetics in Refractory Alloys:** *Penghui Cao*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**10:10 AM Break**

**10:30 AM Invited**

**Defect Evolution in Multi-principal Chemically Disordered Alloys from Multiscale Simulations:** *Shijun Zhao*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**11:00 AM**

**Machine Learning Enhanced Kinetic Monte Carlo Modeling of Molten Salt Corrosion of Ni-Cr Alloys:** *Jilang Miao*<sup>1</sup>; Miaomiao Jin<sup>1</sup>; Hamdy Arkoub<sup>1</sup>; <sup>1</sup>Pennsylvania State University

## MATERIALS SYNTHESIS AND PROCESSING

**Materials Processing and Kinetic Phenomena: From Thin Films and Micro/Nano Systems to Advanced Manufacturing — Thin Film and Micro/Nano Fabrication**

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

**Wednesday AM | March 6, 2024**  
**Celebration 11 | Hyatt**

**Session Chair:** To Be Announced

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### 8:30 AM Introductory Comments

#### 8:40 AM Invited

**Combinatorial Approach to Develop Sputter-deposited High-entropy Alloy Films for Inertial Confinement Fusion Applications:** *Eunjeong Kim*<sup>1</sup>; Alison Engwall<sup>1</sup>; Gregory Taylor<sup>1</sup>; Swanee Shin<sup>1</sup>; Alexander Baker<sup>1</sup>; James Merlo<sup>1</sup>; Liam Sohngen<sup>1</sup>; David Strozzi<sup>1</sup>; Brandon Bocklund<sup>1</sup>; Emily Moore<sup>1</sup>; Scott Peters<sup>1</sup>; Aurelien Perron<sup>1</sup>; Sergei Kucheyev<sup>1</sup>; Leonardus Bimo Bayu Aji<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

#### 9:10 AM Invited

**In Situ Laser Study and Fe-Cr-Ni Thin Film System:** *Kinga Unocic*<sup>1</sup>; John Lasseter<sup>2</sup>; Steven Randolph<sup>1</sup>; Yousub Lee<sup>1</sup>; Rangasayee Kannan<sup>1</sup>; Philip Rack<sup>2</sup>; Stephen Jesse<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>UTK

#### 9:40 AM

**Simulated Surface Diffusion in Nanoporous Gold and Its Dependence on Surface Curvature:** *Conner Winkeljohn*<sup>1</sup>; Jeremy Mason<sup>1</sup>; <sup>1</sup>University of California Davis

#### 10:00 AM Break

#### 10:20 AM

**Dislocation Formation in the Heteroepitaxial Growth of PbSe/PbTe Systems:** *Yang Li*<sup>1</sup>; Boyang Gu<sup>1</sup>; Adrian Diaz<sup>2</sup>; Simon Phillpot<sup>1</sup>; David McDowell<sup>3</sup>; Youping Chen<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Georgia Institute of Technology

#### 10:40 AM

**Fabrication of Periodic Textures at Micron Label on Silicone Membrane Using Femtosecond Laser:** *Suman Chatterjee*<sup>1</sup>; Abhijit Cholkar<sup>1</sup>; David Kinahan<sup>1</sup>; Dermot Brabazon<sup>1</sup>; <sup>1</sup>Dublin City University

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## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Materials for Global Development - 2D Materials and Composites**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Wednesday AM | March 6, 2024**  
**Celebration 14 | Hyatt**

**Session Chairs:** John Obayemi, Worcester Polytechnic Institute; Ali Salifu, Boston College

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**8:30 AM Keynote**

**Fracture at the Two-dimensional Limit:** *Jun Lou*<sup>1</sup>; <sup>1</sup>Rice University

**9:00 AM Keynote**

**Insights on Sustainable Graphene-like Materials from Bioresources and Their Applications:** *Ange Nzihou*<sup>1</sup>; Theotime Beguerie<sup>1</sup>; Amel Ghogia<sup>1</sup>; Claire White<sup>1</sup>; Wole Soboyejo<sup>1</sup>; <sup>1</sup>CNRS - IMT Mines Albi

**9:30 AM Invited**

**An Enzymatic Carbon-Negative Structural Material:** *Nima Rahbar*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**9:55 AM Break**

**10:15 AM Keynote**

**Winston “Wole” Soboyejo – A Retrospective View of His Accomplishments and Contributions:** *Diran Apelian*<sup>1</sup>; <sup>1</sup>University of California-Irvine

**10:45 AM Invited**

**Bioinspired Design of Fracture Resistant Polymer-based Structures:** *Xinrui Niu*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**11:10 AM**

**Recycled Wood-geopolymer Concrete Blocks as Sustainable Material:** *Jong Leng Liow*<sup>1</sup>; Amar Khennane<sup>1</sup>; Firesenay Gigar<sup>1</sup>; Elmira Katoozi<sup>1</sup>; <sup>1</sup>University of New South Wales Canberra

**11:30 AM Invited**

**Mechanical Behaviors of Biological and Engineered Composites:** *Jing Du*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**11:55 AM**

**Imaging-based Fracture Analysis of Epoxy-Alumina Composite:** *Yichun Tang*<sup>1</sup>; Kangning Su<sup>1</sup>; Ruyi Man<sup>1</sup>; Yuetong Hao<sup>1</sup>; Yanran Wang<sup>2</sup>; Michael Hillman<sup>1</sup>; Jiun-Shyan Chen<sup>2</sup>; Jing Du<sup>1</sup>; <sup>1</sup>Penn State University; <sup>2</sup>University of California, San Diego

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## **MATERIALS SYNTHESIS AND PROCESSING**

**Measurement and Control of High-temperature Processes — Measurement Techniques for Extreme Environments: Temperature & Thermal Properties**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

**Program Organizers:** Alexandra Anderson, Gopher Resource; Matthew Zappulla, Los Alamos National Laboratory; Dean Gregurek, RHI Magnesita; Stuart Nicol, Glencore Technology; Kristian Mackowiak, Kingston Process Metallurgy Inc.

**Wednesday AM | March 6, 2024**  
**Celebration 5 | Hyatt**

**Session Chairs:** Alexandra Anderson, Gopher Resource; Matthew Zappulla, Los Alamos National Laboratory

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**8:30 AM Introductory Comments**

**8:35 AM Invited**

**Physical Simulation of Materials at High Temperatures in Real-life Industrial Applications:** *Fulvio Siciliano*<sup>1</sup>; Brian Allen<sup>1</sup>; Don Olszowy<sup>1</sup>; Todd Bonesteel<sup>1</sup>; <sup>1</sup>Dynamic Systems Inc.

**8:55 AM**

**Quenching and Thermal Distortion Behavior of a Vacuum Oil Quenched Uranium Part:** *Matthew Zappulla*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:15 AM Invited**

**Challenges and Benefits of 'Thru-process' Temperature Profiling in the Heat Treatment Industry:** Steve Offley<sup>1</sup>; *Mike Handscombe*<sup>1</sup>; <sup>1</sup>PhoenixTM Ltd

**9:35 AM Invited**

**Determination of Thermal Properties (Thermal Conductivity, Specific Heat, ect) of Mold Materials via Plate Mold Castings:** *Mathew Hayne*<sup>1</sup>; Meghan Gibbs<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:55 AM Invited**

**Trials and Tribulations: Cold Lab Experiments and Modeling of Glovebox Casting Operations:** *Meghan Gibbs*<sup>1</sup>; Mathew Hayne<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:15 AM Break**

**10:35 AM**

**A Complete Thermal Analysis of a Funnel Type Mold Used in High-speed Thin Slab Continuous Casting through Three-dimensional Inverse Heat Conduction Problem:** *Ce Liang*<sup>1</sup>; Haihui Zhang<sup>2</sup>; Wanlin Wang<sup>1</sup>; <sup>1</sup>Central South University; <sup>2</sup>Jiangxi University of Science and Technology

**10:55 AM Invited**

**Infrared Thermography for Temperature Measurement of Vacuum Induction Furnaces:** *Sheridan McPheeters*<sup>1</sup>; William Peach<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**11:15 AM**

**FiberOpticsTemperatureMeasurements,Types,andApplicationsonMetallurgical Furnaces:** *Luis Gonzalez*<sup>1</sup>; <sup>1</sup>Xenon Production Systems

**11:35 AM**

**Fiber Optic Application in Metallurgical Processes External and Internal Temperature Monitoring of Metallurgical Furnaces with Distributed Temperature Sensor (DTS):** *Stefany Huanca Choque*<sup>1</sup>; Carlos Acho Quispe<sup>1</sup>; Luis Gonzalez Gomez<sup>1</sup>; Luis Chambi Viraca<sup>1</sup>; <sup>1</sup>Universidad Mayor de San Andres

**11:55 AM Concluding Comments**

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## MECHANICS OF MATERIALS

### Mechanical Behavior at the Nanoscale VII – 2D Materials and Mechanics at Surfaces

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Wednesday AM | March 6, 2024**

**Manatee Spring I | Hyatt**

**Session Chairs:** Changhong Cao, McGill University; Wei Gao, Texas A&M University

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#### 8:30 AM Invited

**Operational and Environmental Conditions Regulate the Nanoscale Frictional Behavior of Two-dimensional Materials:** *Frank DelRio*<sup>1</sup>; Bien-Cuong Tran-Khac<sup>2</sup>; Hyun-Joon Kim<sup>3</sup>; Koo-Hyun Chung<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of Ulsan; <sup>3</sup>Kyungpook National University

#### 9:00 AM

**In-Plane Fatigue Behavior of 2D Hybrid Organic-Inorganic Perovskites for Long-Term Reliability:** Doyun Kim<sup>1</sup>; Eugenia Vasileiadou<sup>2</sup>; Ioannis Spanopoulos<sup>3</sup>; Xuguang Wang<sup>4</sup>; Jinhui Yan<sup>4</sup>; Mercouri Kanatzidis<sup>2</sup>; *Qing Tu*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Northwestern University; <sup>3</sup>University of South Florida; <sup>4</sup>University of Illinois - Urbana Champaign

#### 9:20 AM

**Influence of Surface State on the Mechanics of Nano-objects:** *Hugo Iteney*<sup>1</sup>; Thomas Cornelius<sup>1</sup>; Olivier Thomas<sup>1</sup>; Jonathan Amodeo<sup>1</sup>; <sup>1</sup>IM2NP

#### 9:40 AM

**Nanoindentation Studies on Early-stage Irradiation Damage in Concentrated Solid-solution Alloys:** *Liuqing Yang*<sup>1</sup>; Youxing Chen<sup>1</sup>; Jimmie Miller<sup>1</sup>; William Weber<sup>2</sup>; Yanwen Zhang<sup>2</sup>; <sup>1</sup>University of North Carolina at Charlotte; <sup>2</sup>University of Tennessee, Knoxville

#### 10:00 AM Break

#### 10:20 AM

**Intrinsic Toughening of a Two-Dimensional Material via In-Plane Nanocomposite:** *Bongki Shin*<sup>1</sup>; Bo Ni<sup>2</sup>; Lucas Sassi<sup>3</sup>; Douglas Steinbach<sup>1</sup>; Zhenze Yang<sup>2</sup>; Chee Tat Toh<sup>3</sup>; Barbaros Oezylmaz<sup>3</sup>; Markus Buehler<sup>2</sup>; Yimo Han<sup>1</sup>; Jun Lou<sup>1</sup>; <sup>1</sup>Rice University; <sup>2</sup>MIT; <sup>3</sup>NUS

#### 10:40 AM

**How Surfaces Affect the Shape, Elastic Response, and Deformation Behavior of Small Metal Nanoparticles:** *Tevis Jacobs*<sup>1</sup>; Ruikang Ding<sup>1</sup>; Ingrid Padilla Espinosa<sup>2</sup>; Soodabeh Azadehranjbar<sup>1</sup>; Ashlie Martini<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>UC Merced

#### 11:00 AM Invited

**Atomistic Origins of Cyclic and Static Fatigue in Two Dimensional Materials:** *Chandra Veer Singh*<sup>1</sup>; <sup>1</sup>University of Toronto

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## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling – Session III

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

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

**Wednesday AM | March 6, 2024**  
**Barrel Spring I | Hyatt**

**Session Chairs:** Minh-Son Pham, Imperial College London; Mythreyi Ramesh, Northwestern University

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**8:30 AM**

**Unraveling the Fast Strain Bursts Dynamics Using Acoustic Emission Measurements:** *Mostafa Omar*<sup>1</sup>; *Jaafar El-Awady*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**8:50 AM**

**Assessment of Phase-field Simulations of Brittle Fracture Using High Energy Diffraction Microscopy and Tomography:** *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

**9:10 AM**

**Characterization of Damage Accumulation Mechanisms in Porous Carbon Fiber Material by Combining Compression Testing with In-Situ Micro-CT and Digital Image Correlation:** *Robert Quammen*<sup>1</sup>; *Paul Rottmann*<sup>1</sup>; <sup>1</sup>University of Kentucky

**9:30 AM**

**Cyclic Degradation of Superelasticity of Fe-Ni-Co-Al-Ti Shape Memory Alloy with Strong Texture Studied by In Situ Deformation:** *Robert Lehnert*<sup>1</sup>; *Anja Weidner*<sup>1</sup>; *Philipp Krooß*<sup>2</sup>; *Thomas Niendorf*<sup>2</sup>; *Horst Biermann*<sup>1</sup>; <sup>1</sup>TU Bergakademie Freiberg; <sup>2</sup>Univerität Kassel

**9:50 AM**

**Identifying Stages of Strain Hardening in the Gamma-rich Transformative Complex Concentrated Alloy Using In-situ Synchrotron Diffraction Technique:** *Roopam Jain*<sup>1</sup>; *Ravi Haridas*<sup>1</sup>; *Priyanka Agrawal*<sup>1</sup>; *J. Park*<sup>2</sup>; *Rajiv Mishra*<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Argonne National Laboratory

**10:10 AM Break**

**10:30 AM**

**Mechanical Responses of a Ductile-phase-toughened Tungsten Alloy Irradiated with Ion Beams at an Elevated Temperature:** *Tianyi Chen*<sup>1</sup>; *Ana Garcia Caraveo*<sup>1</sup>; *Spencer Doran*<sup>1</sup>; *James Haag IV*<sup>2</sup>; *Weilin Jiang*<sup>2</sup>; *Lei Li*<sup>2</sup>; *Zhihan Hu*<sup>3</sup>; *Lin Shao*<sup>3</sup>; *Wahyu Setyawan*<sup>2</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Texas A&M University

**10:50 AM**

**An Investigation of Mechanical Behaviours of Pure Zirconium With and Without Hydrides Using In-situ Testing Method:** *Xuwei Li*<sup>1</sup>; Angus Wilkinson<sup>1</sup>; David Armstrong<sup>1</sup>; Junliang Liu<sup>2</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>University of Wisconsin-Madison

**11:10 AM**

**Deformation Behavior of Plastic Amorphous Aluminum Oxide Thin Films:** *Nidhin George Mathews*<sup>1</sup>; Erkka J. Frankberg<sup>1</sup>; Alosious Lambai<sup>1</sup>; Fabio Di Fonzo<sup>2</sup>; Erkki Levänen<sup>1</sup>; Gaurav Mohanty<sup>1</sup>; <sup>1</sup>Tampere University, Finland; <sup>2</sup>Istituto Italiano di Tecnologia, Italy

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## LIGHT METALS

### Melt Processing, Casting and Recycling — Solidification II

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

**Program Organizers:** Anne Kvithyld, SINTEF; Tao Wang, Rio Tinto; Samuel Wagstaff, Oculatus Consulting

**Wednesday AM | March 6, 2024**  
**Windermere Y-1 | Hyatt**

**Session Chairs:** Joshua Lawalin, Commonwealth Rolled Products; Sara Lawalin, Commonwealth Rolled Products

**8:30 AM**

**Measurement of the Heat Transfer in the Primary Cooling Area of a Laboratory Direct Chill Casting Plant for Alloy Design:** *Andreas Weidinger*<sup>1</sup>; Sebastian Samberger<sup>1</sup>; Florian Schmid<sup>2</sup>; Stefan Pogatscher<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben; <sup>2</sup>AMAG rolling GmbH

**8:55 AM**

**Influence of Chemistry and Direct Chill (DC) Casting Parameters on the Formation of Altenpohl Zone in 5xxx Alloys:** Akash Pakanati<sup>1</sup>; Snorre Rist<sup>1</sup>; *Thomas Ludwig*<sup>2</sup>; Eystein Vada<sup>1</sup>; Shiva Talatori<sup>3</sup>; Jan-Erik Ødegård<sup>1</sup>; <sup>1</sup>Hydro Aluminium Sunndal; <sup>2</sup>Hydro Aluminium CTS; <sup>3</sup>Hydro Aluminium AS

**9:20 AM**

**Mechanisms of Twin-roll Caster Tips Degradation:** *Guillaume Girard*<sup>1</sup>; François Veillette<sup>1</sup>; William Roy<sup>1</sup>; <sup>1</sup>Pyrotek

**9:45 AM**

**Revolutionizing Slab Casting: Unveiling the Power of AI and Computer Vision:** *Loic Fracheboud*<sup>1</sup>; Julien Valloton<sup>1</sup>; <sup>1</sup>GAP Engineering SA

**10:10 AM Break****10:25 AM**

**Study of Vertical Folds Formation on Al–Mg Alloys during Direct Chill (DC) Casting:** *Marianthi Bouzouni*<sup>1</sup>; Theofani Tzevelekou<sup>1</sup>; Spyridon Pinis<sup>2</sup>; Sofia Papadopoulou<sup>1</sup>; Andreas Mavroudis<sup>2</sup>; <sup>1</sup>ELKEME S.A.; <sup>2</sup>ElvalHalcor S.A.

**10:50 AM**

**Liquid Alloy Atomistic Modelling Perspective to Al Alloy Design:** *Philippe Jarry*<sup>1</sup>; Alaa Fahs<sup>1</sup>; Noel Jakse<sup>1</sup>; <sup>1</sup>INP Grenoble

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

## Nanostructured Materials in Extreme Environments II – Corrosive Environment

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Wednesday AM | March 6, 2024**  
**Bayhill 19 | Hyatt**

**Session Chair:** Ashley Bucsek, University of Michigan

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### 8:30 AM Invited

**Direct Visualization and Quantification of Fusion Tungsten Nanofuzz Oxidation by In-situ Environmental TEM:** Rajat Sainju<sup>1</sup>; Marlene Patino<sup>2</sup>; Matthew Baldwin<sup>2</sup>; Osman El Atwani<sup>3</sup>; *Yuanyuan Zhu*<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>University of California, San Diego; <sup>3</sup>Los Alamos National Laboratory

### 8:55 AM

**Advanced Nanometer Resolution In-situ Strain Mapping for Metal Oxidation by 4D-STEM:** Ying Han<sup>1</sup>; *Yongwen Sun*<sup>1</sup>; Dan Zhou<sup>2</sup>; Hugo Garza<sup>2</sup>; Alejandro Perez<sup>3</sup>; Thanos Galanis<sup>3</sup>; Starvos Nicolopoulos<sup>3</sup>; Yang Yang<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>DENSsolutions; <sup>3</sup>NanoMEGAS SPRL

### 9:15 AM

**High-temperature Oxidation Mechanism, Microstructure, and Mechanical Properties Evaluation of Iron-Chromium-Aluminum Alloys:** *Md Mehadi Hassan*<sup>1</sup>; Erofil Kardoulaki<sup>1</sup>; <sup>1</sup>Los Alamos National Lab

### 9:35 AM

**Nano-structured Cr-superalloys in Advanced Concentrated Solar Plant Environments:** *Kan Ma*<sup>1</sup>; Thomas Blackburn<sup>1</sup>; Michael Kerbstadt<sup>2</sup>; Rebeca Hernández<sup>3</sup>; Elvira Onorbe<sup>3</sup>; Marta Navas<sup>3</sup>; Tatu Pinomaa<sup>4</sup>; Emma White<sup>2</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; <sup>4</sup>VTT Technical Research Centre of Finland Ltd

### 9:55 AM Break

### 10:15 AM Invited

**In-situ Transmission X-ray Microscopy Imaging of Hydrogen Charged Metals and Alloys:** *Wendy Gu*<sup>1</sup>; Andrew Lee<sup>1</sup>; Jiyun Kang<sup>1</sup>; <sup>1</sup>Stanford University

### 10:40 AM

**Hydrogen Embrittlement Mechanism of Nanostructured Steels:** *Yi-Sheng Chen*<sup>1</sup>; Ranming Niu<sup>1</sup>; Pang-Yu Liu<sup>1</sup>; Hanyu Liu<sup>1</sup>; Chao Huang<sup>1</sup>; Hung-Wei Yen<sup>2</sup>; Julie Cairney<sup>1</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>National Taiwan University

### 11:00 AM

**Effect of Hydrogen Charging on the Deformation Behavior in Nanostructured Iron:** Marlene Kapp<sup>1</sup>; Michael Zawodzki<sup>1</sup>; Stanislav Zak<sup>1</sup>; Bernd Loder<sup>2</sup>; Gregor Mori<sup>2</sup>; Jürgen Eckert<sup>1</sup>; Reinhard Pippan<sup>1</sup>; Oliver Renk<sup>2</sup>; *Simon Pillmeier*<sup>3</sup>; <sup>1</sup>Erich-Schmid-Institute of Materials Science; <sup>2</sup>University of Leoben; <sup>3</sup>Department of Material Science, Montanuniversitaet Leoben



11:20 AM

**High Temperature Molten Lithium Corrosion of Nanostructured Steels:** *Bradley Young*<sup>1</sup>; Junliang Liu<sup>1</sup>; Thomas Davis<sup>2</sup>; David Armstrong<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>Oxford Sigma Ltd.

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## SPECIAL TOPICS

### **Nix Award and Lecture Symposium V – The Search for Fatigue-resistant Structural Materials**

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

**Program Organizers:** Gang Feng, Villanova University; Seung Min Han, KAIST

Wednesday AM | March 6, 2024  
Regency O | Hyatt

**Session Chairs:** Gang Feng, Villanova University; Seung Min Han, KAIST

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8:30 AM Keynote

**Designing Fatigue Resistant Structural Materials:** *Tresa Pollock*<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

9:30 AM Invited

**Micromechanical Fatigue Experiments for the Development of Microstructure-sensitive Fatigue Simulation Models:** *Peter Gumbsch*<sup>1</sup>; <sup>1</sup>Fraunhofer Institute for Mechanics of Materials IWM

10:10 AM Break

10:30 AM Invited

**A Perspective on Serial Sectioning Technology:** *Michael Uchic*<sup>1</sup>; <sup>1</sup>Air Force Research Laboratory, Wright-Patterson AFB

11:00 AM Invited

**Crystal Plasticity Modeling of the Development of Slip Localizations:** *Irene Beyerlein*<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

11:30 AM Invited

**Experimental Validation and Understanding of the Ultrahigh Temperature Strength of Refractory Alloys:** *Kevin Hemker*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

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## ADVANCED CHARACTERIZATION METHODS

### **Novel Strategies for Rapid Acquisition and Processing of Large Datasets from Advanced Characterization Techniques – Session III**

**Sponsored by:** TMS Structural Materials 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 6, 2024  
Blue Spring I | Hyatt

**Session Chairs:** Sriram Vijayan, Michigan Technological University; Austin McDannald, NIST

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**8:30 AM Invited**

**Data Management, Data Sharing and the Future of Federal Research Funding:** *Jonathan Madison*<sup>1</sup>; <sup>1</sup>National Science Foundation

**8:55 AM Invited**

**Data Management in Additive Manufacturing – Lessons Learned and Opportunities:** Mahdi Jamshid<sup>1</sup>; Mohsen Seifi<sup>1</sup>; *David Eduardo Paredes*<sup>1</sup>; <sup>1</sup>ASTM International

**9:20 AM Invited**

**Connectivity of Experimental Equipment and Interoperability of Experimental Data: Challenges and Opportunities:** *Zachary Trautt*<sup>1</sup>; A. Gilad Kusne<sup>1</sup>; Brian DeCost<sup>1</sup>; Howie Jores<sup>1</sup>; Austin McDannald<sup>1</sup>; Camilo Velez Ramirez<sup>1</sup>; Francesca Tavazza<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology

**9:45 AM Panel Discussion**

**10:45 AM Break**

**10:55 AM Invited**

**Advances in Atom Probe Crystallographic Analysis:** *Andrew Breen*<sup>1</sup>; Simon Ringer<sup>1</sup>; <sup>1</sup>University of Sydney

**11:20 AM Invited**

**Directional Reflectance Microscopy: Beyond Conventional Crystal Orientation Mapping:** *Matteo Seita*<sup>1</sup>; <sup>1</sup>University of Cambridge

**11:45 AM**

**Utilizing Deep Learning Techniques to Accelerate X-ray Absorption and Diffraction Contrast Imaging:** Eshan Ganju<sup>1</sup>; *Nikhilesh Chawla*<sup>1</sup>; <sup>1</sup>Purdue

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Phase Stability in Extreme Environments II – Irradiation Damage on Phase Changes

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

**Program Organizers:** David Frazer, Idaho National Laboratory; Andrew Hoffman, GE Research; Kinga Unocic, Oak Ridge National Laboratory; Janelle Wharry, Purdue University; Kaila Bertsch, Lawrence Livermore National Laboratory; Raul Rebak, GE Global Research; Tianyi Chen, Oregon State University; Marie Romedenne, Oak Ridge National Laboratory

**Wednesday AM | March 6, 2024**  
**Bayhill 18 | Hyatt**

**Session Chair:** Andrew Hoffman, General Electric

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**8:30 AM Invited**

**Exploring and Quantifying Degradation Mechanisms in Irradiated Structural Materials:** *Steven Zinkle*<sup>1</sup>; Qinyun Chen<sup>1</sup>; Zehui Qi<sup>1</sup>; Ryan Thier<sup>1</sup>; Emily R. Proehl<sup>1</sup>; Samara Levine<sup>2</sup>; Yajie Zhao<sup>3</sup>; Yan-Ru Lin<sup>3</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Tokamak Energy; <sup>3</sup>Oak Ridge National Laboratory

**9:00 AM**

**Improving Radiation Resistance in Metal Alloys via the Use of Multiple Synergistic Solutes:** *Soumyajit Jana*<sup>1</sup>; Pascal Bellon<sup>1</sup>; Robert Averback<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign

**9:20 AM**

**Microstructural Evolution and Hardness Changes in Ion Irradiated Ni-based Superalloys:** *Qinyun Chen*<sup>1</sup>; Siwei Chen<sup>1</sup>; Yan-Ru Lin<sup>2</sup>; Yajie Zhao<sup>2</sup>; Ryan Thier<sup>1</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory

**9:40 AM**

**Behavior of Tritium Breeder Ceramics under Ion Irradiation:** *Weilin Jiang*<sup>1</sup>; Libor Kovarik<sup>1</sup>; Mark Wirth<sup>1</sup>; Zihua Zhu<sup>1</sup>; Yeong-Shyung Chou<sup>1</sup>; Satoru Kikuchi<sup>2</sup>; Kazuya Sasaki<sup>2</sup>; Zhihan Hu<sup>3</sup>; Lin Shao<sup>3</sup>; Andrew Casella<sup>1</sup>; David Senior<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Hirosaki University; <sup>3</sup>Texas A&M University

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

**Investigating the Coupling between Short-range Order and Radiation Damage in Multi-component Alloys:** *Miaomiao Jin*<sup>1</sup>; Hyeonwoo Kim<sup>2</sup>; Yang Yang<sup>1</sup>; Sangtae Kim<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Hanyang University

**10:50 AM**

**Radiation-induced Partial Disorder of Heusler Phase in Intermetallic Dispersion Strengthened Ferritic Superalloys:** *Kan Ma*<sup>1</sup>; Robert Abernethy<sup>2</sup>; Sophia von Tiedemann<sup>1</sup>; Nianhua Peng<sup>3</sup>; Graeme Greaves<sup>4</sup>; Anamul H Mir<sup>4</sup>; Christina Hofer<sup>5</sup>; Thomas Pfeifer<sup>6</sup>; Kai Sun<sup>7</sup>; Lumin Wang<sup>7</sup>; Pedro Ferreira<sup>8</sup>; Christopher Hardie<sup>2</sup>; Alexander Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>UK Atomic Energy Authority; <sup>3</sup>Surrey Ion Beam Centre, Surrey University; <sup>4</sup>MIAMI Facility, University of Huddersfield; <sup>5</sup>University of Oxford; <sup>6</sup>University of Virginia; <sup>7</sup>University of Michigan; <sup>8</sup>VTT Technical Research Centre of Finland Ltd

**11:10 AM**

**Effect of Damage, Temperature, and Helium on Irradiated Nanoprecipitation in Advanced Ferritic/Martensitic (F/M) Fe9Cr Steel:** *T.M. Kelsy Green*<sup>1</sup>; Kevin Field<sup>1</sup>; Ying Yang<sup>2</sup>; Tim Graening<sup>2</sup>; Weicheng Zhong<sup>2</sup>; Lizhen Tan<sup>2</sup>; <sup>1</sup>University of Michigan-Ann Arbor; <sup>2</sup>Oak Ridge National Laboratory

**11:30 AM**

**Stability of Hydrogen/Helium-filled Nanocavities in Structural Alloys after Low Temperature Irradiation with Simultaneous High Energy Protons and Spallation Neutron:** *Timothy Lach*<sup>1</sup>; Maxim Gussev<sup>1</sup>; Kinga Unocic<sup>1</sup>; Amy Godfrey<sup>1</sup>; Weicheng Zhong<sup>1</sup>; David McClintock<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIII — 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; Chao-hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; Yee-wen Yen, National Taiwan University of Science and Technology; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Ping-Chuan Wang, SUNY New Paltz; Yu-An Shen, Feng Chia University

**Wednesday AM | March 6, 2024**  
**Celebration 12 | Hyatt**

**Session Chairs:** Yee-wen Yen, National Taiwan University of Science and Technology; Chaohong Wang, National Chung Cheng University

**8:30 AM Invited**

**Superplasticity Deformation of Sn-Bi Based Solder Alloys:** *Akira Yamauchi*<sup>1</sup>; Masashi Kurose<sup>1</sup>; <sup>1</sup>National Institute of Technology, Gunma College

**8:55 AM**

**Effective Suppression of Boron Dopant on the Interfacial Reactions of Electroplating Co(B) Deposits and Lead-free Solders:** *Chao-hong Wang*<sup>1</sup>; Yu-bin Guo<sup>1</sup>; <sup>1</sup>National Chung Cheng University

**9:15 AM**

**Growth Kinetics and Morphological Evolution of Compounds in Cu-eutectic Sn-Bi Alloy System with Ag and Ni:** *Minho O*<sup>1</sup>; Yuki Tanaka<sup>1</sup>; Equo Kobayashi<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology

**9:35 AM**

**Effects of Bi and In on the Growth of Intermetallic Compounds:** *Yi-Wun Wang*<sup>1</sup>; G. W. Wu<sup>1</sup>; H. T. Liang<sup>1</sup>; T. T. Tseng<sup>1</sup>; <sup>1</sup>Tamkang University

**9:55 AM Break**

**10:15 AM**

**Interfacial Reaction in the Liquid/Solid Lead-free Solder/Cu-Ni-Si-Mg Alloy (C7025) Couples:** *Yu-Cheng Jhen*<sup>1</sup>; Yi-Chin Liou<sup>1</sup>; Andromeda Dwi Laksono<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**10:35 AM**

**Phase Equilibrium of Cu-Sn-Ti Ternary System at 450 :** *Hao Wei Lee*<sup>1</sup>; Yee-Wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**10:55 AM**

**Effects of Storage Time on the Growth of Cu(In,Sn)<sub>2</sub>:** *Kai-Chia Chang*<sup>1</sup>; G. W. Wu<sup>1</sup>; Yi-Wun Wang<sup>1</sup>; <sup>1</sup>Tamkang University

## MATERIALS SYNTHESIS AND PROCESSING

**Phase Transformations and Microstructural Evolution — Al Alloys**

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Wednesday AM | March 6, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Ashley Paz y Puente, University of Cincinnati

**8:30 AM Invited**

**Factors Controlling Heteroepitaxial Phase Formation at Intermetallic-Al<sub>3</sub>Sc/Liquid Interfaces:** Hunter Wilkinson<sup>1</sup>; Brianne Boyd<sup>1</sup>; *Deep Choudhuri*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**9:00 AM**

**Early Stage Detection of Beta Phase Formation at Relatively Low Temperatures in Al<sub>5</sub>O<sub>8</sub>3:** *Ramasis Goswami*<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

**9:20 AM**

**Long-Term Microstructural Stability of Eutectic Aluminum Alloys at Elevated Temperatures:** Moyosore Okeyemi<sup>1</sup>; Aman Kshirsagar<sup>1</sup>; *Dinc Erdeniz*<sup>1</sup>; <sup>1</sup>University of Cincinnati

**9:40 AM**

**Nanosopic View of Non-faceted/Faceted Eutectic Solidification:** *Shanmukha Kiran Aramanda*<sup>1</sup>; Paul Chao<sup>1</sup>; Ashwin Shahani<sup>1</sup>; <sup>1</sup>University of Michigan

**10:00 AM Break**

**10:20 AM Invited**

**A Nanoscopic View of Irregular Eutectic Solidification:** *Ashwin Shahani*<sup>1</sup>; <sup>1</sup>University of Michigan

**10:50 AM**

**Through-thickness Precipitate Distribution and Microstructural Evolution in Hot Rolled 7075 Aluminum Alloy:** *Damilola Alewi*<sup>1</sup>; Paul Rottmann<sup>1</sup>; Haluk Karaca<sup>1</sup>; Kirk Lemmen<sup>1</sup>; Heather Murdoch<sup>2</sup>; Daniel Magagnosc<sup>2</sup>; <sup>1</sup>University of Kentucky; <sup>2</sup>U.S. Army Research Lab

**11:10 AM**

**Modelling the Spatial Evolution of Excess Vacancies and Its Influence on Age Hardening Behaviors in Multicomponent Aluminium Alloys:** *Xuezhou Wang*<sup>1</sup>; Dongdong Zhao<sup>2</sup>; Yijiang Xu<sup>3</sup>; Yanjun Li<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology; <sup>2</sup>Tianjin University; <sup>3</sup>SINTEF Industry

**11:30 AM**

**The Role of Deformation on Local Ordering in FCC Alloys:** *William Cunningham*<sup>1</sup>; Hannah Howard<sup>1</sup>; Pulkit Garg<sup>2</sup>; Edward Li<sup>2</sup>; Divya Singh<sup>3</sup>; Arda Genc<sup>1</sup>; Timothy Rupert<sup>2</sup>; Daniel Gianola<sup>1</sup>; <sup>1</sup>University of California Santa Barbara; <sup>2</sup>University of California Irvine; <sup>3</sup>Utah Tech University

**MATERIALS SYNTHESIS AND PROCESSING**

**Powder Materials Processing and Fundamental Understanding — Tailoring**

## Nano/Microstructure

**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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

**Wednesday AM | March 6, 2024**  
**Celebration 9 | Hyatt**

**Session Chairs:** Wenwu Xu, San Diego State University; Carlos Castano Londono, Virginia Commonwealth University

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**8:30 AM**

**Powder Extrusion of High-energy Ball-milled Particle-reinforced AlSi1MgMn for Lightweight Components:** *Maik Trautmann*<sup>1</sup>; Steve Siebeck<sup>2</sup>; Guntram Wagner<sup>1</sup>; <sup>1</sup>TU Chemnitz; <sup>2</sup>Fraunhofer Institute for Machine Tools and Forming Technology

**8:50 AM**

**A Nanocrystalline Copper-Hafnium Alloy by Conformal Coating Powder Metallurgy: Microstructure and Thermomechanical Performance:** *Jonathan Priedeman*<sup>1</sup>; B. Hornbuckle<sup>2</sup>; Sean Fudger<sup>2</sup>; Kristopher Darling<sup>2</sup>; Gregory Thompson<sup>1</sup>; <sup>1</sup>The University of Alabama; <sup>2</sup>Army Research Laboratory

**9:10 AM Invited**

**Interface Energy Control for Improved Mechanical Properties in Oxide Nanoceramics:** *Ricardo Castro*<sup>1</sup>; Isabella Costa<sup>2</sup>; <sup>1</sup>Lehigh University and University of California Davis; <sup>2</sup>University of California Davis

**9:40 AM**

**Alloy Developments and Microstructural Mechanisms of Improved Plasticity in a Cr-based Nanocrystalline Alloy:** *Bryan Lim*<sup>1</sup>; Christopher Fancher<sup>1</sup>; Marissa Brennan<sup>2</sup>; Steve Buresh<sup>2</sup>; Chris Mclasky<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 Global Research; <sup>3</sup>Touchstone Research Laboratory

**10:00 AM**

**Mixing Studies for Oxide Dispersion in IN718 ODS Superalloy:** *Suyog Gaikwad*<sup>1</sup>; Vikram Dabhade<sup>1</sup>; S.V.S 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)

**10:20 AM Break**

**10:40 AM**

**The Strengthening and Deformation Mechanisms of Metal Matrix Nanocomposites:** *Iris Carneiro*<sup>1</sup>; José Fernandes<sup>2</sup>; Sonia Simoes<sup>3</sup>; <sup>1</sup>University of Birmingham, University of Porto, INEGI/LAETA; <sup>2</sup>University of Coimbra; <sup>3</sup>University of Porto, INEGI/LAETA

**11:00 AM**

**Preparation, Structure, and Characterization of SFCA-I:** *Yongda Li*<sup>1</sup>; Junjie Zeng<sup>1</sup>; Ningyu Zhang<sup>1</sup>; Yuxiao Xue<sup>1</sup>; Yong Hou<sup>1</sup>; Xuwei Lv<sup>1</sup>; <sup>1</sup>Chongqing University

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Printed Electronics and Additive Manufacturing: Advanced Functional**

## Materials, Processing Concepts, and Emerging Applications — Printed Electronics III - Interconnects & Sensors

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

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

**Wednesday AM | March 6, 2024**  
**Orlando L | Hyatt**

**Session Chairs:** Harrison Loh, West Virginia University; Joseph Andrews, University of Wisconsin Madison

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**8:30 AM Invited**

**AerosolJet Printing for Three Dimensional Interconnects:** *Michael Renn*<sup>1</sup>; <sup>1</sup>Optomec, Inc.

**8:55 AM**

**Microstructural and Mechanical Analysis of Aerosol Jet 3D Printed Gold Micropillars and Their Biocompatibility in Mouse Brain:** *Sanjida Jahan*<sup>1</sup>; Chunshan Hu<sup>1</sup>; Bin Yuan<sup>1</sup>; Hailey Gorden<sup>1</sup>; Sandra Ritchie<sup>1</sup>; Eric Yttri<sup>1</sup>; Rahul Panat<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**9:15 AM Invited**

**Functional Material Enabled Fiber Optic Sensors in Electrical System Monitoring Applications:** *Paul Ohodnicki*<sup>1</sup>; Dolendra Karki<sup>1</sup>; Yang-Duan Su<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**9:40 AM Invited**

**Large-area Physical and Chemical Sensing Enabled by Printed Thin-film Electronics:** *Joseph Andrews*<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison

**10:05 AM Break**

**10:25 AM Invited**

**Printed Electrochemical Devices for Biochemical Sensing and Studying Biological Cells:** *Aida Ebrahimi*<sup>1</sup>; <sup>1</sup>Penn State University

**10:50 AM Invited**

**Fabrication and Characterization of -Ga<sub>2</sub>O<sub>3</sub> Diodes for Radiation Detection:** *Jarod Remy*<sup>1</sup>; Lei Raymond Cao<sup>1</sup>; <sup>1</sup>The Ohio State University

**11:15 AM**

**Synthesis and Formulation of Multilayered Graphene Electrode for Water Sensing Applications:** *Felix White*<sup>1</sup>; Attila Rektor<sup>1</sup>; Fereshteh Rajabi Kouchi<sup>1</sup>; Tony Valayil Varghese<sup>1</sup>; Prabhu U Arumugam<sup>2</sup>; Harish Subbaraman<sup>3</sup>; David Estrada<sup>1</sup>; <sup>1</sup>Boise State University; <sup>2</sup>Louisiana Tech University; <sup>3</sup>Oregon State University

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### MATERIALS SYNTHESIS AND PROCESSING

**Process Metallurgy and Environmental Engineering: An EPD Symposium in Honor of Takashi Nakamura — Recycling of Batteries**

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

**Program Organizers:** Takanari Ouchi, University of Tokyo; Gerardo Alvear Flores, CaEng Associates; Etsuro Shibata, Tohoku University; Leandro Andres Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

**Wednesday AM | March 6, 2024**  
**Celebration 6 | Hyatt**

**Session Chairs:** Etsuro Shibata, Tohoku University; Gerardo Flores, CaEng Associates

**8:30 AM Keynote**

**Clean Hydrometallurgical Processes from Hazardous Element Immobilization to Sustainable Lithium Battery Recycling:** *George Demopoulos*<sup>1</sup>; <sup>1</sup>McGill University

**9:00 AM Invited**

**Solvent Extraction Process of Nickel Sulfate for Battery Materials:** *Makoto Sugino*<sup>1</sup>; <sup>1</sup>SMM

**9:20 AM Invited**

**Towards Sustainable Battery Recycling:** *Ryohei (Hachi) Yagi*<sup>1</sup>; <sup>1</sup>Umicore

**9:40 AM Invited**

**Separation and Recovery of Positive Electrode Active Materials from Lithium-ion Battery Using Pulsed Discharge:** *Taketoshi Koita*<sup>1</sup>; Moe Nakahara<sup>1</sup>; Takao Namihira<sup>2</sup>; Chiharu Tokoro<sup>1</sup>; <sup>1</sup>Waseda University; <sup>2</sup>Kumamoto University

**10:00 AM Break**

**10:20 AM**

**LAREX-Tupy Process: Recycling of Li-ion Batteries from Electric Vehicles by Hydrometallurgical Route Towards Circular Economy:** *Amilton Botelho Junior*<sup>1</sup>; David Vasconcelos<sup>2</sup>; Anastássia Lima<sup>3</sup>; Rafael de Oliveira<sup>3</sup>; Luciana Gobo<sup>3</sup>; Elio Kumoto<sup>3</sup>; Andre Ferrarese<sup>3</sup>; Jorge Tenório<sup>1</sup>; Denise Espinosa<sup>1</sup>; <sup>1</sup>University of Sao Paulo; <sup>2</sup>Tupy ; <sup>3</sup>Tupy

**10:40 AM**

**New Technologies for Arsenic Stabilization from Smelter and Roaster Wastes:** *Cristian Antonucci*<sup>1</sup>; <sup>1</sup>Ecometales Ltd.

## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Electrometallurgy and High Temperature Processes

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

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

**Wednesday AM | March 6, 2024**  
**Celebration 3 | Hyatt**



**Session Chairs:** Neale Neelameggham, IND LLC; Alafara Baba, University of Ilorin; Hong (Marco) Peng, University of Queensland

**8:30 AM**

**Gas Evolution during Nd and DyFe Electrowinning:** *Ole Kjos*<sup>1</sup>; Henrik Gudbrandsen<sup>1</sup>; Samuel Senanu<sup>1</sup>; Arne Petter Ratvik<sup>1</sup>; <sup>1</sup>Sintef As

**8:50 AM**

**Parameter Study for the Production of DyFe by Molten Salt Electrolysis:** Samuel Senanu<sup>1</sup>; *Arne Ratvik*<sup>1</sup>; Ole Kjos<sup>1</sup>; Karen Osen<sup>1</sup>; Ana Maria Martinez<sup>1</sup>; Wojciech Gebarowski<sup>1</sup>; Thomas Simonsen<sup>1</sup>; Anne Støre<sup>1</sup>; Henrik Gudbrandsen<sup>1</sup>; Kent-Robert Molvik<sup>1</sup>; Egil Skybakmoen<sup>1</sup>; Chris Hall<sup>2</sup>; Vipin Pradeep<sup>2</sup>; Darren Henvey<sup>2</sup>; Jake Johnson<sup>2</sup>; <sup>1</sup>SINTEF; <sup>2</sup>Less Common Metals

**9:10 AM**

**Electrochemical Recovery of Sb, Te, and In in Choline Chloride-Ethylene Glycol DES Electrolyte:** *Goril Jahrsengene*<sup>1</sup>; Zhaohui Wang<sup>1</sup>; Ana Maria Martinez<sup>1</sup>; <sup>1</sup>SINTEF

**9:30 AM**

**YCl<sub>3</sub>·6H<sub>2</sub>O Green Electro-metallurgical Preparation of Y<sub>2</sub>O<sub>3</sub>:** *Shengnan Lin*<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Chengzhen Fuyang<sup>1</sup>; Yingqi Li<sup>1</sup>; Yifeng Liu<sup>1</sup>; <sup>1</sup>Northeastern University

**9:50 AM**

**Recovery of Antimony from Refining Slag of the Unified Mining Company (EMUSA):** *Christian Alvaro Mendoza Ramos*<sup>1</sup>; <sup>1</sup>UMSA

**10:10 AM Break**

**10:30 AM**

**Studies of Layer Growth during the Disintegration of Cemented Carbides with Vaporious Zinc:** *Lea Luznik*<sup>1</sup>; Eva Gerold<sup>1</sup>; Thomas Weirather<sup>1</sup>; Christoph Czettel<sup>1</sup>; Helmut Antrekowitsch<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben

**10:50 AM**

**Effect of Ce Substitution with La and Nd on Microstructure and Mechanical Properties of Al<sub>11</sub>RE<sub>3</sub>:** *Jie Qi*<sup>1</sup>; David Dunand<sup>1</sup>; <sup>1</sup>Northwestern University

## NUCLEAR MATERIALS

**Seaborg Institutes: Emerging Topics in Actinide Materials and Science – Solid State Behavior of the Actinides**

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Wednesday AM | March 6, 2024**

**Regency P | Hyatt**

**Session Chair:** Zach Levin, Los Alamos National Laboratory

**8:30 AM**

**Materials Chemistry of Neptunium Dioxide Produced Through Modified Direct Denitration:** *Kathryn Peruski*<sup>1</sup>; Connor Parker<sup>1</sup>; Samantha Cary<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**8:55 AM**

**Challenges and Promises in Investigating the Fundamental Properties of Actinide Oxides:** *Binod Rai*<sup>1</sup>; Alex Bretaña<sup>1</sup>; Gregory Morrison<sup>2</sup>; Rose Greer<sup>1</sup>; Hanno zur Loye<sup>2</sup>; Krzysztof Gofryk; <sup>1</sup>Savannah River National Laboratory; <sup>2</sup>University of South Carolina Columbia

**9:20 AM**

**Electrodeposition and Fabrication of Californium Targets for Superheavy Element Research:** *Kristian Myhre*<sup>1</sup>; Nathan Sims<sup>1</sup>; Shelley VanCleve<sup>1</sup>; Rose Boll<sup>1</sup>; Susan Hogle<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:45 AM**

**Investigating the Anisotropic Effect of Soluble Hydrogen on Plasticity in Unalloyed Uranium:** *Mary O'Brien*<sup>1</sup>; Rose Bloom<sup>1</sup>; Eric Tegtmeier<sup>1</sup>; Daniel Savage<sup>1</sup>; Bjorn Clausen<sup>1</sup>; Jason Cooley<sup>1</sup>; Samantha Lawrence<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:10 AM Break**

**10:25 AM**

**Recovery and Processing of Mixed-californium Material for Superheavy Element Research:** *Shelley VanCleve*<sup>1</sup>; Kristian Myhre<sup>1</sup>; Jay Kehn<sup>1</sup>; Nathan Sims<sup>1</sup>; Laetitia Delmau<sup>1</sup>; Rose Boll<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:50 AM**

**Thermodynamic Properties of Pu-U-Fe-Ga Intermetallics:** Andrew Strzelecki<sup>1</sup>; Najeb Abdul-Jabbar<sup>1</sup>; S. Parker<sup>1</sup>; W. Phelan<sup>1</sup>; Jason Rizk<sup>1</sup>; Shane Mann<sup>1</sup>; David Arellano<sup>1</sup>; Paul Tobash<sup>1</sup>; Nathan Conroy<sup>1</sup>; Hakim Boukhalfa<sup>1</sup>; Sarah Hernandez<sup>1</sup>; Eric Bauer<sup>1</sup>; Jeremy Mitchell<sup>1</sup>; *Hongwu Xu*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**11:15 AM**

**Identifying Chemical Signatures of Uranium Oxide Particles for Nuclear Forensics Using Synchrotron X-rays:** *Rachel Lim*<sup>1</sup>; Alexander Baker<sup>1</sup>; Alexander Ditter<sup>2</sup>; Scott Donald<sup>1</sup>; David Shuh<sup>2</sup>; Brandon Chung<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Lawrence Berkeley National Laboratory

**11:40 AM**

**Phase Transformations and Thermal Response in Plutonium-gallium Alloys:** *Shane Mann*<sup>1</sup>; Najeb Abdul-Jabbar<sup>1</sup>; Jeremy Mitchell<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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## MECHANICS OF MATERIALS

### Structure-Property Relationships of Bulk Metallic Glasses — Structure and Mechanical Properties I

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Wednesday AM | March 6, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chair:** Peter Derlet, Paul Scherrer Institute

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**8:30 AM Invited**

**Are Metallic Glasses Brittle or Ductile?- A Framework for Plasticity in Metallic Glasses:** *Jan Schroers*<sup>1</sup>; <sup>1</sup>Yale University

**8:55 AM**

**Synchrotron X-ray Study of the Extreme Rejuvenation of Bulk Metallic Glasses by Triaxial Compression:** Nikolaos Panagiotopoulos<sup>1</sup>; Konstantinos Georgarakis<sup>2</sup>; Philip Chater<sup>3</sup>; Yi Li<sup>4</sup>; *A. Lindsay Greer*<sup>1</sup>; <sup>1</sup>University of Cambridge; <sup>2</sup>Cranfield University; <sup>3</sup>Diamond Light Source Ltd; <sup>4</sup>Institute of Metal Research

**9:15 AM**

**Structural Response of Amorphous Solids to Elastic Strains:** *Wojciech Dmowski*<sup>1</sup>; Takeshi Egami<sup>1</sup>; <sup>1</sup>University of Tennessee

**9:35 AM**

**The Mechanical Heterogeneity of Metallic Glasses:** *Miguel B. Costa*<sup>1</sup>; *A. Lindsay Greer*<sup>1</sup>; <sup>1</sup>University of Cambridge

**9:55 AM Break****10:15 AM Invited**

**Connecting Mechanical Properties of Oxide and Hybrid Glasses with Structure at Varying Length Scales:** *Morten Smedskjaer*<sup>1</sup>; <sup>1</sup>Aalborg University

**10:40 AM**

**Spatial Evolution of Structural Motif Populations in Metallic Glasses during Shear Deformation:** *Suzanne Russo*<sup>1</sup>; W. Porter Weeks<sup>1</sup>; Katharine Flores<sup>1</sup>; <sup>1</sup>IMSE - Washington University in St. Louis

**11:00 AM**

**Atomistically Informed STZ Modelling of the Softening Behavior of Bulk Metallic Glasses during Deformation:** *Yuchi Wang*<sup>1</sup>; Yuchu Wang<sup>2</sup>; Gabriel Calderon Ortiz<sup>1</sup>; Md Minhazul Islam<sup>1</sup>; Jinwoo Hwang<sup>1</sup>; Yue Fan<sup>2</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>University of Michigan

**11:20 AM**

**Investigation of Fe-based Metallic Glasses Combining High-Energy In-situ X-ray Diffraction and Fast Calorimetry: Challenges and Opportunities:** *Florian Spieckermann*<sup>1</sup>; Felix Römer<sup>1</sup>; Parthiban Ramasamy<sup>2</sup>; Zoltan Hegedüs<sup>3</sup>; Ulrich Lienert<sup>3</sup>; Cameron Quick<sup>1</sup>; Mihai Stoica<sup>4</sup>; Jörg Löffler<sup>4</sup>; Jürgen Eckert<sup>1</sup>; <sup>1</sup>University of Leoben; <sup>2</sup>Austrian Academy of Sciences (ÖAW); <sup>3</sup>Deutsches Elektronen-Synchrotron DESY; <sup>4</sup>ETH Zürich

**11:40 AM**

**Shear-band Cavitation Determines the Shape of the Stress-strain Curve of Metallic Glasses:** Amlan Das<sup>1</sup>; Catherine Ott<sup>2</sup>; Dinesh Pechimuthu<sup>3</sup>; Robabeh Moosavi<sup>3</sup>; Mihai Stoica<sup>4</sup>; Peter Derlet<sup>5</sup>; *Robert Maass*<sup>3</sup>; <sup>1</sup>Cornell High Energy Synchrotron Source; <sup>2</sup>Northwestern University; <sup>3</sup>Federal Institute of Materials Research and Testing (BAM); <sup>4</sup>ETH Zurich; <sup>5</sup>Paul Scherrer Institute

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**SPECIAL TOPICS**

**The Future of Work in Materials Science — Session I**

**Sponsored by:** TMS: Professional Development Committee, TMS: Emerging Professionals Committee

**Program Organizers:** Richard Otis, Jet Propulsion Laboratory; James Saal, Citrine Informatics; Soumya Varma, KLA Corporation; Surojit Gupta, University of North Dakota

**Wednesday AM | March 6, 2024**  
**Bayhill 24 | Hyatt**

**Session Chair:** Richard Otis, Jet Propulsion Laboratory

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**8:30 AM Introductory Comments**

**8:40 AM Invited**

**Navigating Tenure in a Post-Covid World:** *Chelsey Hargather*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**9:10 AM**

**How to Navigate the World of Hybrid Learning - A Perspective:** *Surojit Gupta*<sup>1</sup>; <sup>1</sup>University of North Dakota

**9:30 AM**

**Leveraging Remote Work to Accelerate Material Informatics by Implementing Machine Learning Web Applications and Introducing Statistical Analysis Tools for Materials Scientists in a Chemical Corporation:** *Yoshishige Okuno*<sup>1</sup>; <sup>1</sup>Resonac Corporation

**9:50 AM**

**Remote Collaboration and Education in 3D Printing: Strategies for Engaging and Training Remote Learners:** *Arslan Yousaf*<sup>1</sup>; *Muammer Koc*<sup>1</sup>; <sup>1</sup>Hamad bin Khalifa University

**10:10 AM Break**

**10:30 AM Invited**

**Transatlantic Nuclear Fuels: International Collaboration in the COVID-19 Era and Its Impact on the Future of Work:** *Dong Liu*<sup>1</sup>; <sup>1</sup>University of Bristol

**10:50 AM**

**The Online REU (O-REU) Program at Texas A&M University:** *Michael Demkowicz*<sup>1</sup>; <sup>1</sup>Texas A&M University

**11:10 AM Panel Discussion**

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**2D Materials – Preparation, Properties, Modeling & Applications – Preparation, Properties, Modeling & Simulation 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; Ramana Chintalapalle, University of Texas at El Paso

**Wednesday PM | March 6, 2024**  
**Celebration 16 | Hyatt**

**Session Chairs:** Joshua Young, New Jersey Institute of Technology; Gerald Ferblantier, University of Strasbourg

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**2:00 PM Introductory Comments**

**2:05 PM**

**Computational Investigation of MAX as Intercalation Host for Rechargeable Aluminum-ion Battery:** *Lin Wang*<sup>1</sup>; Bin Ouyang<sup>1</sup>; <sup>1</sup>Florida State University

**2:25 PM**

**A Novel Solid Solution MXene with High Gravimetric Capacitance:** *Wansen Ma*<sup>1</sup>; Zeming Qiu<sup>1</sup>; Chaowen Tan<sup>1</sup>; Chenzhen Hou<sup>1</sup>; Xuwei Lv<sup>1</sup>; Jinzhou Li<sup>1</sup>; Liwen Hu<sup>1</sup>; Jie Dang<sup>1</sup>; <sup>1</sup>Chongqing University

**2:45 PM Invited**

**Computational Study and Design of 2D MXenes for Applications Ranging from Metal-ion Batteries and Sensors to Membranes for Removal of Metal Ions:** *Mohsen Asle Zaeem*<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**3:05 PM Invited**

**Computationally Guided Synthesis of MXenes by Dry Selective Extraction:** *Yong-Jie Hu*<sup>1</sup>; Ervin Rems<sup>1</sup>; Mark Anayee<sup>1</sup>; David Bugallo Ferron<sup>1</sup>; Yury Gogotsi<sup>1</sup>; <sup>1</sup>Drexel University

**3:25 PM Break**

**3:40 PM Invited**

**High-throughput Ab-Initio Study of 2D Janus-bulk Material Heterostructures for Photocatalysis:** *Arunima Singh*<sup>1</sup>; <sup>1</sup>Arizona State University

**4:00 PM Invited**

**MXene-Based Surface Coatings for Efficient Antiviral Air filtration:** *Mengqiang Zhao*<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

**4:20 PM Keynote**

**Synthesis and Characterization of Selenides and Hybrid Halide Perovskites for Nanodevices:** *Anupama Kaul*<sup>1</sup>; <sup>1</sup>University of North Texas

**4:45 PM**

**Synthesis and Characterization of Q-silicon:** *Siba Sundar Sahoo*<sup>1</sup>; Naveen Joshi<sup>1</sup>; Jagdish Narayan<sup>1</sup>; Roger Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University

**5:05 PM Invited**

**The Transverse Stiffness of Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> MXene and the Role of Inter-layer Water using Sub-angstrom Resolution Nanoindentation:** *Ryan Khan*<sup>1</sup>; Daniel Vizoso<sup>1</sup>; Mikhail Shekhirev<sup>2</sup>; Frank DelRio<sup>1</sup>; Yuri Gogotsi<sup>2</sup>; Remi Dingreville<sup>1</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Drexel University

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## NUCLEAR MATERIALS

### Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Fuel Qualification II

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Wednesday PM | March 6, 2024**

**Blue Spring I | Hyatt**

**Session Chairs:** Antoine Claisse, Westinghouse Electric Sweden; Assel Aitkaliyeva, University of Florida

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**2:00 PM Invited**

**Uncertainty Quantification and Bayesian Calibration Applied to Mechanistic Models of Nuclear Fuel Performance:** *David Andersson*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**2:30 PM**

**An Integrated Statistical-thermodynamic Model for Fission Gas Swelling and Release in Nuclear Fuels:** Charles Lieou<sup>1</sup>; Nathan Capps<sup>2</sup>; *Michael Cooper*<sup>3</sup>; Pierre-Clement Simon<sup>4</sup>; Brian Wirth<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Los Alamos National Laboratory; <sup>4</sup>Idaho National Laboratory

**2:50 PM**

**Results of MARGARET Fission Gas and Microstructure Model, Following Latest Developments:** *Matteo Vergani*<sup>1</sup>; Laurence Noirod<sup>1</sup>; <sup>1</sup>CEA, DES, IRESNE, DEC, Cadarache, 13108 Saint-Paul lez Durance, France

**3:10 PM**

**Effective Parameterization of Phase-field Models of Fission Gas Bubble Growth:** *Larry Aagesen*<sup>1</sup>; Sourabh Kadambi<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**3:30 PM**

**Modeling of Fission Gas Behavior in Uranium Nitride Fuel:** *Jason Rizk*<sup>1</sup>; Christopher Matthews<sup>1</sup>; Michael Cooper<sup>1</sup>; Anton Schneider<sup>1</sup>; Anders Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:50 PM Break**

**4:10 PM**

**Development of a Fission Gas Swelling Model for U-Mo Fuel Incorporating Fission Density, Grain Size, Fission Rate, and Coolant Inlet Temperature:** *ATM Jahid Hasan*<sup>1</sup>; Benjamin Beeler<sup>1</sup>; <sup>1</sup>North Carolina State University

**4:30 PM**

**Atomistic Modeling of Fission Gas (Xe) Diffusivity at UO<sub>2</sub> Grain Boundaries:** *Xiang-Yang Liu*<sup>1</sup>; Conor Galvin<sup>1</sup>; William Neilson<sup>1</sup>; Michael Cooper<sup>1</sup>; David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

4:50 PM

**High-burnup Structure Formation and Associated Fission Product Diffusion in UO<sub>2</sub>:** *Sudipta Biswas*<sup>1</sup>; Lingfeng He<sup>2</sup>; Dewen Yushu<sup>1</sup>; Prithivirajan Veerappan<sup>1</sup>; Linu Malakkal<sup>1</sup>; Cameron Howard<sup>2</sup>; Chao Jiang<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>NCSU

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials – Shape Memory Alloys

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

Wednesday PM | March 6, 2024  
Plaza Int'l D | Hyatt

**Session Chair:** Markus Chmielus, University of Pittsburgh

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2:00 PM Invited

**An ICME Framework for Tailoring the Transformation Characteristics of AM NiTi(x)-based Shape Memory Alloys:** *Raymundo Arroyave*<sup>1</sup>; Meelad Ranaiefar<sup>1</sup>; Pejman Honarmandi<sup>1</sup>; Raymond Neuberger<sup>1</sup>; Lei Xue<sup>1</sup>; Richard Otis<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; Alaa Elwany<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>JPL

2:30 PM

**Binder Jet Printed and Sintered Porous Ni-Mn-Ga Magnetic Shape-Memory Alloys:** Pierangeli Rodriguez de Vecchis<sup>1</sup>; Amir Mostafaei<sup>2</sup>; *Markus Chmielus*<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Illinois Institute of Technology

2:50 PM

**Shape Memory Alloy Enabled Interlocking Metasurfaces:** *Abdelrahman Elsayed*<sup>1</sup>; Benjamin Young<sup>2</sup>; Ophelia Bolmin<sup>2</sup>; Philip Noell<sup>2</sup>; Brad Boyce<sup>2</sup>; Alaa Elwany<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M; <sup>2</sup>Sandia National Lab

3:10 PM

**Iron-based Shape Memory Alloy Fabricated Using Laser Powder Bed Fusion:** Anwar Algamal<sup>1</sup>; Abdalmageed Almotari<sup>1</sup>; Majed Ali<sup>1</sup>; *Ala Qattawi*<sup>1</sup>; <sup>1</sup>University of Toledo

3:30 PM

**Mitigation of Solidification Cracking in Wire Arc Additive Manufacturing (WAAM) of Fe-based Shape Memory Alloy Using Machine Hammer Peening:** *Soumyajit Koley*<sup>1</sup>; Kuladeep Rajamudili<sup>1</sup>; Supriyo Ganguly<sup>1</sup>; <sup>1</sup>Cranfield University

3:50 PM Break

4:10 PM

**Advanced Thermal Analysis to Study the Degree of Solid-State Thermoelastic Phase Transformation of Ti-rich Laser Directed Energy Deposition (LDED)-based NiTi Alloys:** *Arnab Chatterjee*<sup>1</sup>; Reginald Hamilton<sup>1</sup>; <sup>1</sup>Penn State

4:30 PM

**Functional and Mechanical Behavior of Ultrathin, Porous NiTi Fabricated via Laser Powder Bed Fusion:** *Londiwe Motibane*<sup>1</sup>; Lerato Tshabalala<sup>1</sup>; Devon Devon Hagedorn-Hansen<sup>2</sup>; Silethelwe Chikisha<sup>1</sup>; Thorsten Becker<sup>3</sup>; <sup>1</sup>CSIR South Africa;

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Fatigue and Fracture: Towards Rapid Qualification – Microstructure-based Fatigue Studies on Additive-Manufactured Materials: Joint Session with Fatigue in Materials Symposium

**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; Steve Daniewicz, University of Alabama

**Wednesday PM | March 6, 2024**  
**Plaza Int'l E | Hyatt**

**Session Chairs:** Orion Kafka, National Institute of Standards and Technology; Nik Hrabe, National Institute of Standards and Technology

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**2:00 PM Invited**

**Towards Rapid Qualification, a Hybrid Experimental-Modeling Approach to Account for the Presence of Porosity:** Krzysztof Stopka<sup>1</sup>; Andrew Desrosiers<sup>2</sup>; Amber Andreaco<sup>2</sup>; *Michael Sangid*<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>GE Additive

**2:20 PM**

**Rapid Prediction of Fatigue-performance Heat Maps in Additively Manufactured Metals by Integrating Physics-based and Data-Driven Modeling:** *Krishna Prasath Logakannan*<sup>1</sup>; Ashley Spear<sup>1</sup>; <sup>1</sup>University of Utah

**2:40 PM**

**In-situ Fatigue Life Prediction with Simulated Defects for Additive Manufacturing Process:** *Xueyong Qu*<sup>1</sup>; Leland Shimizu<sup>1</sup>; Jacob Rome<sup>1</sup>; <sup>1</sup>The Aerospace Corporation

**3:00 PM**

**Fatigue Life Depends on Layer Height When Multiple Lasers are Used: A Study on L-PBF IN718 with As-Built Surfaces:** *Orion Kafka*<sup>1</sup>; Jake Benzing<sup>1</sup>; Nikolas Hrabe<sup>1</sup>; Lucas Koepke<sup>1</sup>; Philipp Schumacher<sup>2</sup>; Donald Godfrey<sup>2</sup>; Chad Beamer<sup>3</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>SLM Solutions; <sup>3</sup>Quintus Technologies

**3:20 PM**

**Strong and Fracture-resistant High-entropy Alloy Intrinsically Toughened by 3D-printing:** *Punit Kumar*<sup>1</sup>; David Cook<sup>1</sup>; Huang Sheng<sup>2</sup>; Matthew Michalek<sup>3</sup>; Mingwei Zhang<sup>1</sup>; Pei Wang<sup>4</sup>; Andrew Minor<sup>3</sup>; Upadrasta Ramamurty<sup>2</sup>; Robert Ritchie<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory; <sup>2</sup>Nanyang Technological University Singapore; <sup>3</sup>University of California Berkeley; <sup>4</sup>Institute of Material Research and Engineering

**3:40 PM Break**

**4:00 PM Invited**

**Tailoring Materials by Additive Manufacturing - From Process Parameters to Superior Fatigue Properties:** *Thomas Niendorf*<sup>1</sup>; <sup>1</sup>Universitaet Kassel

**4:20 PM**

**Impact of Micro and Mesostructure on the Failure Resistance of Laser Powder Bed Fusion-processed Materials:** *Bernd Gludovatz*<sup>1</sup>; Moses Paul<sup>1</sup>; Jamie Kruzic<sup>1</sup>; Upadrasta Ramamurty<sup>2</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>Nanyang Technological University



**4:40 PM**

**Using Microstructure-Sensitive Modeling to Accelerate Qualification of Fatigue Critical AM Alloys:** *Gary Whelan*<sup>1</sup>; <sup>1</sup>Questek Innovations Llc

**5:00 PM**

**Understanding Fracture in Additively Manufactured Metals: Towards Certification of Complex Geometries:** *Allison Beese*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**5:20 PM**

**Towards Defining a Process Window in Terms of Fatigue:** *Anthony Rollett*<sup>1</sup>; John Lewandowski<sup>2</sup>; Sneha Narra<sup>1</sup>; Albert To<sup>3</sup>; Kirk Rogers<sup>4</sup>; Frank Medina<sup>5</sup>; Craig Brice<sup>6</sup>; Jack Beuth<sup>1</sup>; <sup>1</sup>Carnegie Mellon University; <sup>2</sup>Case Western Reserve University; <sup>3</sup>University of Pittsburgh; <sup>4</sup>Barnes Global Advisors; <sup>5</sup>University of Texas El Paso; <sup>6</sup>Colorado School of Mines

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Materials in Energy Environments — Processing and Application

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

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

**Wednesday PM | March 6, 2024**  
**Atlantic | Hyatt**

**Session Chairs:** Yi Xie, Purdue University; Mohan Sai Kiran Kumar Yadav Nartu, Pacific Northwest National Laboratory

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**2:00 PM Invited**

**Additive Manufacturing of Ferritic/Martensitic Steels for Nuclear Applications (Invited Talk):** *Srinivas Aditya Mantri*<sup>1</sup>; Xuan Zhang<sup>1</sup>; <sup>1</sup>Argonne National Lab

**2:30 PM**

**Cold Spray Manufacturing of Oxide Dispersion Strengthened (ODS) Steels Using 14YWT Powders:** *Hwasung Yeom*<sup>1</sup>; David Hoelzer<sup>2</sup>; Stuart Maloy<sup>3</sup>; Kumar Sridharan<sup>4</sup>; <sup>1</sup>Pohang University of Science and Technology; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>University of Wisconsin, Madison

**2:50 PM**

**In-situ Synthesis of Nitrides through Controlling Reactive Gas Atmosphere during Laser Powder Bed Fusion of FeCrAl:** *Omer Cakmak*<sup>1</sup>; Seung Hoon Lee<sup>1</sup>; Seong Gyu Chung<sup>1</sup>; Jung-Wook Cho<sup>1</sup>; <sup>1</sup>Pohang University of Science and Technology (POSTECH)

**3:10 PM**

**Process Mapping on Representative Geometries Using SS316 with Varying C Content Fabricated by Laser Powder Bed Fusion:** *Holden Hyer*<sup>1</sup>; Josh Kendall<sup>1</sup>; David Collins<sup>1</sup>; Amir Ziabari<sup>1</sup>; Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:30 PM****Prototype Tooling for Bipolar Plates Challenges Additive Manufacturing:** *Patrick Cyron*<sup>1</sup>; Maxim Beck<sup>1</sup>; Celalettin Karadogan<sup>1</sup>; Mathias Liewald<sup>1</sup>; <sup>1</sup>University of Stuttgart, Institute for Metal Forming Technology**3:50 PM Break****4:10 PM****Transitioning from Tungsten to Steels by Laser-Directed Energy Deposition:** *Deniz Ebeperi*<sup>1</sup>; Tim Graening<sup>2</sup>; Ying Yang<sup>2</sup>; Yutai Katoh<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Oak Ridge National Laboratory**4:30 PM****Additive Manufacturing Technique to Stop Corrosion Propagation in Magnesium/Aluminum Alloy by Zn and Mg/WE43 Inhibition:** *Minh Tran*<sup>1</sup>; Fanyue Kong<sup>1</sup>; Elena Romanovskaia<sup>1</sup>; Valentin Romanovski<sup>1</sup>; Ji Ma<sup>1</sup>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia**4:50 PM****Improved Intergranular Corrosion Resistance of Laser Powder Bed Fusion Printed Stainless Steels via Feedstock Modification:** *Venkata Bhuvaneshwari Vukkum*<sup>1</sup>; Evan Delvecchio<sup>1</sup>; Jijo Christudas Justus<sup>2</sup>; Steven Storck<sup>3</sup>; Rajeev Gupta<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Applied Physics Laboratory

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**ADDITIVE MANUFACTURING****Additive Manufacturing Modeling, Simulation and Machine Learning — CALPHAD Approach****Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS: Integrated Computational Materials Engineering Committee**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology**Wednesday PM | March 6, 2024**  
**Orlando N | Hyatt****Session Chairs:** Charles Fisher, Naval Surface Warfare Center; Li Ma, Johns Hopkins University Applied Physics Laboratory; Jing Zhang, Indiana University-Purdue University Indianapolis**2:00 PM****A CALPHAD Model of Dendritic Growth for the Design of Printable Industrial Alloys:** *Christopher Hareland*<sup>1</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University**2:20 PM****On the Applicability of CALPHAD and Process Models to Predict Solidification Cracking:** *Mustafa Megahed*<sup>1</sup>; Klaus Buessenschuett<sup>2</sup>; Philipp Stich<sup>3</sup>; Markus Apel<sup>4</sup>; Ludo Bautmans<sup>5</sup>; Christian Haase<sup>2</sup>; <sup>1</sup>ESI Group; <sup>2</sup>RWTH Aachen; <sup>3</sup>EOS GmbH; <sup>4</sup>Access Technology; <sup>5</sup>Oerlikon**2:40 PM****A Robust Model for Estimating the Metal Evaporation during Laser Powder Bed Fusion with Inputs from CALPHAD Approach:** *Soumya Sridar*<sup>1</sup>; Wei Xiong<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**3:00 PM**

**Prediction of Process Maps and Location Specific Properties for Additive Manufacturing through CALPHAD:** *Andreas Markstrom*<sup>1</sup>; Amer Malik<sup>1</sup>; Minh Do Quang<sup>1</sup>; Johan Jeppsson<sup>1</sup>; <sup>1</sup>Thermo Calc Software Ab

**3:20 PM**

**Fast and Scalable Method to Generate Reduced Order Models of Metal-based Additive Manufacturing Simulations Using a Hypercomplex-based Automatic Differentiation Finite Element Method:** *Mauricio Aristizabal Cano*<sup>1</sup>; Juan-Sebastian Rincon-Tabares<sup>1</sup>; Matthew Balcer<sup>1</sup>; Arturo Montoya<sup>1</sup>; David Restrepo<sup>1</sup>; Harry Millwater<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio

**3:40 PM Break**

**4:00 PM**

**Analyzing Micro-macro Transitional Length Scale in 3D Printed Chopped Fiber Reinforced Polymers:** *Indu Modala*<sup>1</sup>; Paromita Nath<sup>1</sup>; Nand Kishore Singh<sup>1</sup>; <sup>1</sup>Rowan University

**4:20 PM**

**Transfer Learning Based Prediction of Part Quality in Additive Manufacturing:** *Tyler Paupst*<sup>1</sup>; Paromita Nath<sup>1</sup>; <sup>1</sup>Rowan University

**4:40 PM**

**Multi-Information Source Thermal Modeling for Design of Printable Refractory Alloys:** *Brent Vela*<sup>1</sup>; Peter Morcos<sup>1</sup>; Cafer Acemi<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Alaa Elwany<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**5:00 PM**

**Domain Stitching: A Technique for Large-scale Microstructural Studies in Laser Powder Bed Fusion:** *Giovanni Orlandi*<sup>1</sup>; Daniel Moser<sup>1</sup>; Theron Rodgers<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

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## ADDITIVE MANUFACTURING

### Additive Manufacturing of Refractory Metallic Materials — Additive Manufacturing of Refractory Metallic Materials: Nb and Ta Alloys

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

**Program Organizers:** Faramarz Zarandi, RTX Corporation; Antonio Ramirez, Ohio State University; Jeffrey Sowards, NASA Marshall Space Flight Center; Omar Mireles, Los Alamos National Laboratory; Eric Lass, University of Tennessee-Knoxville; Matthew Osborne, Global Advanced Metals; Joao Oliveira, Faculdade Ciencias Tecnologias

**Wednesday PM | March 6, 2024**  
**Rainbow Spring II | Hyatt**

**Session Chairs:** Jeffrey Sowards, NASA Marshal Space Flight Center; Antonio Ramirez, Ohio State University

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**2:00 PM**

**Development of FGMs from Superalloys to Refractory Alloys:** Brian Jordan<sup>1</sup>; Yousub Lee<sup>1</sup>; James Haley<sup>1</sup>; Dunji Yu<sup>1</sup>; Ke An<sup>1</sup>; Marcus Hansen<sup>2</sup>; Jaimie Tiley<sup>1</sup>; Soumya Nag<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Texas A&M University

**2:20 PM****Residual Stress Prediction and Neutron Validation for Functionally Graded High Temperature Materials of IN718 and C103:** *Yousub Lee*<sup>1</sup>; James Haley<sup>1</sup>; Brian Jordan<sup>1</sup>; Soumya Nag<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory**2:40 PM****Control of Toughness in Refractory Nb-Ti Powders Through Induction of Oxygen-binding Subphases:** *Julia Pürstl*<sup>1</sup>; Mahsa Amiri<sup>1</sup>; Matt Foong<sup>1</sup>; Daniel Mumm<sup>1</sup>; Lorenzo Valdevit<sup>1</sup>; <sup>1</sup>University of California, Irvine**3:00 PM****Printing Complex and Stable Titanium-Niobium Geometries via Laser Powder Bed Fusion:** *Kourtney Porsch*<sup>1</sup>; Michael Brupbacher<sup>1</sup>; Kevin Hemker<sup>2</sup>; Catherine Barrie<sup>2</sup>; Steven Storck<sup>1</sup>; <sup>1</sup>Johns Hopkins University Applied Physics Laboratory; <sup>2</sup>Johns Hopkins University**3:20 PM****Surrogate Additive Processes of Refractory Multi-principal Element Alloys:** *Anna Rawlings*<sup>1</sup>; Andrew Birnbaum<sup>2</sup>; John Steuben<sup>2</sup>; Colin Stewart<sup>2</sup>; Eric Patterson<sup>2</sup>; John Michopoulos<sup>2</sup>; Mitra Taheri<sup>3</sup>; <sup>1</sup>U.S. Naval Research Laboratory / Johns Hopkins University; <sup>2</sup>U.S. Naval Research Laboratory; <sup>3</sup>Johns Hopkins University**3:40 PM Break****4:00 PM****Use of Materials Modeling and Direct Energy Deposition for Design of Additively Manufacturable Tantalum Alloys:** *Colleen Hilla*<sup>1</sup>; Paul Korinko<sup>1</sup>; Tatiana Ayers<sup>1</sup>; Guru Dinda<sup>1</sup>; Laura Tovo<sup>1</sup>; <sup>1</sup>SRNL**4:20 PM****In-situ Alloying of Tantalum-tungsten with Laser Powder Bed Fusion:** *Marissa Linne*<sup>1</sup>; Kaila Bertsch<sup>1</sup>; Connor Rietema<sup>1</sup>; Waldi Greene<sup>1</sup>; Steve Burke<sup>1</sup>; Riley Wraith<sup>1</sup>; Amanda Wu<sup>1</sup>; Joe Mckeown<sup>1</sup>; Hye-Sook Park<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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**ADDITIVE MANUFACTURING****Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III – Neutron Measurements****Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Advanced Characterization, Testing, and Simulation Committee**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University**Wednesday PM | March 6, 2024****Orlando M | Hyatt****Session Chair:** Donald Brown, Los Alamos National Laboratory

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**2:00 PM****In-situ Neutron Diffraction Measurements on Electron Beam Additively Manufactured (EBAM) 316 Stainless Steel:** *Donald Brown*<sup>1</sup>; D. Braun<sup>2</sup>; E. Tiferet<sup>2</sup>; Y. Ganor<sup>2</sup>; A. Pesach<sup>2</sup>; Bjørn Clausen<sup>3</sup>; <sup>1</sup> Los Alamos National Laboratory; <sup>2</sup>Rotem Industries, Be'er-Sheva, Israel; <sup>3</sup>Los Alamos National Laboratory

**2:20 PM**

**Neutron Diffraction Microstructural and Deformation Analysis of Additively Manufactured Alloys:** *Kenta Yamanaka*<sup>1</sup>; Manami Mori<sup>2</sup>; Yusuke Onuki<sup>3</sup>; Shigeo Sato<sup>4</sup>; Akihiko Chiba<sup>1</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>National Institute of Technology, Sendai College; <sup>3</sup>Tokyo Denki University; <sup>4</sup>Ibaraki University

**2:40 PM**

**Spatially Resolving Micro-/Nano- Structures in Bulk Additively Manufactured Parts by Neutron Grating Interferometry:** *Yuxuan Zhang*<sup>1</sup>; Erik Stringfellow<sup>1</sup>; Hassina Bilheux<sup>1</sup>; Jean Bilheux<sup>1</sup>; Leslie Butler<sup>2</sup>; Kyungmin Ham<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Louisiana State University

**3:00 PM**

**Creep Behavior of an Additively Manufactured Al-Ce-Ni-Mn-Zr Alloy Measured via In Situ Neutron Diffraction:** *Sumit Bahl*<sup>1</sup>; Tiffany Wu<sup>2</sup>; Richard Michi<sup>1</sup>; Ke An<sup>1</sup>; Dunji Yu<sup>1</sup>; Lawrence Allard<sup>1</sup>; Jovid Rakhmonov<sup>1</sup>; Jonathan Poplawsky<sup>1</sup>; Christopher Fancher<sup>1</sup>; David Dunand<sup>2</sup>; Alex Plotkowski<sup>1</sup>; Amit Shyam<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Northwestern University

**3:20 PM**

**In-situ Neutron Studies on Metallic Materials during Laser Powder Bed Fusion:** *Shieren Sumarli*<sup>1</sup>; Efthymios Polatidis<sup>1</sup>; Steven Van Petegem<sup>1</sup>; Roland Logé<sup>2</sup>; Markus Strobl<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>École Polytechnique Fédérale de Lausanne

**3:40 PM Break**

**3:55 PM**

**Neutron Diffraction Analysis of Microstructure and Residual Stresses in Lubricant-free AFSD AA7075 Repairs:** *Ning Zhu*<sup>1</sup>; Yan Chen<sup>2</sup>; Ke An<sup>2</sup>; Luke Brewer<sup>3</sup>; Paul Allison<sup>1</sup>; Brian Jordon<sup>1</sup>; <sup>1</sup>Baylor University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>University of Alabama

**4:15 PM**

**Characterizing the Effects of Varying Process Parameters on Additive Manufactured Materials for Nuclear Structural Material Applications:** *Chuting Tsai*<sup>1</sup>; Cheng Sun<sup>1</sup>; Xinchang Zhang<sup>1</sup>; William Chuirazzi<sup>1</sup>; Jeffrey Bunn<sup>2</sup>; Yuxuan Zhang<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Oak Ridge National Laboratory

**4:35 PM**

**Improving the Efficiency of Stress-strain Neutron Diffraction Using a Polychromatic Beam and Multiplexing:** *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

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Length-Scale Phenomena in Mechanical Response — Mechanical Behavior of Additively Manufactured Complex Alloys**

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Wednesday PM | March 6, 2024**

**Plaza Int'l F | Hyatt**

**Session Chairs:** Dina Fouad, University of Birmingham; Tianyi Chen, Oregon State University

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**2:00 PM Invited**

**Mesostructure Engineering from Random Powder Mixtures in Laser Powder Bed Fusion (LPBF):** *Christopher Hutchinson*<sup>1</sup>; Erin Brodie<sup>1</sup>; Huikai Li<sup>1</sup>; <sup>1</sup>Monash University

**2:30 PM**

**Multiscale Characterization of the Heterogeneous Composition-Microstructure-Property Relationships in Additive Manufacturing Multicomponent Materials:** *Shunyu Liu*<sup>1</sup>; <sup>1</sup>Clemson University

**2:50 PM**

**Microstructural Control and Variant Selection in Laser Powder Bed Fusion of Ti-6Al-4V:** *Dina Fouad*<sup>1</sup>; Yu-Lung Chiu<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham

**3:10 PM**

**Investigation of the Size Effect of the Additively Manufactured Thin Wall Structures with Crystal Plasticity Simulations:** *Subhadip Sahoo*<sup>1</sup>; Mohammad M. Keleshteri<sup>1</sup>; Jason Mayeur<sup>2</sup>; Gabriel Demeneghi<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>NASA

**3:30 PM Break**

**3:50 PM**

**Unveiling the Formation Mechanism of Sn-rich Phases and Enhancing Mechanical Properties of Cu-10Sn via LPBF:** *Kangwei Chen*<sup>1</sup>; Simon Ringer<sup>1</sup>; Keita Nomoto<sup>1</sup>; <sup>1</sup>University Of Sydeny

**4:10 PM Invited**

**Nanoindentation Studies on the Surface Properties of Additively Manufactured Ni-base Alloys:** *Youxing Chen*<sup>1</sup>; Oliver Bürgi<sup>1</sup>; Alex Bridges<sup>2</sup>; Liuqing Yang<sup>1</sup>; John Shingledecker<sup>2</sup>; <sup>1</sup>University of North Carolina Charlotte; <sup>2</sup>Electric Power Research Institute

**4:40 PM**

**Toward Stronger and Highly Conductive Copper-based Alloys via Additive Manufacturing:** *Keita Nomoto*<sup>1</sup>; Kangwei Chen<sup>1</sup>; Simon Ringer<sup>1</sup>; <sup>1</sup>The University of Sydney

**5:00 PM**

**Micromechanical Behavior of Multi-layered Medium-entropy Alloy and the Hydrogen Effects on It:** *Zhe Gao*<sup>1</sup>; Yakai Zhao<sup>2</sup>; Pei Wang<sup>2</sup>; Hyoung Seop Kim<sup>3</sup>; Upadrasta Ramamurthy<sup>4</sup>; Jae-il Jang<sup>1</sup>; <sup>1</sup>Hanyang University; <sup>2</sup>Institute of Materials Research and Engineering (IMRE); <sup>3</sup>Pohang University of Science and Technology; <sup>4</sup>Nanyang Technological University

**5:20 PM**

**Spall Strength Sensitivity to Process Parameters in Additively Manufactured 316L Stainless Steel:** *Benjamin Derby*<sup>1</sup>; Ankur Agrawal<sup>2</sup>; David Jones<sup>1</sup>; Reeju Pokharel<sup>1</sup>; Daniel Martinez<sup>1</sup>; Ramon Martinez<sup>1</sup>; Dan Thoma<sup>2</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>UW-Madison

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Process-induced Microstructures and Defects — Steel and Aluminum Alloys**

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

**Wednesday PM | March 6, 2024**  
**Florida C | Hyatt**

**Session Chair:** Eric Payton, University of Cincinnati

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**2:00 PM**

**Metastable Phase Formation in a High-Strength Aluminum Alloy Fabricated Using Additive Manufacturing:** *Andrew Iams*<sup>1</sup>; *Jordan Weaver*<sup>1</sup>; *Brandon Lane*<sup>1</sup>; *Darby LaPlant*<sup>2</sup>; *Hunter Martin*<sup>2</sup>; *Fan Zhang*<sup>1</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>HRL

**2:20 PM**

**Understanding the Microstructure and Chemical Evolution of Al-Mg alloys Prepared by Hybrid Casting and Additive Manufacturing Processes:** *Tanvi Ajantiwalay*<sup>1</sup>; *Mayur Pole*<sup>1</sup>; *Gerald Knapp*<sup>2</sup>; *Thomas Feldhausen*<sup>2</sup>; *Mithulan Paramanathan*<sup>2</sup>; *Alex Plotkowski*<sup>2</sup>; *Arun Devaraj*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Oak Ridge National Lab

**2:40 PM**

**Giant Supersaturation of Interstitial Light Atoms in Laser Powder Bed Fusion Processed Stainless Steel 316L via Solute Trapping:** *Xiaolei Guo*<sup>1</sup>; *Hsien-Lien Huang*<sup>1</sup>; *Menglin Zhu*<sup>1</sup>; *Karthikeyan Hariharan*<sup>1</sup>; *Szu-Chia Chien*<sup>1</sup>; *Ngan Huynh*<sup>1</sup>; *Jinwoo Hwang*<sup>1</sup>; *Wolfgang Windl*<sup>1</sup>; *Christopher Taylor*<sup>1</sup>; *Eric Schindelholz*<sup>1</sup>; *Gerald Frankel*<sup>1</sup>; <sup>1</sup>The Ohio State University

**3:00 PM**

**Gleeble Simulations of Stainless Steels to Understand Correlations between Build Height, Thermal History, Microstructure, and Mechanical Properties in AM:** *Grant Johnson*<sup>1</sup>; *Maria Quintana*<sup>1</sup>; *Sougata Roy*<sup>2</sup>; *Peter Collins*<sup>1</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>University of North Dakota

**3:20 PM Break**

**3:40 PM**

**Multiscale Gradient Strengthening of Additively Manufactured Low Alloy Martensitic Steel:** *Ankita Roy*<sup>1</sup>; *Abhijeet Dhal*<sup>1</sup>; *Roopam Jain*<sup>1</sup>; *Priyanka Agrawal*<sup>1</sup>; *Shreya Mukherjee*<sup>1</sup>; *Rajiv Mishra*<sup>1</sup>; *B. McWilliams*<sup>1</sup>; *Clara Mock*<sup>1</sup>; *K Cho*<sup>1</sup>; <sup>1</sup>University of North Texas

**4:00 PM**

**Effect of Deposition Sequence on the Interfacial Characteristics of Additively Manufactured Stainless Steel 316L/Inconel 718 Multi-material Structures:** *Sourav Goswami*<sup>1</sup>; *V.M.S.K. Minnikanti*<sup>1</sup>; *Sushil Mishra*<sup>1</sup>; *Shyamprasad Karagadde*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**4:20 PM**

**Microstructural Changes and Defect Evolution on Powder Bed Fusion Processed 316L Austenitic Stainless Steel:** *Selda Nayir*<sup>1</sup>; *Caleb Massey*<sup>1</sup>; *Chase Joslin*<sup>1</sup>; *Fred A List III*<sup>1</sup>; *Peeyush Nandwana*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**4:40 PM**

**Investigating Build Orientation-induced Mechanical Anisotropy in Additive Manufacturing 316L Stainless Steel:** *Som Dixit*<sup>1</sup>; *Shunyu Liu*<sup>1</sup>; *Heather Murdoch*<sup>2</sup>; *Pauline Smith*<sup>2</sup>; <sup>1</sup>Clemson University; <sup>2</sup>DEVCOM Army Research Laboratory

**5:00 PM**

**Effect of Laser Irradiation Mode on L-PBF Ti6Al4V Thin Sections:** John Daniel Arputharaj<sup>1</sup>; *Shahrooz Nafisi*<sup>1</sup>; Reza Ghomashchi<sup>1</sup>; <sup>1</sup>University of Adelaide

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation – Local Strain

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

**Wednesday PM | March 6, 2024**  
**Celebration 1 | Hyatt**

**Session Chairs:** Jean-Charles Stinville, University of Illinois; Andrew Minor, University of California-Berkeley

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**2:00 PM**

**The Role of Intermetallic Particles in the Fracture of Al2024-T351:** *Sara Ricci*<sup>1</sup>; Nicola Bonora<sup>1</sup>; Gabriel Testa<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; Di Wan<sup>2</sup>; Zhuo Xu<sup>2</sup>; Filippo Berto<sup>3</sup>; <sup>1</sup>University Of Cassino; <sup>2</sup>Norwegian University of Science and Technology; <sup>3</sup>Sapienza University of Rome

**2:20 PM**

**Incipient Plastic Localization from Cryogenic to High Temperatures in a Nickel Based-superalloy:** *Dhruv Anjaria*<sup>1</sup>; Darren Pagan<sup>2</sup>; Jean-Charles Stinville<sup>1</sup>; <sup>1</sup>University of Illinois Urbana Champaign; <sup>2</sup>The Pennsylvania State University

**2:40 PM**

**Effect of Laser Peening on the Origin of Wear in Additively Manufactured Nickel Superalloy at Elevated Temperatures:** *Manisha Tripathy*<sup>1</sup>; Lloyd Hackel<sup>2</sup>; Ali Beheshti<sup>1</sup>; <sup>1</sup>George Mason University; <sup>2</sup>Curtiss-Wright Surface Technology, Livermore, CA

**3:00 PM**

**Micromechanical Properties of Low Angle Grain Boundaries in Single Crystal Ni-based Superalloys:** *Felicitas Werner*<sup>1</sup>; Aleksander Kostka<sup>1</sup>; Pascal Thome<sup>1</sup>; Felicitas Scholz<sup>1</sup>; Gunther Eggeler<sup>1</sup>; Jan Frenzel<sup>1</sup>; <sup>1</sup>Ruhr-University Bochum

**3:20 PM**

**A Study on the Irradiation Response of the Microstructure of Zr.25Nb Pressure Tubes in Load-following Nuclear Reactors:** *Thalles Lucas*<sup>1</sup>; Fei Long<sup>1</sup>; Levente Balogh<sup>1</sup>; <sup>1</sup>Queen'S University

**3:40 PM Break**

**4:00 PM**

**Exploring Deformation Behavior and Phase Transformations of Tin:** *Reeju Pokharel*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:20 PM**

**Mapping Local Strain in Metallic Glass Composites during In Situ Deformation in the TEM:** *Christoph Gammer*<sup>1</sup>; Simon Fellner<sup>1</sup>; Lukas Schretter<sup>1</sup>; Jürgen Eckert<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science



**4:40 PM**

**Delamination Behavior of Crystalline-amorphous Interfaces Studied at Different Lengthscales:** *Alice Lassnig*<sup>1</sup>; Megan Cordill<sup>1</sup>; Andrew Minor<sup>2</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science; <sup>2</sup>University of California, Berkeley

**5:00 PM**

**Mapping Nanoscale Strain Redistributions in Multi-layered Metallic Glasses during In-situ Deformation:** *Lukas Schretter*<sup>1</sup>; Simon Fellner<sup>1</sup>; Jürgen Eckert<sup>1</sup>; Christoph Gammer<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Functional and Structural Thin Films and Coatings – Thin Films for Optoelectronic Materials & Nanotechnology

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

**Program Organizers:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Karine Mougín, Cnrs, Is2m; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

**Wednesday PM | March 6, 2024**  
**Bayhill 25 | Hyatt**

**Session Chairs:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Karine Mougín, Cnrs - Is2m

**2:00 PM Introductory Comments**

**2:05 PM Keynote**

**Nanocrystalline Diamond for MEMS/NEMS Applications:** *Ashok Kumar*<sup>1</sup>; <sup>1</sup>University of South Florida

**2:45 PM**

**Diamond Epitaxy Using Nickel to Facilitate Epitaxy with Q-carbon as the Seed Layer:** *Pranay Kalakonda*<sup>1</sup>; Naveen Narasimhachar Joshi<sup>1</sup>; Siba Sundar Sahoo<sup>1</sup>; Roger Narayan<sup>1</sup>; Jagdish Narayan<sup>1</sup>; <sup>1</sup>North Carolina State University

**3:15 PM**

**NiCo<sub>2</sub>O<sub>4</sub>/Graphene Quantum Dots as Advanced Electrodes for High Efficiency Asymmetric and Symmetric Supercapacitors:** *A Lakshmi Narayana*<sup>1</sup>; Navid Attarzadeh<sup>1</sup>; Ramana C V<sup>1</sup>; <sup>1</sup>University of Texas at El Paso

**3:45 PM Break**

**4:05 PM**

**Multiphysics Modelling of AlScN Film Growth for MemS and Memory Applications:** Trans Si Bui Quang<sup>1</sup>; Lau Yang Hao<sup>1</sup>; Zicong Marvin Wong<sup>1</sup>; Gang Wu<sup>1</sup>; Srinivasan Bharathi Madurai<sup>1</sup>; Joshi Kartikey<sup>1</sup>; Le Duc Vinh<sup>1</sup>; Leong Fong Yew<sup>1</sup>; *Ramanarayan Hariharaputran*<sup>1</sup>; <sup>1</sup>Institute of High Performance Computing (IHPC), Agency for Science, Technology and Research (A\*STAR), Singapore

**4:25 PM**

**Toward the Development of Densors and Actuators by 4D Printing:** *Karine Mougín*<sup>1</sup>; Quentin Bauerlin<sup>1</sup>; Xingyu Wu<sup>1</sup>; Benjamin Leuschel<sup>1</sup>; Ferial Ghellal<sup>1</sup>; Damien Favier<sup>2</sup>;

Christian Gauthier<sup>2</sup>; Thierry Roland<sup>2</sup>; Arnaud Spangenberg<sup>1</sup>; <sup>1</sup>Institut de Science des Matériaux de Mulhouse, UMR 7361 CNRS-Université de Haute Alsace; <sup>2</sup>Institut Charles Sadron, UPR22 CNRS

4:45 PM Concluding Comments

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 — Energy Storage with Battery II

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

Wednesday PM | March 6, 2024  
Celebration 13 | Hyatt

**Session Chairs:** Yuting Luo, Johns Hopkins University; Partha Mukherjee, Purdue University; Dibakar Datta, New Jersey Institute Of Technology

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2:00 PM Keynote

**Mesoscale Mechanics of Battery Materials: What Have We Learned:** *Scott Roberts*<sup>1</sup>; Jeffrey Horner<sup>2</sup>; Julia Meyer<sup>3</sup>; Partha Mukherjee<sup>3</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Sandia National Laboratory; <sup>3</sup>Purdue University

2:30 PM Invited

**Insight of Li-ion Transport on Additive-free LCO Cathode for All-solid-state Batteries:** *Yuting Luo*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

2:55 PM

**LiFePO<sub>4</sub>/C Prepared Using a Novel Multi-step Temperature Controlled Solid-phase Method as a Cathode Material for Lithium Batteries:** *Li Wang*<sup>1</sup>; *Weiya Zhang*<sup>1</sup>; *Jinyu Liu*<sup>1</sup>; <sup>1</sup>Hebei Normal University for Nationalities

3:15 PM Invited

**Manipulating Electrolytes and Interfaces for Improved Electrochemical and Thermal Stability in Sodium-ion Batteries:** *Susmita Sarkar*<sup>1</sup>; Partha Mukherjee<sup>1</sup>; <sup>1</sup>Purdue University

3:40 PM Break

4:00 PM

**Materials Characterization of Black Mass Using 3D Automated Quantitative Mineralogy in the X-ray Microscope:** *Ria Mitchell*<sup>1</sup>; Eddy Hill<sup>1</sup>; Richard Taylor<sup>1</sup>; Andy Holwell<sup>1</sup>; <sup>1</sup>ZEISS Microscopy

4:25 PM Invited

**Mechanistic Analysis of Interface Instability in Solid-state Batteries:** *Bairav Vishnugopi*<sup>1</sup>; Kaustubh Naik<sup>1</sup>; Partha Mukherjee<sup>1</sup>; <sup>1</sup>Purdue University

4:50 PM Invited

**Multiscale Active Materials for Next-generation Energy Storage:** Dibakar Datta<sup>1</sup>; *Joy Datta*<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

5:15 PM Invited

**Some Considerations in Morphology for the Next Generation of Electrode Materials:** *Luis De Jesus Baez*<sup>1</sup>; <sup>1</sup>University of Buffalo

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials — Multiferroic, Hexaferrites, and Magnetoelastic Materials

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

**Program Organizers:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

Wednesday PM | March 6, 2024

Bayhill 27 | Hyatt

**Session Chair:** Jose M. Porro, BCMaterials & Ikerbasque

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2:00 PM Invited

**Applications Based on Magneto-elastic Materials:** *Andoni Lasheras*<sup>1</sup>; G. Saiz Paula<sup>1</sup>; Iban Quintana<sup>2</sup>; Jon Gutiérrez<sup>1</sup>; Jose Maria Porro<sup>3</sup>; Lopes Ana Catarina<sup>1</sup>; <sup>1</sup>University of the Basque Country; <sup>2</sup>IK4-Tekniker; <sup>3</sup>BCMaterials

2:30 PM

**Effect of Tensile Stress Application on Magnetic Properties of Fe-Co Alloy Foils:** *Tomohiro Tabata*<sup>1</sup>; Masafumi Noujima<sup>1</sup>; Yusuke Asari<sup>1</sup>; Shohei Terada<sup>1</sup>; <sup>1</sup>Hitachi, Ltd.

2:50 PM

**Large Tunable Contrast in Thermal and Electrical Conductivities of Ni-Co-Mn-In Magnetic Shape Memory Alloys:** *Daniel Salas*<sup>1</sup>; Serdar Torun<sup>1</sup>; Elena Cimpoiasu<sup>2</sup>; Joseph Ross<sup>1</sup>; Adam Wilson<sup>3</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>United States Naval Academy; <sup>3</sup>U.S. Army Research Laboratory

3:10 PM

**Linking Plastic Deformation and Magnetic Properties in Mn-based Heusler Intermetallics:** *Bailey Rhodes*<sup>1</sup>; Justin Mayer<sup>1</sup>; Xiaoke Xu<sup>2</sup>; W. Cunningham<sup>1</sup>; Coleman Forth<sup>1</sup>; Christian Kübel<sup>2</sup>; Ram Seshadri<sup>1</sup>; Yolita Eggeler<sup>2</sup>; Daniel Gianola<sup>1</sup>; <sup>1</sup>UC Santa Barbara; <sup>2</sup>Karlsruhe Institute of Technology

3:30 PM Break

3:45 PM Invited

**Polarized Neutron Diffraction Techniques for the Study of Quantum Materials:** *Jose Alberto Rodriguez-Velamazan*<sup>1</sup>; <sup>1</sup>Institut Laue-Langevin

4:15 PM

**Strain-dependent Magnetic Anisotropy in Heusler Alloys Induced by Orbital and Quadrupole Moments:** *Amran Yatmeidhy*<sup>1</sup>; Yoshihiro Gohda<sup>1</sup>; <sup>1</sup>Tokyo Institute of Technology

4:35 PM

**All-d-Metal Metamagnetic Shape Memory Alloys with Tunable Phase Transitions via Microstructure Control:** *Serdar Torun*<sup>1</sup>; Woohyun Cho<sup>1</sup>; Daniel Salas<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; <sup>1</sup>Texas A&M University

4:55 PM Invited

**Static and Dynamic Characterization of Epitaxial Ni-Ferrite Thin Films: Extreme UV and X-ray Studies:** *Dario Arena*<sup>1</sup>; Susmita Saha<sup>2</sup>; Ronny Knut<sup>3</sup>; <sup>1</sup>University of South Florida; <sup>2</sup>Ashoka University; <sup>3</sup>Uppsala University

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## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys III: 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

Wednesday PM | March 6, 2024  
Barrel Spring II | Hyatt

**Session Chairs:** Rui Feng, National Energy Technology Laboratory; Chanho Lee, Auburn University

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2:00 PM Invited

**Microstructures and Properties of AlCrFeMnV, AlCrFeTiV, and AlCrMnTiV High-entropy Alloys:** *Keith Knippling*<sup>1</sup>; Patrick Callahan<sup>1</sup>; David Beaudry<sup>2</sup>; <sup>1</sup>Naval Research Laboratory; <sup>2</sup>Johns Hopkins University

2:20 PM Invited

**In-situ Mapping for Diffusion Investigations and the Associated Vacancies & Creep Activities in High Entropy Alloys:** *E-Wen Huang*<sup>1</sup>; Mao-Yuan Luo<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

2:40 PM Invited

**Constituent Phase Assessment of Composition Interspace between a MnFeCoNiCu Alloy and Nickel Alloy 738LC by Synchrotron XRD:** *Benjamin Schneiderman*<sup>1</sup>; Andrew Chuang<sup>2</sup>; Zhenzhen Yu<sup>3</sup>; <sup>1</sup>Colorado School of Mines; HYSA Fillers LLC; <sup>2</sup>Advanced Photon Source, Argonne National Laboratory; <sup>3</sup>Colorado School of Mines

3:00 PM Invited

**In-operando Observation of Twinning Mechanism in a High-entropy Alloy:** Q. Yang<sup>1</sup>; Y. Hu<sup>1</sup>; *Jian Min Zuo*<sup>1</sup>; <sup>1</sup>University of Illinois, Urbana-Champaign

3:20 PM Invited

**Solution Thermodynamics Guided Tuning of Local Chemical Ordering in High Entropy Alloys: Breaking the Strength-ductility Compromise:** Sriswaroop Dasari<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Chao Jiang<sup>2</sup>; Bharat Gwalani<sup>3</sup>; Stephane Gorsse<sup>4</sup>; An-Chou Yeh<sup>5</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>North Carolina State University; <sup>4</sup>University of Bordeaux; <sup>5</sup>National Tsing Hua University

3:40 PM Break

4:00 PM

**Characterizing Deformation Behavior in a BCC+B2 Fe<sub>75</sub>Al<sub>15</sub>Ni<sub>10</sub> Alloy to Better Understand Deformation in BCC+B2 Multi-Phase Refractory Complex**

**Concentrated Alloys:** *Bryan Crossman*<sup>1</sup>; Jean-Philippe Couzinie<sup>2</sup>; Michael Mills<sup>1</sup>; Maryam Ghazisaeidi<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Institute of Chemistry and Materials Science (ICMPE)

#### 4:20 PM Invited

**Phase Transformation and Deformation Behavior in a B2-base High-entropy Alloy:** *Rui Feng*<sup>1</sup>; You Rao<sup>2</sup>; Chuan Zhang<sup>3</sup>; Maryam Ghazisaeidi<sup>2</sup>; Peter Liaw<sup>4</sup>; Ke An<sup>5</sup>; <sup>1</sup>National Energy Technology Laboratory; <sup>2</sup>The Ohio State University; <sup>3</sup>CompuTherm LLC; <sup>4</sup>The University of Tennessee, Knoxville; <sup>5</sup>Oak Ridge National Laboratory

#### 4:40 PM

**High-entropy Effects on Phase Transformation Behavior of CuNiTiHfZr High-entropy Shape Memory Alloys:** *Mao-Yuan Luo*<sup>1</sup>; Tu-Ngoc Lam<sup>1</sup>; Nien-En Chiang<sup>1</sup>; Ching-Yu Chiang<sup>2</sup>; Yuh Sun<sup>1</sup>; Jo-chi Tseng<sup>3</sup>; Che-Wei Tsai<sup>4</sup>; E-Wen Huang<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University; <sup>2</sup>National Synchrotron Radiation Research Center, Hsinchu, Taiwan; <sup>3</sup>Japan Synchrotron Radiation Research Institute; <sup>4</sup>National Tsing Hua University, Hsinchu, Taiwan

#### 5:00 PM Invited

**Absence of Equilibrium B2 Phase in Three Al-Nb-Ta-Ti- Zr Refractory High-entropy Alloys Above 700°C:** An-Chen Fan<sup>1</sup>; Yun-Syuan Chen<sup>1</sup>; Chong-Chi Chi<sup>2</sup>; Daniel B. Miracle<sup>3</sup>; Chih-Hao Hsu<sup>1</sup>; Kai-Cheng Yang<sup>1</sup>; Shu-Yi Tung<sup>1</sup>; Ming-Yen Lu<sup>2</sup>; *Ming-Hung Tsai*<sup>1</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>National Tsing Hua University; <sup>3</sup>AF Research Laboratory

#### 5:20 PM

**Single Defect-driven Deformation Mechanism in VCoNi Medium-entropy Alloy at 15 K:** *Muhammad Naeem*<sup>1</sup>; Yuemin Ma<sup>2</sup>; Jin Tian<sup>3</sup>; Gong Wu<sup>4</sup>; Stefanus Harjo<sup>4</sup>; Xun-Li Wang<sup>2</sup>; <sup>1</sup>University Of Birmingham; <sup>2</sup>City University Of Hong Kong; <sup>3</sup>Xi'an Jiaotong University; <sup>4</sup>Japan Atomic Energy Agency

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VI — Session I

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

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Arif Mubarak, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Venkataramana Gadhamshetty, South Dakota School of Mines & Technology

**Wednesday PM | March 6, 2024**

**Celebration 9 | Hyatt**

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

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#### 2:00 PM Introductory Comments

#### 2:05 PM Invited

**Using Performance Driven Coating Development to Explore Process-structure Relationships of Molybdenum Disulfide Coatings:** *Tomas Babuska*<sup>1</sup>; Michael Dugger<sup>1</sup>; Mark Rodriguez<sup>1</sup>; Steven Larson<sup>1</sup>; John Curry<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

#### 2:25 PM

**Application of AFSD as a Surface Repairing Technique on Steels and Aluminum Alloys:** *Ning Zhu*<sup>1</sup>; Matthew Batson<sup>1</sup>; Brian Jordon<sup>1</sup>; Paul Allison<sup>1</sup>; <sup>1</sup>Baylor University

**2:45 PM**

**Lunar Dust Erosion Behavior of Novel Plasma Sprayed Titanium-Boron Nitride Coatings at Extreme Temperatures:** *Abhijith Sukumaran*<sup>1</sup>; Cheng Zhang<sup>1</sup>; Sara Rengifo<sup>2</sup>; William Scott<sup>2</sup>; Sang-Hyon Chu<sup>3</sup>; Cheol Park<sup>4</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>Florida International University; <sup>2</sup>National Aeronautics and Space Administration; <sup>3</sup>NASA Langley Research Center ; <sup>4</sup>NASA Langley Research Center

**3:05 PM**

**In Situ Surface Treatment by Atmospheric Plasma-jet for Patternable Wettability and Enhanced Adhesion:** *Lakshmi Prakasan*<sup>1</sup>; Jacob Manzi<sup>1</sup>; Cary Addington<sup>2</sup>; Harish Subbaraman<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>HP

**3:25 PM**

**Surface Topography as a Material Parameter:** *Tevis Jacobs*<sup>1</sup>; Arushi Pradhan<sup>1</sup>; Luke Thimons<sup>1</sup>; Antoine Sanner<sup>2</sup>; Lars Pastewka<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>University of Freiburg

**3:45 PM Break****4:00 PM**

**Interface Engineered Diamond Coatings for Dry Machining Applications:** *Ashok Kumar*<sup>1</sup>; <sup>1</sup>University of South Florida

**4:20 PM**

**The Role of Nanosecond Laser-treated Surface in Enhancing Bonding Strength of Adhesively Bonded Aluminum Alloy 6061 Similar Joints:** *Avik Samanta*<sup>1</sup>; Seunghyun Ko<sup>1</sup>; Yongsoon Shin<sup>1</sup>; Yao Qiao<sup>1</sup>; Robert Seffens<sup>1</sup>; Daniel Merkel<sup>1</sup>; Khaled Shahwan<sup>1</sup>; Kevin Simmons<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**4:40 PM**

**Magnetic-guided Physical Vapor Deposition for Direct Deposition of Chromium-Nitrogen Films With Uniaxial and Biaxial Crystal Alignment:** Santiago Vargas<sup>1</sup>; *Camilo Bedoya Lopez*<sup>1</sup>; Diana Galeano<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**5:00 PM**

**Ultralow Wear Plasma-enhanced ALD Nitride Coatings: Linking Film Process-Structure-Property Relationships:** *Kylie Van Meter*<sup>1</sup>; Md. Chowdury<sup>2</sup>; Mark Sowa<sup>3</sup>; Alexander Kozen<sup>4</sup>; Thomas Lockhart<sup>1</sup>; Nicholas Strandwitz<sup>2</sup>; Brandon Krick<sup>1</sup>; <sup>1</sup>Florida State University; <sup>2</sup>Lehigh University; <sup>3</sup>Veeco ALD; <sup>4</sup>University of Maryland

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## LIGHT METALS

### Advances in Titanium Technology — Session VI

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

**Wednesday PM | March 6, 2024**

**Windermere X-1 | Hyatt**

**Session Chairs:** Rongpei Shi, Harbin Institute of Technology (Shenzhen); Qiaofu Zhang, University of Alabama

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**2:00 PM Invited**

**Industry-wide Learning and Perspectives on Management of Cold-dwell Fatigue:** *Adam Pilchak*<sup>1</sup>; <sup>1</sup>University of North Texas

**2:25 PM**

**Effect of Phase Fraction on Hydrogen Embrittlement in  $\alpha$  Titanium Alloys:** *Lucia Chen*<sup>1</sup>; Zhenbo Zhang<sup>2</sup>; Philip Platt<sup>2</sup>; Patrick Burr<sup>1</sup>; Michael Preuss<sup>3</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>University of Manchester; <sup>3</sup>Monash University

**2:45 PM**

**Investigation of the Nanostructures in Deformation Twins in Metastable Beta Titanium Alloys:** Dian Li<sup>1</sup>; Deepak Pillai<sup>1</sup>; Sydney Fields<sup>1</sup>; *Yufeng Zheng*<sup>1</sup>; <sup>1</sup>University of North Texas

**3:05 PM Invited**

**Stress-Induced Martensite and Martensite Twinning/De-twinning on the Deformation Behavior of TRIP/TWIP Ti Alloys:** *Fan Sun*<sup>1</sup>; Bingnan Qian<sup>2</sup>; Junhui Tang<sup>1</sup>; Sucharita Banerjee<sup>3</sup>; Philippe Vermaut<sup>1</sup>; Rajarshi Banerjee<sup>4</sup>; Frédéric Prima<sup>1</sup>; <sup>1</sup>Chimie-Paristech, IRCP, PSL University; <sup>2</sup>Southern University of Science and Technology; <sup>3</sup>University of Texas, Austin; <sup>4</sup>University of North Texas, Denton

**3:30 PM Break**

**3:50 PM**

**Phase Transformations and Twin Microstructure in Titanium:** *Lei Cao*<sup>1</sup>; <sup>1</sup>University of Nevada Reno

**4:10 PM**

**Novel Ti-Ta-Zr-Mo Alloys Utilizing Martensite-driven TRIP/TWIP Mechanisms for Cardiovascular Stent Applications:** *Sucharita Banerjee*<sup>1</sup>; Junhui Tang<sup>2</sup>; Rajarshi Banerjee<sup>3</sup>; Fan Sun<sup>2</sup>; <sup>1</sup>University of Texas at Austin; <sup>2</sup>PSL Research University, Chimie ParisTech, Institut de Recherche de Chimie Paris, CNRS ; <sup>3</sup>University of North Texas

**4:30 PM**

**The Effect of Thermal Debinding Holding Time on Microstructure and Mechanical Properties of Ti-15Nb-5Sn Alloy by Metal Fused Filament Fabrication (MF<sup>3</sup>):** *Jin-hwan Lim*<sup>1</sup>; Gyeongho Kang<sup>1</sup>; Giseong Kim<sup>1</sup>; Sooyeong Kim<sup>1</sup>; Taehyun Nam<sup>1</sup>; <sup>1</sup>Gyeongsang National University

**4:50 PM**

**Multiscale Model of  $\alpha/\beta$ -phase Coevolution During Thermomechanical Processing of Dual-phase Titanium Alloys:** *Benjamin Begley*<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session VI**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Wednesday PM | March 6, 2024**  
**Bayhill 32 | Hyatt**

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

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**2:00 PM**

**Thermal Conductivity Homogenization of Composites via Deep Material Network:** *Dongil Shin*<sup>1</sup>; Peter Creveling<sup>1</sup>; Scott Roberts<sup>1</sup>; Remi Dingreville<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**2:20 PM**

**Autonomous Learning of Atomistic Structural Transitions via Physics-inspired Graph Neural Networks:** Bamidele Aroboto<sup>1</sup>; Shaohua Chen<sup>2</sup>; Tim Hsu<sup>3</sup>; Brandon Wood<sup>3</sup>; Yang Jiao<sup>2</sup>; *James Chapman*<sup>1</sup>; <sup>1</sup>Boston University; <sup>2</sup>Arizona State University; <sup>3</sup>Livermore National Laboratory

**2:40 PM**

**Cluster Expansion Approximation Accelerated by a Graph Neural Network Regressor:** *Guillermo Vazquez Tovar*<sup>1</sup>; Daniel Saucedo<sup>1</sup>; Raymundo Arróyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:00 PM**

**Investigation of In-liquid Ordering Mediated Transformations in Al-Sc via Ab Initio Molecular Dynamics and Unsupervised Learning:** *Deep Choudhuri*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**3:20 PM**

**Thermodynamics and Kinetics of Point Defects in Alloys: A Physics-informed Machine Learning Approach:** *Anjana Talapatra*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:40 PM Break**

**3:50 PM**

**Accelerating Defect Predictions in Semiconductors Using Crystal Graphs:** *Arun Kumar Mannodi Kanakkithodi*<sup>1</sup>; <sup>1</sup>Purdue University

**4:10 PM**

**Understanding the Effects of Environment Gas and Sample Properties on Sample Temperature Distribution in an Optical Floating-zone Crystal-Growth Furnace through Modeling of Heat Transfer:** *Eymana Maria*<sup>1</sup>; Jonathan J. Denney<sup>2</sup>; Guanglong Huang<sup>1</sup>; Praveen Soundararajan<sup>1</sup>; Peter G. Khalifah<sup>2</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>Stony Brook University

**4:30 PM**

**Big Microstructure Datasets for Materials Informatics: Using Statistically Conditioned Generative Models to Curate Big Datasets:** *Andreas Robertson*<sup>1</sup>; Adam Generale<sup>1</sup>; Surya Kalidindi<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology



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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithm Development in Materials Science and Engineering – Solution Algorithms for Solidification Microstructures

#### Sponsored by:

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

**Wednesday PM | March 6, 2024**  
**Bayhill 28 | Hyatt**

**Session Chair:** Adrian Sabau, Oak Ridge National Laboratory

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#### 2:00 PM

**Data-driven 2D Grain Growth Microstructure Reconstruction Using Deep Learning and Spectral Graph Theory:** Jose Nino<sup>1</sup>; *Oliver Johnson*<sup>1</sup>; <sup>1</sup>Brigham Young University

#### 2:20 PM Invited

**Microstructural Interrogation Using Information Theory and Correlative Statistics:** *Jeffrey Rickman*<sup>1</sup>; <sup>1</sup>Lehigh University

#### 2:50 PM

**Multiscale Modeling to Investigate the Deformation and Bonding Mechanism during Joining of Multi-materials by High-velocity Riveting:** *Ayoub Soulami*<sup>1</sup>; Lei Li<sup>1</sup>; Krishna Chaitanya Pitike<sup>1</sup>; Benjamin Schuessler<sup>1</sup>; Kranthi Balusu<sup>1</sup>; Sridhar Niverty<sup>1</sup>; Vineet Joshi<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 3:10 PM

**Parameter Prediction of Anisotropic Yield Function from Neural Network-based Indentation Plastometry:** *Minwoo Park*<sup>1</sup>; Kyeongjae Jeong<sup>2</sup>; Kyungyul Lee<sup>1</sup>; Dongil Kwon<sup>1</sup>; Myoung-Gyu Lee<sup>1</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Max-Planck-Institut für Eisenforschung

#### 3:30 PM

**Understanding the Effects of Stresses on Precipitation: Beyond Classical Nucleation Theory:** *Khanh Dang*<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

#### 3:50 PM Break

#### 4:10 PM Invited

**A Critical and Quantitative Comparison of Models for Grain Structure Prediction in Solidification Processes:** *Damien Touret*<sup>1</sup>; Angela Montanero Lancharro<sup>1</sup>; Rouhollah Tavakoli<sup>1</sup>; Seyed Mohammad Elahi<sup>2</sup>; Ignacio Romero<sup>2</sup>; <sup>1</sup>IMDEA Materials Institute; <sup>2</sup>Universidad Politecnica de Madrid & IMDEA Materials

#### 4:40 PM

**Three-Dimensional Micromechanical Framework for Explicit representation of Deformation Twinning:** *Akhilesh Pedgaonkar*<sup>1</sup>; Anderson Nascimento<sup>2</sup>; Curt Bronkhorst<sup>1</sup>; Irene Beyerlein<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>University of California, Santa Barbara

5:00 PM

**Massively Parallel Simulations with Diffuse Interface Methods Using Block-structured Adaptive Mesh Refinement:** *Brandon Runnels*<sup>1</sup>; <sup>1</sup>Iowa State University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XII — Session III

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

Wednesday PM | March 6, 2024

Bayhill 26 | Hyatt

**Session Chairs:** Yoshisato Kimura, Tokyo Institute of Technology; Yun-Han Huang-Lu, National Yang Ming Chiao Tung University

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2:00 PM Invited

**Magnesium Antimonide Thermoelectric Materials/Devices: Possible Replacement to Bismuth Telluride:** *Takao Mori*<sup>1</sup>; <sup>1</sup>National Institute For Materials Science

2:20 PM Invited

**Characterization of Composition Gradient Layered Microstructure Formed in Mg<sub>2</sub>(Si, Sn)-based Thermoelectric Alloys:** *Yoshisato Kimura*<sup>1</sup>; Hiromasa Ichise<sup>1</sup>; Feifan Zhang<sup>1</sup>; Yaw Wang Chai<sup>1</sup>; Manabu Watanabe<sup>1</sup>; Yonghoon Lee<sup>2</sup>; <sup>1</sup>Tokyo Institute of Technology; <sup>2</sup>KELK Ltd.

2:40 PM Invited

**Melt Growth of Magnesium Silicides for Thermoelectric and Thermophotovoltaic Applications:** *Haruhiko Uono*<sup>1</sup>; <sup>1</sup>Ibaraki University

3:00 PM Invited

**Si-based Planar-type Thermoelectric Generators:** *Masahiro Nomura*<sup>1</sup>; Ryoto Yanagisawa<sup>2</sup>; <sup>1</sup>The University of Tokyo; <sup>2</sup>University of Tokyo

3:20 PM Invited

**Nanomaterial Design and Fabrication for Thermoelectric Performance Enhancement:** *Yoshiaki Nakamura*<sup>1</sup>; <sup>1</sup>Osaka University

3:40 PM Break

4:00 PM Invited

**Accurately Describing Electronic and Thermal Transport of Thermoelectric Materials:** *Ernst Bauer*<sup>1</sup>; Fabian Garmroudi<sup>1</sup>; Michael Parzer<sup>1</sup>; Alexander Riss<sup>1</sup>; Takao Mori<sup>2</sup>; <sup>1</sup>Vienna University of Technology; <sup>2</sup>NIMS, Tsukuba

4:20 PM Invited

**Compositional Design with Double/Triple Half-Heusler Concept:** *Kazuki Imasato*<sup>1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science and Technology

4:40 PM

**Thermoelectric Properties of TaSb<sub>2</sub> and NbSb<sub>2</sub> Using Experimental and Computational Tools:** *Shamim Shaikh*<sup>1</sup>; Naoki Sato<sup>1</sup>; Takao Mori<sup>1</sup>; <sup>1</sup>National Institute

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## LIGHT METALS

### Alumina & Bauxite — New Alumina Production Technologies and Red Mud Management

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

**Program Organizers:** Michael Coley, University of the West Indies; Samuel Wagstaff, Oculatus Consulting

**Wednesday PM | March 6, 2024**  
**Windermere X-3 | Hyatt**

**Session Chair:** Amit Desai, Solugen Inc.

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#### 2:00 PM Introductory Comments

##### 2:05 PM

**Bauxite Processing via Sulfide Chemistry:** Caspar Stinn<sup>1</sup>; Lucas Marden<sup>1</sup>; Ethan Benderly-Kremen<sup>1</sup>; William Gilstrap<sup>1</sup>; *Antoine Allanore*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

##### 2:30 PM

**Study on a New Method of Clean Production of Alumina by Calcification Transformation:** *Ting-an Zhang*<sup>1</sup>; Guozhi Lv<sup>1</sup>; Yiyong Wang<sup>2</sup>; Yan Liu<sup>1</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>Institute of Nonferrous Solid Waste Technology of Northeastern University

##### 2:55 PM

**Development of a Hydrometallurgical Process to Obtain High-purity Alumina Using Bauxite:** Bárbara Pereira<sup>1</sup>; Morgana Rosset<sup>1</sup>; *Amilton Botelho*<sup>1</sup>; Jorge Tenório<sup>1</sup>; <sup>1</sup>USP

#### 3:20 PM Break

##### 3:35 PM

**Research of Cleaner Production of Alumina and Harmless Utilization of Red Mud:** He Xin<sup>1</sup>; Lv Guo-zhi<sup>1</sup>; *Ting-an Zhang*<sup>1</sup>; Wang Song<sup>1</sup>; Wang Long<sup>1</sup>; <sup>1</sup>Northeastern University

##### 4:00 PM

**Sustainable Valorization of Bauxite Residue (“Red Mud”): Exploring the Potential of H<sub>2</sub> Reduction for Multi-metal Recovery:** *Ganesh Pilla*<sup>1</sup>; Tobias Hertel<sup>1</sup>; Yiannis Pontikes<sup>1</sup>; <sup>1</sup>Ku Leuven

##### 4:25 PM

**Dealkalinization Effect of Carbon Dioxide in Flue Gas on Bayer Red Mud:** Chaojun Fang<sup>1</sup>; *Yihong Jia*<sup>1</sup>; Tianrui Cai<sup>1</sup>; Lijuan Gao<sup>1</sup>; Xiaowei Deng<sup>1</sup>; Bo Lv<sup>1</sup>; Yongping Wang<sup>2</sup>; <sup>1</sup>Henan Polytechnic University; <sup>2</sup>CHALCO

##### 4:50 PM

**Pilot Study on the Recovery of Iron from High-iron Red Mud by Vortex Smelting Reduction:** Xiaofei Li<sup>1</sup>; *Ting-an Zhang*<sup>1</sup>; Guozhi Lv<sup>1</sup>; Kun Wang<sup>1</sup>; <sup>1</sup>Northeastern University

#### 5:15 PM Concluding Comments

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Homogenization, Annealing and Heat Treatments

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

**Wednesday PM | March 6, 2024**  
**Windermere W-1 | Hyatt**

**Session Chairs:** Xiyu Wen, University of Kentucky; Etienne Martin, École Polytechnique

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**2:00 PM**

**Annealing Behavior of Cold Rolling Sheets of a Continuous Cast Al-1.5Cu Alloy with Potential Application to Low Cost Auto Forming Parts or Sheets:** *Xiyu Wen*<sup>1</sup>; Yan Jin<sup>1</sup>; Wei Li<sup>1</sup>; <sup>1</sup>University of Kentucky

**2:25 PM**

**Comparison of Heating Systems for Aluminum Forging:** *Nurcan Akduran*<sup>1</sup>; Ahmet Eser<sup>2</sup>; Ahmet Cakal<sup>2</sup>; Mustafa Acarer<sup>1</sup>; <sup>1</sup>Selcuk University; <sup>2</sup>AYD Automotiv Industry

**2:50 PM**

**Effect of Cold Rolling Prior to Homogenization Heat Treatment on the Microstructural Evolution and Mechanical Properties of Twin-roll Cast 8026 Aluminum Alloy:** *Ahmet Kabil*<sup>1</sup>; Hatice Mollaoğlu Altuner<sup>1</sup>; Onur Meydanoglu<sup>1</sup>; <sup>1</sup>Assan Aluminyum San. ve Tic. A.S.

**3:15 PM**

**Heat Treatment of Aluminum A20X Manufactured Using Laser Powder Bed Fusion:** Heidar Karimialavijeh<sup>1</sup>; Apratim Chakraborty<sup>1</sup>; Martin Proebstle<sup>2</sup>; Kentaro Oishi<sup>1</sup>; Jean-Philippe Harvey<sup>1</sup>; *Etienne Martin*<sup>1</sup>; <sup>1</sup>Polytechnique Montreal; <sup>2</sup>GE Additive

**3:40 PM Break**

**3:55 PM**

**Thermomechanical and Metallographic Comparison of Twin Roll Casted 1235, 3003, 8006, 8011 Alloy Series Used in the Production of Foil Manufacturing:** *Sergen Belit*<sup>1</sup>; Tugce Sezen<sup>1</sup>; Dudu Aydn<sup>1</sup>; Kaan Ipek<sup>1</sup>; <sup>1</sup>Teknik Aluminyum San. Tic. A.S.

**4:20 PM**

**The Effect of Cold Rolling Strain Degree in Corrosion Resistance of Fully Soft TemperAutomotive5182Alloy:** *Dionysios Spathis*<sup>1</sup>; John Tsiros<sup>1</sup>; Andreas Mavroudis<sup>1</sup>; Athanasios Vazdirvanidis<sup>2</sup>; <sup>1</sup>ELVAL SA; <sup>2</sup>ELKEME

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## LIGHT METALS

### Aluminum Reduction Technology — Fundamental Studies / Developments / Research / Environmental

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Wednesday PM | March 6, 2024**  
**Windermere Y-2 | Hyatt**

**Session Chairs:** Michel Reverdy, Emirates Global Aluminium; Laurent Fiot, Rio Tinto Aluminium

**2:00 PM**

**Study of the Degradation of Ordinary Refractory Bricks in an Aluminium Reduction Cell:** *Mohamed Ben Salem*<sup>1</sup>; Gervais Soucy<sup>1</sup>; Daniel Marceau<sup>2</sup>; Antoine Godefroy<sup>3</sup>; Sébastien Charest<sup>3</sup>; <sup>1</sup>Université de Sherbrooke; <sup>2</sup>University of Québec at Chicoutimi; <sup>3</sup>Aluminerie Alouette inc.

**2:25 PM**

**Cradle-to-Gate Carbon Footprint Assessment of Graphite Cathode for Aluminium Electrolysis Pots:** *Tristan Carrere*<sup>1</sup>; Bénédicte Allard<sup>1</sup>; Till Reek<sup>1</sup>; <sup>1</sup>Tokai COBEX

**2:50 PM**

**Influence of Low Temperature on the Surface and Morphological Properties of Hydrated Lime in SO<sub>2</sub> Desulfurization Reaction:** Karthikeyan Rajan<sup>1</sup>; Duygu Kocaefe<sup>1</sup>; *Yasar Kocaefe*<sup>1</sup>; Julie Bureau<sup>1</sup>; Jonathan Bernier<sup>2</sup>; Yoann Robert<sup>2</sup>; Yves Dargis<sup>3</sup>; <sup>1</sup>University of Quebec at Chicoutimi; <sup>2</sup>Rio Tinto; <sup>3</sup>Graymont

**3:15 PM**

**Preliminary Testing and Simulations of Pot Integrated Abart (PIA) at Alcoa Mosjøen:** Asbjørn Solheim<sup>1</sup>; Anders Sørhuus<sup>2</sup>; Ole Kjos<sup>1</sup>; *Håvard Olsen*<sup>2</sup>; Helene Granlund<sup>3</sup>; <sup>1</sup>Sintef As; <sup>2</sup>REEL Norway AS; <sup>3</sup>Alcoa Norway ANS

**3:40 PM Break**

**3:55 PM**

**Sustainability of Different Aluminium Production Technologies:** *Samuel Senanu*<sup>1</sup>; Mona Hassel<sup>1</sup>; Asbjørn Solheim<sup>1</sup>; Egil Skybakmoen<sup>1</sup>; <sup>1</sup>SINTEF

**4:20 PM**

**Thermal Analysis of Operational Events Affecting Electrolysis Cells and Their Local Alumina Dissolution Conditions:** Ali Kodfard<sup>1</sup>; *Lukas Dion*<sup>2</sup>; Thomas Roger<sup>2</sup>; Sébastien Guérard<sup>3</sup>; Jean-François Bilodeau<sup>3</sup>; <sup>1</sup>REGAL-UQAC; <sup>2</sup>GRIPS-UQAC; <sup>3</sup>Arvida Research and Development Center

**4:45 PM**

**Regeneration of Aluminum Fluoride from Pure Bath:** *Brian Zukas*<sup>1</sup>; Xiangwen Wang<sup>1</sup>; <sup>1</sup>Alcoa Corp

## LIGHT METALS

**An Atoms to Autos Approach for Materials Innovations for Lightweighting: An LMD Symposium in Honor of Anil K. Sachdev — Multi-scale Modeling and Mechanisms**

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

**Program Organizers:** Alan Luo, Ohio State University; Michele Manuel, University of Florida; Yue Qi, Brown University

**Wednesday PM | March 6, 2024**

**2:00 PM Keynote**

**Influence of Length Scale on the Kinetics of Phase Transformation and Microstructure Evolution during Field-Assisted Sintering and Severe Plastic Deformation:** *Enrique Lavernia*<sup>1</sup>; Kaustubh Kulkarni<sup>2</sup>; Anil Sachdev<sup>3</sup>; <sup>1</sup>University of California, Irvine; <sup>2</sup>Indian Institute of Technology, Kanpur; <sup>3</sup>GM Global R&D Center

**2:20 PM Invited**

**Nanoindentation as One of the Multiscale Mechanical Characterization Tools for Developing Materials for Automotive Applications:** *Yang Cheng*<sup>1</sup>; <sup>1</sup>University of Kentucky

**2:40 PM Invited**

**Rate Your Sensitivity - The M's Have It:** *Brad Diak*<sup>1</sup>; Shig Saimoto<sup>1</sup>; <sup>1</sup>Queen's University

**3:00 PM Invited**

**The Influence of Grain Boundary Character on Deformation Mechanisms in Sheet Alloys for Lightweighting of Auto Structures:** *David Fullwood*<sup>1</sup>; Michael Miles<sup>1</sup>; Marko Knezevic<sup>2</sup>; <sup>1</sup>Brigham Young University; <sup>2</sup>University of New Hampshire

**3:20 PM Invited**

**Parametrically-upscaled Crack Nucleation Model (PUCNM) for Fatigue Nucleation in Ti Alloys Containing Micro-Texture Regions:** *Somnath Ghosh*<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**3:40 PM Break**

**4:00 PM Invited**

**Aluminum-Metallic Glass Composites:** *Challapalli Suryanarayana*<sup>1</sup>; Zhi Wang<sup>2</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>South China University of Technology

**4:20 PM Invited**

**Investigations of Solute Clustering and GP Zone Nucleation Kinetics in Al-Zn-Mg-based Alloys:** Zhucong Xi<sup>1</sup>; Arya Chatterjee<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>GM Global Technical Center

**4:40 PM**

**Solute Clustering Mechanisms in 6xxx Sheet Products:** *Monica Kapoor*<sup>1</sup>; David Tweddle<sup>2</sup>; Gregory Thompson<sup>3</sup>; John Carsley<sup>1</sup>; <sup>1</sup>Novelis; <sup>2</sup>Bruker; <sup>3</sup>University of Alabama

**5:00 PM**

**Investigating Hydrogen Embrittlement in Aluminum Alloys: Insights from First-principles Calculations:** *XiaoXiang Yu*<sup>1</sup>; Ganesh Bhaskaran<sup>1</sup>; Yudie Yuan<sup>1</sup>; <sup>1</sup>Novelis Global Research Center

**5:20 PM Concluding Comments:** Anil Sachdev and organizers

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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; Po-Yu Chen, National Tsing Hua University; Terry Lowe, Colorado School of Mines

**Wednesday PM | March 6, 2024**  
**Celebration 12 | Hyatt**

**Session Chairs:** Candan Tamerler, University of Kansas; Hannes Schniepp, William & Mary University

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**2:00 PM Invited**

**The Difference of Trabecular and Cortical Bone Material Properties at the Proximal Hip May Influence Bone Fragility:** *Philipp Thurner*<sup>1</sup>; Martin Frank<sup>1</sup>; Andreas Reisinger<sup>2</sup>; Katja Haslinger<sup>1</sup>; Dieter Pahr<sup>1</sup>; <sup>1</sup>TU Wien; <sup>2</sup>Karl Landsteiner University of Health Sciences

**2:30 PM Invited**

**Nanomechanical Mapping in Bone:** *Jing Du*<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**3:00 PM Invited**

**Surface Modified Nanomaterials for Viral Interactions:** *Sudipta Seal*<sup>1</sup>; <sup>1</sup>University of Central Florida

**3:30 PM Break**

**3:45 PM Invited**

**Mechanically and Biologically Tunable Biomaterials:** *Dinesh Katti*<sup>1</sup>; Krishna Kundu<sup>1</sup>; Hanmant Gaikwad<sup>1</sup>; Sharad Jaswandkar<sup>1</sup>; Pooyan Vahidi Pashaki<sup>1</sup>; Kalpana Katti<sup>1</sup>; <sup>1</sup>North Dakota State University

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## BIOMATERIALS

### Biological Materials Science — Biological Materials Science VI

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

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

**Wednesday PM | March 6, 2024**  
**Celebration 15 | Hyatt**

**Session Chairs:** Debora Lyn Porter, University of California, Merced; Zhifei Deng, Virginia Tech

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**2:00 PM**

**Designing Bio-secure Metallic Surfaces: Exploring Microstructural Impacts on the Oligodynamic Effect:** *Julian Rackwitz*<sup>1</sup>; Mostafa Alyan<sup>2</sup>; Kirmina Monir<sup>1</sup>; Shimshon Belkin<sup>2</sup>; Cem Tasan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Hebrew University of Jerusalem

**2:20 PM**

**Systematic Study of TiC Nanoparticles Effect on Fatigue Behavior of Zn Alloys:** *Yuxin Zeng*<sup>1</sup>; Xiaochun Li<sup>1</sup>; <sup>1</sup>University of California Los Angeles

**2:40 PM**

**Unravelling the Construction of the Tetragonula Carbonaria Brood Comb Using 3D X-ray Microscopy:** *Rahul Franklin*<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>The University of Sydney

**3:00 PM**

**Insights on the Microstructure of Mammalian Enamel From Synchrotron X-ray Tomography:** *Donna Guillen*<sup>1</sup>; Zherui Guo<sup>1</sup>; Jack Grimm<sup>2</sup>; Cameron Renteria<sup>2</sup>; Dwayne Arola<sup>2</sup>; Viktor Nikitin<sup>3</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>University of Washington; <sup>3</sup>Argonne National Laboratory/APS

**3:20 PM Break**

**3:40 PM**

**Stimuli-responsive Hydrogels for Controlled Drug Delivery:** *Parker Toews*<sup>1</sup>; Jeff Bates<sup>1</sup>; <sup>1</sup>University of Utah

**4:00 PM**

**Tissue-adhesive Hydrogel for Multimodal Drug Release to Immune Cells in Skin:** *Nicole Day*<sup>1</sup>; Rianne Dalhuisen<sup>2</sup>; Nichole Loomis<sup>1</sup>; Sarah Adzema<sup>1</sup>; C.Wyatt Shields IV<sup>1</sup>; Jai Prakash<sup>2</sup>; <sup>1</sup>University of Colorado Boulder; <sup>2</sup>University of Twente

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## NUCLEAR MATERIALS

### **Ceramics and Ceramic-based Composites for Nuclear Fission Applications — Nuclear Fuels II**

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

**Program Organizers:** Dong Liu, University of Oxford; Assel Aitkaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory; Konstantina Lambrinou, University of Huddersfield; Cynthia Adkins, Idaho National Laboratory; Scarlett Widgeon Paisner, Los Alamos National Laboratory

**Wednesday PM | March 6, 2024**

**Rainbow Spring I | Hyatt**

**Session Chairs:** Tyler Gerczak, ORNL; Yongfeng Zhang, University of Wisconsin-Madison

**2:00 PM**

**Thermophysical Properties of Uranium Nitride-metal Composite Fuels:** *Joseph Schaeperkoetter*<sup>1</sup>; Scarlett Widgeon Paisner<sup>1</sup>; Timothy Coons<sup>1</sup>; Darrin Byler<sup>1</sup>; Joshua White<sup>1</sup>; Erofil Kardoulaki<sup>1</sup>; Jhonathan Rosales<sup>2</sup>; Kenneth McClellan<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>NASA Marshall Space Flight Center

**2:20 PM**

**Elucidating the Effect of Radiation-induced Defect Accumulation on Swelling in UN Using In-situ TEM Irradiation:** *Maria Kosmidou*<sup>1</sup>; Adrien J. E. Terricabras<sup>1</sup>; Caitlin A. Kohnert<sup>1</sup>; Joshua T. White<sup>1</sup>; Erofil Kardoulaki<sup>1</sup>; <sup>1</sup>LANL

**2:40 PM**

**Thermodynamics of Complex Carbides for Nuclear Applications in Extreme Environments:** Najeb Abdul-Jabbar<sup>1</sup>; Erofil Kardoulaki<sup>1</sup>; Shane Mann<sup>1</sup>; Maria Kosmidou<sup>1</sup>; *Geronimo Robles*<sup>1</sup>; Joshua White<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory



**3:00 PM**

**Using *In Situ* Neutron Powder Diffraction to Study the Thermal Expansion of Fission Product Doped UN:** *Melody Ranger*<sup>1</sup>; Jennifer Stansby<sup>1</sup>; Faris Sweidan<sup>2</sup>; James Hester<sup>3</sup>; Patrick Burr<sup>1</sup>; Denise Adorno Lopes<sup>4</sup>; Vanessa Peterson<sup>3</sup>; Pär Olsson<sup>4</sup>; Edward Obbard<sup>1</sup>; <sup>1</sup>UNSW; <sup>2</sup>KTH Royal Institute of Technology; <sup>3</sup>Australian Nuclear Science and Technology Organisation; <sup>4</sup>KTH Royal Institute of Technology

**3:20 PM Break****3:35 PM**

**Thermophysical Properties of Solid Solution Carbide Fuels for Nuclear Thermal Propulsion:** *Scarlett Widgeon Paisner*<sup>1</sup>; Erofil Kardoulaki<sup>1</sup>; Adrian Gonzales<sup>1</sup>; Joseph Schaeperkoetter<sup>1</sup>; Darrin Byler<sup>1</sup>; Joshua White<sup>1</sup>; Jhonathan Rosales<sup>2</sup>; Kenneth McClellan<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>NASA Marshall Space Flight Center

**3:55 PM**

**Mechanical and Thermophysical Properties of ZrC, NbC, and TaC Binary Carbide Surrogate Fuels for Nuclear Thermal Propulsion Systems:** *Alexander Nadermann*<sup>1</sup>; Jonas Kessing<sup>1</sup>; Brandon Shaver<sup>1</sup>; Justin Milner<sup>2</sup>; Kelsa Palomares<sup>3</sup>; Steven Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>Analytical Mechanics Associates Inc.

**4:15 PM**

**Unraveling the Influence of Charge Effect on Defect Recombination in ThO<sub>2</sub>:** *Lin-Chieh Yu*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**4:35 PM**

**From First-principles, Modeling the Effect of Point-defect Phonon Scattering on the Thermal Conductivity of Oxide Fuels:** *Erika Nosal*<sup>1</sup>; Saqeeb Adnan<sup>1</sup>; Linu Malakkal<sup>2</sup>; Miaomiao Jin<sup>3</sup>; Marat Khafizov<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Idaho National Lab; <sup>3</sup>The Pennsylvania State University

**4:55 PM**

**Advanced Fuel for Integrating Nuclear SMRs with Renewables:** *James Portwin*<sup>1</sup>; Patrick Burr<sup>1</sup>; Jessica Veliscek Carolan<sup>2</sup>; Edward Obbard<sup>1</sup>; Gordon Thorogood<sup>2</sup>; <sup>1</sup>UNSW Sydney; <sup>2</sup>ANSTO

**ADVANCED CHARACTERIZATION METHODS**

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Characterization of Metals**

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

**Program Organizers:** Zhiwei Peng, Central South 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

**Wednesday PM | March 6, 2024  
Celebration 2 | Hyatt**

**Session Chairs:** Mingming Zhang, Bowu Group; Rajiv Soman, AnalytiChem Group, USA

**2:00 PM**

**Chemistry-Structure-Property Relations in Al<sub>10</sub>Cr<sub>15</sub>(Fe<sub>3</sub>Mn)<sub>75-x</sub>(Ni)<sub>x</sub> Medium-entropy Alloys:** Jarrod Gesualdi<sup>1</sup>; Peyman Asghari-Rad<sup>1</sup>; Hojong Kim<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**2:20 PM**

**New Method for the Production of Medium-Mn Steel with Micro-segregation Bands Induced by Sub-rapid Solidification:** Hui Xu<sup>1</sup>; Wanlin Wang<sup>1</sup>; Peisheng Lyu<sup>1</sup>; Lankun Wang<sup>1</sup>; <sup>1</sup>Central South University

**2:40 PM**

**Novel Al-10Si-0.3Mg-0.2Fe Alloy: Enhancing Strength and Recyclability Through Thermal Treatment:** Kwangjun Euh<sup>1</sup>; Young-Hee Cho<sup>1</sup>; <sup>1</sup>Korea Institute of Materials Science

**3:00 PM**

**Initiation and Propagation of Corrosion on Additively Manufactured Stainless Steel:** Michael Melia<sup>1</sup>; Nicole Nimeh<sup>1</sup>; Kasandra Escarcega<sup>1</sup>; Peter Renner<sup>1</sup>; Erin Karasz<sup>1</sup>; Jason Taylor<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**3:20 PM**

**Impact of Interface on Mechanical Behavior of Bonded 1100 Aluminum and Commercial Purity Grade 1 Titanium:** Zachary Levin<sup>1</sup>; Mathew Hayne<sup>1</sup>; Joseph Leal<sup>1</sup>; Noah Pearlstein<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**3:40 PM Break**

**3:55 PM**

**Exploring the Mechanical and Microstructural Properties of Ti<sub>10</sub>V<sub>5</sub>Al<sub>30</sub>Nb<sub>20</sub>Mo<sub>25</sub>Cu<sub>10</sub> High Entropy Alloy:** Emre Gunes<sup>1</sup>; Yunus Kalay<sup>2</sup>; <sup>1</sup>EKTAM; <sup>2</sup>Middle East Technical University

**4:15 PM**

**Development of NiMn-based Shape Memory Alloys with Enhanced Elastocaloric Properties for Solid-state Cooling Applications:** Francesca Villa<sup>1</sup>; Pietro Ruggieri<sup>2</sup>; Michela Tamandi<sup>2</sup>; Lara Righi<sup>3</sup>; Francesca Passaretti<sup>1</sup>; Riccardo Casati<sup>4</sup>; Elena Villa<sup>1</sup>; <sup>1</sup>CNR ICMATE; <sup>2</sup>Università degli Studi di Milano - Bicocca; <sup>3</sup>Università di Parma; <sup>4</sup>Politecnico di Milano

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## ADDITIVE MANUFACTURING

### Cold Spray Additive Manufacturing: Part Quality and Performance — Characterization and Properties

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

**Program Organizers:** Ahmed Alade Tihamiyu, University Of Calgary, Canada; Tanaji Paul, Florida International University; Julio Villafuerte, CenterLine Windsor Ltd; Aaron Nardi, VRC Metal Systems; Joseph Heelan, Solvus Global

**Wednesday PM | March 6, 2024**  
Gulf | Hyatt

**Session Chairs:** Tanaji Paul, Florida International University; Ahmed Tihamiyu, University of Calgary, Canada

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**2:00 PM Invited**

**Engineering Boron Nitride Reinforcement for Strengthening Cold Sprayed Aluminum Deposits:** *Arvind Agarwal*<sup>1</sup>; <sup>1</sup>Florida International University

**2:30 PM**

**Static and Dynamic Performance of F357 Cold Spray Materials in Relevant Repair Geometries:** *Kyle Johnson*<sup>1</sup>; <sup>1</sup>VRC Metal Systems LLC

**2:50 PM**

**Effect of Post-deposition Heat Treatment on Mechanical, Microstructural, and Corrosion Properties of NASA HR-1 Cold Spray Deposits:** *Sathwik Tirukandyur*<sup>1</sup>; Marius Ellingsen<sup>2</sup>; Ozan Ozdemir<sup>3</sup>; Bharat Jasthi<sup>1</sup>; Zachary Velasquez<sup>3</sup>; <sup>1</sup>South Dakota Mines; <sup>2</sup>VRC Metal system; <sup>3</sup>Northeastern University

**3:10 PM**

**Enhancing Strength and Ductility of CS Deposits through Ad-mixed Feedstocks:** *Ahmad Nourian-Avval*<sup>1</sup>; Sinan Muftu<sup>1</sup>; <sup>1</sup>Northeastern University

**3:30 PM Break**

**3:50 PM Invited**

**Towards Quantitative Understanding of the Particle-substrate Bonding during Supersonic Microparticle Impacts:** *Veera Panova*<sup>1</sup>; *Christopher Schuh*<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:20 PM**

**CSAM of Refractory Materials:** *Michael Kracum*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**4:40 PM**

**Effect of Friction Stir Processing on the Microstructure and Mechanical Performance of 316L SS Cold Sprayed Deposits:** *Srinivasan Nagarajan*<sup>1</sup>; Michael Carter<sup>1</sup>; Todd Curtis<sup>1</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>South Dakota School of Mines and Technology

**5:00 PM**

**Evolution of Residual Stress in Cold Sprayed SS304L Measured via Neutron Diffraction:** *Christopher Roper*<sup>1</sup>; Chris Fancher<sup>2</sup>; Jeff Bunn<sup>2</sup>; Luke Brewer<sup>1</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Oak Ridge National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### **Composite Materials: Sustainable and Eco-Friendly Materials and Application – Eco Friendly and Sustainable Composite Materials: Waste Stream Benefits**

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

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

**Wednesday PM | March 6, 2024**

**Celebration 4 | Hyatt**

**Session Chair:** Ioannis Mastorakos, Clarkson University

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**2:00 PM**

**Adsorption Efficiency and Photocatalytic Activity of Silver Sulfide-activated Carbon (Ag<sub>2</sub>S-AC) Composite:** *Norsuria Mahmed*<sup>1</sup>; Zahra Ramadlan Mubarakah<sup>1</sup>; Siti Norsaffirah Zailan<sup>1</sup>; Mohd Natashah Norizan<sup>1</sup>; Ili Salwani Mohamad<sup>1</sup>; Nurfina

Yudasari<sup>2</sup>; <sup>1</sup>Universiti Malaysia Perlis; <sup>2</sup>National Research and Innovation Agency

**2:20 PM**

**Nanocomposite Materials for Radionuclide Sequestration from Groundwater Environments:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

**2:40 PM**

**Plastics-to-Carbons: Transforming Plastic Waste Into Diverse Morphologies:** Kenan Song<sup>1</sup>; *Zhaohong Xiu*<sup>1</sup>; <sup>1</sup>Arizona State University

**3:00 PM**

**Effect of Plasma Low Temperature Plasma on Waste Carbon Fiber for Effective Recycling:** *Vijaya Rangari*<sup>1</sup>; Gautam Chandrasekhar<sup>1</sup>; Jonathan Stocks<sup>1</sup>; <sup>1</sup>Tuskegee University

**3:20 PM Break**

**3:40 PM**

**Cellulose Derived From Banana Peels:** *Erin-Nicole Scott*<sup>1</sup>; <sup>1</sup>Tuskegee University MSE Department

**4:00 PM**

**Photocatalytic Nitrate Destruction Studies in Complex Environments:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

**4:20 PM**

**Technical Route to Develop High Tg Epoxy Composite That is Water Degradable at Low Temperature:** *Lei Zhao*<sup>1</sup>; Jiaxiang Ren<sup>1</sup>; Tim Dunne<sup>1</sup>; Peng Cheng<sup>1</sup>; <sup>1</sup>CNPC USA

**4:40 PM**

**Recycling, Reuse and Conformed of Acrylonitrile Butadiene Styrene (ABS) From Wee Waste:** *Judith Blanca Collo Mollo*<sup>1</sup>; <sup>1</sup>UMSA

**5:00 PM**

**High Ampacity Aluminum-graphene Wires for Overhead Conductor Applications:** *Aditya Nittala*<sup>1</sup>; Md Reza E Rabby<sup>1</sup>; Pedro Ottoni Negrao<sup>1</sup>; Nicole Overman<sup>1</sup>; Keerti Kappagantula<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Discovery and Design of Materials — Session V

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

**Program Organizers:** Houlong Zhuang, Arizona State University; Ismaila Dabo, Pennsylvania State University; Arezoo Emdadi, Missouri University of Science and Technology; Yang Jiao, Arizona State University; Sara Kadkhodaei, University Of Illinois Chicago; Mahesh Neupane, DEVCOM Army Research Laboratory; Xiaofeng Qian, Texas A&M University; Arunima Singh, Arizona State University; Natasha Vermaak, Lehigh University

**Wednesday PM | March 6, 2024**

**Bayhill 22 | Hyatt**

**Session Chair:** Ismaila Dabo, Pennsylvania State University

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**2:00 PM Invited**

**Impacts of Oxygen Doping on Sodium-ion Diffusion in Solid-state Batteries with Glassy Electrolyte: A Molecular Dynamics Perspective:** Kun Luo<sup>1</sup>; Qi An<sup>1</sup>; <sup>1</sup>Iowa State University

**2:25 PM**

**Interactions between Oxygen Vacancies and Polarons in Perovskite Oxides:** Dylan Windsor<sup>1</sup>; Haixuan Xu<sup>1</sup>; <sup>1</sup>University of Tennessee-Knoxville

**2:45 PM**

**Methodology And Performance of a Deep Learning Model for Property Predictions and Discovery of Ni-based Superalloys:** Vanessa Oklejas<sup>1</sup>; Scott Cochran<sup>1</sup>; James Lynch<sup>1</sup>; Brian Gockel<sup>1</sup>; <sup>1</sup>Lockheed Martin

**3:05 PM Invited**

**Microstructure-sensitive Calculations of Metal Nanocomposite Electrical Conductivity:** William Frazier<sup>1</sup>; Aditya Nittala<sup>1</sup>; Nicole Overman<sup>1</sup>; Hrishikesh Das<sup>1</sup>; Christopher Smith<sup>1</sup>; Keerti Kappagantula<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:30 PM**

**The Integration of VASP 6's Machine Learning Algorithms into the Solid and Liquid in Ultra Small Coexistence with Hovering Interfaces Code to for Melting Point Determination:** Audrey Campbell<sup>1</sup>; Qijun Hong<sup>1</sup>; <sup>1</sup>Arizona State University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Defect Thermodynamics & Kinetics

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Turret, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Wednesday PM | March 6, 2024**  
**Bayhill 29 | Hyatt**

**Session Chairs:** Krishna Pitike, Pacific Northwest National Laboratory; Victoria Tucker, Purdue University

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**2:00 PM Invited**

**Ion-electron Coupling in Energetic Radiation Damage Events:** Andrea Sand<sup>1</sup>; Antoine Clement<sup>1</sup>; <sup>1</sup>Aalto University

**2:30 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

**2:50 PM**

**Modeling the Nature of Suzuki Segregation with High Throughput Computational Techniques:** Victoria Tucker<sup>1</sup>; Michael Titus<sup>1</sup>; <sup>1</sup>Purdue University

**3:10 PM**

**Solute Induced Defect Phases Transformations in Mg  $\Sigma$ 7 Grain Boundaries:** Prince Mathews<sup>1</sup>; Siyuan Zhang<sup>1</sup>; Christina Scheu<sup>1</sup>; Rebecca Janisch<sup>2</sup>; Jörg Neugebauer<sup>1</sup>; Tilmann Hickel<sup>3</sup>; <sup>1</sup>Max-Planck-Institut für Eisenforschung; <sup>2</sup>Ruhr Universität

Bochum; <sup>3</sup>Federal Institute for Materials Research and Testing (BAM)

### 3:30 PM Break

### 3:50 PM

**Modeling Ionic Exchange in Faujasite Zeolite for Nuclear Waste Treatment:** *An Ta*<sup>1</sup>; R. Seaton Ullberg<sup>1</sup>; Ayoub Daouli<sup>2</sup>; Vanessa Proust<sup>3</sup>; Michael Badawi<sup>2</sup>; Agnes Grandjean<sup>3</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Lorraine; <sup>3</sup>CEA (France)

### 4:10 PM

**Atomistic and Machine Learning Studies of Solute Segregation in Metastable Grain Boundaries:** *Yasir Mahmood*<sup>1</sup>; Maher Alghalayini<sup>1</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Clemson University

### 4:30 PM Invited

**Accurate Fe–He Machine Learning Potential for Studying He Effects in Ferritic Steels for Fusion Applications:** *Krishna Pitike*<sup>1</sup>; Wahyu Setyawan<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

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## MECHANICS OF MATERIALS

### Defects and Interfaces: Modeling and Experiments — Multiscale Modeling I

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

Wednesday PM | March 6, 2024

Coral Spring II | Hyatt

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Youping Chen, University of Florida; Heechen Cho, Liberty University

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### 2:00 PM Invited

**Understanding Defects, Interfaces, and Their Collective Dynamics:** *Youping Chen*<sup>1</sup>; <sup>1</sup>University of Florida

### 2:30 PM

**Elucidating Grain Boundaries in Irradiated FeCr Alloys Using Multiscale Modeling and High-resolution Characterization:** *Mukesh Bachhav*<sup>1</sup>; Sourabh Kadambi<sup>1</sup>; Boopathy Kombaiah<sup>1</sup>; Jia-Hong Ke<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

### 2:50 PM

**From Anti-Arrhenius to Arrhenius Behavior in a Dislocation-obstacle Bypass: Atomistic Simulations and Theoretical Investigation:** *Mohammad Nahavandian*<sup>1</sup>; Enrique Martinez<sup>1</sup>; Soumit Sarkar<sup>1</sup>; <sup>1</sup>Clemson University

### 3:10 PM

**Ab Initio Investigation of the Screw Dislocation-hydrogen Interaction in BCC Tungsten and Iron:** *Pedro Borges*<sup>1</sup>; Emmanuel Clouet<sup>2</sup>; Lisa Ventelon<sup>2</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>French Alternative Energies and Atomic Energy Commission (CEA)

3:30 PM Break

3:45 PM

**Understanding Microstructure Effects on Plasticity Contributions in Polycrystalline BCC Microstructures:** *Aadhithyan Kannan*<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

4:05 PM

**Grain Boundary Phase Transformations in Segregated Metallic Alloys:** *Timofey Frolov*<sup>1</sup>; Vivek Devulapalli<sup>2</sup>; Tobias Brink<sup>2</sup>; Christian Liebscher<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>MPIE

4:25 PM

**A Self-consistent Solution for Diffusion Creep Behavior of Multiphase Polycrystalline Materials:** *Heecheon Cho*<sup>1</sup>; <sup>1</sup>Liberty University

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## MATERIALS SYNTHESIS AND PROCESSING

### Defects and Properties of Cast Metals – Defect II & Properties I

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

**Program Organizers:** Lang Yuan, University of South Carolina; Andrew Kao, University of Greenwich; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Kyle Fezi, Fort Wayne Metals

Wednesday PM | March 6, 2024  
Celebration 8 | Hyatt

**Session Chairs:** Begoña Santillana, Tata Steel Europe; Kyle Fezi, Fort Wayne Metals

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2:00 PM Invited

**Prediction of Defects in Metal Additive Manufacturing:** *Dan Thoma*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

2:25 PM

**Mitigation of Cracking Formed during Wire Plus Arc Additive Manufacturing of High Alloyed Austenitic and Ferritic Structures:** *Supriyo Ganguly*<sup>1</sup>; William James<sup>1</sup>; James German; Soumyajit Koley<sup>1</sup>; Kuladeep Rajamudili<sup>1</sup>; Goncalo Pardal<sup>1</sup>; <sup>1</sup>Cranfield University

2:45 PM

**Simulations of Multi-component Solidification and Freckles in Alloys:** G S Abhishek<sup>1</sup>; *Shyamprasad Karagadde*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

3:05 PM

**Avoiding the Cold Shut Defect by Introducing the Shape Factor Modifying Chvorinov's Rule in Aluminum Gravity Die Casting:** *Fu-Yuan Hsu*<sup>1</sup>; Chi-Ming Hung<sup>2</sup>; Zhang-Yuan Luo<sup>2</sup>; <sup>1</sup>National United University, Taiwan; <sup>2</sup>Metal Industry Research and Development Centre, Taiwan

3:25 PM

**Slag Entrainment and Entrapment Defects in Continuous Casting of Steel Slabs:** *Seong-Mook Cho*<sup>1</sup>; Brian Thomas<sup>2</sup>; <sup>1</sup>Pukyong National University; <sup>2</sup>Colorado School of Mines

3:45 PM Break

4:05 PM Invited

**Accurate Determination of the Liquidus Temperature to Avoid Defects Formation during Casting of Steels:** *Begona Santillana*<sup>1</sup>; W. van der Knoop<sup>1</sup>; H. Visser<sup>1</sup>; C. Kooij<sup>1</sup>; M. Mohr<sup>2</sup>; Wilhelmus Sillekens<sup>3</sup>; <sup>1</sup>Tata Steel Nederland; <sup>2</sup>DRL, previously at Ulm University; <sup>3</sup>European Space Agency

4:30 PM

**Study of Tube/Pipe Cracking Induced by Casting Defects in Medium Carbon Steels:** Tihe Zhou<sup>1</sup>; Youliang He<sup>2</sup>; Peng Zhang<sup>3</sup>; Ryan Lu<sup>1</sup>; <sup>1</sup>McMaster University; <sup>2</sup>CanMetMATERIALS, Natural Resources Canada; <sup>3</sup>Algoma Steel Inc.

4:50 PM

**Rapid Solidification of Titanium Alloy Swarf:** *Konstantinos Georgarakis*<sup>1</sup>; Unmesh Hariyani<sup>1</sup>; Martin Stiehler<sup>1</sup>; Arul Varman<sup>1</sup>; Konstantinos Salonitis<sup>1</sup>; Mark Jolly<sup>1</sup>; <sup>1</sup>Cranfield University

5:10 PM

**Nanotechnology-enabled Investment Casting of High Strength Wrought Aluminum Alloys:** *Yitian Chi*<sup>1</sup>; Xiaochun Li<sup>1</sup>; <sup>1</sup>University of California Los Angeles

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## MECHANICS OF MATERIALS

### Dynamic Behavior of Materials X – High Strain Rate Deformation

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

Wednesday PM | March 6, 2024

Coral Spring I | Hyatt

**Session Chairs:** Nitin Daphalapurkar, Los Alamos National Laboratory; Andrew Ruggiero, University of Cassino and Southern Lazio

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2:00 PM

**Dislocation Generation in Diamond under Extreme Loading:** Alex Li<sup>1</sup>; Rob Rudd<sup>1</sup>; Boya Li<sup>1</sup>; *Marc Meyers*<sup>1</sup>; Eduardo Bringa<sup>2</sup>; <sup>1</sup>University of California San Diego; <sup>2</sup>Universidad de Mendoza

2:20 PM

**Development of an ML Interatomic Potential for SiC for Extreme Environments:** *Michael Maclsaac*<sup>1</sup>; <sup>1</sup>University of Florida

2:40 PM

**Modeling Shear Fracture at High Strain Rates: Numerical Simulation of Shock-driven Extrusion Test:** *Gabriel Testa*<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; Sara Ricci<sup>1</sup>; Nicola Bonora<sup>1</sup>; <sup>1</sup>University of Cassino and Southern Lazio

3:00 PM

**Modeling Grain Boundary Mediated Plasticity with Massively Parallel Atomistic Simulations:** *Timofey Frolov*<sup>1</sup>; Nicolas Bertin<sup>1</sup>; Ian Winter<sup>2</sup>; Alexander Chernov<sup>1</sup>; Tomas Ooppelstrup<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Sandia National Lab



**3:20 PM**

**Shock Compression of Nanocrystalline Boron Carbide from Deep Learning Molecular Dynamics Simulations:** *Qi An*<sup>1</sup>; Jun Li<sup>1</sup>; <sup>1</sup>Iowa State University

**3:40 PM Break**

**4:00 PM**

**Thermo-mechanical Representation of Adiabatic Shear Banding:** Jack Rees<sup>1</sup>; Curt Bronkhorst<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**4:20 PM**

**Numerical Simulation of Shear Band Formation and Fracture in Collapsing Thick-walled Cylinder Experiment:** *Nicola Bonora*<sup>1</sup>; Gianluca Iannitti<sup>1</sup>; Zev Lovinger<sup>2</sup>; Sara Ricci<sup>1</sup>; Andrew Ruggiero<sup>1</sup>; Gabriel Testa<sup>1</sup>; Roman Kositski<sup>3</sup>; <sup>1</sup>University of Cassino and Southern Lazio; <sup>2</sup>Technion - Israel Institute of Technology; <sup>3</sup>Rafael

**4:40 PM**

**High-strain Rate Deformation Mechanisms in High Entropy Alloys as a Function of Tri-axial Load:** *Chunyu Li*<sup>1</sup>; Saswat Mishra<sup>1</sup>; Ethan Holbrook<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

**5:00 PM**

**Shock Wave Propagation in Medium and High Entropy Alloys through Moving Window Concurrent Atomistic Continuum Method:** *Vinamra Agrawal*<sup>1</sup>; Abigail Hunter<sup>2</sup>; Saryu Fensin<sup>2</sup>; <sup>1</sup>Auburn University; <sup>2</sup>Los Alamos National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Electrical Steels — Electrical Steels I

**Sponsored by:** TMS Structural Materials 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

**Wednesday PM | March 6, 2024**  
**Celebration 14 | Hyatt**

**Session Chair:** Gaoyuan Ouyang, Ames Laboratory

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**2:00 PM Invited**

**Atomic-Scale Mechanisms Behind the Abnormal Growth of Goss Grains in Grain-oriented Electrical Steels:** *Dierk Raabe*<sup>1</sup>; Stefan Zaefferer<sup>1</sup>; <sup>1</sup>Max-Planck Institute

**2:30 PM Invited**

**{001} vs {111} Recrystallization Textures in Ultra-low Carbon Steel:** *Leo Kestens*<sup>1</sup>; Estefania Sepulveda Hernandez<sup>1</sup>; Tuan Nguyen Minh<sup>1</sup>; Felipe Castro Cerda<sup>2</sup>; <sup>1</sup>Ghent University; <sup>2</sup>Universidad de Santiago de Chile

**3:00 PM**

**Effect of Silicon on the Microstructural Features of Electrical Steels During Torsion Simulation of Hot Rolling:** *Clodualdo Aranas*<sup>1</sup>; Youliang He<sup>2</sup>; Jubert Pasco<sup>1</sup>; Samuel Rodrigues<sup>3</sup>; <sup>1</sup>University of New Brunswick; <sup>2</sup>Natural Resources Canada; <sup>3</sup>Federal Institute of Education, Science and Technology of Maranhao

3:20 PM

**Influence of Hot Rolling Reduction Rate on the Microstructure, Texture of a Strip Cast Fe-2.5 wt% Si Non-oriented Electrical Steel:** *Huihui Wang*<sup>1</sup>; *Wanlin Wang*<sup>1</sup>; *Peisheng Lyu*<sup>1</sup>; *Chenyang Zhu*<sup>1</sup>; *Xueying Lyu*<sup>1</sup>; *Lulu Song*<sup>1</sup>; *Yunli Zhang*<sup>1</sup>; <sup>1</sup>Central South University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 Management — Energy Efficiency, Electrification & Carbon Management

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

**Program Organizers:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Metals Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong (Marco) Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Onuralp Yücel, Istanbul Technical University; Alafara Baba, University of Ilorin

**Wednesday PM | March 6, 2024**  
**Bayhill 33 | Hyatt**

**Session Chairs:** Onuralp Yücel, Istanbul Teknik University; Alafara Baba, University of Ilorin

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### 2:00 PM Introductory Comments

2:10 PM

**Benchmarking of Energy Consumption and CO2 Emissions in Cement Production – A Case Study:** *Shoaib Sarfraz*<sup>1</sup>; *Ziyad Sherif*<sup>1</sup>; *Mark Jolly*<sup>1</sup>; *Konstantinos Salonitis*<sup>1</sup>; <sup>1</sup>Cranfield University

2:30 PM

**Low-energy Processing of a Local Boltwoodite Ore as Intermediate in Nuclear Fuel Cell:** *Alafara Baba*<sup>1</sup>; *Mustapha Raji*<sup>1</sup>; *Kehinde Omoniyi*<sup>2</sup>; *Shemang Chindo*<sup>2</sup>; *Aduagba Kareem*<sup>3</sup>; *Abhilash*<sup>4</sup>; *Pratima Meshram*<sup>4</sup>; *Amudat Lawal*<sup>1</sup>; *Folahan Adekola*<sup>1</sup>; *Rasheed Agava*<sup>5</sup>; *Bernard Ozigi*<sup>5</sup>; <sup>1</sup>University of Ilorin; <sup>2</sup>Ahmadu Bello University; <sup>3</sup>Aeronautics and Air Vehicle Development Institute; <sup>4</sup>National Metallurgical Laboratory (CSIR); <sup>5</sup>National Agency for Science and Engineering Infrastructure (NASENI)

2:50 PM

**Low Energy Process Development for Chibuluma Copper Tailings:** *Yotamu Hara*<sup>1</sup>; *Nachikonde Fumpa*<sup>1</sup>; *Phenny Mwaanga*<sup>1</sup>; *Gershon Mwandila*<sup>1</sup>; *Bawemi Mtonga*<sup>1</sup>; *Makwenda Ngomba*<sup>1</sup>; <sup>1</sup>Copperbelt University

3:10 PM

**Production of FeCr and FeCrNi Alloys With an Energy Saving Route:** *Hasan Güney*<sup>1</sup>; *Selçuk Kan*<sup>1</sup>; *Kagan Benzesik*<sup>1</sup>; *Onuralp Yücel*<sup>1</sup>; <sup>1</sup>Istanbul Technical University

3:30 PM Break

3:50 PM

**SmartMelt Reduce Energy Consumption and Process Efficiency of Melting Process by Intelligent Deep Learning and Digital Twins:** *Amin Rostamian*<sup>1</sup>; Viet

Hang Nguyen<sup>1</sup>; Marc Bertherat<sup>2</sup>; <sup>1</sup>Novamet; <sup>2</sup>Constellium

**4:10 PM**

**Application of Fiber Optics in Metallurgical Processes, Temperature Monitoring of Metallurgical Furnace With Distributed Temperature Sensing (DTS):** *Carlos Acho*<sup>1</sup>; Luis Gonzalez<sup>2</sup>; <sup>1</sup>Universidad Mayor de San Andrés; <sup>2</sup>Xenon Production Systems

**4:30 PM**

**Fused Alumina Production From Non-metallic Residue of Aluminum White Dross:** *Selçuk Kan*<sup>1</sup>; Hasan Güney<sup>1</sup>; Kaan Benzeşik<sup>1</sup>; Onuralp Yücel<sup>1</sup>; <sup>1</sup>Istanbul Technical University

**4:50 PM**

**Technoeconomic Analysis of Supercritical Fluid Extraction Process for Recycling Rare Earth Elements From Neodymium Iron Boron Magnet:** *Gisele Azimi*<sup>1</sup>; Maziar Sauber<sup>2</sup>; <sup>1</sup>University of Toronto; <sup>2</sup>CanmetMINING, Natural Resources Canada

**5:10 PM Concluding Comments**

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

**Environmentally Assisted Cracking: Theory and Practice — Liquid Metal, Molten Salt, and Hydrogen Effect**

**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 PM | March 6, 2024**  
**Bayhill 17 | Hyatt**

**Session Chairs:** Bruce Pint, Oak Ridge National Laboratory; Stephen Raiman, University of Michigan

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**2:00 PM Invited**

**Effect of Liquid Metal Exposure on Structural Alloy Ductility:** *Bruce Pint*<sup>1</sup>; Marie Romedenne<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**2:30 PM**

**Micromechanisms Behind Liquid Metal Embrittlement in Galvanized TWIP Steel:** *Virginia Bertolo*<sup>1</sup>; Roumen Petrov<sup>2</sup>; Vera Popovich<sup>1</sup>; <sup>1</sup>Delft University of Technology; <sup>2</sup>Ghent University

**2:50 PM**

**Characterizing Stress-assisted Grain Boundary Diffusion of Zinc During Liquid Metal Embrittlement of AHSS:** *Gautham Mahadevan*<sup>1</sup>; <sup>1</sup>Delft University of Technology

**3:10 PM**

**Microstructural Aspects of the Deterioration of Creep Life for Austenitic Steels in CO<sub>2</sub> Environment:** *Kyle Rozman*<sup>1</sup>; Richard Oleksak<sup>1</sup>; Ömer Doğan<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**3:30 PM Break**

**3:50 PM Invited**

**Recent Progress on Environmentally Assisted Cracking in Molten Salts: Fission Products and Other Nuisances:** *Stephen Raiman*<sup>1</sup>; Muhammad Khan<sup>1</sup>; Elise Shauf<sup>1</sup>; Lauryn Reyes<sup>2</sup>; Ryan Gordon<sup>3</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Tennessee; <sup>3</sup>University of Wisconsin

**4:20 PM Invited**

**Probing the Mechanism Underlying the Interplay Between the Microscale Plastic Flow and the Atomic-scale H Diffusion Through Concurrent Atomistic-continuum Simulations:** *Thanh Phan*<sup>1</sup>; Yipeng Peng<sup>1</sup>; Liming Xiong<sup>1</sup>; <sup>1</sup>NC State University

**4:50 PM**

**Prediction of Hydrogen Uptake Kinetics in Cathodically Polarized Metals:** *Livia Cupertino Malheiros*<sup>1</sup>; Emilio Martinez-Paneda<sup>1</sup>; <sup>1</sup>Imperial College London

**5:10 PM**

**Hydrogen and Nitrogen Contents Effects on Mechanical Behavior of Austenitic Stainless Steel:** *Ikram Hamdaoui*<sup>1</sup>; Abdelali Oudriss<sup>1</sup>; Xavier Feaugas<sup>1</sup>; <sup>1</sup>La Rochelle University, LaSIE

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## **ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

### **Functional Nanomaterials 2024 — Functional Nanomaterials VI: From Synthesis to Applications**

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Wednesday PM | March 6, 2024**  
**Bayhill 21 | Hyatt**

**Session Chairs:** Woochul Lee, University of Hawaii at Manoa; Seungha Shin, University of Tennessee; Mostafa Bedewy, University of Pittsburgh

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**2:00 PM Keynote**

**Hydroxide Derived Nanomaterials and Their Properties:** *Michel Barsoum*<sup>1</sup>; <sup>1</sup>Drexel University

**2:40 PM Invited**

**Infrared Colloidal Quantum Dot Photodetectors:** *Ayaskanta Sahu*<sup>1</sup>; <sup>1</sup>New York University

**3:05 PM**

**Formation and Aging Behavior of Cerium Oxide-based Nanostructures in Peroxide Solution:** *Craig Neal*<sup>1</sup>; Yifei Fu<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Sudipta Seal<sup>1</sup>; <sup>1</sup>University of Central Florida

**3:25 PM Break**

**3:45 PM Invited**

**Nanoscale Engineering of Solar Cells for Enhanced Optical Performance:** *Jung-Kun Lee*<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**4:10 PM Invited****2D Materials-based Atomic Catalysts towards Electrochemical Nitrogen Fixation:***Chandra Veer Singh*<sup>1</sup>; Xue Yao<sup>1</sup>; Zhi Chen<sup>1</sup>; <sup>1</sup>University of Toronto**4:35 PM Invited****High-Remanence Magnetic Nanostructures for Microactuators:** *Amal El-Ghazaly*<sup>1</sup>;Yulan Chen<sup>1</sup>; Ludovico Cestarollo<sup>1</sup>; <sup>1</sup>Cornell University**5:00 PM****A Low-powered Fast-response Colored Electrophoretic Display Based on****Structural Color:** *Alyssa Troksa*<sup>1</sup>; Anne Cardenas<sup>1</sup>; Jenny Zhou<sup>1</sup>; Xiaojie Xu<sup>1</sup>; Simran Singh<sup>1</sup>; Elaine Lee<sup>1</sup>; Anna Hiszpanski<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN****High Performance Steels — Steel Performance****Sponsored by:** TMS Structural Materials Division, TMS: Steels Committee**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)**Wednesday PM | March 6, 2024****Bayhill 31 | Hyatt****Session Chairs:** Matthew Enloe, Steel Dynamics; Kasturi Narasimha Sasidhar, University of Wisconsin-Madison**2:00 PM****Zn Segregation at Grain Boundaries during Liquid Metal Embrittlement in the****Fe-Zn System:** *Yuki Ikeda*<sup>1</sup>; Hsu-Chih Ni<sup>2</sup>; Theophilus Wallis<sup>1</sup>; Anirban Chakraborty<sup>3</sup>; Hassan Ghassemi-Armaki<sup>4</sup>; Jian-Min Zuo<sup>2</sup>; Reza Darvishi Kamachali<sup>1</sup>; Robert Maass<sup>1</sup>; <sup>1</sup>Federal Institute of Materials Research and Testing (BAM); <sup>2</sup>University of Illinois Urbana-Champaign; <sup>3</sup>ArcelorMittal Global Research and Development; <sup>4</sup>General Motors Research and Development**2:20 PM****Effect of Carbon Content on the Critical Intergranular Fracture Stress in Tempered****Martensitic Steels:** *Masahide Yoshimura*<sup>1</sup>; Gabriel Arcuri<sup>2</sup>; Hatem Zurob<sup>1</sup>; <sup>1</sup>McMaster University; <sup>2</sup>Canadian Centre for Electron Microscopy, McMaster University**2:40 PM****Evaluating Strengthening and Impact Toughness Mechanisms for High Strength****Ni-Mo Alloyed Thick Plates:** Xabier Azpeitia<sup>1</sup>; Nerea Isasti<sup>1</sup>; Eric Detemple<sup>2</sup>; Hardy Mohrbacher<sup>3</sup>; *Pello Uranga*<sup>1</sup>; <sup>1</sup>CEIT and TECNUN (University of Navarra); <sup>2</sup>AG der Dillinger Hüttenwerke; <sup>3</sup>NiobelCon bvba**3:00 PM****Phase Transformation, Microstructure and Mechanical Properties on Nickel-free****High Chromium Weld Metal:** *Mustafa Acarer*<sup>1</sup>; Fikret Kabakci<sup>2</sup>; Nurcan Akduran<sup>1</sup>; <sup>1</sup>Selcuk University; <sup>2</sup>Zonguldak Bulent Ecevit University**3:20 PM****Studying Microstructural and Mechanical Properties Variations through the****Thickness of a 22-mm Thick Gauge X70 Line Pipe Steel:** *Afm Monowar Hossain*<sup>1</sup>; Nilesh Kumar<sup>1</sup>; <sup>1</sup>University of Alabama Tuscaloosa

3:40 PM Break

3:55 PM

**The Dual Role of TRIP Effect on Ductility and Toughness of a Medium Mn Steel:** *Chen Hu*<sup>1</sup>; Mingxin Huang<sup>1</sup>; <sup>1</sup>University of Hong Kong

4:15 PM

**Yield Stress Anisotropy of Carbon Steel with Elongated Pearlite:** *Rintaro Uejī*<sup>1</sup>; Hidetoshi Somekawa<sup>1</sup>; Satoshi Emura<sup>1</sup>; Akinobu Shibata<sup>1</sup>; Noriyuki Tsuchida<sup>2</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>University of Hyogo

4:35 PM

**Investigation of 9Cr-1Mo % Steel Weld Metal Microstructure and Mechanical Properties Used for High Temperature Application:** *Nurcan Akduran*<sup>1</sup>; <sup>1</sup>Selcuk University

5:15 PM

**Under Deposit Corrosion:** *Parul Bishnoi*<sup>1</sup>; Stella Pedrazzini<sup>1</sup>; Mary Ryan<sup>1</sup>; Nick Laycock<sup>2</sup>; Chris Bilsland<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>Qatar Shell Research & Technology Centre

4:55 PM

**The Effects of Molybdenum Segregation on Mechanical Behavior in Maraging Steel Processed by Wire Directed Energy Deposition:** *Kyrus Tsai*<sup>1</sup>; Jay Scala<sup>1</sup>; Rumman Ahsan<sup>2</sup>; Patrick Grace<sup>2</sup>; Sean Langan<sup>2</sup>; Victor Champagne<sup>3</sup>; Seok-Woo Lee<sup>1</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Solvus Global; <sup>3</sup>Cold Spray Innovations International

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Hume-Rothery Symposium on Alloy Microstructure Science and Engineering – Modeling, Experiments, and Theory in Ti-alloys

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

**Program Organizers:** Long-Qing Chen, Pennsylvania State University; Yufeng Zheng, University of North Texas; Wei Xiong, University of Pittsburgh; Rajarshi Banerjee, University of North Texas

Wednesday PM | March 6, 2024

Bayhill 23 | Hyatt

**Session Chairs:** Yongmei Jin, Michigan Technological University; Rajarshi Banerjee, University of North Texas

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2:00 PM Invited

**Linkage between Microstructure and Mechanical Properties in Alpha-Beta Titanium Alloys:** *David Furrer*<sup>1</sup>; Sergei Burlatsky<sup>2</sup>; Vasisht Venkatesh<sup>1</sup>; Adam Pilchak<sup>1</sup>; Ryan Noraas<sup>1</sup>; Gangshu Shen<sup>1</sup>; <sup>1</sup>Pratt & Whitney; <sup>2</sup>Raytheon Technologies Research Center

2:30 PM Invited

**Stability and Growth Kinetics of Deformation Twin Embryos in Beta Ti Alloys:** Ganlin Chen<sup>1</sup>; Dian Li<sup>2</sup>; Yufeng Zheng<sup>2</sup>; *Liang Qi*<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Nevada, Reno

**3:00 PM Invited**

**A Novel Growth Mechanism of the Alpha Phase in Titanium Alloys:** Rongpei Shi<sup>1</sup>; Deep Choudhuri<sup>2</sup>; Ankush Kashiwar<sup>3</sup>; Sriswaroop Dasari<sup>4</sup>; Yunzhi Wang<sup>5</sup>; Rajarshi Banerjee<sup>4</sup>; *Dipankar Banerjee*<sup>6</sup>; <sup>1</sup>Harbin Institute of Technology; <sup>2</sup>New Mexico Tech; <sup>3</sup>Université catholique de Louvain; <sup>4</sup>University of North Texas; <sup>5</sup>Ohio State University; <sup>6</sup>Indian Institute of Science

**3:30 PM Break****3:50 PM Invited**

**Shuffle Transformation in Titanium Alloys:** *Yufeng Zheng*<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

**4:20 PM Invited**

**Effects of Stress and Defects on the Phase Transformation, Local Texture and Mechanical Properties of Dual-phase Titanium Alloys:** *Dongsheng Xu*<sup>1</sup>; Jinhua Zhang<sup>1</sup>; Xuexiong Li<sup>1</sup>; Adam Ismaeel<sup>1</sup>; Chunyu Teng<sup>2</sup>; Rui Yang<sup>1</sup>; <sup>1</sup>Institute of Metal Research, Chinese Academy of Sciences; <sup>2</sup>AVIC China Aero-Polytechnology Establishment

**4:50 PM Concluding Comments**

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**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion – Local Ordering in Materials Out of Equilibrium I**

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

**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley

**Wednesday PM | March 6, 2024**

**Bayhill 30 | Hyatt**

**Session Chairs:** Irene Beyerlein, University of California, Santa Barbara; Penghui Cao, University of California, Irvine; Yang Yang, The Pennsylvania State University; Judith Yang, Brookhaven National Laboratory

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**2:00 PM Invited**

**Non-equilibrium Ionic Transport in Oxides:** *Blas Uberuaga*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**2:30 PM Invited**

**Atomic-scale Origin of the Low Grain-boundary Resistance in Perovskite Solid Electrolyte  $\text{Li}_{0.375}\text{Sr}_{0.4375}\text{Ta}_{0.75}\text{Zr}_{0.25}\text{O}_3$ :** Tom Lee<sup>1</sup>; Chaitanya Gadre<sup>1</sup>; Huaixun Huan<sup>1</sup>; *Xiaoqing Pan*<sup>1</sup>; <sup>1</sup>University of California Irvine

**3:00 PM Invited**

**Design of Radiation-resistant Solid Solution Alloys Using Co-clustering of Synergistic Solutes:** *Pascal Bellon*<sup>1</sup>; Soumyajit Jana<sup>1</sup>; Vaibhav Vasudevan<sup>1</sup>; Robert Averback<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

3:30 PM

**Won't You Be My Neighbor: Tracking Chemical Short-Range Order and Its Impact on Corrosion Resistance in a Medium Entropy Alloy:** *Elaf Anber*<sup>1</sup>; Debashish Sur<sup>2</sup>; John Scully<sup>2</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Virginia

3:50 PM Break

4:05 PM Invited

**Effect of Local Chemical Order on the Irradiation-induced Defect Evolution in Multi-principal Element Alloys:** *Jun Ding*<sup>1</sup>; Zhen Zhang<sup>1</sup>; Chenyang Lu<sup>1</sup>; Robert Ritchie<sup>2</sup>; Evan Ma<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University; <sup>2</sup>University of California Berkeley

4:35 PM Invited

**Role of Nanoscale Heterogeneities on Charged Species Transport and Oxide Growth: Example of Noble Metallic Inclusions:** *Adrien Couet*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; Junliang Liu<sup>1</sup>; Ricardo Vidrio<sup>1</sup>; Maryam Zahedian<sup>1</sup>; Jennifer Choy<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

5:05 PM

**A Simple Model for Short-Range Ordering Kinetics in Multicomponent Solid Solution Alloys:** *Anas Abu-Odeh*<sup>1</sup>; Bin Xing<sup>2</sup>; Penghui Cao<sup>2</sup>; Blas Uberuaga<sup>3</sup>; Mark Asta<sup>1</sup>; <sup>1</sup>University Of California, Berkeley; <sup>2</sup>University of California, Irvine; <sup>3</sup>Los Alamos National Laboratory

5:25 PM

**Quantitative Assessment of Short-range Order in Atomistic Simulations of High-entropy Alloys:** *Killian Sheriff*<sup>1</sup>; Yifan Cao<sup>1</sup>; Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

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## LIGHT METALS

### Magnesium Technology 2024 — Biomedical Applications

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

Wednesday PM | March 6, 2024

Windermere Y-3 | Hyatt

**Session Chairs:** Petra Maier, Stralsund University of Applied Sciences Germany; Jonathan Weiler, Meridian Lightweight Technologies Inc

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2:00 PM Invited

**Assessment of Magnesium Wire Coatings for Absorbable Medical Devices:** *Adam Griebel*<sup>1</sup>; Cody David<sup>1</sup>; Jeremy Schaffer<sup>1</sup>; Roger Guillory<sup>2</sup>; <sup>1</sup>Fort Wayne Metals; <sup>2</sup>Michigan Technological University

2:25 PM

**Processing and Characterization of Mg Microtubes for Biodegradable Vascular Stents:** *Joung Sik Suh*<sup>1</sup>; Chang Dong Yim<sup>1</sup>; Byeong-Chan Suh<sup>1</sup>; Ha Sik Kim<sup>1</sup>; Sang Eun Lee<sup>1</sup>; Hwa-Chul Jung<sup>2</sup>; <sup>1</sup>Korea Institute Of Materials Science; <sup>2</sup>innosys Co., Ltd.

2:45 PM

**Severe Plastically Deformed Mg-Zn-Zr-RE Alloy Developed as a Biomaterial:** *Vasanth Shunmugasamy*<sup>1</sup>; Bilal Mansoor<sup>1</sup>; <sup>1</sup>Texas A&M University at Qatar



**3:05 PM****The Effect of Powder Size and Morphology on the Sinterability of Novel Bioresorbable Mg-Sr/Ca Alloys:** *Ava Azadi Chegeni*<sup>1</sup>; Eoin O'Cearbhaill<sup>1</sup>; Mert Celikin<sup>1</sup>; <sup>1</sup>University College Dublin**3:25 PM Break****3:45 PM****Data-Driven Discovery of Structure-Property Correlations in Lean Magnesium Alloys for Biomedical Applications:** *Sreenivas Raguraman*<sup>1</sup>; Ryan McGovern<sup>1</sup>; Andrew Kim<sup>1</sup>; Veronica Ivanovskaya<sup>1</sup>; Tram Nguyen<sup>1</sup>; Tunde Ayodeji<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**4:05 PM****Examination of Cycling Rate Sensitivity in Magnesium Alloys in Fatigue and Corrosion Fatigue:** *Adam Griebel*<sup>1</sup>; Olivia Schuller<sup>1</sup>; <sup>1</sup>Fort Wayne Metals**4:25 PM Concluding Comments**

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN****Materials and Chemistry for Molten Salt Systems — Engineering Materials and Measurements****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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory**Wednesday PM | March 6, 2024**  
**Bayhill 20 | Hyatt****Session Chair:** Stephen Raiman, University of Michigan**2:00 PM****Metals and Alloys Corrosion in Unpurified Molten FLiNaK Salt: Development and Evaluation of Electrochemical Methods:** *Elena Romanovskaia*<sup>1</sup>; Ho Lun Chan<sup>1</sup>; Valentin Romanovski<sup>1</sup>; Francisco Garfias<sup>1</sup>; Minsung Hong<sup>2</sup>; Sara Mastromarino<sup>2</sup>; Raluca Scarlat<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**2:20 PM****Evolution of Micro-structure and Hardening in Modified Ni-Mo-Cr-W Alloys:** *Naveen Kumar N*<sup>1</sup>; Vishal Soni<sup>1</sup>; Boateng Twum Donkor<sup>2</sup>; Sonali Ravikumar<sup>2</sup>; J Song<sup>3</sup>; M. A. Steiner<sup>2</sup>; Abhishek Sharma<sup>1</sup>; Sriswaroop Dasari<sup>4</sup>; Rajarshi Banerjee<sup>1</sup>; Govindarajan Muralidharan<sup>5</sup>; Ravi Vilupanur<sup>6</sup>; Steven J. Zinkle<sup>7</sup>; Vijay K Vasudevan<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>University of Cincinnati; <sup>3</sup>Virginia Polytechnic Institute and State University; <sup>4</sup>Idaho National Laboratory; <sup>5</sup>Oak Ridge National Laboratory; <sup>6</sup>California State Polytechnic University; <sup>7</sup>The University of Tennessee**2:40 PM****Overview of the United States Molten Salt Reactor Program:** *Patricia Paviet*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:10 PM****The Time-dependent Measurement of Ni-20Cr Corrosion in Molten FLiBe:** *Ryan Hayes*<sup>1</sup>; *Raluca Scarlat*<sup>1</sup>; <sup>1</sup>University of California Berkeley**3:30 PM Break****3:50 PM****Discussion on the Lessons Learned, Tips, and Tricks When Measuring Thermal Properties of Molten Salts:** *Toni Karlsson*<sup>1</sup>; *Nick Erfurth*<sup>1</sup>; *Robin Roper*<sup>1</sup>; *Kevin Tolman*<sup>1</sup>; *Michael Woods*<sup>1</sup>; *Carl Karlsson*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory**4:10 PM****Molten Chloride Salt Corrosion of Ultra-high Temperature Ceramics:** *Brian Carpman*<sup>1</sup>; *James Kelly*<sup>1</sup>; *Stephen Raiman*<sup>1</sup>; <sup>1</sup>University of Michigan**4:30 PM****Creep and Tensile Behavior of Advanced Ni-Based Alloys for Molten Fluoride Salt Applications:** *Jaimie Tiley*<sup>1</sup>; *Ryan Gordon*<sup>2</sup>; *Ryan Thier*<sup>3</sup>; *Adrien Couet*<sup>2</sup>; *Soumya Nag*<sup>1</sup>; *Bruce Pint*<sup>1</sup>; *Steven Zinkle*<sup>3</sup>; *Kumar Sridharan*<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Wisconsin, Madison; <sup>3</sup>University of Tennessee**4:50 PM****Studies on Purification of Fluoride Salts and Static Corrosion of Stainless Steel 316H:** *Jaewoo Park*<sup>1</sup>; *Jinsuo Zhang*<sup>1</sup>; <sup>1</sup>Virginia Tech

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**NUCLEAR MATERIALS****Materials Informatics to Accelerate Nuclear Materials Investigation — Machine Learning Enhanced Characterization of Nuclear Materials****Sponsored by:** TMS Structural Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Nuclear Materials Committee, TMS: Computational Materials Science and Engineering Committee, TMS: Advanced Characterization, Testing, and Simulation Committee**Program Organizers:** *Miaomiao Jin*, Pennsylvania State University; *Yongfeng Zhang*, University of Wisconsin; *Tiankai Yao*, Idaho National Laboratory; *Anjana Talapatra*, Los Alamos National Laboratory; *Luca Messina*, CEA Cadarache; *Fei Xu*, Idaho National Laboratory; *Benjamin Afflerbach*, University of Wisconsin-Madison**Wednesday PM | March 6, 2024****Silver Spring I-II | Hyatt****Session Chairs:** *Tiankai Yao*, Idaho National Laboratory; *Anjana Talapatra*, Los Alamos National Laboratory

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**2:00 PM****Probing Radiation Induced Interface Metastability Using Deep Learning Object Detection:** *Emily Hopkins*<sup>1</sup>; *Sicong He*<sup>2</sup>; *Annie Barnett*<sup>1</sup>; *Michael Falk*<sup>1</sup>; *Jaime Marian*<sup>2</sup>; *Mitra Taheri*<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of California - Los Angeles**2:20 PM Invited****Synthetic Data Driven Materials Informatics Methods for Nuclear Materials Characterization:** *Kevin Field*<sup>1</sup>; *Matthew Lynch*<sup>1</sup>; *Gabriella Bruno*<sup>1</sup>; *Ryan Jacobs*<sup>2</sup>; *Nicholas Clancy*<sup>1</sup>; *Dane Morgan*<sup>2</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>University of Wisconsin**2:50 PM****Inverse Uncertainty Quantification of Dispersion Analysis Research Tool (DART) Parameters Necessary for the Calculation of Fission Gas Swelling in U-Mo Fuel:**

ATM Jahid Hasan<sup>1</sup>; Zhi-Gang Mei<sup>2</sup>; Bei Ye<sup>2</sup>; Benjamin Beeler<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Argonne National Laboratory

### 3:10 PM Invited

**Revealing the Story of Defects from Coupled Extreme Environments with Autoencoders and Dense Neural Networks:** Kory Burns<sup>1</sup>; Khalid Hattar<sup>2</sup>; Nan Li<sup>3</sup>; Caitlin Kohnert<sup>3</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>University of Tennessee; <sup>3</sup>Los Alamos National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing and Kinetic Phenomena: From Thin Films and Micro/Nano Systems to Advanced Manufacturing – Innovative Manufacturing

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Thin Films and Interfaces Committee, TMS: Phase Transformations Committee

**Program Organizers:** Hang Yu, Virginia Polytechnic Institute And State University; Steven Boles, Norwegian University of Science and Technology; Jihun Oh, Korea Advanced Institute of Science & Technology (KAIST); Jerrold Floro, University of Virginia; Zungsun Choi, Infineum Singapore LLP; Matteo Seita, University of Cambridge; Changquan Lai, Nanyang Technological University

Wednesday PM | March 6, 2024  
Celebration 11 | Hyatt

**Session Chair:** To Be Announced

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### 2:00 PM Invited

**Determination of the Friction Stir Welding Window from the Solid-state-bonding Mechanics under Severe Thermomechanical Conditions:** Yanfei Gao<sup>1</sup>; Xue Wang<sup>1</sup>; Martin McDonnell<sup>2</sup>; Zhili Feng<sup>3</sup>; <sup>1</sup>University of Tennessee-Knoxville; <sup>2</sup>US Army DEVCOM Ground Vehicle Systems Center; <sup>3</sup>Oak Ridge National Laboratory

### 2:30 PM

**Sintering Kinetics of Compacted Core-shell Nickel-chromium Powder:** Gil Rubia<sup>1</sup>; Camilo Bedoya<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

### 2:50 PM

**Coarse-grained Molecular Modeling of Macropore-infused Nanocomposite Emulsion Thermosets (MINET):** Yiqun Xu<sup>1</sup>; Jonathan Singer<sup>1</sup>; Ryan Sills<sup>1</sup>; <sup>1</sup>Rutgers University

### 3:10 PM

**The Microstructure Evolution of the Electroplating Cu Foil by the Multiple Switched Current Density Method:** Yun-Fong Lee<sup>1</sup>; <sup>1</sup>National Central University

3:30 PM Concluding Comments

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## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo – Materials Science for Global Development - Manufacture**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**Wednesday PM | March 6, 2024**  
**Windermere W-2 | Hyatt**

**Session Chairs:** Jingjie Hu, North Carolina State University; Jing Du, Penn State University

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**2:00 PM Keynote**

**Innovation in Manufacturing Tools:** *Glenn Daehn*<sup>1</sup>; <sup>1</sup>Ohio State University

**2:30 PM Keynote**

**Scale-enabled Subcritical Crack Growth Mechanisms in Thin Sheet Materials:** *Christopher Muhlstein*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**3:00 PM Invited**

**Compliant Manipulation through Dynamically Tunable Dry Adhesion:** *Wanliang Shan*<sup>1</sup>; <sup>1</sup>Syracuse University

**3:25 PM Break**

**3:45 PM Keynote**

**Mechanisms of Rapid Improvement of Mechanical Properties of Cold Sprayed Coatings by Induction Heating:** *Wei Zhou*<sup>1</sup>; <sup>1</sup>Nanyang Technological University, Singapore

**4:15 PM**

**Macroscale Superlubricity on Carbon Coated Metallic Surfaces:** *Tabiri Asumadu*<sup>1</sup>; *Mobin Vandadi*<sup>1</sup>; *Desmond Klenam*<sup>1</sup>; *Kwadwo Mensah-Darkwa*<sup>1</sup>; *Emmanuel Gikunoo*<sup>1</sup>; *Samuel Kwofie*<sup>1</sup>; *Nima Rahbar*<sup>1</sup>; *Winston Soboyejo*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

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## **MATERIALS SYNTHESIS AND PROCESSING**

**Measurement and Control of High-temperature Processes — Measurement Techniques for Extreme Environments: Composition, Flow, & Level**

**Sponsored by:** TMS Extraction and Processing Division, TMS: Process Technology and Modeling Committee, TMS: Pyrometallurgy Committee

**Program Organizers:** Alexandra Anderson, Gopher Resource; Matthew Zappulla, Los Alamos National Laboratory; Dean Gregurek, RHI Magnesita; Stuart Nicol, Glencore Technology; Kristian Mackowiak, Kingston Process Metallurgy Inc.

**Wednesday PM | March 6, 2024**  
**Celebration 5 | Hyatt**

**Session Chairs:** Dean Gregurek, RHI Magnesita GmbH; Stuart Nicol, Glencore

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**2:00 PM Introductory Comments**

**2:05 PM**

**Online Molten Salt and Off-Gas Monitoring Using Coupled Spectroscopy Techniques:** *Ruchi Gakhar*<sup>1</sup>; *Ammon Williams*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**2:25 PM Invited**

**On-line Monitoring of Molten Salts: Process Control and Fundamental Characterization:** *Sam Bryan*<sup>1</sup>; Shirmir Branch<sup>1</sup>; Heather Felmy<sup>1</sup>; Adan Schafer Medina<sup>1</sup>; Amanda Lines<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**2:45 PM**

**Linde's Image Analysis System to Tune Burners for Lead Recovery from Automotive Batteries in Rotary Furnaces:** *Brenno Ferreira*<sup>1</sup>; Izaias Marques<sup>1</sup>; Martin Adendorff<sup>1</sup>; Joachim von Scheele<sup>1</sup>; <sup>1</sup>Linde Technology

**3:05 PM**

**Flexible Flame Staging Improving Copper Scrap Oxidation and Reduction Steps Toward Its Recovery at Recope Laminacao:** *Brenno Ferreira*<sup>1</sup>; William Mahoney<sup>1</sup>; Joachim von Scheele<sup>1</sup>; Edson Isihara<sup>2</sup>; Brenno Silva<sup>2</sup>; Eduardo Sarti<sup>3</sup>; Julio Bittencourt<sup>3</sup>; <sup>1</sup>Linde Technology; <sup>2</sup>Linde plc; <sup>3</sup>Metalgroup

**3:25 PM Break****3:40 PM Invited**

**Observed Instrumentation in Hydrometallurgical Processes:** *Kerry McQuaid*<sup>1</sup>; <sup>1</sup>Argonaut Gold

**4:00 PM Invited**

**Advances in Magnetic Measurements and Externally Applied Magnetic Fields for Vacuum Arc Remelting Process Monitoring and Control:** *Matt Cibula*<sup>1</sup>; Josh Motley<sup>1</sup>; Nathan Pettinger<sup>1</sup>; Dan McCulley<sup>1</sup>; Paul King<sup>1</sup>; <sup>1</sup>Ampere Scientific

**4:20 PM Invited**

**Radiometric Measurements, the Measurement of Last Resort:** *Becky Olliges*<sup>1</sup>; <sup>1</sup>Berthold Technologies

**4:40 PM**

**Development of a Prototype Flow Sensor for Molten Materials:** *Bo Raadam*<sup>1</sup>; Jaeheon Lee<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**5:00 PM**

**Non-contact Casting Rate Measurement of Molten Iron Jet Discharged from Blast Furnace:** *Weixiao Shang*<sup>1</sup>; Jun Chen<sup>1</sup>; Tyamo Okosun<sup>2</sup>; Chenn Zhou<sup>2</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Purdue University Northwest

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**MECHANICS OF MATERIALS**
**Mechanical Behavior at the Nanoscale VII — Multilayers and Thin Films**

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Wednesday PM | March 6, 2024**  
**Manatee Spring I | Hyatt**

**Session Chairs:** Sezer Ozerinc, Middle East Technical University; Niaz Abdolrahim, University of Rochester

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**2:00 PM Invited**

**Mechanical Behavior of Laser Refined Nanoscale Eutectics:** *Amit Misra*<sup>1</sup>; <sup>1</sup>University of Michigan

**2:30 PM**

**Fatigue Degradation in Pure Nanocrystalline Metallic Thin Films Using a MEMS Microresonator:** *Alejandro Barrios*<sup>1</sup>; Qiushi Li<sup>2</sup>; Yang Yichen<sup>2</sup>; Manish Jain<sup>1</sup>; Brad Boyce<sup>1</sup>; Olivier Pierron<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Georgia Institute of Technology

**2:50 PM**

**Deposition of Hierarchical 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>1</sup>; Garritt Tucker<sup>2</sup>; <sup>1</sup>Iowa State University; <sup>2</sup>Colorado School of Mines

**3:10 PM**

**Co-deformation of Heterogeneous Cu-Mo-W Thin Films:** *Forrest Wissuchek*<sup>1</sup>; Bibhu Sahu<sup>1</sup>; Arkajit Ghosh<sup>1</sup>; Amit Misra<sup>1</sup>; Ben Derby<sup>1</sup>; <sup>1</sup>University of Michigan

**3:30 PM Break**

**3:50 PM**

**Role of Interface Attributes on Strength and Plasticity of Advanced Nano Laminates:** *Rodney McCabe*<sup>1</sup>; Yifan Zhang<sup>1</sup>; Thomas Nizolek<sup>1</sup>; Nan Li<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**4:10 PM**

**The Effect of Nanomechanical Behavior on the Manufacturing of Pharmaceutical Tablets:** *Sushmita Majumder*<sup>1</sup>; Tianyi Xiang<sup>1</sup>; Vikram Chandrashekhar Joshi<sup>1</sup>; Calvin Sun<sup>1</sup>; Nathan Mara<sup>1</sup>; <sup>1</sup>University of Minnesota-Twin Cities

**4:30 PM**

**Nanomechanical Effects of Composition and Microstructure in Spark Plasma Sintered Ti-Zr-Ta Alloys:** *Bamidele Lawrence Bayode*<sup>1</sup>; Thato Tshepe<sup>1</sup>; Mercy Ramakokovhu<sup>2</sup>; Peter Olubambi<sup>1</sup>; <sup>1</sup>University of Johannesburg - Doornfontein Campus; <sup>2</sup>Tshwane University of Technology

**4:50 PM**

**Exploring Deformation Mechanisms in Optical Ceramic Nanomultilayers:** *Danielle White*<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California

**5:10 PM Invited**

**Micro-scale Fracture Mechanics of BaTiO<sub>3</sub> Thin Films:** *Balila Nagamani Jaya*<sup>1</sup>; Nidhin G Mathews<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

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## MECHANICS OF MATERIALS

**Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling — Session IV**

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

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

**Wednesday PM | March 6, 2024**  
**Barrel Spring I | Hyatt**

**Session Chair:** Brian Schuster, University of Texas at El Paso

**2:00 PM**

**Nanoporous Amorphous Carbon Nanopillars with Lightweight, Near-theoretical Strength, Large Fracture Strain, and High Damping Capability:** *Zhongyuan Li*<sup>1</sup>; Ayush Bhardwaj<sup>2</sup>; Jinlong He<sup>3</sup>; Wenxin Zhang<sup>4</sup>; Thomas Tran<sup>4</sup>; Julia Greer<sup>4</sup>; Ying Li<sup>3</sup>; James Watkins<sup>2</sup>; Seok-Woo Lee<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>University of Massachusetts Amherst; <sup>3</sup>University of Wisconsin-Madison; <sup>4</sup>California Institute of Technology

**2:20 PM**

**Post-Quench Ductility of FeCrAl Alloys Subjected to High Heating Rates:** *Victoria Davis*<sup>1</sup>; Caleb King<sup>1</sup>; Jessika Rojas<sup>1</sup>; Carlos Castano<sup>1</sup>; Reza Mohammadi<sup>1</sup>; Braden Goddard<sup>1</sup>; Tristan Norrgard<sup>1</sup>; Rajnikant Umretiya<sup>1</sup>; Colson Miller<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**2:40 PM**

**Rate-dependent Transition of Dislocation Mechanisms in a Magnesium Alloy:** *Xinyu Xu*<sup>1</sup>; Y.Z. Li<sup>1</sup>; C.P. Huang<sup>1</sup>; M.X. Huang<sup>1</sup>; <sup>1</sup>University of Hong Kong

**3:00 PM**

**Micro-shear of Silicon: Effects of Temperature and Crystal Orientation Analyzed Using In-situ Digital Image Correlation:** Carmen Lauener<sup>1</sup>; Fabian Schwarz<sup>1</sup>; Laszlo Pethö<sup>2</sup>; Johann Michler<sup>2</sup>; *Jeff Wheeler*<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich - Laboratory for Nanometallurgy; <sup>2</sup>Empa - Laboratory for Mechanics of Materials and Nanostructures

**3:20 PM**

**Small-scale Mechanical Testing of Material Interfaces Enabled by Site-specific Femtosecond Laser Machining:** *Brian Schuster*<sup>1</sup>; Jorge Acosta<sup>1</sup>; David Santacruz<sup>1</sup>; Emilio Loera<sup>1</sup>; Erwin Cazares<sup>1</sup>; <sup>1</sup>University of Texas at El Paso

**3:40 PM Break**

**4:00 PM**

**Streamlined Assessment of Microstructure-Mechanical Property Relationships in Ni Based Superalloys:** *Kevin Schmalbach*<sup>1</sup>; Toshio Osada<sup>2</sup>; Eric Hintsala<sup>1</sup>; Douglas Stauffer<sup>1</sup>; Takahito Ohmura<sup>2</sup>; <sup>1</sup>Bruker Nano; <sup>2</sup>National Institute for Materials Science

**4:20 PM**

**Twin Transmission and Variant Continuity in Mg Bicrystals:** Chunyang Huang<sup>1</sup>; *Khalil Elkhodary*<sup>2</sup>; Shan Tang<sup>3</sup>; <sup>1</sup>Kunming University; <sup>2</sup>AUC; <sup>3</sup>Dalian University of Technology

**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN**

## Nanostructured Materials in Extreme Environments II – Other Environments and Materials Fabrication/Characterization

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

**Wednesday PM | March 6, 2024**  
**Bayhill 19 | Hyatt**

**Session Chair:** Xiang Wang, Pacific Northwest National Laboratory

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**2:00 PM Invited**

**Hetero-nanostructuring and Relaxation Behavior of an Al-Mg Nanostructured Alloy Examined by High-energy Synchrotron X-rays:** *Megumi Kawasaki*<sup>1</sup>; *Jae-Kyung Han*<sup>1</sup>; *Klaus-Dieter Liss*<sup>2</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>University of Wollongong

**2:25 PM**

**Dominant High-temperature Mechanism for Grain Size Stability in Nanocrystalline Alloys:** *Mostafa Saber*<sup>1</sup>; <sup>1</sup>Oregon Institute of Technology

**2:45 PM**

**A new Class of Dynamically Recrystallized Oxide Dispersion Strengthened Steel (DRX-ODS Steel) by Solid Phase Processing:** *Xiang Wang*<sup>1</sup>; *Dalong Zhang*<sup>1</sup>; *Jens Darsell*<sup>1</sup>; *Ross Kenneth*<sup>1</sup>; *Xiaolong Ma*<sup>1</sup>; *Kayla Yano*<sup>1</sup>; *Tingkun Liu*<sup>1</sup>; *Ramprashad Prabhakaran*<sup>1</sup>; *Lan Li*<sup>1</sup>; *Iver Anderson*<sup>2</sup>; *Wahyu Setyawan*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Ames Laboratory

**3:05 PM**

**Simplified Production of ODS-Ferritic Alloys for Long-life Reactor Fuel Assembly Ducts:** *Jordan Tiarks*<sup>1</sup>; *Iver Anderson*<sup>2</sup>; *Landon Hickman*<sup>3</sup>; *Emma Cockburn*<sup>3</sup>; *Nicolas Argibay*<sup>1</sup>; *Hyojung Kim*<sup>4</sup>; *Stuart Maloy*<sup>5</sup>; *Siddhartha (Sid) Pathak*<sup>3</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Iowa State University Ames Laboratory; <sup>3</sup>Iowa State University; <sup>4</sup>Los Alamos National Laboratory; <sup>5</sup>Pacific Northwest National Laboratory

**3:25 PM Break**

**3:45 PM**

**Studying Microstructural Evolution in a Friction Stir Processing Consolidated ODS-14YWT Powders:** *Shubhrodev Bhowmik*<sup>1</sup>; *Stuart Maloy*<sup>2</sup>; *Kumar Kandasamy*<sup>3</sup>; *Nilesh Kumar*<sup>1</sup>; <sup>1</sup>University of Alabama Tuscaloosa; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Enabled Engineering

**4:05 PM**

**Multi-Component Nanomaterials in the Environment: Fate, Transport, and Potential Ecotoxicological Impacts:** *Ikhazuagbe Ifijen*<sup>1</sup>; *Ifeanyi Odiachi*<sup>2</sup>; *Sonia Edionweme*<sup>1</sup>; *Esther Brodrick*<sup>1</sup>; <sup>1</sup>Rubber Research Institute of Nigeria; <sup>2</sup>Delta State Polytechnic, Ogwashi-Uku, Nigeria

**4:25 PM**

**Understanding and Characterization of the Dynamic Deformation Behavior of Multiphase Cu-Fe Alloy Microstructures Using Molecular Dynamics and Virtual**



**Diffraction:** *Phillip Tsurkan*<sup>1</sup>; Marco Echeverria<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Phase Stability in Extreme Environments II — Nickel Alloy Phase Changes

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

**Program Organizers:** David Frazer, Idaho National Laboratory; Andrew Hoffman, GE Research; Kinga Unocic, Oak Ridge National Laboratory; Janelle Wharry, Purdue University; Kaila Bertsch, Lawrence Livermore National Laboratory; Raul Rebak, GE Global Research; Tianyi Chen, Oregon State University; Marie Romedenne, Oak Ridge National Laboratory

**Wednesday PM | March 6, 2024**

**Bayhill 18 | Hyatt**

**Session Chair:** Kinga Unocic, ORNL

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**2:00 PM**

**A Phase-field-informed Micromechanical Modeling at the Dendritic Scale to Evaluate the Performance of Ni-based Single-crystal Superalloys:** Jean-Briac le Graverend<sup>1</sup>; *Jose Dominic*<sup>1</sup>; <sup>1</sup>Texas A&M University

**2:20 PM**

**Effect of Surface Orientation on the Oxidation of Ni-based Single-crystal Superalloys Using Ab Initio Simulations:** *Aidan O'Donnell*<sup>1</sup>; Jean Briac Le-Graverend<sup>1</sup>; Tahir Cagin<sup>1</sup>; <sup>1</sup>Texas A&M University

**2:40 PM**

**Effects of Microstructural Variance on Edge Dislocation Mobility and Pinning in Nickel Superalloys at High Temperatures:** *Lukas Metzger*<sup>1</sup>; Stephen Taller<sup>2</sup>; <sup>1</sup>Virginia Tech, Nuclear Materials and Fuel Cycle Center; <sup>2</sup>Oak Ridge National Laboratory

**3:00 PM**

**Phase-field-informed Crystal-plasticity Modeling of 3D ' Rafting in Ni-based Single-crystal Superalloys:** *Jean-Briac le Graverend*<sup>1</sup>; Aidan O'Donnell<sup>1</sup>; <sup>1</sup>Texas A&M University

**3:20 PM Break**

**3:40 PM**

**Precipitate Evolution and Stability in Superalloy 718 Following HFIR Irradiation or Thermal Aging:** *Stephen Taller*<sup>1</sup>; Jesse Werden<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**4:00 PM**

**Frictional Ignition of Dispersion-strengthened Ni-base Superalloys in High Pressure Oxygen Environments:** *Zachary Cordero*<sup>1</sup>; Andres Garcia-Jimenez<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**4:20 PM**

**The Effect of Alloying Elements and Atmosphere on the Oxidation of NiCr Model Alloys:** *Juho Lehmusto*<sup>1</sup>; Marie Romedenne<sup>2</sup>; Rishi Pillai<sup>2</sup>; Bruce Pint<sup>2</sup>; <sup>1</sup>Abo Akademi University; <sup>2</sup>Oak Ridge National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

## Phase Transformations and Microstructural Evolution — Other Non-Ferrous

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Wednesday PM | March 6, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Adriana Eres-Castellanos, Colorado School of Mines

### 2:00 PM Invited

**Leveraging Plastic Deformation to Optimize Solute Clustering and Intermetallic Nucleation in Magnesium Alloys for Biodegradable Implant Applications:** Sreenivas Raguraman<sup>1</sup>; Zehao Li<sup>2</sup>; Suhas Prameela<sup>3</sup>; Vicente Munizaga<sup>1</sup>; Taisuke Sasaki<sup>2</sup>; Adam Griebel<sup>4</sup>; Michael Falk<sup>1</sup>; *Timothy Weihs*<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>National Institute for Materials Science; <sup>3</sup>Massachusetts Institute of Technology; <sup>4</sup>Fort Wayne Metals

### 2:30 PM

**Using Zentropy to Predict Phase Transitions in PbTiO<sub>3</sub>:** *Nigel Hew*<sup>1</sup>; Shun-Li Shang<sup>1</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Penn State University

### 2:50 PM

**Phase-field Simulation of Microstructure Development in Nonplanar Thin Films for Nanoelectronics Applications:** Hwanwook Lee<sup>1</sup>; Jungin Park<sup>1</sup>; Hassaan Ali<sup>1</sup>; *Yongwoo Kwon*<sup>1</sup>; <sup>1</sup>Hongik University

### 3:10 PM

**Investigation of Phase Transformations in Compositionally Gradient Ti-X Alloys:** *Deepak Pillai*<sup>1</sup>; Sydney Fields<sup>1</sup>; Dian Li<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas

### 3:30 PM Break

### 3:50 PM Invited

**Role of Aluminum Rejection from Isothermal Precipitates on the Formation of Precipitates in the Metastable -titanium Alloy Ti-10V-2Fe-3Al:** *Srinivas Aditya Mantri*<sup>1</sup>; Sriswaroop Dasari<sup>2</sup>; Abhishek Sharma<sup>3</sup>; Yufeng Zheng<sup>4</sup>; Hamish Fraser<sup>5</sup>; Rajarshi Banerjee<sup>3</sup>; <sup>1</sup>Argonne National Lab; <sup>2</sup>Idaho National Lab; <sup>3</sup>University of North Texas; <sup>4</sup>University of Nevada, Reno; <sup>5</sup>The Ohio State University

### 4:20 PM

**Phase Field Simulations of Thermal Aging of Energetic Materials Thin Films:** *Andrew Pham*<sup>1</sup>; Joseph Monti<sup>2</sup>; Remi Dingreville<sup>2</sup>; David Damm<sup>2</sup>; Marisol Koslowski<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Sandia National Laboratories

### 4:40 PM

**Phase Transformations in Entropy Stabilized Oxides Controlled by Defect Chemistry:** *Jacob Norman*<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>UCI; <sup>2</sup>University of Connecticut

### 5:00 PM

**Multiphase Coatings for Environments with Multiple Degradation Mechanisms:** *Luis Granadillo*<sup>1</sup>; Ian McCue<sup>1</sup>; <sup>1</sup>Northwestern University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics IV - Devices

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

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

**Wednesday PM | March 6, 2024**  
Orlando L | Hyatt

**Session Chairs:** Roberto Aga, KBR; David Estrada, Boise State University

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#### 2:00 PM Invited

**An Alternative Processing Concept for Printed Strain Sensor with Enhanced Sensitivity:** Roberto Aga<sup>1</sup>; Fahima Ouchen<sup>1</sup>; Rachel Aga<sup>2</sup>; Emily Heckman<sup>3</sup>; Carrie Bartsch<sup>3</sup>; <sup>1</sup>KBR; <sup>2</sup>Wright State University; <sup>3</sup>AFRL

#### 2:25 PM Invited

**Laser-induced Graphene Microelectrodes: Toward One-step Fabrication of Implantable Flexible Devices:** Mostafa Bedewy<sup>1</sup>; <sup>1</sup>University of Pittsburgh

#### 2:50 PM Invited

**Printed Multifunctional Wearable E-Textiles from Water-based Silver Conductive Inks:** Changyong Cao<sup>1</sup>; <sup>1</sup>Case Western Reserve University

#### 3:15 PM Break

#### 3:35 PM Invited

**Advanced Materials and Manufacturing Processes for Transient Papertronics:** Seokheun Choi<sup>1</sup>; <sup>1</sup>Suny at Binghamton

#### 4:00 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>; Kesavan Srivilliputhur<sup>1</sup>; Andrew Lupini<sup>1</sup>; Fred List<sup>1</sup>; Burak Ozpineci<sup>1</sup>; Haynes James A.<sup>1</sup>; Kashif Nawaz<sup>1</sup>; Tolga Aytug<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 4:25 PM

**Enabling Eco-friendly and Sustainable Electronics by Dry Printing Technique:** Adib Taba<sup>1</sup>; Aarsh Patel<sup>1</sup>; Zabihollah Ahmadi<sup>1</sup>; Parvin Fathi-Hafshejani<sup>1</sup>; Shuai Shao<sup>1</sup>; Michael Hamilton<sup>1</sup>; Nima Shamsaei<sup>1</sup>; Masoud Mahjouri-Samani<sup>1</sup>; <sup>1</sup>Auburn University

#### 4:45 PM

**Additive Nanomanufacturing of 2D Materials on Rigid and Flexible Substrate:** Suman Jaiswal<sup>1</sup>; Zabihollah Ahmadi<sup>1</sup>; Aarsh Patel<sup>1</sup>; Masoud Mahjouri-Samani<sup>1</sup>; <sup>1</sup>Auburn University

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## MATERIALS SYNTHESIS AND PROCESSING

### Process Metallurgy and Environmental Engineering: An EPD Symposium in

## Honor of Takashi Nakamura — New Reactions and Processing

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

**Program Organizers:** Takanari Ouchi, University of Tokyo; Gerardo Alvear Flores, CaEng Associates; Etsuro Shibata, Tohoku University; Leandro Andres Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

**Wednesday PM | March 6, 2024**  
**Celebration 6 | Hyatt**

**Session Chairs:** Leandro Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

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### 2:00 PM Keynote

**Up-grade Recycling of Titanium and Its Alloys:** *Toru Okabe*<sup>1</sup>; Takanari Ouchi<sup>1</sup>; <sup>1</sup>University of Tokyo

### 2:30 PM

**Development of an Efficient Deoxidation Process for Off-grade Ti Sponge Using Mg Metal with Wire Mesh Strainer Type of Crucible:** Sung-Hun Park<sup>1</sup>; Hyeong-Jun Jeoung<sup>1</sup>; Tae-Hyuk Lee<sup>2</sup>; Ho-Sang Sohn<sup>3</sup>; *Jungshin Kang*<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources; <sup>3</sup>Kyungpook National University

### 2:50 PM Invited

**Electrolysis of Alkaline Iodide Solution for Hydrogen Production and Valuable Metal Recovery from E-waste:** *Yu-Ki Taninouchi*<sup>1</sup>; Hiroaki Nakano<sup>1</sup>; Tetsuya Uda<sup>2</sup>; <sup>1</sup>Kyushu University; <sup>2</sup>Kyoto University

### 3:10 PM

**Synthesis of a Reactive MgO Based on the MgSO<sub>4</sub> Reductive Decomposition for Aqueous Solutions Treatment:** *Eduardo Brocchi*<sup>1</sup>; Rodrigo Souza<sup>1</sup>; Bruno Muniz<sup>1</sup>; Julia Hernandez<sup>1</sup>; Iranildes Santos<sup>1</sup>; José de Campos<sup>1</sup>; <sup>1</sup>Pontifícia Universidade Católica do Rio de Janeiro

### 3:30 PM Break

### 3:50 PM Invited

**Mutual Separation of Rare Earth Elements by Hydrometallurgical Methods:** *Hirokazu Narita*<sup>1</sup>; Takeshi Ogata<sup>1</sup>; Mikiya Tanaka<sup>1</sup>; <sup>1</sup>National Institute of Advanced Industrial Science & Technology

### 4:10 PM Invited

**Synthesis of Scorodite from Iron(III) Oxide and As(V) Solution:** *Etsuro Shibata*<sup>1</sup>; Ken Adachi<sup>1</sup>; Atsushi Iizuka<sup>1</sup>; <sup>1</sup>Tohoku University

### 4:30 PM Invited

**Rare Earth Recycle Process by Molten Salt Electrolysis Using Alloy Diaphragms:** *Tetsuo Oishi*<sup>1</sup>; Miki Yaguchi<sup>1</sup>; Yumi Katasho<sup>1</sup>; Toshiyuki Nohira<sup>2</sup>; <sup>1</sup>Aist; <sup>2</sup>Kyoto University

### 4:50 PM Invited

**Impact of Bromine Flame Retarded Plastics on Allocation and Recovery of Cu in Pyrolysis of E-waste:** *Sylwia Oleszek*<sup>1</sup>; Shogo Kumagai<sup>2</sup>; Mariusz Grabda<sup>3</sup>; Etsuro Shibata<sup>2</sup>; Takashi Nakamura<sup>4</sup>; Toshiaki Yoshioka<sup>2</sup>; Masaki Takaoka<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Tohoku University; <sup>3</sup>Polish Academy of Sciences; <sup>4</sup>Fukuoka Research Commercialization Center for Recycle System

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## NUCLEAR MATERIALS

### Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Actinide Chemistry and Behavior II

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Wednesday PM | March 6, 2024**  
**Blue Spring II | Hyatt**

**Session Chair:** Rory Kennedy, GTSI - Idaho National Laboratory

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**2:00 PM**

**Real-time Process Monitoring: Supporting Advances in Nuclear Material Processing:** *Amanda Lines*<sup>1</sup>; Heather Felmy<sup>1</sup>; Hope Lackey<sup>1</sup>; Poki Tse<sup>1</sup>; Shirmir Branch<sup>1</sup>; Adan Schafer Medina<sup>1</sup>; Samuel Bryan<sup>1</sup>; <sup>1</sup>PNNL

**2:25 PM**

**In Situ and In Operando Approaches for Studying Actinide Oxidation Behavior with Near-atomic Scale Resolution:** *Elizabeth Kautz*<sup>1</sup>; Sten Lambeets<sup>2</sup>; Daniel Perea<sup>2</sup>; Daniel Schreiber<sup>2</sup>; Arun Devaraj<sup>2</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory

**2:50 PM**

**Irradiation Behavior Observed for Low-enriched Uranium Nuclear Fuels Tested in the Advanced Test Reactor:** *Dennis Keiser*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**3:15 PM Break**

**3:35 PM**

**Molten Salt Crystal Growth of Americium Containing Oxides and Fluorides:** *Hans-Conrad Zur Loye*<sup>1</sup>; Travis Deason<sup>1</sup>; Hunter Tisdale<sup>1</sup>; Adrian Hines<sup>1</sup>; Gregory Morrison<sup>1</sup>; Theodore Besmann<sup>1</sup>; Amir Mofrad<sup>1</sup>; Gary Was<sup>2</sup>; Kai Sun<sup>2</sup>; Jake Amoroso<sup>3</sup>; David DiPrete<sup>3</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>University of Michigan; <sup>3</sup>Savannah River National Laboratory

**4:00 PM**

**Developing Waste Forms for the Transuranic Elements:** *Travis Deason*<sup>1</sup>; Gregory Morrison<sup>1</sup>; Hunter Tisdale<sup>1</sup>; Amir Mofrad<sup>1</sup>; Jake Amoroso<sup>2</sup>; David DiPrete<sup>2</sup>; Theodore Besmann<sup>1</sup>; Gary Was<sup>3</sup>; Hans-Conrad Zur Loye<sup>1</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>Savannah River National Lab; <sup>3</sup>University of Michigan

**4:25 PM**

**Role of Electron and Phonon Interactions in the Thermal Conductivity of ZrN, ThN and UN:** *Linu Malakkal*<sup>1</sup>; Marat Khafizov<sup>2</sup>; David Hurley<sup>1</sup>; Chris Marianetti<sup>3</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Ohio State University; <sup>3</sup>Columbia University

**4:50 PM**

**Revisit Formation Energy of Native Defects in UO<sub>2</sub>: Spin-orbit Coupling and Magnetic Orderings:** *Shuxiang Zhou*<sup>1</sup>; Krzysztof Gofryk<sup>1</sup>; Chao Jiang<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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**MECHANICS OF MATERIALS**

## Structure-Property Relationships of Bulk Metallic Glasses — Novel Alloys, Processing, and Manufacturing Methods

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Wednesday PM | March 6, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chair:** Katharine Flores, Washington University in Saint Louis

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**2:00 PM Invited**

**Fabrication of Amorphous Metals In Space (FAMIS) NASA Flight Experiment:** *Douglas Hofmann*<sup>1</sup>; Punnathat Bordeenithikasem<sup>1</sup>; Scott Roberts<sup>1</sup>; Samad Firdosy<sup>1</sup>; <sup>1</sup>NASA Jet Propulsion Laboratory

**2:25 PM Invited**

**Development of Zr-based Metallic Glasses to Utilize Thermoplastic Forming Processes for Engineering Plastics:** W.H. Ryu<sup>1</sup>; K.J. Kim<sup>1</sup>; M.K. Kwak<sup>1</sup>; C.W. Ryu<sup>2</sup>; *Eun Soo Park*<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Hongik University

**2:50 PM Invited**

**Hierarchically Phase-separated Metallic Glass: An X-ray Diffraction Computed Nanotomography Study:** *Mihai Stoica*<sup>1</sup>; Baran Sarac<sup>2</sup>; Florian Spieckermann<sup>3</sup>; Jonathan Wright<sup>4</sup>; Christoph Gammer<sup>2</sup>; Junhee Han<sup>5</sup>; Petre Gostin<sup>6</sup>; Jurgen Eckert<sup>2</sup>; Jörg Löffler<sup>1</sup>; <sup>1</sup>Eth Zuerich; <sup>2</sup>Erich Schmid Institute of Materials Science, Austrian Academy of Sciences (ÖAW); <sup>3</sup>Montanuniversität Leoben; <sup>4</sup>European Synchrotron Radiation Facility (ESRF); <sup>5</sup>Korea Institute for Rare Metals (KIRAM), Korea Institute of Industrial Technology (KITECH); <sup>6</sup>Technical University of Denmark

**3:15 PM Break**

**3:35 PM**

**Controlling the Structure and Mechanical Properties of a Zr-based Bulk Metallic Glass via Laser Powder Bed Fusion:** *Jamie Kruzic*<sup>1</sup>; Bosong Li<sup>1</sup>; Vladislav Yakubov<sup>2</sup>; Keita Nomoto<sup>2</sup>; Simon Ringer<sup>2</sup>; Bernd Gludovatz<sup>1</sup>; Xiaopeng Li<sup>1</sup>; <sup>1</sup>University of New South Wales (UNSW Sydney); <sup>2</sup>The University of Sydney

**3:55 PM**

**Prediction, Synthesis, and Characterization of Refractory Metallic Glass Powders:** *Jerry Howard*<sup>1</sup>; Dev Chidambaram<sup>1</sup>; Leslie Mushongera<sup>1</sup>; Krista Carlson<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

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## MATERIALS SYNTHESIS AND PROCESSING

**Ultrafine-grained and Heterostructured Materials (UFGH XIII) — UFGH-Heterostructure, Nanolaminates, and Nanoparticles**

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

**Program Organizers:** Megumi Kawasaki, Oregon State University; Penghui Cao, University of California, Irvine; Mostafa Hassani, Cornell University; Rajib Kalsar, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Praveen Kumar, Indian Institute of Science; Dmytro Orlov, Lund University

**Wednesday PM | March 6, 2024**  
**Celebration 10 | Hyatt**

**Session Chairs:** Mostafa Hassani, Cornell University; Hiromi Miura, Toyohashi University of Technology

**2:00 PM Invited**

**Plastic Deformation Processing of Heterostructured Materials: An Overview:** *Yuntian Zhu*<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**2:30 PM**

**Mechanical Response and Microstructure Evolution of the Coarse-grained Matrix in Gradient Structure Cu Alloys:** *Xinkun Zhu*<sup>1</sup>; <sup>1</sup>Kunming University of Science and Technology

**2:50 PM**

**Microstructure and Mechanical Properties of Heterogeneous-nanostructured Duplex Stainless Steels:** *Hiromi Miura*<sup>1</sup>; Koji Koyama<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

**3:10 PM Invited**

**High-Temperature Deformation Behavior of a Harmonic Structure Designed CrMnFeCoNi Alloy:** *Kei Ameyama*<sup>1</sup>; Mie Kawabata<sup>1</sup>; Hiroshi Fujiwara<sup>1</sup>; Kazuo Isonishi<sup>1</sup>; <sup>1</sup>Ritsumeikan University

**3:40 PM Break**

**4:00 PM Invited**

**Severe Plastic Deformation of Metal Nanoparticles:** Jonathan Zimmerman<sup>1</sup>; Zhao Liang<sup>1</sup>; *Eugen Rabkin*<sup>1</sup>; <sup>1</sup>Technion – Israel Institute of Technology

**4:30 PM**

**Discerning Intragranular and Interfacial Plasticity in Cu/Nb Nanolaminates:** Xiaolong Ma<sup>1</sup>; Bharat Gwalani<sup>2</sup>; Jinhui Tao<sup>3</sup>; *Mert Efe*<sup>3</sup>; Matthew Olszta<sup>3</sup>; Thomas Nizolek<sup>4</sup>; John Carpenter<sup>4</sup>; Arun Devaraj<sup>3</sup>; Suveen Mathaudhu<sup>5</sup>; Aashish Rohatgi<sup>3</sup>; <sup>1</sup>City University of Hong Kong; <sup>2</sup>North Carolina State University; <sup>3</sup>Pacific Northwest National Laboratory; <sup>4</sup>Los Alamos National Laboratory; <sup>5</sup>Colorado School of Mines

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**2D Materials – Preparation, Properties, Modeling & Applications – Preparation, Properties, Modeling & Simulation 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; Ramana Chintalapalle, University of Texas at El Paso

**Thursday AM | March 7, 2024**  
**Celebration 16 | Hyatt**

**Session Chairs:** Farnaz Shakib, New Jersey Institute of Technology; Hesam Askari, University of Rochester

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**8:30 AM Introductory Comments**

**8:40 AM**

**Two-Dimensional Solution-processed Tungsten Diselenide's Response to Nitrogen Gas Flow:** *Ashique Zaman*<sup>1</sup>; Thomas Mather<sup>1</sup>; Anupama B. Kaul<sup>1</sup>; <sup>1</sup>University of North Texas

**9:00 AM Invited**

**Two Dimensional Ferroelectric-based Catalysts for Enhanced CO2 Reduction:** *Joshua Young*<sup>1</sup>; Mo Li<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

**9:20 AM**

**Uniaxial Strain-induced Stacking Order Change in Trilayer Graphene:** *Aditya Dey*<sup>1</sup>; Hesam Askari<sup>1</sup>; <sup>1</sup>University of Rochester

**9:40 AM**

**Synthesis and Characterization of 2D WSe2 and Triple Cation Perovskite Based Photoabsorbers:** *Silvino Bastos*<sup>1</sup>; Sujan Aryal<sup>1</sup>; Anupama Kaul<sup>1</sup>; <sup>1</sup>University of North Texas

**10:00 AM Break**

**10:20 AM Invited**

**Computational Search for van der Waals Layered Group-IV Monochalcogenides:** *Cristian Ciobanu*<sup>1</sup>; Sri Likith<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**10:40 AM Invited**

**Controlling the Growth of Wafer-scale 2D Materials: A Computational Framework for MOCVD Synthesis:** *Kasra Momeni*<sup>1</sup>; Yanzhou Ji<sup>2</sup>; Nuruzzaman Sakib<sup>1</sup>; Shiddartha Paul<sup>1</sup>; Tanushree Choudhury<sup>3</sup>; Adri van Duin<sup>3</sup>; Joan Redwing<sup>3</sup>; Long-Qing Chen<sup>3</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Ohio State University; <sup>3</sup>Pennsylvania State University

**11:00 AM Invited**

**Electro-chemo-mechanics of Two-dimensional Materials-based Energy Storage Systems:** Dibakar Datta<sup>1</sup>; *Rumana Hasan*<sup>1</sup>; <sup>1</sup>New Jersey Institute of Technology

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**NUCLEAR MATERIALS**

**Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Accident Tolerant Fuel and Cladding**



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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Thursday AM | March 7, 2024**  
**Blue Spring I | Hyatt**

**Session Chairs:** Michael Cooper, Los Alamos National Laboratory; Tianyi Chen, Oregon State University

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**8:30 AM Invited**

**Accelerated Nuclear Materials Qualification and the Swedish SUNRISE Programme:** *Par Olsson*<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**9:00 AM**

**Perspectives on the Pesky Problem of Post-Irradiation Hardening in Wrought FeCrAl Alloys:** *Caleb Massey*<sup>1</sup>; Ben Garrison<sup>1</sup>; Annabelle Le Coq<sup>1</sup>; Yukinori Yamamoto<sup>1</sup>; Jason Harp<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:20 AM**

**Microstructure, Mechanical Properties, and Performance of Cold Spray Cr Coatings on Zr-alloy Fuel Cladding:** *Tyler Dabney*<sup>1</sup>; Hwasung Yeom<sup>1</sup>; Benjamin Maier<sup>2</sup>; Jorie Walters<sup>2</sup>; K. Sasidhar<sup>1</sup>; Ben Eftink<sup>3</sup>; Nan Li<sup>3</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Westinghouse Electric Company; <sup>3</sup>Los Alamos National Laboratory

**9:40 AM**

**In-situ Characterization of FeCrAl Claddings Under Simulated LOCA Conditions:** *Samuel Bell*<sup>1</sup>; Mackenzie Ridley<sup>1</sup>; David Hoesler<sup>1</sup>; Nathan Capps<sup>1</sup>; Caleb Massey<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:00 AM**

**Enhanced Properties of CrAl Coated ATF Cladding:** *Sung Eun Kim*<sup>1</sup>; Dae Ho Kim<sup>1</sup>; Jong Dae Hong<sup>1</sup>; Hong Ryoul Hong<sup>1</sup>; Hyun-gil Kim<sup>1</sup>; <sup>1</sup>Korea Atomic Energy Research Institute

**10:20 AM Break**

**10:35 AM Invited**

**Advancing Silicon Carbide Composite Modeling Within the Accelerated Fuel Qualification Framework:** *George Jacobsen*<sup>1</sup>; Chris Ellis<sup>1</sup>; Joel Kosmatka<sup>1</sup>; Herbert Shatoff<sup>1</sup>; Kevin Spilker<sup>2</sup>; Gyanender Singh<sup>3</sup>; <sup>1</sup>General Atomics Electromagnetic Systems; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Idaho National Laboratory

**11:05 AM**

**Two-step Upscaling for the Response of Ceramic Based Composites in Nuclear Reactors:** *Kevin Spilker*<sup>1</sup>; Laurent Capolungo<sup>1</sup>; Ricardo Lebensohn<sup>1</sup>; George Jacobsen<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>General Atomics

**11:25 AM**

**High Temperature Ring-pull Mechanical Tests of Thin-walled Tube:** *Benjamin Eftink*<sup>1</sup>; Peter Beck<sup>1</sup>; Mathew Hayne<sup>1</sup>; Tyler Dabney<sup>2</sup>; Carl Cady<sup>1</sup>; Tarik Saleh<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>University of Wisconsin Madison

11:45 AM

**An Approach for In-situ Loading and Corrosion Testing of Accident Tolerant Fuel Cladding:** *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, Department of Nuclear Engineering and Radiological Sciences

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Hard and Soft Magnets

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

Thursday AM | March 7, 2024  
Bayhill 22 | Hyatt

**Session Chair:** Andrew Kustas, Sandia National Laboratories

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8:30 AM Invited

**Hard Magnetic 3D Objects fabricated by Extrusion- and Stereolithography-based Additive Manufacturing:** *Ester Palmero*<sup>1</sup>; Zaida Curbelo-Cano<sup>1</sup>; Claire Frank<sup>1</sup>; Cristina M. Montero<sup>1</sup>; Javier de Vicente<sup>1</sup>; Alberto Bollero<sup>1</sup>; <sup>1</sup>IMDEA Nanociencia

9:00 AM

**Fabrication of Highly Textured Galfenol Using Laser Powder Bed Fusion:** *Alexander Baker*<sup>1</sup>; Alfred Amon<sup>1</sup>; Jibril Shittu<sup>1</sup>; Hunter Henderson<sup>1</sup>; Emily Moore<sup>1</sup>; Aurelien Perron<sup>1</sup>; Scott McCall<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

9:20 AM Invited

**High Magnetization FeCo Alloy Nanoparticles for the Fabrication of Intelligent Magnetorheological Fluids:** *Jon Gutierrez*<sup>1</sup>; Virginia Vadillo<sup>2</sup>; Maite Insausti<sup>1</sup>; <sup>1</sup>University of the Basque Country UPV/EHU; <sup>2</sup>BCMaterials

9:50 AM Break

10:10 AM Invited

**Additive Manufacturing of Soft Magnetoactive Composites:** *Carmen Tubio*<sup>1</sup>; Josu Maestu<sup>1</sup>; Ander Garcia<sup>1</sup>; Jon Etxebarria<sup>2</sup>; Senentxu Lanceros-Mendez<sup>1</sup>; <sup>1</sup>Fundación BCMaterials - Basque Center for Materials, Application and Nanostruct; <sup>2</sup>University of the Basque Country UPV/EHU

10:40 AM

**Influence of Energy Density on the Microstructure, and Growth Orientation of Additively Manufactured Fe-6.5wt%Si Transformer Steels:** *SaiSree Varahabhatla*<sup>1</sup>; Abhishek Sharma<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Srinivas Aditya Mantri<sup>1</sup>; Varun Chaudhary<sup>2</sup>; Raju Ramanujan<sup>3</sup>; Narendra Dahotre<sup>1</sup>; Raj Banerjee<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Chalmers University of Technology; <sup>3</sup>Nanyang Technological University

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning — Experimental Techniques

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**Thursday AM | March 7, 2024**  
**Orlando N | Hyatt**

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center; Jing Zhang, Indiana University-Purdue University Indianapolis

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**8:30 AM**

**Application of Computer Vision to Mapping of Process Parameters to Material Structure of AM Carbon Fiber Composites:** *Kenneth Clarke*<sup>1</sup>; Michael Groeber<sup>1</sup>; John Wertz<sup>2</sup>; Michael Chapman<sup>2</sup>; Andrew Abbott<sup>2</sup>; Roneisha Haney<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Air Force Research Lab

**8:50 AM**

**Analyzing Debinding and Carbide Pickup for Quality Control of Binder Jet Printed SS 316L Using Computer Vision:** *Pooja Maurya*<sup>1</sup>; P.Chris Pistorius<sup>1</sup>; Alex Gaudio<sup>1</sup>; Asim Smailagic<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**9:10 AM**

**On Predicting the Fatigue Behavior of Direct Aged L-PBF IN718 Using Machine Learning Informed by XCT and EBSD:** *Alexander Caputo*<sup>1</sup>; Chaitanya Vallabh<sup>2</sup>; Haolin Zhang<sup>3</sup>; Xiayun Zhao<sup>3</sup>; Richard Neu<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Steven's Institute of Technology; <sup>3</sup>University of Pittsburgh

**9:30 AM**

**In-situ Monitoring and Numerical Simulation of Shrinkage during Sintering in Metal Binder Jetted Parts:** Mohammad Jamalkhani<sup>1</sup>; Zhifang Deng<sup>2</sup>; Iman Dashtgerd<sup>1</sup>; *Amir Mostafaei*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology; <sup>2</sup>The University of Texas at Dallas

**9:50 AM Break**

**10:10 AM**

**Defect Detection in Laser Powder Bed Fusion Using In-situ Layer-wise Optical Imaging:** *Sanam Gorgannejad*<sup>1</sup>; Wanda Wang<sup>1</sup>; Gabe Guss<sup>1</sup>; Steven Hoover<sup>1</sup>; Justin Patridge<sup>1</sup>; Nicholas Calta<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**10:30 AM**

**Orthogonal Cutting of Wire Arc Additively Manufactured Steel and the Role of Microstructure:** *Jason Mayeur*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:50 AM**

**Computational Modeling and Experimental Investigation of Additively Manufactured Fused Deposition Modeling Samples with In-Built Porosity:** *Mosa Almutahhar*<sup>1</sup>; Khaled Al-Athel<sup>1</sup>; Jafar Albinmousa<sup>1</sup>; Usman Ali<sup>1</sup>; <sup>1</sup>King Fahd University of Petroleum & Minerals

**11:10 AM**

**Towards Adaptive Metal Additive Manufacturing: The Role of Modeling in Real-time Process Control:** *Dayalan Gunasegaram*<sup>1</sup>; <sup>1</sup>CSIRO

11:30 AM

**Efficient Process Control Model for Laser Powder Bed Fusion Using an Experimentally Validated Heat Source:** *Andrew Moore*<sup>1</sup>; Kyle Perkins<sup>1</sup>; Ioannis Bitharas<sup>1</sup>; <sup>1</sup>Heriot-Watt University

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — Synchrotron X-ray Diffraction: Static and Time-Resolved Studies**

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

Thursday AM | March 7, 2024  
Orlando M | Hyatt

**Session Chair:** Andrew Chuang, Argonne National Laboratory

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8:30 AM

**How Accurately Can One Determine Temperature and Heating/Cooling Rates from Time-resolved Synchrotron Diffraction Experiments during AM?:** Steve Gaudez<sup>1</sup>; Daniel Weisz-Patrault<sup>2</sup>; Kouider Abdellah Abdesselam<sup>2</sup>; Veijo Honkimäki<sup>3</sup>; Steven Van Petegem<sup>1</sup>; *Manas Upadhyay*<sup>2</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>Ecole Polytechnique, LMS, CNRS; <sup>3</sup>European Synchrotron Radiation Facility

8:50 AM

**Probing the Origin of Superelasticity in Metastable Beta Ti-Alloy Using In-situ Synchrotron Diffraction:** *Peter Ibrahim*<sup>1</sup>; *Peter Ibrahim*<sup>1</sup>; *Peter Ibrahim*<sup>1</sup>; *Peter Ibrahim*<sup>1</sup>; Konstantinos Liogas<sup>2</sup>; Richard Moat<sup>3</sup>; Alexander Korsunsky<sup>2</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Oxford University; <sup>3</sup>The Open University

9:10 AM

**Effect of Ultrasound Melt Treatment in Additive Manufacturing Environment: An In Situ Synchrotron X-ray Diffraction Analysis:** *Tianzhao Wang*<sup>1</sup>; Benjamin Schneiderman<sup>2</sup>; Samuel Clark<sup>3</sup>; Andrew Chuang<sup>3</sup>; Zhenzhen Yu<sup>2</sup>; Xun Liu<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Colorado School of Mines; <sup>3</sup>Advanced Photon Source, Argonne National Laboratory

9:30 AM

**Operando X-ray Diffraction Study on Phase Transformations in Carbon Steel during Powder Bed Fusion - Laser Beam:** *William Hearn*<sup>1</sup>; Sneha Goel<sup>1</sup>; Camille Puazon<sup>2</sup>; Abdul Shaafi Shaikh<sup>2</sup>; Eduard Hryha<sup>2</sup>; Steven Van Petegem<sup>1</sup>; <sup>1</sup>Paul Scherrer Institute; <sup>2</sup>Chalmers University of Technology

9:50 AM

**Uncovering the Effects of Nanoparticles on the Solidification Dynamics during Laser Melting of Metal by In-situ x-ray Diffraction:** *Junye Huang*<sup>1</sup>; Lianyi Chen<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

10:10 AM Break

10:25 AM

**Mapping Solidification Pathways in Fe-Ni-Cr Alloys for Additive Manufacturing with Time-Resolved Synchrotron X-ray Diffraction:** *Joseph Aroh*<sup>1</sup>; Seunghee Oh<sup>2</sup>; S. Thomas Britt<sup>3</sup>; Andrew Chuang<sup>4</sup>; P. Chris Pistorius<sup>3</sup>; Fan Zhang<sup>1</sup>; Anthony Rollett<sup>3</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>University of Michigan; <sup>3</sup>Carnegie Mellon University; <sup>4</sup>Argonne National Laboratory

10:45 AM

**Operando Characterization of Laser Powder Bed Fusion of Ti-6Al-4V and Ti-6Al-4V-3Fe via Synchrotron High-speed XRD:** *Ming Chen*<sup>1</sup>; Marco Simonelli<sup>2</sup>; Zhiyi Zou<sup>2</sup>; Steven Van Petegem<sup>1</sup>; Yau Yau Tse<sup>3</sup>; Dario Sanchez<sup>4</sup>; Helena Moens-Van Swygenhoven<sup>1</sup>; <sup>1</sup>Photons for Engineering and Manufacturing, Paul Scherrer Institut; <sup>2</sup>Centre for Additive Manufacturing, University of Nottingham; <sup>3</sup>Department of Materials, Loughborough University; <sup>4</sup>MicroXAS Beamline, Paul Scherrer Institut

11:05 AM

**Time-Resolved Investigation of Martensite Decomposition in Ti-6Al-4V Using In-Situ Synchrotron X-Ray Diffraction:** *Seunghee Oh*<sup>1</sup>; Joseph Aroh<sup>2</sup>; Andrew Chuang<sup>3</sup>; Nicholas Lamprinakos<sup>4</sup>; Ashley Bucsek<sup>1</sup>; Robert Suter<sup>4</sup>; Anthony Rollett<sup>4</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>National Institute of Standards and Technology; <sup>3</sup>Advanced Photon Source, ANL; <sup>4</sup>Carnegie Mellon University

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Length-Scale Phenomena in Mechanical Response – Mechanical Performance of Additively Manufactured Metals in Extreme Conditions and Complex Structure Design**

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

**Thursday AM | March 7, 2024**  
**Rainbow Spring II | Hyatt**

**Session Chairs:** Eda Aydogan, Middle East Technical University; Moataz Attallah, University of Birmingham

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8:30 AM Invited

**Unique Irradiation Responses of Additively Manufactured Steels:** *Lin Shao*<sup>1</sup>; <sup>1</sup>Texas A&M University

9:00 AM

**Creep Behavior of 316L Stainless Steel Fabricated by Electron Beam Powder-bed Fusion:** *Kwang-Hyeok Lim*<sup>1</sup>; Jong-Soo Bae<sup>1</sup>; Shubham Chandra<sup>2</sup>; Xipeng Tan<sup>3</sup>; Gi-Dong Sim<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology; <sup>2</sup>Nanyang Technological University; <sup>3</sup>National University of Singapore

9:20 AM

**High-Throughput Microstructure Design of Laser Powder Bed Fusion SS316L:** *Janith Wann*<sup>1</sup>; Dan Thoma<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison

**9:40 AM****Heterogeneous Micro-architected Cellular Materials: Mechanics, Design, and Applications:** *Bosco Yu*<sup>1</sup>; <sup>1</sup>University of Victoria**10:00 AM Break****10:20 AM****Design, Additive Manufacturing and Testing of Bio-inspired, Mechanically-Graded Interlocking Suture Composites:** *Tsai Yu-Tung*<sup>1</sup>; Ghimire Ashish<sup>1</sup>; Chen Po-Yu<sup>1</sup>; <sup>1</sup>NTHU**10:40 AM****Fabrication of Metal Matrix Composites Using Hybrid Additive Manufacturing:** *Amlan Kar*<sup>1</sup>; Todd Curtis<sup>1</sup>; Bharat Jasthi<sup>1</sup>; Wade Lein<sup>2</sup>; Zackery McClelland<sup>3</sup>; Grant Crawford<sup>1</sup>; <sup>1</sup>Arbegast Materials Processing and Joining Laboratory (AMP); <sup>2</sup>U.S. Army Corps of Engineers Cold Regions Research and Engineering Laboratory; <sup>3</sup>U.S. Army Engineer Research and Development Center**11:00 AM****Additive Manufacturing of a Strong, Deformable Al Alloy with Nanoprecipitates:** *Anyu Shang*<sup>1</sup>; Benjamin Stegman<sup>1</sup>; Kenyi Choy<sup>2</sup>; Pascal Bellon<sup>2</sup>; Haiyan Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>UIUC**11:20 AM****Microstructure and Heterogeneous Deformation Behavior of Functionally Integrated Materials (FIMs) Processed via Directed Energy Deposition (DED):** *Xin Wang*<sup>1</sup>; Baolong Zheng<sup>1</sup>; Brandon Fields<sup>1</sup>; Benjamin MacDonald<sup>1</sup>; Penghui Cao<sup>1</sup>; Lorenzo Vadelvit<sup>1</sup>; Enrique Lavernia<sup>1</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>University of California, Irvine

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**ADDITIVE MANUFACTURING****Additive Manufacturing: Process-induced Microstructures and Defects — Directed Energy Deposition and Nickel-based Alloys****Sponsored by:** TMS Structural Materials Division, TMS: Mechanical Behavior of Materials Committee, TMS: Additive Manufacturing Committee**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation**Thursday AM | March 7, 2024****Florida C | Hyatt****Session Chair:** Nadia Kouraytem, Utah State University

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**8:30 AM****Effect of Scan Strategy on Texture and Single-crystal Structure Formations in Laser Powder Bed Fusion of Pure Ni with a Flat-top Laser Beam:** *Tomonori Kitashima*<sup>1</sup>; Dennis Jodi<sup>2</sup>; Makoto Watanabe<sup>1</sup>; <sup>1</sup>National Institute for Materials Science; <sup>2</sup>Kyushu University**8:50 AM****Aiming the Susceptibility to Weld Solidification Cracking in Nickel-based Alloys Produced by Laser 3D Printing Processes:** *Jhoan Guzman*<sup>1</sup>; William Evans<sup>2</sup>; Eric Brizes<sup>3</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>NASA, Marshall Space Flight Center; <sup>3</sup>NASA, Glenn Research Center

**9:10 AM****In-situ Monitoring and Defect Detection of Direct Energy Deposition Process:** *Jiahui Zhang*<sup>1</sup>; *Xiao Shang*<sup>1</sup>; *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto**9:30 AM****Influence of Solidification Parameters on the Microstructure of Inconel 625 Processed by Direct Energy Deposition:** *Vijay Shankar Sridharan*<sup>1</sup>; *Siwei Du*<sup>2</sup>; *Shubham Chandra*<sup>3</sup>; *Varun Chaudhary*<sup>4</sup>; *Dong Zhili*<sup>1</sup>; <sup>1</sup>Nanyang Technological University; <sup>2</sup>Agency for Science, Technology and Research (A\*STAR), Advanced Remanufacturing and Technology Centre (ARTC); <sup>3</sup>Singapore Centre for 3D Printing; <sup>4</sup>Chalmers University of Technology**9:50 AM Break****10:10 AM****High-Temperature Mechanical and Oxidation Performance of Additive Friction Stir Deposited IN625:** *Shreyash Patil*<sup>1</sup>; *Madhavan Radhakrishnan*<sup>1</sup>; *V. Mani Krishna Karri*<sup>1</sup>; *Shashank Sharma*<sup>1</sup>; *Sameehan Joshi*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; *Narendra Dahotre*<sup>1</sup>; <sup>1</sup>University of North Texas, Denton**10:30 AM****Microstructure and Mechanical Effects of Inter-layer Machine Hammer Peening on Wire Arc Additively Manufactured Nickel Superalloys:** *James German*<sup>1</sup>; <sup>1</sup>Cranfield University**10:50 AM****Characterization of Ti-6Al-4V Microstructure Development in Laser Powder Bed Fusion with Preheat as a Variable Printing Parameter:** *Evan Adcock*<sup>1</sup>; *Anthony Rollett*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University**11:10 AM****Predicting the Unique Microstructures of Inoculated High Strength Aluminum Alloys Processed with Wire Arc Additive Manufacturing:** *Joe Kleindienst*<sup>1</sup>; *Nick Bagshaw*<sup>2</sup>; *Jeff Lints*<sup>2</sup>; *Jeremy Iten*<sup>3</sup>; *Dennis Harwig*<sup>4</sup>; *Jonah Klemm-Toole*<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Fortius Metals; <sup>3</sup>Elementum 3D; <sup>4</sup>Ohio State University

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**ADVANCED CHARACTERIZATION METHODS****Advanced Characterization Techniques for Quantifying and Modeling Deformation – Modelling****Sponsored by:** TMS Extraction and Processing Division, TMS: Materials Characterization Committee**Program Organizers:** *Mariyappan Arul Kumar*, Los Alamos National Laboratory; *Irene Beyerlein*, University of California, Santa Barbara; *Wolfgang Pantleon*, Technical University of Denmark; *C. Tasan*, Massachusetts Institute of Technology; *Olivia Jackson*, Sandia National Laboratory**Thursday AM | March 7, 2024  
Celebration 1 | Hyatt****Session Chairs:** *Joao Fonseca*, The University of Manchester; *Nithin Mathew*, Los Alamos National Laboratory**8:30 AM****An Integrated Simulation and Experimental Framework for Characterizing Deformation Mechanisms in Alloys:** *John Allison*<sup>1</sup>; <sup>1</sup>University of Michigan

**8:50 AM**

**Measuring and Modelling the Elastoplastic Transition at the Microstructural Scale:** *Joao Quinta da Fonseca*<sup>1</sup>; Michael Atkinson<sup>1</sup>; Dongchen Hu<sup>1</sup>; David Lunt<sup>2</sup>; Conghui Liu<sup>1</sup>; <sup>1</sup>University of Manchester; <sup>2</sup>UKAEA

**9:10 AM**

**Crystal Plasticity Investigation of Microstructural Thermo-mechanical Fatigue Damage Mechanisms under Various Phasing Profiles Leveraging High-energy X-ray Diffraction Microscopy:** *Brandon Mackey*<sup>1</sup>; Ritwik Bandyopadhyay<sup>2</sup>; Sven Gustafson<sup>3</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Indian Institute of Technology Delhi; <sup>3</sup>Cornell High Energy Synchrotron Source

**9:30 AM**

**Microstructure-sensitive Modeling of Grade-91 Alloy with Uncertainty Quantification:** *Jobin Joy*<sup>1</sup>; Anjana Talapatra<sup>1</sup>; Mariyappan Arul Kumar<sup>1</sup>; Laurent Capolungo<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

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

**Application of Machine Learning to Assess the Influence of Microstructure on Twin Nucleation in Mg Alloys:** Biaobiao Yang<sup>1</sup>; Valentin Vassilev-Galindo<sup>2</sup>; *Javier Llorca*<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute & Technical University of Madrid; <sup>2</sup>IMDEA Materials Institute

**10:30 AM**

**Insights into Dynamic Deformation via Virtual Diffractograms and Physics-informed Machine Learning:** *Avanish Mishra*<sup>1</sup>; Nithin Mathew<sup>1</sup>; Edward Kober<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:50 AM**

**Multimodal Characterization and Modeling of Additively Manufactured Alloys with Intentionally Seeded Pores:** *Krzysztof Stopka*<sup>1</sup>; Yixuan Sun<sup>1</sup>; Peter Kenesei<sup>2</sup>; Jun-Sang Park<sup>2</sup>; Jose Solano<sup>1</sup>; Andrew Desrosiers<sup>3</sup>; Amber Andreaco<sup>3</sup>; Guang Lin<sup>1</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Argonne National Laboratory; <sup>3</sup>GE Additive

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 – Energy Conversion and Storage Mix I

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

**Thursday AM | March 7, 2024**

**Celebration 13 | Hyatt**

**Session Chairs:** Ankit Verma, National Renewable Energy Laboratory; Eric Kazyak, University of Wisconsin - Madison

**8:30 AM Invited**

**Upcycling of Aged Graphite Anodes from End-of-Life Lithium-ion Batteries via Tailored Solvent Treatment:** *Ankit Verma*<sup>1</sup>; Maxwell Schulze<sup>1</sup>; Andrew Colclasure<sup>1</sup>; Kae Fink<sup>1</sup>; <sup>1</sup>National Renewable Energy Laboratory



**8:55 AM Invited**

**Synthesis and Design of Intercalation Electrodes through Data-enabled Workflows:** *Rachel Davidson*<sup>1</sup>; Justin Andrews<sup>2</sup>; Mark Pankow<sup>3</sup>; Paige Pearson<sup>4</sup>; Sarbajit Banerjee<sup>5</sup>; <sup>1</sup>University of Delaware; <sup>2</sup>Purdue University; <sup>3</sup>US National Reconnaissance Office; <sup>4</sup>UK Defense Science and Technology Laboratory; <sup>5</sup>Institute for Material Research, Tohoku University

**9:20 AM Keynote**

**The Impact of Interface Layer on Li Plating and Stripping Morphology:** *Yue Qi*<sup>1</sup>; <sup>1</sup>Brown University

**9:50 AM Invited**

**Understanding the Electro-chemo-mechanical Coupling and Implications for Solid-state Li-metal Batteries with Operando Microscopy:** *Eric Kazyak*<sup>1</sup>; <sup>1</sup>University of Wisconsin - Madison

**10:15 AM Break****10:30 AM**

**High Induction Soft Magnetic Materials Prepared by Continuous Ultra-rapid Annealing Method:** *Przemyslaw Zackiewicz*<sup>1</sup>; Aleksandra Kolano-Burian<sup>1</sup>; Marcin Karpinski<sup>1</sup>; Magdalena Steczkowska-Kempka<sup>1</sup>; Maciej Kowalczyk<sup>2</sup>; <sup>1</sup>Lukasiewicz Research Network - IMN; <sup>2</sup>Warsaw University of Technology

**10:50 AM**

**Incorporation of Metal Additives into LiNi<sub>0.8</sub>Mn<sub>0.1</sub>Co<sub>0.1</sub>O<sub>2</sub> Synthesized by Carbonate Co-precipitation:** *Valérie Charbonneau*<sup>1</sup>; David Nadeau<sup>1</sup>; François Larouche<sup>2</sup>; Kamyab Amouzegar<sup>2</sup>; Jocelyn Veilleux<sup>1</sup>; <sup>1</sup>Université de Sherbrooke; <sup>2</sup>Hydro-Québec

**11:10 AM**

**Multi-principal Element Alloy Hydrides:** *Prashant Singh*<sup>1</sup>; Weiyi Xia<sup>1</sup>; Gaoyuan Ouyang<sup>1</sup>; Tyler Del Rose<sup>1</sup>; Ihor Hlova<sup>1</sup>; Matthew J. Kramer<sup>1</sup>; Duane D. Johnson<sup>1</sup>; Cai-Zhuang Wang<sup>1</sup>; <sup>1</sup>Ames National Laboratory

**11:30 AM**

**Outstanding Performance of Hierarchical Ni-Mn Oxyhydroxide@NiMn Nanotubular Array Electrocatalysts for Water-splitting at Large Current Density:** *Harpreet Singh*<sup>1</sup>; Arpit Thomas<sup>1</sup>; <sup>1</sup>Shiv Nadar Institute of Eminence, Delhi NCR, India

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Advances in Magnetism and Magnetic Materials — Ab-initio, Micromagnetic, Machine Learning and Artificial Intelligence**

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

**Program Organizers:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

**Thursday AM | March 7, 2024**

**Bayhill 27 | Hyatt**

**Session Chair:** Durga Paudyal, Ames Laboratory

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**8:30 AM****Amorphous and Nanocrystalline Soft Magnetic Alloy Rapid Annealing via Laser Processing:** *Tyler Paplham*<sup>1</sup>; David Greve<sup>2</sup>; Jagannath Devkota<sup>3</sup>; Paul Ohodnicki<sup>1</sup>;<sup>1</sup>University of Pittsburgh; <sup>2</sup>Carnegie Mellon University; <sup>3</sup>National Energy Technology Laboratory**8:50 AM****Discovery of Novel Magnetic Fe-Co-Ni Alloys by Machine Learning and Combinatorial Experiments:** *Raju Ramanujan*<sup>1</sup>; Shakti Padhy<sup>1</sup>; Li Tan<sup>1</sup>; Varun Chaudhary<sup>2</sup>;<sup>1</sup>Nanyang Technological University; <sup>2</sup>Chalmers University of Technology**9:10 AM****Effect of Magnetic Disorder on Defect Properties in Nickel using Electronic Structure Calculations and Machine-learning Interatomic Potential:** *Didier Bathellier*<sup>1</sup>; Pär Olsson<sup>1</sup>;<sup>1</sup>KTH Royal Institute of Technology**9:30 AM****Physics-informed Machine Learning for Designing Novel Functional Magnetic Materials:** *Prashant Singh*<sup>1</sup>; Tyler Del Rose<sup>1</sup>; Andriy Palasyuk<sup>1</sup>; Yaroslav Mudryk<sup>1</sup>;<sup>1</sup>Ames National Laboratory**9:50 AM Break****10:05 AM****Predicting Emergent Behaviors at Finite Temperatures for Magnetic Materials by DFT-based Zentropy Theory:** *Shun-Li Shang*<sup>1</sup>; Nigel Hew<sup>1</sup>; Zi-Kui Liu<sup>1</sup>;<sup>1</sup>Pennsylvania State University**10:25 AM****Nanocrystalline Soft Magnetic Alloys for Extreme Temperature Applications:** *Lauren Wewer*<sup>1</sup>; Alex Leary<sup>2</sup>; Vladimir Keylin<sup>2</sup>; Ronald Noebe<sup>2</sup>; Kevin Byerly<sup>3</sup>; Sam Kernion<sup>3</sup>; Paul Ohodnicki<sup>1</sup>;<sup>1</sup>University of Pittsburgh; <sup>2</sup>NASA Glenn Research Center; <sup>3</sup>CorePower Magnetics

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**MECHANICS OF MATERIALS****Advances in Multi-Principal Element Alloys III: Mechanical Behavior — Alloy Design and Manufacturing****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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical**Thursday AM | March 7, 2024****Barrel Spring II | Hyatt****Session Chairs:** Hyoung Kim, Pohang University of Science and Technology; Wen Chen, University of Massachusetts-Amherst

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**8:30 AM****Combinatorial and High-throughput Methodology for MPEA Discovery and Design:** *Andre Bohn*<sup>1</sup>; Andrea Hodge<sup>1</sup>;<sup>1</sup>University of Southern California

**8:50 AM**

**Study on Corrosion Resistance of Aluminium-doped CoCrFeMnNi High Entropy Alloy:** Nur Izzati Muhammad Nadzir<sup>1</sup>; Nurlyana Izyan Mohd Ali<sup>1</sup>; Sudha Joseph<sup>2</sup>; Tea-Sung Jun<sup>3</sup>; Adam Rylski<sup>4</sup>; <sup>1</sup>Universiti Malaysia Perlis; <sup>2</sup>Cambridge Institute of Technology; <sup>3</sup>Incheon University; <sup>4</sup>Lodz University of Technology

**9:10 AM Invited**

**Electrodeposited Nanocrystalline High-entropy Alloys with High Strength and Thermal Stability:** Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

**9:30 AM Invited**

**Design and Testing of Castable Co-free Multi-principal Element Alloy for Extreme Environment Application Using Automated CALPHAD Approaches:** Zachary Sims<sup>1</sup>; Aurelien Perron<sup>2</sup>; Brandon Bocklund<sup>2</sup>; <sup>1</sup>University of Tennessee / Oak Ridge Innovation Institute; <sup>2</sup>Lawrence Livermore National Laboratory

**9:50 AM Invited**

**A Bayesian Approach to Explore Large Dimensional Compositionally Complex Alloy Spaces:** Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**10:10 AM Break****10:30 AM Invited**

**Orientation Dependence of the Effect of Short-range Ordering on the Plastic Deformation of a Medium Entropy Alloy:** Ibrahim Karaman<sup>1</sup>; Sezer Picak<sup>2</sup>; Daniel Salas<sup>1</sup>; Prasanth Singh<sup>3</sup>; Matheus Tunes<sup>4</sup>; Yuriy Chumlyakov<sup>5</sup>; Duane Johnson<sup>3</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Karabuk University; <sup>3</sup>DOE Ames National Laboratory; <sup>4</sup>Los Alamos National Laboratory; <sup>5</sup>Tomsk State University

**10:50 AM Invited**

**Refractory Alloys with Ru-based B2 Precipitation-strengthened Microstructures:** Sebastian Kube<sup>1</sup>; Carolina Frey<sup>1</sup>; Chiyo McMullin<sup>1</sup>; Ben Neuman<sup>1</sup>; Kaitlyn Mullin<sup>1</sup>; Tresa Pollock<sup>1</sup>; <sup>1</sup>University of California Santa Barbara

**11:10 AM Invited**

**Structure and Phase Characterizations of Refractory High-entropy Alloying Nanoparticles Synthesized Using Femtosecond Laser Ablation:** Anming Hu<sup>1</sup>; David Fieser<sup>1</sup>; John Whitlow<sup>1</sup>; Peter Liaw<sup>1</sup>; <sup>1</sup>University of Tennessee

**11:30 AM Invited**

**The Precipitated Strengthening of Eta Phase on the Non-equimolar CoCrNiTi Medium-entropy Alloys:** Ting-En Shen<sup>1</sup>; Hung-Chih Liu<sup>1</sup>; Shao-Lun Lu<sup>2</sup>; Hung-Wei Yen<sup>2</sup>; Jien-Wei Yeh<sup>1</sup>; Che-Wei Tsai<sup>1</sup>; <sup>1</sup>National Tsing Hua University; <sup>2</sup>National Taiwan University

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VI — Session II

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

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Arif Mubarak, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Venkataramana Gadhamshetty, South Dakota School of Mines & Technology

**Thursday AM | March 7, 2024**

**Celebration 9 | Hyatt**

### 8:30 AM Introductory Comments

8:35 AM

**Coating Development for High Temperature Dissolvable Rubber Element in Dissolvable Plug Applications:** *Jiaxiang Ren*<sup>1</sup>; Peng Cheng<sup>1</sup>; Lei Zhao<sup>1</sup>; Yu Liu<sup>1</sup>; Huailiang Liu<sup>1</sup>; Xuefeng Cui<sup>2</sup>; Bing Zhu<sup>2</sup>; Qingjiang Wang<sup>2</sup>; <sup>1</sup>CNPC-USA; <sup>2</sup>Daqing Oilfield Limited Company

8:55 AM

**Solvent-facing Charged Defect Screening and Compensation Through An Implicit Solvation Model:** Preston Vargas<sup>1</sup>; *Eric Fonseca*<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

9:15 AM

**Improving the Corrosion and Wear Behaviour of ECAP-processed Biodegradable Mg-Zn-Ca Alloy for Bone Repair Applications:** *Waleed El-Garaihy Nasr*<sup>1</sup>; Abdulrahman I. Alateyah<sup>1</sup>; Abdulrahman Alrumayh<sup>1</sup>; Amal BaQais<sup>2</sup>; Majed O. Alawad<sup>3</sup>; Mohamed El-Asfoury<sup>4</sup>; <sup>1</sup>Qassim University; <sup>2</sup>Princess Nourah bint Abdulrahman University; <sup>3</sup>King Abdulaziz City for Science and Technology; <sup>4</sup>Port-Said University

9:35 AM

**Enhanced Phosphatability by Decorating Ferrite Layer on the Surface of a Multi-phase Steel:** *Dong-Hyun Kim*<sup>1</sup>; Joonchul Park<sup>2</sup>; Jae-Dong Joe<sup>2</sup>; Yongghyun Jung<sup>2</sup>; Yonkyun Song<sup>2</sup>; Jae-Sang Lee<sup>1</sup>; Yoon-Uk Heo<sup>1</sup>; <sup>1</sup>Graduate Institute of Ferrous & Energy Materials Technology (GIFT), POSTECH; <sup>2</sup>POSCO R&D Center

9:55 AM Break

10:10 AM

**Effect of Heat Input on Corrosion Behavior of Fe-based Metallic Glass Composite Coatings:** *Md Akif Faridi*<sup>1</sup>; Tapas Laha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

10:30 AM

**Electrodeposition Preparation and Performance Enhancement Mechanisms for Ni-Co-Fe Coatings:** *Yizhe Du*<sup>1</sup>; Xuan Chen<sup>1</sup>; Zhenyu Sun<sup>1</sup>; Dengfu Chen<sup>1</sup>; <sup>1</sup>Chongqing University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session VII**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

Thursday AM | March 7, 2024  
Bayhill 32 | Hyatt

**8:30 AM**

**Uncertainty Quantification and Propagation in Modeling Hierarchy for Solidification of Metals and Alloys:** *Sepideh Kavousi*<sup>1</sup>; Mohsen Asle Zaeem<sup>1</sup>;  
<sup>1</sup>Colorado School of Mines

**8:50 AM**

**How Solid is Your Ground Truth? Interdisciplinary Application of Uncertainty Quantification to Experimental Indentation Testing:** Astrid Rodriguez Negrón<sup>1</sup>; *Aaron Tallman*<sup>1</sup>; <sup>1</sup>Florida International University

**9:10 AM**

**Natural Language Processing and Large Language Models for Automated Extraction of Materials Chemistry Data from Literature:** *Taylor Sparks*<sup>1</sup>; Sterling Baird<sup>2</sup>; Hasan Sayeed<sup>1</sup>; Ramsey Issa<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of Toronto

**9:30 AM**

**Towards Rapid Validation and Dynamic Standardisation of Advanced Manufactured Parts:** *Gareth Tear*<sup>1</sup>; Jose Videira<sup>1</sup>; James Bird<sup>1</sup>; <sup>1</sup>Synbiosys

**9:50 AM**

**Uncertainty Quantification for Accelerated Production of CHIMES ML Force-fields:** *Jared Stimac*<sup>1</sup>; Nir Goldman<sup>2</sup>; <sup>1</sup>Lawrence Livermore National Laboratory; <sup>2</sup>Lawrence Livermore National Laboratory

**10:10 AM Break**

**10:20 AM**

**A Dataset of CFD Simulated Industrial Furnace Images for Conditional Automatic Generation with GANs:** *Ricardo Calix*<sup>1</sup>; Orlando Ugarte Almeida<sup>1</sup>; Hong Wang<sup>2</sup>; Tyamo Okosun<sup>1</sup>; <sup>1</sup>Purdue University Northwest; <sup>2</sup>Oak Ridge National Laboratory

**10:40 AM**

**Data-Driven Modeling of Performance Degradation in Optoelectronic and Electronic Materials in a High Performance Computing Environment:** *Jarod Kaltenbaugh*<sup>1</sup>; Max Liggett<sup>1</sup>; Taylor Currie<sup>1</sup>; Matt Hoffman<sup>2</sup>; Ayorinde Olatunde<sup>2</sup>; Pawan Tripathi<sup>2</sup>; Dylan Colvin<sup>1</sup>; Mengjie Li<sup>1</sup>; Alp Sehirlioglu<sup>2</sup>; Roger French<sup>2</sup>; Kristopher Davis<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Case Western Reserve University

**11:00 AM**

**Research on the Model of Matching Inventory Plates with Order Contracts of Steel Enterprises:** *Chenghong Li*<sup>1</sup>; Mingmei Zhu<sup>1</sup>; Xianwu Zhang<sup>1</sup>; Kunchi Jiang<sup>1</sup>;  
<sup>1</sup>Chongqing University

**11:20 AM**

**Size Estimation of Sintered Alumina by Deep Learning:** *Kazuki Ueda*<sup>1</sup>; Yu Okano<sup>1</sup>; Kazuaki Takano<sup>1</sup>; Yoshishige Okuno<sup>1</sup>; <sup>1</sup>Resonac Corporation

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Algorithm Development in Materials Science and Engineering – Algorithm Development and Applications of AI/ML Deep Learning**

**Sponsored by:**

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

**Thursday AM | March 7, 2024**  
**Bayhill 28 | Hyatt**

**Session Chair:** Jeremy Mason, University of California, Davis

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**8:30 AM Invited**

**Deep Learning Approaches for Time-resolved Laser Absorptance Prediction in Additive Manufacturing:** Runbo Jiang<sup>1</sup>; *Anthony Rollett*<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**9:00 AM**

**Applications of Persistent Homology for Microstructure Quantification:** *Simon Mason*<sup>1</sup>; Stephen Niezgodá<sup>1</sup>; Dennis Dimiduk<sup>2</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Blue Quartz Software

**9:20 AM Invited**

**Exascale Simulations Using Ultra-fast Force Field for Materials Discovery and Design:** *Richard Hennig*<sup>1</sup>; Ajinkya Hire<sup>1</sup>; Jason Gibson<sup>1</sup>; Hendrik Kraß<sup>2</sup>; Ming Li<sup>1</sup>; Pawan Prakash<sup>1</sup>; Stephen Xie<sup>3</sup>; Matthias Rupp<sup>4</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Universität Konstanz; <sup>3</sup>NASA Ames; <sup>4</sup>Luxembourg Institute of Science and Technology

**9:50 AM**

**Developing Data-driven Strength Models Incorporating Temperature and Strain-rate Dependence:** *Nicole Aragon*<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Corbett Battaile<sup>1</sup>; Hojun Lim<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**10:10 AM Break****10:30 AM Invited**

**A Digital Thread for Field Assisted Sintering of Titanium Components:** *Lucia Scotti*<sup>1</sup>; Hector Basoalto-Ibarra<sup>1</sup>; Prashant Jadhav<sup>1</sup>; Hugh Banes<sup>1</sup>; James Pepper<sup>1</sup>; Magnus Anderson<sup>2</sup>; Samuel Lister<sup>1</sup>; Martin Jackson<sup>1</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>Thermo-Calc Software

**11:00 AM**

**Predicting and Designing the Thermo-elasto-plastic Response of Composites Using Deep Material Network:** *Remi Dingreville*<sup>1</sup>; Dongil Shin<sup>1</sup>; Ryan Alberdi<sup>1</sup>; Ricardo Lebensohn<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>Los Alamos National Laboratory

**11:20 AM**

**A Computationally Efficient Method to Address the Gap Between Dilute and Concentrated Calculations:** Pang-Yu Liu<sup>1</sup>; Yi-Sheng Chen<sup>1</sup>; Julie Cairney<sup>1</sup>; *Patrick Burr*<sup>2</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>The University of New South Wales

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Alloys and Compounds for Thermoelectric and Solar Cell Applications XII — Session IV**

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

**Thursday AM | March 7, 2024**  
**Bayhill 26 | Hyatt**

**Session Chairs:** Jen-Hsun Weng, National Yang Ming Chiao Tung University; Wen-Ching Wu, National Yang Ming Chiao Tung University

**8:30 AM Invited**

**Effect of Electrode Materials on the Property of  $\text{Bi}_2\text{Te}_3$  and  $\text{Sb}_2\text{Te}_3$  Thin Film Module:** *Albert T. Wu*<sup>1</sup>; Kai-Wen Cheng<sup>1</sup>; Zhen-Wei Sun<sup>1</sup>; <sup>1</sup>National Central University

**8:50 AM**

**All Metal TE Devices Utilizing Mid-entropy Diffusion Barrier:** *Wen-Ching Wu*<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**9:10 AM**

**Process Development of Flexible Thermoelectric Modules Based on Printing and Sintering Technology:** *Lu-Cheng Hou*<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**9:30 AM**

**Co/Bi<sub>2</sub>Te<sub>3</sub> Interfacial Reactions and Co-Bi-Te Phase Equilibria:** *Cheng-Hsi Ho*<sup>1</sup>; Jia-Ruei Chang<sup>1</sup>; He-Cheng Yang<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**9:50 AM Break**

**10:10 AM**

**Self-encapsulated Flexible Thermoelectrics for Curved and Moistened Heat Sources:** *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

**10:30 AM Invited**

**Synthesis and Thermoelectric Properties of Bulk Tellurene: The 2D Form of Tellurium:** Zhenyu Pan<sup>1</sup>; Xinbo Zhang<sup>1</sup>; Yuanbing Mao<sup>1</sup>; *Heng Wang*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

**10:50 AM Invited**

**Laser-based Additive Manufacturing as a Mean to Create Tunable Thermoelectric Devices:** *Saniya Leblanc*<sup>1</sup>; Yahya Oztan<sup>1</sup>; Joy Gockel<sup>2</sup>; <sup>1</sup>George Washington University; <sup>2</sup>Colorado School of Mines

## LIGHT METALS

### Aluminum Reduction Technology — Environmental / Cathodes and Lining Design

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

**Program Organizers:** Nabeel Aljallabi, Aluminium Bahrain Bsc; Samuel Wagstaff, Oculatus Consulting

**Thursday AM | March 7, 2024**  
**Celebration 15 | Hyatt**

**Session Chairs:** Laurent Fiot, Rio Tinto Aluminium; Stephan Broek, Kensington Technology Inc

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### 8:30 AM

**Low Carbon Emission Technology Upgrading Industrial Pilot of 350kA Pots:** Tiejun Wang<sup>1</sup>; Yafeng Liu<sup>2</sup>; Guijun Ge<sup>1</sup>; *Shimin Qu*<sup>3</sup>; Mingzhu Zhou<sup>3</sup>; Hailong Liu<sup>1</sup>; Wei Zhu<sup>3</sup>; Yuanbing Zhu<sup>1</sup>; Hongwu Hu<sup>2</sup>; Xi Cao<sup>2</sup>; Michael Ren<sup>4</sup>; <sup>1</sup>SPIC Nei Mongol Energy Co.Ltd.; <sup>2</sup>Shenyang Aluminum and Magnesium Engineering and Research Institute Co.Ltd.; <sup>3</sup>Inner Mongolia Huomeihongjun Aluminium & Electricity Co. Ltd.; <sup>4</sup>Sunlightmetal Consulting Inc.

### 8:55 AM

**MHD Stability of Aluminium Cells - Cathode Design Effects:** Valdis Bojarevics<sup>1</sup>; Marc Dupuis<sup>2</sup>; <sup>1</sup>Greenwich University; <sup>2</sup>GeniSim Inc.

### 9:20 AM

**Modeling and Design of the Cathode Block Assembly Using Different Types of Models:** Marc Dupuis<sup>1</sup>; Liao Xianan<sup>2</sup>; Nyah Ren<sup>3</sup>; <sup>1</sup>GeniSim Inc.; <sup>2</sup>XLIAO Consulting Inc; <sup>3</sup>Elkem Carbon

### 9:45 AM

**Cathode Inspection and Repair Procedure Improvements in ALBRAS:** Ana Guedes<sup>1</sup>; Marvin Bugge<sup>2</sup>; Michel Pena<sup>1</sup>; Marcio Souza<sup>1</sup>; Ana Nunes<sup>1</sup>; Adalberto Pastana<sup>1</sup>; <sup>1</sup>ALBRAS; <sup>2</sup>Hydro

### 10:10 AM Break

### 10:25 AM

**Combining New and Old Cathode Block Assembly to Increase the Lifetime of Pot at INALUM:** Kukuh Yudiarto<sup>1</sup>; Rainaldy Harahap<sup>1</sup>; Ade Buandra<sup>1</sup>; Ari Purwanto<sup>1</sup>; Ferdy Rahadian<sup>1</sup>; <sup>1</sup>PT. Indonesia Asahan Aluminium (INALUM)

### 10:50 AM

**Design and Trial of Electrical Collector Plate in Cathode Assemblies:** Guorong Cao<sup>1</sup>; Hao Zhang<sup>1</sup>; <sup>1</sup>Rio Tinto Aluminium

### 11:15 AM

**Determination of the Air-gap Distribution at the Cast Iron to Carbon Cathode Interface Using a 3D Scanning Approach:** Omolbanin Saeidi<sup>1</sup>; *Simon-Olivier Tremblay*<sup>1</sup>; Daniel Marceau<sup>1</sup>; Antoine Godefroy<sup>2</sup>; Sébastien Charest<sup>2</sup>; <sup>1</sup>University of Quebec at Chicoutimi; <sup>2</sup>Aluminerie Alouette Inc

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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; Po-Yu Chen, National Tsing Hua University; Terry Lowe, Colorado School of Mines

Thursday AM | March 7, 2024

Celebration 12 | Hyatt

**Session Chairs:** Kalpana Katti, North Dakota State University; Krishna Kundu, North Dakota State University

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**8:30 AM Keynote**

**Matrix Assisted Pulsed Laser Evaporation for Layer-by-Layer Processing of Thin Films for Biomedical Applications:** *Roger Narayan*<sup>1</sup>; <sup>1</sup>University of North Carolina

**9:00 AM Invited**

**Architected Interfaces in Biological Systems that Mitigate Failure:** *David Kisailus*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**9:30 AM Invited**

**Interpenetrating Polymer Network as Interface Material in Bioinspired Composites:** *Hortense Le Ferrand*<sup>1</sup>; <sup>1</sup>Nanyang Technological University

**10:00 AM Break****10:15 AM Invited**

**Enamel Formation: Bioinspired Interfacial Design:** *Malcolm Snead*<sup>1</sup>; <sup>1</sup>University of Southern California

**10:45 AM Invited**

**Molecular Insights Into Mineral Nanoparticle Interactions With Proteins:** *Vadim Kessler*<sup>1</sup>; <sup>1</sup>Swedish University of Agricultural Sciences

**11:15 AM**

**Effect of Ice Nucleation Proteins on the Structure-property Relationships of Ice: A Combined Simulation and Experimental Approach:** *Ali Shargh*<sup>1</sup>; Christopher Stiles<sup>2</sup>; K. Salerno<sup>2</sup>; Thomas Arbaugh<sup>2</sup>; Jaafar El-Awady<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory

**11:45 AM Invited**

**A Nanoscale Perspective on Charge Carrier Transport in Melanin Biopigments for Sustainable Electronics:** *Clara Santato*<sup>1</sup>; <sup>1</sup>Ecole Polytechnique Montreal

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**NUCLEAR MATERIALS**

**Ceramics and Ceramic-based Composites for Nuclear Fission Applications — TRISO and Graphite**

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

**Program Organizers:** Dong Liu, University of Oxford; Assel Aitkaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory; Konstantina Lambrinou, University of Huddersfield; Cynthia Adkins, Idaho National Laboratory; Scarlett Widgeon Paisner, Los Alamos National Laboratory

**Thursday AM | March 7, 2024**

**Rainbow Spring I | Hyatt**

**Session Chairs:** Dong (Lilly) Liu, University of Bristol; Anne Campbell, Oak Ridge National Laboratory

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**8:30 AM**

**Next Steps in TRISO Fuel Technology Development:** *Tyler Gerczak*<sup>1</sup>; Eddie Lopez-Honorato<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:10 AM**

**Multiphysics and Multiscale Modeling of the Mechanical Properties of the Porous Pyrocarbon Buffer Layer in TRISO Particle Fuel:** *Karim Ahmed*<sup>1</sup>; Merve Gencturk<sup>1</sup>;

Nicholas Faulkner<sup>1</sup>; Claire Griesbach<sup>2</sup>; Ramathasan 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

**9:30 AM**

**Aspects of Graphite Performance in Molten Salt:** *Raluca Scarlat*<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**10:10 AM Break**

**10:25 AM**

**Beryllium Carbide Tolerance to Radiation Damage for Advance Reactor Moderators:** *Diego Muzquiz*<sup>1</sup>; Stephen Raiman<sup>1</sup>; <sup>1</sup>University of Michigan Nuclear Engineering

**10:45 AM**

**Evaluating the Strength of TRISO Pebbles via Drop Tests and Nondestructive Techniques:** *Assel Aitkaliyeva*<sup>1</sup>; Mitchell Mika<sup>1</sup>; <sup>1</sup>University of Florida

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## ADVANCED CHARACTERIZATION METHODS

**Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies – 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; 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

**Thursday AM | March 7, 2024**  
**Celebration 2 | Hyatt**

**Session Chairs:** Jiann-Yang Hwang, Michigan Technological University; John S. Carpenter, DEVCOM ARL Army Research Office

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**8:30 AM**

**Used and Useful – The Importance of Refractory Post Mortem Studies:** *Dean Gregurek*<sup>1</sup>; Jürgen Schmidl<sup>1</sup>; <sup>1</sup>RHI Magnesita

**8:50 AM**

**Preparation of Boronized Ti6Al4V/HA Composites by Powder Sintering for Dental Applications: Effect of Mixing Method:** *Shangyong Zuo*<sup>1</sup>; Qian Peng<sup>1</sup>; Tong Zhang<sup>1</sup>; Ting Luo<sup>1</sup>; Yuehong Wang<sup>1</sup>; Zhiwei Peng<sup>1</sup>; <sup>1</sup>Central South University

**9:10 AM**

**Mechanical Properties and EMI-shielding Efficiencies of Graphite and Iron(II) Oxide-filled Polypropylene and Polyethylene Based Polymer Composites:** *Hulya Kaftelen Odabası*<sup>1</sup>; Elshod Haqberdiev<sup>2</sup>; Akin Odabaşı<sup>1</sup>; Selçuk Helhel<sup>3</sup>; <sup>1</sup>Firat University; <sup>2</sup>Institute of Polymer Chemistry and Physics Academy of Science of the Republic Uzbekistan; <sup>3</sup>Akdeniz University

**9:30 AM****Phosphoric Acid Leaching of Ni-Co-Fe Powder Derived From Limonitic Laterite Ore:** *Jing Chen*<sup>1</sup>; Ding Xu<sup>1</sup>; Zhongxiao Qin<sup>1</sup>; Meishi Hu<sup>1</sup>; Jun Luo<sup>1</sup>; Guanghui Li<sup>1</sup>; Tao Jiang<sup>1</sup>; Xin Zhang<sup>1</sup>; Zhiwei Peng<sup>1</sup>; Mingjun Rao<sup>1</sup>; <sup>1</sup>Central South University**9:50 AM****Preparation of Forsterite-spinel Refractory From MgO-rich Residue Derived From Ludwigite Ore:** *Jing Wang*<sup>1</sup>; Mingjun Rao<sup>1</sup>; Tao Xiao<sup>1</sup>; Jinxiang You<sup>1</sup>; Jun Luo<sup>1</sup>; Zhiwei Peng<sup>1</sup>; <sup>1</sup>Central South University**10:10 AM Break****10:25 AM****Chemically Bonded Phosphate Ceramics and Their Composites:** *Henry Colorado*<sup>1</sup>; Mery Cecilia Gomez Marroquin<sup>2</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>National University of Engineering**10:45 AM****Characterization and Modelling of Triply Periodic Minimum Surface (TPMS) Lattice Structures for Energy Absorption in Automotive Applications:** Nic Creswell<sup>1</sup>; Ali Ameri<sup>1</sup>; Jianshen Wang<sup>1</sup>; Hongxu Wang<sup>1</sup>; Paul Hazell<sup>1</sup>; *Juan Escobedo-Diaz*<sup>1</sup>; <sup>1</sup>University of New South Wales**11:05 AM****Advanced Characterization of the Local Topological and Chemical Order in Marginal Metallic Glasses:** *Yunus Kalay*<sup>1</sup>; Can Okuyucu<sup>1</sup>; Douhan Sariturk<sup>1</sup>; İlkey Kalay<sup>2</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Cankaya University**11:25 AM****Microwave-assisted Reduction Behaviors of Spent Cathode Material With Biochar:** *Zhongxiao Qin*<sup>1</sup>; Mingjun Rao<sup>1</sup>; Zhiwei Peng<sup>1</sup>; Guanghui Li<sup>1</sup>; <sup>1</sup>Central South University

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**MATERIALS SYNTHESIS AND PROCESSING****Composite Materials: Sustainable and Eco-Friendly Materials and Application – Eco Friendly and Sustainable Composite Materials: Building Materials and Construction****Sponsored by:** TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Composite Materials Committee, TMS: Materials Characterization Committee, TMS: Mechanical Behavior of Materials Committee**Program Organizers:** Brian Wisner, Ohio University; Ioannis Mastorakos, Clarkson University; Simona Hunyadi Murph, Savannah River National Laboratory; Muralidharan Paramsothy, NanoWorld Innovations (NWI)**Thursday AM | March 7, 2024****Celebration 4 | Hyatt****Session Chair:** Brian Wisner, Ohio University**8:30 AM****Influence of Car Glass Addition as a Replacement of Natural Aggregate on Mechanical and Thermal Properties of Concrete:** *Marcin Malek*<sup>1</sup>; <sup>1</sup>Military University of Technology, Faculty of Civil Engineering and Geodesy**8:50 AM****Multi-walled Carbon Nanotubes and Graphene Oxide Decorated Pitch-derived Carbon Foam Composites for Enhanced Structural and Catalytic Performances:**

Muhammad Khan<sup>1</sup>; Emrah Unalan<sup>1</sup>; <sup>1</sup>Middle East Technical University

**9:10 AM**

**New Circular, Sustainable Building Composite Material Made of Building Wastes:** *Mélanie Horvath*<sup>1</sup>; Pierre Bollen<sup>1</sup>; Sophie Trachte<sup>2</sup>; Thomas Pardoën<sup>1</sup>; <sup>1</sup>UCLouvain; <sup>2</sup>Université de Liège

**9:30 AM**

**Synthesis and Characterization of Superabsorbent Polymer Hydrogels Containing Silicate Precursors to Internally Cure and Strengthen Cement:** *Akul Seshadri*<sup>1</sup>; Kendra Erk<sup>1</sup>; John Howarter<sup>1</sup>; <sup>1</sup>Purdue University

**9:50 AM Break**

**10:10 AM**

**Development of Hard Coating Based in Eucalyptus Sawdust Waste in a Polymeric Composites:** Darcy da Rocha Oliveira<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**10:30 AM**

**Evaluation of Hard Polymeric Composites Coating Based in Granite Powder Waste:** Pedro Rabello Neves<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**10:50 AM**

**Inhibition Performance of Snail Shell Nanoparticle Extract as a Sustainable Ecofriendly Inhibitor for API 5L X65 Pipeline Steel Corrosion Towards Acid Activation Environment.:** *Alice Alao*<sup>1</sup>; Patricia Poopola<sup>1</sup>; Omotayo Sanni<sup>1</sup>; Modupeola Dada<sup>1</sup>; <sup>1</sup>Tshwane University of Technology

**11:10 AM**

**Development of Eco-friendly Composite for High-performance Flooring by Coffee Grounds Waste:** Bruna Nogueira Simões Cobuci<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Noan Tonini Simonassi<sup>1</sup>; Rubén Jesus Sánchez Rodríguez<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Solidification

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Touret, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Thursday AM | March 7, 2024**

**Bayhill 29 | Hyatt**

**Session Chairs:** Ian Winter, Sandia National Laboratories; Damien Touret, IMDEA Materials Institute

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**8:30 AM**

**Modeling and Simulation of Semi-solid Deformation Using Multi-phase-field Lattice Boltzmann Method:** *Tomohiro Takaki*<sup>1</sup>; Namito Yamanaka<sup>1</sup>; Shinmei Hayase<sup>1</sup>; Shinji Sakane<sup>1</sup>; <sup>1</sup>Kyoto Institute of Technology

**8:50 AM**

**Integration of X-ray Imaging and Phase-field Simulations for High-quality Evaluation of Solidification Microstructure Evolution:** *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

**9:10 AM**

**Atomistic Simulations of the Effect of Alloying on Solid/Liquid Interfacial Free Energies:** *Ian Winter*<sup>1</sup>; Michael Chandross<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**9:30 AM**

**Nucleation and Growth of Al<sub>3</sub>Ti Intermetallics in Al-based Metal Matrix Nanocomposites: Insights from Phase Field Modeling:** *Lingxia Shi*<sup>1</sup>; Jason Landini<sup>1</sup>; Jaime Coronado<sup>1</sup>; Jonathan Goettsch<sup>1</sup>; Shanmukha Aramanda<sup>1</sup>; Ashiwin Shahani<sup>1</sup>; Alan Taub<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**9:50 AM**

**Toward the Prediction of Location-specific Microstructures in Metallic Alloy Additive Manufacturing – Combining Phase-field and Fast Thermal Models:** *Jose Mancias*<sup>1</sup>; Robert Saunders<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Damien Turrett<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>IMDEA Materials

**10:10 AM Break****10:30 AM**

**Kinetic Phase Field Versus Atomistic Data of Simulation in Fast Crystal Growth:** *Peter Galenko*<sup>1</sup>; <sup>1</sup>Friedrich Schiller University Jena

**10:50 AM**

**Uncertainty Quantification of Classical Theories of Dendritic Growth Kinetics Applied to Nickel-based Alloys:** *Brodan Richter*<sup>1</sup>; Joshua Pribe<sup>2</sup>; Richard Otis<sup>3</sup>; Edward Glaessgen<sup>1</sup>; <sup>1</sup>NASA Langley Research Center; <sup>2</sup>Analytical Mechanics Associates; <sup>3</sup>Jet Propulsion Laboratory

**11:10 AM**

**A CALPHAD Model for Rapid Solidification in Industrial Alloys:** *Christopher Hareland*<sup>1</sup>; Gildas Guillemot<sup>2</sup>; Paul Martin<sup>2</sup>; Charles-André Gandin<sup>2</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Mines ParisTech

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## MECHANICS OF MATERIALS

### Defects and Interfaces: Modeling and Experiments – Multiscale Characterization

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Thursday AM | March 7, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Darren Pagan, Penn State Univ; Yang Yang, Penn State Univ

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**8:30 AM Invited**

**Mapping Stacking Fault by Four-dimensional Scanning Transmission Electron Microscopy (4D-STEM):** Yongwen Sun<sup>1</sup>; Sheng Yin<sup>2</sup>; Ju Li<sup>3</sup>; Andrew Minor<sup>2</sup>; Yang Yang<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>LBNL; <sup>3</sup>MIT

**9:00 AM**

**Deformation of Ti Polycrystals from 3D Diffraction Contrast Tomography Data: Experiments and Simulations:** *Eugenia Nieto Valeiras*<sup>1</sup>; Alberto Orozco-Caballero<sup>2</sup>; Maral Sarebanzadeh<sup>1</sup>; Jun Sun<sup>3</sup>; Javier Llorca<sup>1</sup>; <sup>1</sup>Imdea Materials Institute; <sup>2</sup>Chemistry and Industrial Design, Polytechnic University of Madrid; <sup>3</sup>Xnovo Technology ApS

**9:20 AM**

**Hydrogen Induced Transformation of Dislocation Core in Fe and Its Effect on Dislocation Mobility:** Md. Shahrier Hasan<sup>1</sup>; Hadia Bayat<sup>1</sup>; Colin Delaney<sup>1</sup>; Christopher Foronda<sup>1</sup>; *Wenwu Xu*<sup>1</sup>; <sup>1</sup>San Diego State University

**9:40 AM**

**Investigating Effect of Interfacial Solute Partitioning on Strength of Nanocrystalline Alloys:** *Ankit Gupta*<sup>1</sup>; Ilias Bikmukhametov<sup>2</sup>; Thomas Koenig<sup>2</sup>; Gregory Thompson<sup>2</sup>; Garritt Tucker<sup>1</sup>; <sup>1</sup>Baylor University; <sup>2</sup>University of Alabama

**10:00 AM Break****10:15 AM**

**Quantifying High-pressure Fe Recrystallization Kinetics Using In Situ Synchrotron X-ray Multi-Anvil Compression:** *Darren Pagan*<sup>1</sup>; Lukas Kissel<sup>1</sup>; Matthew Whitaker<sup>2</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Stony Brook University

**10:35 AM**

**Microstructural and Nanomechanical Characterization of Ti/Nb Nanolayered Materials Containing Thick 3D Interfaces:** *Mauricio De Leo*<sup>1</sup>; Justin Cheng<sup>1</sup>; Nicholas Fuchs-Lynch<sup>2</sup>; Jon Baldwin<sup>3</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

**10:55 AM**

**Nanoscale Vacancy Mapping in Metals by Four-dimensional Scanning Transmission Electron Microscopy (4D-STEM):** *Yang Yang*<sup>1</sup>; Sheng Yin<sup>2</sup>; Weiyue Zhou<sup>2</sup>; Michael Short<sup>2</sup>; Mark Asta<sup>3</sup>; Andrew Minor<sup>3</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>MIT; <sup>3</sup>LBNL

**11:15 AM**

**Mechanical Properties of Cu-Al – Al<sub>2</sub>O<sub>3</sub> Nanolaminates:** Amit Sharma<sup>1</sup>; Skye Supakul<sup>2</sup>; Chunhua Tian<sup>1</sup>; Daniele Casari<sup>1</sup>; Carlos Guerra-Nunez<sup>3</sup>; Johann Michler<sup>1</sup>; *Xavier Maeder*<sup>1</sup>; <sup>1</sup>Empa; <sup>2</sup>Iowa State University; <sup>3</sup>Swiss Cluster AG

**11:35 AM**

**Characterization of Implanted He during the Annealing of Co-Deposited Cu-W Nanocomposites:** *Griffin Turner*<sup>1</sup>; Digvijay Yadav<sup>1</sup>; Sisi Xiang<sup>1</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

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**MATERIALS SYNTHESIS AND PROCESSING****Defects and Properties of Cast Metals — Properties II**

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

**Program Organizers:** Lang Yuan, University of South Carolina; Andrew Kao, University of Greenwich; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Kyle Fezi, Fort Wayne Metals

**Thursday AM | March 7, 2024**  
**Celebration 8 | Hyatt**

**Session Chairs:** Andrew Kao, University of Greenwich; Andre Phillion, McMaster University

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**8:30 AM Invited**

**Comparing Analysis Methods of Centerline Segregation in Steel Continuous Casting:** Araf Al Rafi<sup>1</sup>; Begona Santillana<sup>2</sup>; Thinium Natarajan<sup>3</sup>; Renfei Feng<sup>4</sup>; Brian Thomas<sup>5</sup>; *Andre Phillion*<sup>1</sup>; <sup>1</sup>McMaster University; <sup>2</sup>TATA Steel Europe; <sup>3</sup>U. S. Steel; <sup>4</sup>Canadian Light Source; <sup>5</sup>Colorado School of Mines

**8:55 AM**

**Three-dimensional Microstructure Solidification Modelling Incorporating Concurrent Structural Mechanical Mechanisms:** Peter Soar<sup>1</sup>; *Andrew Kao*<sup>1</sup>; Koulis Pericleous<sup>1</sup>; <sup>1</sup>University of Greenwich

**9:15 AM**

**How Various Inoculants and Their Amount Influence on the Metal Expansion Penetration in Grey Cast Iron Component:** *Izudin Dugic*<sup>1</sup>; <sup>1</sup>Linnaeus University

**9:35 AM**

**Microalloying Cast Aluminum Alloy A206 for Enhanced Mechanical and Anti-corrosion Performance:** *Bo Zhao*<sup>1</sup>; Shuaihang Pan<sup>1</sup>; Chengshang Zhou<sup>1</sup>; Zhigang Fang<sup>1</sup>; Xiuzhen Zhang<sup>2</sup>; Dengshan Zhou<sup>2</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Northeastern University

**9:55 AM Break**

**10:15 AM Invited**

**Integrated Computational Materials Engineering Process Simulations for Predictions of Metal Casting Defects:** *Adrian Sabau*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**10:40 AM**

**Improvement of Casting Properties for High Chromium Molybdenum Cast Iron:** *Mustafa Acarer*<sup>1</sup>; Mustafa Doganay<sup>1</sup>; Nurcan Akduran<sup>1</sup>; <sup>1</sup>Selcuk University

**11:00 AM**

**Mold Simulator Study of Lubrication Behavior of High 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>; <sup>1</sup>Central South University; <sup>2</sup>Jiangxi University of Science and Technology

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**MECHANICS OF MATERIALS**

**Dynamic Behavior of Materials X — High Rate Deformation I**

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

**Thursday AM | March 7, 2024**  
**Coral Spring I | Hyatt**

**Session Chairs:** Nicola Bonora, University of Cassino; Mukul Kumar, Lawrence Livermore National Laboratory

**8:30 AM**

**On Critical Thresholds for Dynamic Response of Matter:** *Neil Bourne*<sup>1</sup>; <sup>1</sup>University of Manchester

**8:50 AM**

**Purity Effects on Shock Driven Phase Transformations in Titanium:** *David Jones*<sup>1</sup>; Jesse Callanan<sup>1</sup>; Daniel Martinez<sup>1</sup>; George Gray<sup>1</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**9:10 AM**

**Phase Transformation Mechanisms of Aluminum under Ramp Compression Loading:** Lijie He<sup>1</sup>; Danae Polsin<sup>2</sup>; Shuai zhang<sup>2</sup>; Gilbert Collins<sup>2</sup>; *Niaz Abdolrahim*<sup>1</sup>; <sup>1</sup>University of Rochester; <sup>2</sup>Laboratory for Laser Energetics

**9:30 AM**

**Concurrent Atomistic-Continuum Study of Crack Propagation vs. Dislocation Emission:** *Boyang Gu*<sup>1</sup>; <sup>1</sup>University of Florida

**9:50 AM Break**

**10:10 AM**

**Simulating Plastic Flow Near Grain Boundaries with Dislocation Dynamics:** *Mujan Seif*<sup>1</sup>; Fengxian Liu<sup>2</sup>; Edmund Tarleton<sup>1</sup>; <sup>1</sup>University of Oxford; <sup>2</sup>University of Twente

**10:30 AM**

**Spatial Description of Dislocation Nucleation in the Shock Response of Single-crystalline Aluminum:** *Andre Archer*<sup>1</sup>; Kaitlyn Campbell<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

## MATERIALS SYNTHESIS AND PROCESSING

### Electrical Steels — Electrical Steels II

**Sponsored by:** TMS Structural Materials 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

**Thursday AM | March 7, 2024**  
**Celebration 14 | Hyatt**

**Session Chair:** Clodualdo Aranas Jr., University of New Brunswick



**8:30 AM Invited**

**Compositional Design of Fe-Si-X High Silicon Steel:** *Gaoyuan Ouyang*<sup>1</sup>; Roger Claude<sup>2</sup>; Maria Lebedeva<sup>2</sup>; Ben Hilliard<sup>1</sup>; Iver Anderson<sup>1</sup>; Matthew Kramer<sup>1</sup>; Jun Cui<sup>1</sup>; <sup>1</sup>Ames Laboratory; <sup>2</sup>Iowa State University

**9:00 AM**

**Microstructure and Texture Evolution During Hot Dipping of a 3.2 wt.% Si Non-oriented Electrical Steel:** *Gyanaranjan Mishra*<sup>1</sup>; Youliang He<sup>2</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>Univeristy of New Brunswick; <sup>2</sup>CanmetMaterials, Natural Resources Canada

**9:20 AM**

**Recrystallization of a 2.8 wt% Si Non-oriented Electrical Steel After Skew Cold Rolling at Different Angles to the Hot Rolling Direction:** *Youliang He*<sup>1</sup>; Mehdi Sanjari<sup>1</sup>; <sup>1</sup>CanmetMATERIALS, Natural Resources Canada

**9:40 AM**

**Effect of Processing Methods on the Magnetic Properties of Non-oriented Electrical Steel:** *Shengjie Wu*<sup>1</sup>; Wanlin Wang<sup>1</sup>; Chongxiang Yue<sup>2</sup>; Hualong Li<sup>2</sup>; <sup>1</sup>Central South University; <sup>2</sup>Institute of Research of Iron and Steel, Shasteel

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS****Electronic Packaging and Interconnection Materials — Advanced Microelectronic Packaging Materials II**

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

**Thursday AM | March 7, 2024**

**Bayhill 25 | Hyatt**

**Session Chairs:** Arif Salleh, Universiti Malaysia Perlis; David Yan, San José State University

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**8:30 AM**

**The Conductivity and Mechanical Properties of Hybrid Carbon Black/Copper Filled Linear Low-density Polyethylene (LLDPE) and Liquid Silicone Rubber (LSR) Flexible Conductive Polymer Composites for Electronic Interconnect Applications.:** *Khairul Anwar Abdul Halim*<sup>1</sup>; Mohd Arif Anuar Mohd Salleh<sup>1</sup>; Azlin Fazlina Osman<sup>1</sup>; Mohd. Firdaus Omar<sup>1</sup>; Muhammad Salihin Zakaria<sup>1</sup>; Farah Badrul<sup>1</sup>; Sin Chiat Tew<sup>1</sup>; <sup>1</sup>Universiti Malaysia Perlis (Unimap)

**8:50 AM**

**Controlling Porosity During Transient Liquid Phase Soldering for Power Modules:** *Kazuhiro Nogita*<sup>1</sup>; Nurul Abdul Razak<sup>2</sup>; Xin Tan<sup>1</sup>; Yiwei Chai<sup>1</sup>; Michael Bermingham<sup>1</sup>; Jeffrey Venezuela<sup>1</sup>; Keith Sweatman<sup>3</sup>; Stuart McDonald<sup>1</sup>; <sup>1</sup>University of Queensland; <sup>2</sup>Universiti Malaysia Perlis ; <sup>3</sup>Nihon Superior Co., Ltd.

**9:10 AM**

**Contribution of Ni Microalloying to the Cu Dissolution of In-35Sn/Cu Solder Joint After Multiple Reflows:** *Mohd Arif Anuar Salleh*<sup>1</sup>; Chang May Shin<sup>1</sup>; Kazuhiro Nogita<sup>2</sup>; Hideyuki Yasuda<sup>3</sup>; <sup>1</sup>Universiti Malaysia Perlis (Unimap); <sup>2</sup>The University of Queensland; <sup>3</sup>Kyoto University

**9:30 AM**

**Towards Practical Demountable Joints for Fusion Devices - Microstructure Formation and its Stability in the In-Bi-Sn Ultra-low-temperature Eutectic Soldering Alloy:** *Sergey Belyakov*<sup>1</sup>; Greg Brittles<sup>1</sup>; <sup>1</sup>Tokamak Energy

**9:50 AM Break**

**10:10 AM**

**New Insights Into the Role of Microstructure on the Thermal Fatigue Performance of BGA Packages:** *Christopher Gourlay*<sup>1</sup>; Jingwei Xian<sup>1</sup>; Yilun Xu<sup>1</sup>; Richard Coyle<sup>2</sup>; Fionn Dunne<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>Nokia Bell Labs

**10:30 AM**

**Electromigration Behavior of Nano-twinned Cu-Ag Alloy Thin Films:** Fan-Yi Ouyang<sup>1</sup>; Ko-Chieh Hsueh<sup>1</sup>; *Yung-Pei Lin*<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**10:50 AM Concluding Comments**

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 Management — Sustainable Production

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

**Program Organizers:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Metals Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong (Marco) Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Onuralp Yucel, Istanbul Technical University; Alafara Baba, University of Ilorin

**Thursday AM | March 7, 2024**  
**Bayhill 33 | Hyatt**

**Session Chairs:** Neale Neelameggham, IND LLC; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization

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**8:30 AM Introductory Comments**

**8:40 AM Invited**

**Seawater Electrolysis Enables High-quality Carbon Removal:** *Erika La Plante*<sup>1</sup>; Dante Simonetti<sup>2</sup>; David Jassby<sup>2</sup>; Lorenzo Corsini<sup>3</sup>; Gaurav Sant<sup>2</sup>; <sup>1</sup>University of California, Davis; <sup>2</sup>University of California, Los Angeles; <sup>3</sup>Equatic, Inc.

**9:10 AM**

**A Clean Production Metallurgy - Chlorine Metallurgy: A Review:** *Xue Haiyue*<sup>1</sup>; Lv Guozhi<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Wang Long<sup>1</sup>; <sup>1</sup>Northeastern University

**9:30 AM**

**A Review of the Extraction of Gallium From Bauxite Ores:** *Hua Yutong*<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Wang Long<sup>1</sup>; <sup>1</sup>Northeastern University

9:50 AM Break

10:10 AM

**Life Cycle Assessment for the Mining and Metallurgical Industries: Issues and Challenges:** *Nawshad Haque*<sup>1</sup>; <sup>1</sup>Commonwealth Scientific and Industrial Research Organization

10:30 AM

**Should We Lightweight Electric Vehicles? A Life Cycle Perspective With an Outlook to 2050:** *Heather Liddell*<sup>1</sup>; <sup>1</sup>Purdue University

10:50 AM

**Lifecycle Environmental Impact Assessment of Swarf Recycling Routes for Additive Manufacturing Applications:** *Emanuele Pagone*<sup>1</sup>; Konstantinos Salonitis<sup>1</sup>; Mark Jolly<sup>1</sup>; Stewart Willams<sup>1</sup>; <sup>1</sup>Cranfield University

11:10 AM Concluding Comments

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

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

**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

Thursday AM | March 7, 2024  
Bayhill 17 | Hyatt

**Session Chairs:** C. Cem Tasan, Massachusetts Institute of Technology; Jessica Krogstad, University of Illinois at Urbana-Champaign

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8:30 AM Invited

**On Hydride Nucleation and Growth in + Ti Alloys:** *C. Tasan*<sup>1</sup>; Felicity Worsnop<sup>1</sup>; Jinwoo Kim<sup>1</sup>; Haoxue Yan<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

9:00 AM Invited

**Multi-physics Phase Field Modelling of Corrosion and Hydrogen Embrittlement:** *Emilio Martinez-Paneda*<sup>1</sup>; <sup>1</sup>University of Oxford

9:30 AM

**Effect of Hydrogen on the Deformation Mechanism and Grain Boundary Decohesion of an Austenitic FeCrNi Alloy:** *Tingkun Liu*<sup>1</sup>; Sarah Uddin<sup>1</sup>; Dallin Barton<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

9:50 AM Invited

**Towards Next Generation, Low Cost, Hydrogen Resilient Austenitic Steels: Relating Composition, Microstructure and Deformation Modes Across Length Scales:** *Jessica Krogstad*<sup>1</sup>; Po-Cheng Kung<sup>1</sup>; Quinten Yurek<sup>1</sup>; Tianyu Su<sup>1</sup>; Hoon Lee<sup>1</sup>; Dominic Piedmont<sup>1</sup>; Toshihiro Tschuiyama<sup>2</sup>; Eilf Ertekin<sup>1</sup>; James Stubbins<sup>1</sup>; Brian Somerday<sup>3</sup>; Petros Sofronis<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign; <sup>2</sup>Kyushu University; <sup>3</sup>Somerday Consulting, LLC

**10:20 AM Break**

**10:40 AM**

**Kim-Kim-Suzuki (KKS) Phase Field Model for Hydrogen-assisted Cracking:** *Gabriel Frank Bouobda Moladje*<sup>1</sup>; Antoine Ruffini<sup>1</sup>; Yann Le Bouar<sup>1</sup>; Alphonse Finel<sup>1</sup>; <sup>1</sup>ONERA

**11:20 AM**

**Insights of Organic Compounds as Permeation Barriers for Hydrogen Embrittlement Prevention in Steel:** *Sourav Kumar Saha*<sup>1</sup>; Byungrok Moon<sup>1</sup>; Namhyun Kang<sup>1</sup>; <sup>1</sup>Pusan National University

**11:00 AM**

**Fundamental Design of Alloys Resistant to H-embrittlement: Simulation Insights on Nanoscale H-defects Interactions:** *Matthew Melfi*<sup>1</sup>; S. Mohadeseh Taheri-Mousavi<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

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## MECHANICS OF MATERIALS

### **Fatigue in Materials: Fundamentals, Multiscale Characterizations and Computational Modeling — Fatigue of Ceramics and Advanced Alloys**

**Sponsored by:** TMS Materials Processing and Manufacturing Division, 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; Ashley Spear, University of Utah; Brian Wisner, Ohio University

**Thursday AM | March 7, 2024**  
**Manatee Spring II | Hyatt**

**Session Chair:** Brian Wisner, Ohio University

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**8:30 AM**

**Cyclic Deformation Behavior of CoCrFeMnNi Multi-principal Element Alloys With Different Cr/Ni:** Shubham Sisodia<sup>1</sup>; Maik Rajkowski<sup>2</sup>; Guillaume Laplanche<sup>2</sup>; *Ankur Chauhan*<sup>1</sup>; <sup>1</sup>Indian Institute of Science, Bengaluru; <sup>2</sup>Institut für Werkstoffe, Ruhr-Universität Bochum

**8:50 AM**

**Fatigue Behavior of Cast Al-Ce-Mg-Sc Alloys:** *Ramit Kaushik*<sup>1</sup>; Roberto Menchaca<sup>1</sup>; Devin Davis<sup>1</sup>; Vishal Soni<sup>1</sup>; Naveen Kumar<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; David Weiss<sup>2</sup>; Adam Loukus<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

**9:10 AM**

**Lifetime Reliability Prediction Tool of Ceramic Receivers:** *Pawan Chaugule*<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**9:30 AM**

**Development of Irreversible Intragranular Orientation Gradients and Slip Processes During Cyclic Loading in Polycrystalline Inconel 718:** *Justine Schulte*<sup>1</sup>; Jonathan Hestoffer<sup>1</sup>; Dalton Shadle<sup>2</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

9:50 AM Break

10:10 AM

**Investigation of Stress Corrosion Cracking in CMSX-4 Turbine Blade Alloys Using AI and Deep-learning Assisted X-ray Microscopy:** *Ria Mitchell*<sup>1</sup>; Andy Holwell<sup>1</sup>; Hrishikesh Bale<sup>1</sup>; Mustafa Elsherkisi<sup>2</sup>; <sup>1</sup>ZEISS Microscopy; <sup>2</sup>Cranfield University

10:30 AM

**Phase-field Modeling of Fatigue Microstructures in Ni-based Single Crystal Superalloys:** *Jose Dominic*<sup>1</sup>; Jean-Briac le Graverend<sup>1</sup>; <sup>1</sup>Texas A&M University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials VII: Polymers and Composites

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

Thursday AM | March 7, 2024  
Bayhill 21 | Hyatt

**Session Chairs:** Michael Cai Wang, University of South Florida; Yong Lin Kong, University of Utah

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8:30 AM Keynote

**Nanocrystal Growth and Processing for Investigating Nano-scale Effects in Nanocomposites:** *George Nolas*<sup>1</sup>; <sup>1</sup>University of South Florida

9:10 AM Invited

**Nanoparticle-containing Layers for 1D Fibers, 2D Coatings, and 3D Intelligent Structures:** *Kenan Song*<sup>1</sup>; <sup>1</sup>Arizona State University

9:40 AM Invited

**Unravelling the Governing Factors for Cholesteric Liquid Crystal Self-assembly of Polysaccharides:** *Cecile Chazot*<sup>1</sup>; Simona Fine<sup>1</sup>; Eleanor Grosvenor<sup>1</sup>; <sup>1</sup>Northwestern University

10:10 AM Break

10:30 AM Invited

**Photoactive Nanocomposites-emulated Neuromorphic Intelligence:** Jae Kim<sup>1</sup>; Ruo Chen Liu<sup>1</sup>; Jingjing(Jenny) Qiu<sup>1</sup>; *Shiren Wang*<sup>1</sup>; <sup>1</sup>Texas A&M University

11:00 AM Invited

**Dynamics and Heterogeneity of Particle Network in Composite Electrodes of Li-ion Batteries:** *Kejie Zhao*<sup>1</sup>; <sup>1</sup>Purdue University

11:30 AM

**Synthesis of Graphene Oxide-Gold Nanorods Nanocomposite-Porphyrin Conjugate for Improved Dual Cancer Phototherapy Performance:** *Thabang Lebepe*<sup>1</sup>; Oluwatobi Samuel Oluwafemi<sup>1</sup>; <sup>1</sup>University of Johannesburg

## MATERIALS SYNTHESIS AND PROCESSING

### Functionally Graded Materials, Coatings and Claddings: Toward Microstructure and Property Control – Gradient Design and Alloys

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Powder Materials Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Aurelien Perron, Lawrence Livermore National Laboratory; Kaila Bertsch, Lawrence Livermore National Laboratory; Emma White, DECHEMA Forschungsinstitut; Iver Anderson, Iowa State University Ames Laboratory; Timothy Prost, Uniformity Labs; Matthew Dunstan, US Army Research Laboratory

**Thursday AM | March 7, 2024**  
**Celebration 5 | Hyatt**

**Session Chair:** Aurelien Perron, LLNL

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#### 8:30 AM

**Gradient Design for Alloy Stacking Fault Energy with Autonomous Path Planning:** *James Hanagan*<sup>1</sup>; *Nicole Person*<sup>1</sup>; *Daniel Salas*<sup>1</sup>; *Daniel Lewis*<sup>1</sup>; *Marshall Allen*<sup>1</sup>; *Wenle Xu*<sup>1</sup>; *Raymundo Arróyave*<sup>1</sup>; *Brady Butler*<sup>2</sup>; *Ibrahim Karaman*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Army Research Laboratory

#### 8:50 AM

**Calphad-based Path Planning for Multicomponent Systems: Composition and Properties:** *Nicholas Ury*<sup>1</sup>; *Brandon Bocklund*<sup>1</sup>; *Aurelien Perron*<sup>1</sup>; *Kaila Bertsch*<sup>1</sup>; <sup>1</sup>LLNL

#### 9:10 AM

**Engineering Austenite-metastability Gradient via Additive Manufacturing and Evaluating Its Impact on Mechanical Properties:** *Abhishek Sharma*<sup>1</sup>; *Tirthesh Ingale*<sup>1</sup>; *Ravisankar Haridas*<sup>1</sup>; *Rajiv Mishra*<sup>1</sup>; *Rajarshi Banerjee*<sup>1</sup>; <sup>1</sup>University of North Texas

#### 9:30 AM

**Functionally Graded Joints from Tungsten to Ferritic/Martensitic Steels Fabricated Using Laser-directed Energy Deposition:** *Deniz Ebeperi*<sup>1</sup>; *Tim Graening*<sup>2</sup>; *Raiyan Seede*<sup>1</sup>; *Austin Whitt*<sup>1</sup>; *Ying Yang*<sup>2</sup>; *Yutai Katoh*<sup>2</sup>; *Ibrahim Karaman*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Oak Ridge National Laboratory

#### 9:50 AM

**Minimizing Interfacial Stresses in Additively-graded GRCop-42 to Inconel 625:** *Maddy Selby*<sup>1</sup>; *Mo-Rigen He*<sup>1</sup>; *Alex Lark*<sup>2</sup>; *Li Ma*<sup>2</sup>; *Samuel Hocker*<sup>3</sup>; *Gianna Valentino*<sup>4</sup>; *Kevin Hemker*<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>Johns Hopkins University Applied Physics Laboratory; <sup>3</sup>NASA Langley Research Center; <sup>4</sup>University of Maryland, College Park

#### 10:10 AM Break

#### 10:30 AM

**Galvanic Corrosion Behavior of Functionally Graded Carbon Steel to Stainless Steel Claddings:** *Scott Bozeman*<sup>1</sup>; *Julie Tucker*<sup>1</sup>; *O. Isgor*<sup>1</sup>; <sup>1</sup>Oregon State University

#### 10:50 AM

**Enabling a Compositional Pathway from Titanium to Tantalum Using Directed Energy Deposition:** *Raiyan Seede*<sup>1</sup>; *Michael Juhasz*<sup>1</sup>; *Benjamin Ellyson*<sup>1</sup>; *Deniz Ebeperi*<sup>1</sup>; *Brandon Bocklund*<sup>1</sup>; *Aurelien Perron*<sup>1</sup>; *Kaila Bertsch*<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**11:10 AM**

**Additive Manufacturing of Functionally Graded Refractory Materials with Spatial Transitioning:** Anwar Algamal<sup>1</sup>; Abdalmageed Almotari<sup>1</sup>; Majed Ali<sup>1</sup>; *Ala Qattawi*<sup>1</sup>; <sup>1</sup>University of Toledo

**11:30 AM**

**Thermo-mechanical Performance of Compositionally Graded Refractory Alloys:** *Benjamin Ellyson*<sup>1</sup>; Michael Juhasz<sup>1</sup>; Raiyan Seede<sup>1</sup>; Kaila Bertsch<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Steel Performance II

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

**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

**Thursday AM | March 7, 2024**

**Bayhill 31 | Hyatt**

**Session Chair:** Melissa Thrun, Los Alamos National Lab

**8:30 AM**

**Reducing Hydrogen Embrittlement by Controlling Boron Segregation in Martensitic Steel:** *Hidekazu Minami*<sup>1</sup>; Julie Cairney<sup>1</sup>; Matthew Griffith<sup>1</sup>; Yuki Toji<sup>2</sup>; Shinjiro Kaneko<sup>3</sup>; <sup>1</sup>The University of Sydney; <sup>2</sup>JFE Holdings Incorporated; <sup>3</sup>JFE Steel Corporation

**8:50 AM**

**Hydrogen Trapping and Hydrogen Embrittlement in Hybrid Steel Strengthened by Dual Precipitates:** *Hung-Wei Yen*<sup>1</sup>; Chin-En Chou<sup>1</sup>; Yi-Hsuan Sun<sup>1</sup>; Steve Woei Ooi<sup>2</sup>; Ranming Niu<sup>3</sup>; Chao Huang<sup>3</sup>; Yi-Sheng Chen<sup>3</sup>; Julie Cairney<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Ovako Corporate R&D; <sup>3</sup>The University of Sydney

**9:10 AM**

**Investigating the Effects of Weld-bonding in Ultra-high Strength Steel (UHSS) Performance:** *Henry León-Henao*<sup>1</sup>; Antonio Ramirez<sup>1</sup>; <sup>1</sup>The Ohio State University

**9:30 AM**

**Metastable Phases in Additive Manufacturing Produced Maraging 300 Steel:** A. Santanaa<sup>1</sup>; Adriana Eres-Castellanos<sup>2</sup>; R. Rementeriac<sup>3</sup>; Jonathan Poplawsky<sup>4</sup>; E. Urones-Garrotee<sup>5</sup>; Carlos Capdevila-Montes<sup>6</sup>; *Francisca Caballero*<sup>1</sup>; <sup>1</sup>National Centre for Metallurgical Research (CENIM-CSIC); <sup>2</sup>Colorado School of Mines; <sup>3</sup>ArcelorMittal Global R&D SLab—Steel Labs; <sup>4</sup>Oak Ridge National Laboratory; <sup>5</sup>Spanish National Centre for Electron Microscopy (CNME), Facultad de Ciencias Químicas, Universidad Complutense de Madrid; <sup>6</sup>National Centre for Metallurgical Research (CENIM-CSIC),

**9:50 AM Break****10:05 AM**

**Advanced Metallurgical and Micromechanical Modelling to Deploy the Microstructural Tailoring Potential of Press Hardening- MiPRE:** *Carlos Capdevila-Montes*<sup>1</sup>; <sup>1</sup>National Centre for Metallurgical Research (CENIM-CSIC)

**10:25 AM**

**Understanding the Cl Distribution Resulting from Under Deposit Corrosion in Industrial Boiler System Steels:** *Christopher Bilsland*<sup>1</sup>; Parul Bishnoi<sup>1</sup>; Nick Laycock<sup>2</sup>; Mary Ryan<sup>1</sup>; Stella Pedrazzini<sup>1</sup>; <sup>1</sup>Imperial College London; <sup>2</sup>QSRTC

**10:45 AM**

**Boron Segregation Behavior in a Microstructure Complex Multiphase Lightweight Steel:** *Xizhen Dong*<sup>1</sup>; Aparna Saksena<sup>1</sup>; Baptiste Gault<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 Eisenforschung GmbH; <sup>2</sup>East China University of Science and Technology

**11:05 AM**

**Effects of Plastic Deformation on Austenite Formation in a High-Ni Martensitic Steel:** *Chia-Pao Lee*<sup>1</sup>; Amir Farkoosh<sup>1</sup>; Dieter Isheim<sup>1</sup>; David Seidman<sup>1</sup>; <sup>1</sup>Northwestern University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion – Local Ordering in Materials Out of Equilibrium II**

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

**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley

**Thursday AM | March 7, 2024**  
**Bayhill 30 | Hyatt**

**Session Chairs:** Judith Yang, Brookhaven National Laboratory; Yang Yang, The Pennsylvania State University; Penghui Cao, University of California, Irvine; Irene Beyerlein, University of California, Santa Barbara

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**8:30 AM Invited**

**Oxidation Kinetics for Model Refractory Multiple Principal Element Alloy Nb-Ti-Zr:** *Elizabeth Opila*<sup>1</sup>; Charlie Brandenburg<sup>1</sup>; David Beaudry<sup>2</sup>; Elaf Anber<sup>2</sup>; Mitra Taheri<sup>2</sup>; <sup>1</sup>University of Virginia; <sup>2</sup>Johns Hopkins University

**9:00 AM Invited**

**Impact of Thermal Vacancies on Chemical Ordering Kinetics in Complex Concentrated Alloys:** *Yongfeng Zhang*<sup>1</sup>; Anus Manzoor<sup>1</sup>; <sup>1</sup>University of Wisconsin

**9:30 AM Invited**

**Combinatorial Investigation of He-ion Irradiation Behavior of Nano-structured W-based Alloys:** Haechan Jo<sup>1</sup>; Daegun You<sup>1</sup>; Sooran Kim<sup>2</sup>; *Dongwoo Lee*<sup>1</sup>; <sup>1</sup>Sungkyunkwan University; <sup>2</sup>Kyungpook National University

**10:00 AM Break**

**10:15 AM Invited**

**Ordering and Spinodal Decomposition in Lightweight Fe-Mn-Al-C Steels:** *Dierk Raabe*<sup>1</sup>; <sup>1</sup>Max-Planck Institute



**10:45 AM**

**Statistical Fluctuations, Clustering and Short-range Ordering: A CALPHAD Based Thermodynamics Perspective:** *Alisson Kwiatkowski da Silva*<sup>1</sup>; Qing Chen<sup>1</sup>; Dierk Raabe<sup>2</sup>; <sup>1</sup>Thermo-Calc Software AB; <sup>2</sup>Max-Planck-Institut für Eisenforschung GmbH

**11:15 AM**

**Thermodynamic Formation Mechanism of Chemical Short-range Order and Its Influence on Elastoplastic Deformation in Multi-principal Elemental Alloys:** *Yunjiang Wang*<sup>1</sup>; <sup>1</sup>Institute of Mechanics, Chinese Academy of Sciences

**11:35 AM Invited**

**A Percolation Model of Passivation for Binary FCC Alloys: Effects of Short Range Order:** *Abhinav Roy*<sup>1</sup>; Aden Weiser<sup>1</sup>; John Cavin<sup>1</sup>; Karl Sieradzki<sup>2</sup>; Ian McCue<sup>1</sup>; James Rondinelli<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>Arizona State University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Materials and Chemistry for Molten Salt Systems — Molten Salt Structure, Properties, and Thermodynamics

**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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

**Thursday AM | March 7, 2024**

**Bayhill 20 | Hyatt**

**Session Chair:** Michael Short, MIT

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**8:30 AM**

**Uncertainty Quantification and Propagation of Molten Salt Vapor Pressures Calculated from Thermodynamic Models:** *Jorge Paz Soldan Palma*<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Amir Mofrad<sup>1</sup>; Jack Wilson<sup>1</sup>; Clara Dixon<sup>1</sup>; Mina Aziziha<sup>1</sup>; Ronald Booth<sup>1</sup>; Theodore Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

**8:50 AM**

**Thermodynamic Analysis of the Recovery of Metallic Mn from Waste Lithium Manganese Battery Using the Molten Salt Method:** *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

**9:10 AM**

**Uncertainty Quantification and Sensitivity Analysis of Advanced Models for Thermodynamic Modeling of Molten Salt Systems:** *Rushi Gong*<sup>1</sup>; Shun-Li Shang<sup>1</sup>; Vitaliy Goncharov<sup>2</sup>; Bryn Merrill<sup>2</sup>; Xiaofeng Guo<sup>2</sup>; Zi-Kui Liu<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Washington State University

**9:30 AM**

**Thermodynamic Assessment of the Pseudo-Quinary Na, K, Cs, Mg | Cl, I Reciprocal System:** *Clara Dixon*<sup>1</sup>; Mina Aziziha<sup>1</sup>; Juliano Schorne-Pinto<sup>1</sup>; Jorge Paz Soldan Palma<sup>1</sup>; Theodore Besmann<sup>1</sup>; <sup>1</sup>University of South Carolina

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

**Fission Product Solubility Measurements in 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

**10:30 AM**

**Exploring the Effect of Radiation and Temperature on the Local Structure of Ni<sup>2+</sup> Ions in Molten Salt Systems Using X-ray Absorption Spectroscopy Study:** *Nirmalendu Patra*<sup>1</sup>; *Kazuhiro Iwamatsu*<sup>1</sup>; *Alejandro Ballesteros*<sup>2</sup>; *Mehmet Topsakal*<sup>1</sup>; *Ruchi Gakhar*<sup>2</sup>; *Jay LaVerne*<sup>3</sup>; *James Wishart*<sup>1</sup>; *Anatoly Frenkel*<sup>1</sup>; *Simerjeet Gill*<sup>1</sup>; <sup>1</sup>Brookhaven National Laboratory; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>University of Notre Dame

**10:50 AM**

**Electrorefiner Speciation and Phase Model for Prediction of Operation Lifetime:** *Jacob A. Yingling*<sup>1</sup>; *Tae-Sic Yoo*<sup>1</sup>; *Toni Karlsson*<sup>1</sup>; *Guy Fredrickson*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

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**NUCLEAR MATERIALS****Materials Informatics to Accelerate Nuclear Materials Investigation — Harnessing Machine Learning for Nuclear Material Imaging**

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

**Program Organizers:** *Miaomiao Jin*, Pennsylvania State University; *Yongfeng Zhang*, University of Wisconsin; *Tiankai Yao*, Idaho National Laboratory; *Anjana Talapatra*, Los Alamos National Laboratory; *Luca Messina*, CEA Cadarache; *Fei Xu*, Idaho National Laboratory; *Benjamin Afflerbach*, University of Wisconsin-Madison

**Thursday AM | March 7, 2024**  
**Silver Spring I-II | Hyatt**

**Session Chairs:** *Fei Xu*, Idaho National Laboratory; *Luca Messina*, CEA Cadarache; *Xing Wang*, Pennsylvania State University

**8:30 AM Invited**

**Accelerating Characterization of Radiation Driven Processes using Machine Learning Tools:** *Stephen Toller*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:00 AM**

**Characterizing Microstructures in Aluminide Coatings Captured in SEM Image with Convolutional Neural Networks:** *Cuong Ly*<sup>1</sup>; *Joshua Silverstein*<sup>1</sup>; *Danny Edwards*<sup>1</sup>; *Marjolein Oostrom*<sup>1</sup>; *Karl Pazdernik*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**9:20 AM Invited**

**Comparative Analysis of U-Net, Mask R-CNN, and YOLO for Electron Microscopy Image Segmentation and Object Detection in Nuclear Materials:** *Shradha Agarwal*<sup>1</sup>; *Anshul Sawant*<sup>2</sup>; *Steven Zinkle*<sup>1</sup>; *Chun Yin Wong*<sup>1</sup>; <sup>1</sup>University of Tennessee; <sup>2</sup>Google

**9:50 AM**

**Deep Learning-enabled Computer Vision Pipeline for the Automated Analysis of Helium Bubbles in In-situ Ion Irradiation Transmission Electron Microscopy**

**Experiments:** *Chun Yin Wong*<sup>1</sup>; Sydney Copp<sup>1</sup>; July Reyes-Zacarias<sup>1</sup>; Mani Valletti<sup>1</sup>; Khalid Hattar<sup>1</sup>; Maxim Ziatdinov<sup>2</sup>; Sergei Kalinin<sup>1</sup>; Shradha Agarwal<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville; <sup>2</sup>Oak Ridge National Laboratory

### 10:10 AM Break

### 10:25 AM

**Deep Neural Network for Porosity and Microstructure Analytics of a High Burnup U-10Zr Metallic Solid Fuel:** *Fei Xu*<sup>1</sup>; Elijah Darko<sup>1</sup>; Lu Cai<sup>1</sup>; Daniele Salvato<sup>1</sup>; Fidelma Di Lemmaa<sup>1</sup>; Luca Capriotti<sup>1</sup>; Tiankai Yao<sup>1</sup>; Min Xian<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

### 10:45 AM Invited

**Few-shot Machine Learning for Automated Analysis of TEM Images of Nuclear Materials:** *Xing Wang*<sup>1</sup>; Xinyuan Xu<sup>1</sup>; Zefeng Yu<sup>1</sup>; Arthur Motta<sup>1</sup>; <sup>1</sup>Pennsylvania State University

### 11:15 AM

**Scanning-TEM (STEM) 3D Tomography for Quantification of Radiation Damage in Neutron Irradiated 316L Stainless Steel:** *Laura Hawkins*<sup>1</sup>; Fei Xu<sup>1</sup>; Mario Matos<sup>1</sup>; Tiankai Yao<sup>1</sup>; Boopathy Kombaiyah<sup>1</sup>; Collin Knight<sup>1</sup>; Yachun Wang<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

### 11:35 AM

**Quantitative Insight to Fission Gas Bubble Distribution and Lanthanide Movement in Irradiated Annular U-10Zr Metallic Fuel Using Deep Learning:** *Fei Xu*<sup>1</sup>; *Yalei Tang*<sup>1</sup>; Lu Cai<sup>1</sup>; Daniele Salvato<sup>1</sup>; Shoukun Sun<sup>2</sup>; Min Xian<sup>1</sup>; Fidelma Giulia Di Lemma<sup>1</sup>; Luca Capriotti<sup>1</sup>; Tiankai Yao<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>University of Idaho

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## MECHANICS OF MATERIALS

### Mechanical Behavior at the Nanoscale VII – Size Effects

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Thursday AM | March 7, 2024**

**Manatee Spring I | Hyatt**

**Session Chairs:** Sezer Ozerinc, Middle East Technical University; Yu Zou, University of Toronto

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### 8:30 AM Invited

**Characterizing and Tuning the Mechanical Properties of Nanoparticle Assemblies:** *Gang Feng*<sup>1</sup>; <sup>1</sup>Villanova University

### 9:00 AM

**Polycrystalline Grain Boundary Plasticity at Large Grain Sizes:** *Zhiliang Pan*<sup>1</sup>; Guangbin Wei<sup>1</sup>; <sup>1</sup>Guilin University of Electronic Technology

### 9:20 AM

**Size Effects in Confined Layers of Nanocrystalline High Entropy Alloys:** Amir Fadaie<sup>1</sup>; Amir Motallebzadeh<sup>2</sup>; *Sezer Ozerinc*<sup>1</sup>; <sup>1</sup>Middle East Technical University; <sup>2</sup>Koç University Surface Science and Technology Center

**9:40 AM**

**Investigating the Mechanisms and Driving Forces Governing the Mechanical Behavior of Sub-10-nm Metal Nanoparticles:** *Ruikang Ding*<sup>1</sup>; Soodabeh Azadehranjbar<sup>2</sup>; Ingrid M. Padilla-Espinosa<sup>3</sup>; Douglas Zhang<sup>3</sup>; Muztoba Rabbani<sup>3</sup>; Ashlie Martini<sup>3</sup>; Tevis D. B. Jacobs<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>Bruker; <sup>3</sup>University of California, Merced

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

**A Unified Approach to Quantify the Indentation Size Effect:** *Harita Seekala*<sup>1</sup>; Vikram Balaji<sup>2</sup>; L. Rama Krishna<sup>1</sup>; Hariharan Krishnaswamy<sup>2</sup>; P. Sudharshan Phani<sup>1</sup>; <sup>1</sup>ARCI; <sup>2</sup>Indian Institute of Technology

**10:40 AM**

**Brittle and Ductile Deformations in Uniaxial Compression of Si pillars:** *Boyang Gu*<sup>1</sup>; Yang Li<sup>1</sup>; Adrian Diaz<sup>2</sup>; David McDowell<sup>3</sup>; Youping Chen<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Georgia Institute of Technology

**11:00 AM**

**Grain Size Effect on Microstructural Evolution in Nanocrystalline MgAl<sub>2</sub>O<sub>4</sub> under Nanoindentation:** *Zachary Arenella*<sup>1</sup>; James Wollmershauser<sup>2</sup>; Edward Gorzkowski<sup>2</sup>; Boris Feigelson<sup>2</sup>; Seok-Woo Lee<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>US Naval Research Laboratory

**11:20 AM**

**On the Formulation of Representative Volume Element (RVE) of Multiphase Thin Films:** *Ahmad Ahmad*<sup>1</sup>; Anter El-Azab<sup>1</sup>; <sup>1</sup>Purdue University

**11:40 AM**

**Nanoindentation Stress Relaxation Tests for Reliable Determination of Deformation Activation Parameters:** *Suprit Bhusare*<sup>1</sup>; Alosious Lambai<sup>1</sup>; Jakob Schwiedrzik<sup>2</sup>; Johann Michler<sup>2</sup>; Gaurav Mohanty<sup>1</sup>; <sup>1</sup>Tampere University; <sup>2</sup>EMPA, Thun, Switzerland

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**MECHANICS OF MATERIALS****Mechanical Response of Materials Investigated through Novel In-situ Experiments and Modeling – Session V**

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

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

**Thursday AM | March 7, 2024**

**Barrel Spring I | Hyatt**

**Session Chair:** Collin Foster, University of Illinois at Urbana Champaign

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**8:30 AM****Anomalous Crack Growth Resistance in Atomically Layered Ternary Carbides:** *Sahin Celik*<sup>1</sup>; Milos Dujovic<sup>1</sup>; Miladin Radovic<sup>1</sup>; Ankit Srivastava<sup>1</sup>; <sup>1</sup>Texas A&M University**8:50 AM****Interface Characteristics of Tailored Thin Films Examined Using Micromechanical Spectroscopy:** *Markus Alfreider*<sup>1</sup>; Michael Meindlhumer<sup>1</sup>; Tobias Ziegelwanger<sup>1</sup>; Rostislav Daniel<sup>1</sup>; Jozef Keckes<sup>1</sup>; Daniel Kiener<sup>1</sup>; <sup>1</sup>University of Leoben**9:10 AM****A Multiscale Framework to Predict the Kinetics of Phase Transformation in In Situ Laser Shock Experiments:** *Roshan Sebastian*<sup>1</sup>; Ching Chen<sup>1</sup>; Avinash Dongare<sup>1</sup>; <sup>1</sup>University of Connecticut, Storrs**9:30 AM****In Situ Micro-computed Tomography of Reentry Fabrics under Tensile Loading:** *Collin Foster*<sup>1</sup>; Cutler Phillippe<sup>1</sup>; Laura Villafañe Roca<sup>1</sup>; Francesco Panerai<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana Champaign**9:50 AM****Multiscale Analysis of Deformation Behavior in Silver Nanowires:** *Thanh Phan*<sup>1</sup>; Liming Xiong<sup>1</sup>; Yipeng Peng<sup>1</sup>; <sup>1</sup>North Carolina State University**10:10 AM Break****10:30 AM****Controlling Dislocation Motion Using an Electric Field:** *Yu Zou*<sup>1</sup>; <sup>1</sup>University of Toronto**10:50 AM*****In situ* Investigations into the Adhesion and Compression of Catalyst-relevant Metal Nanoparticles:** *Tevis Jacobs*<sup>1</sup>; Ruikang Ding<sup>1</sup>; Andrew Baker<sup>1</sup>; Ingrid Padilla Espinosa<sup>2</sup>; Soodabeh Azadehranjbar<sup>1</sup>; Ashlie Martini<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>UC Merced**11:10 AM****The Characterization of Local Deformation Fields Around Zirconium Hydrides:** *Hamidreza Abdolvand*<sup>1</sup>; Masoud Taherijam<sup>1</sup>; Saiedeh Marashi<sup>1</sup>; Alireza Tondro<sup>2</sup>; Khaled El-Sobahi<sup>1</sup>; <sup>1</sup>The University of Western Ontario; <sup>2</sup>University of Western Ontario

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**MATERIALS DEGRADATION AND DEGRADATION BY DESIGN****Nanostructured Materials in Extreme Environments II – Modeling and Simulation*****Sponsored by:*** TMS Structural Materials Division, TMS: Advanced Characterization, Testing, and Simulation Committee, TMS: Mechanical Behavior of Materials Committee, TMS: Nanomechanical Materials Behavior Committee, TMS: Nuclear Materials Committee***Program Organizers:*** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing**Thursday AM | March 7, 2024****Bayhill 19 | Hyatt**

**Session Chairs:** Yue Fan, University of Michigan; Irene Beyerlein, University of California Santa Barbara

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**8:30 AM Invited**

**Continuum Theory of Defects as a Framework for Predictive Modeling of Radiation Effects in Crystalline Solids:** *Anter El-Azab*<sup>1</sup>; *Sreekar Rayaprolu*<sup>1</sup>; <sup>1</sup>Purdue University

**8:55 AM Invited**

**Bias and Void Swelling in Irradiated -iron Using Mesoscale and Atomistic Simulations:** *Haixuan Xu*<sup>1</sup>; *Ziang Yu*<sup>1</sup>; <sup>1</sup>University of Tennessee

**9:20 AM**

**Determining the Spatial Distribution of Primary Radiation Damage in Nanostructured Materials:** *Matt Brand*<sup>1</sup>; *Patrick Burr*<sup>1</sup>; *Edward Obbard*<sup>1</sup>; <sup>1</sup>University of New South Wales

**9:40 AM**

**Molecular Dynamics Simulations of the Interaction of Energetic Atomic Oxygen with Carbon Nanotube Based Composites:** *Fuyue Li*<sup>1</sup>; *Chaitanya Deo*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**10:00 AM Break**

**10:20 AM Invited**

**Radiation Induced Segregation in Nanocrystalline Alloys: Perspectives from Modeling:** *Yongfeng Zhang*<sup>1</sup>; *Raphaelle David*<sup>1</sup>; *Aashique Rezwan*<sup>2</sup>; *Andrew Hoffman*<sup>3</sup>; *Haiming Wen*<sup>4</sup>; <sup>1</sup>University of Wisconsin; <sup>2</sup>Sandia National Laboratory ; <sup>3</sup>General Electric ; <sup>4</sup>Missouri S&T

**10:45 AM Invited**

**The Role of Local Chemical Ordering on Diffusion and Deformation Mechanisms in Multi-principal Element Alloys:** *Penghui Cao*<sup>1</sup>; <sup>1</sup>University of California, Irvine

**11:10 AM**

**Understanding Functional Materials in Extremes Through Machine-guided Discovery:** *Steven Spurgeon*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**11:30 AM**

**The Role of Twin Boundaries and Pre-existing Dislocations on the Mechanical Behavior of Tungsten:** *Omar Hussein*<sup>1</sup>; *Tomas Ooppelstrup*<sup>2</sup>; *Fadi Abdeljawad*<sup>3</sup>; *Timofey Frolov*<sup>2</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Lawrence Livermore National Laboratory; <sup>3</sup>Lehigh University

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Phase Stability in Extreme Environments II — Oxidation and Hydrogen influence on Phase Changes

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

**Program Organizers:** David Frazer, Idaho National Laboratory; Andrew Hoffman, GE Research; Kinga Unocic, Oak Ridge National Laboratory; Janelle Wharry, Purdue University; Kaila Bertsch, Lawrence Livermore National Laboratory; Raul Rebak, GE Global Research; Tianyi Chen, Oregon State University; Marie Romedenne, Oak Ridge National Laboratory

**Thursday AM | March 7, 2024**

**8:30 AM Invited**

**Impact of Build/Print Variations on Steam Oxidation Performance of 316L Stainless Steel:** Elizabeth Sooby<sup>1</sup>; Scott Schier<sup>1</sup>; Ana Stevanovic<sup>1</sup>; Brian Jaques<sup>2</sup>; Patrick Warren<sup>1</sup>; <sup>1</sup>University of Texas at San Antonio; <sup>2</sup>Boise State University

**9:00 AM**

**Degradation Mechanisms of Steels and Ni-based Alloys in Hydrogen/Water Vapor High Temperature Environments:** David Kniep<sup>1</sup>; Mario Rudolphi<sup>1</sup>; Mathias Galetz<sup>1</sup>; <sup>1</sup>DECHEMA-Forschungsinstitut

**9:20 AM Invited**

**The Less Understood Impact of Environmental Degradation on Phase Stabilities in High Temperature Alloys:** Rishi Pillai<sup>1</sup>; Marie Romedenne<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**9:50 AM Break**

**10:10 AM Invited**

**Atomic-scale Understanding of the Hydrogen Embrittlement Mechanism in Model and Commercial Austenitic Steels Using Cryogenic Transfer Atom Probe Tomography:** Zehao Li<sup>1</sup>; Semanti Mukhopadhyay<sup>1</sup>; Tingkun Liu<sup>1</sup>; Dallin Barton<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**10:40 AM**

**Effect of Hydrogen on the Phase Stability of Steels:** Tilmann Hickel<sup>1</sup>; Ali Tehrani<sup>2</sup>; Joerg Neugebauer<sup>2</sup>; <sup>1</sup>BAM Federal Institute for Materials Research and Testing; <sup>2</sup>Max-Planck-Institut fuer Eisenforschung

**11:00 AM**

**Non-ideality of Hydrogen Isotope Permeation in Metals & Alloys:** Kacie Breeding<sup>1</sup>; Steven Zinkle<sup>1</sup>; Weicheng Zhong<sup>2</sup>; <sup>1</sup>University of Tennessee, Knoxville; <sup>2</sup>Oak Ridge National Laboratory

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**MATERIALS SYNTHESIS AND PROCESSING**

**Phase Transformations and Microstructural Evolution — Ferrous Alloys I**

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Thursday AM | March 7, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Eric Payton, University of Cincinnati

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**8:30 AM**

**Interfacial and Microstructural Characteristics of Mechanically Alloyed and Spark Plasma Sintered Fe-Ni-Si alloys:** Bamidele Lawrence Bayode<sup>1</sup>; Molebogeng

Maumakwe<sup>2</sup>; Linda Teffo<sup>2</sup>; Peter Olubambi<sup>1</sup>; <sup>1</sup>University of Johannesburg - Doornfontein Campus; <sup>2</sup>Tshwane University of Technology

**8:50 AM**

**Abnormal Cryogenic Strength Enabled by Magnetic-Ordering-Driven Tetragonality in Metastable Steel:** *Satoshi Morooka*<sup>1</sup>; Naoki Igawa<sup>1</sup>; Miki Sasaki<sup>1</sup>; Nozomi Nabatame<sup>1</sup>; Katsuaki Kodama<sup>1</sup>; <sup>1</sup>Japan Atomic Energy Agency

**9:10 AM**

**Effect of Lamellarizing Heat Treatments on Low Temperature Impact Toughness in 9% Ni Steel Alloy:** *Younghoon Kim*<sup>1</sup>; Eunji Song<sup>2</sup>; So-Hyeon Lee<sup>1</sup>; Minh Park<sup>3</sup>; Hyunbo Shim<sup>3</sup>; Ju-Young Kim<sup>1</sup>; <sup>1</sup>UNIST (Ulsan National Institute of Science and Technology); <sup>2</sup>University of Michigan, Ann Arbor; <sup>3</sup>Hyundai Steel

**9:30 AM**

**On the Possible Mechanisms of Serrated Flow in 316L Stainless Steel during Tensile Testing at 6K:** *Muhammad Ishtiaq*<sup>1</sup>; Saurabh Tiwari<sup>1</sup>; Young-Kyun Kim<sup>2</sup>; Ka-Ram Lim<sup>2</sup>; Young-Sang Na<sup>2</sup>; Jae-Bok Seol<sup>1</sup>; <sup>1</sup>Gyeongsang National University; <sup>2</sup>Korea Institute of Materials Science (KIMS)

**9:50 AM Break**

**10:10 AM**

**Optimizing Mechanical Properties of Q&T Steels by Tailoring the Evolution of Nano-scale Cu-precipitates:** *Kapil Sharma*<sup>1</sup>; Kaustav Barat<sup>2</sup>; Sudipta Patra<sup>3</sup>; Anish Karmakar<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Roorkee; <sup>2</sup>CSIR-National Aerospace Laboratories, Bangalore; <sup>3</sup>Indian Institute of Technology (BHU), Varanasi

**10:30 AM**

**Microstructure Evolution during Magnetic Field-assisted Processing of Steels:** *Megan Hurley*<sup>1</sup>; Ramon Padin-Monroig<sup>1</sup>; Zhongwei Li<sup>1</sup>; Zach Tener<sup>2</sup>; Steven Flynn<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

**10:50 AM**

**Athermally-enhanced Recrystallization Behavior in Cold-rolled Pure Fe Strips Induced by Novel Electro-treatment: A Comprehensive Study of Microstructure, Texture, Crystallinity, and Mechanical Property:** *Meng-Chun Chiu*<sup>1</sup>; Hsuan-Cheng Huang<sup>1</sup>; Pao-Hsuan Yang<sup>1</sup>; Chien-Lung Liang<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

**Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Printed Electronics V**

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

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

**Thursday AM | March 7, 2024**  
**Orlando L | Hyatt**

**Session Chair:** Benjamin Lariviere, Oak Ridge National Laboratory

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**8:30 AM Invited**

**Scalable and Sustainable Production of Printable Nanoelectronic Inks:** *Mark Hersam*<sup>1</sup>; <sup>1</sup>Northwestern University

**8:55 AM**

**Nanoscale Printing of Metals via Localized Photoreduction:** *Jungho Choi*<sup>1</sup>; *Sourabh Saha*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**9:15 AM**

**Measurement of Thermal Properties of Multilayer Porous Printed Films Using Modulated Photothermal Radiometry:** *Javier Corona*<sup>1</sup>; *Nirmala Kandada*<sup>1</sup>; <sup>1</sup>Oregon State University

**9:35 AM Invited**

**Vapour-phase Microreactor-assisted Nanomaterial Deposition for Additive Manufacturing:** *V. Vinay K. Doddapaneni*<sup>1</sup>; *Jeffery Dhas*<sup>1</sup>; *Chuankai Song*<sup>1</sup>; *Havva Aysa*<sup>2</sup>; *Alvin Chang*<sup>1</sup>; *Konstantinos Sierros*<sup>2</sup>; *Somayeh Pasebani*<sup>1</sup>; *Brian Paul*<sup>1</sup>; *Mark Rice*<sup>1</sup>; *Changqing Pan*<sup>1</sup>; *Chih-Hung Chang*<sup>1</sup>; <sup>1</sup>Oregon State University; <sup>2</sup>West Virginia University

**10:00 AM**

**Additively Manufactured Multifunctional Zed Fresnel Lenses for Sensing Applications:** *Murad Ali*<sup>1</sup>; *Haider Butt*<sup>1</sup>; <sup>1</sup>Khalifa University

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**NUCLEAR MATERIALS**

**Seaborg Institutes: Emerging Topics in Actinide Materials and Science — Actinide Chemistry and Modeling**

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

**Program Organizers:** Don Wood, Idaho National Laboratory; Samantha Schrell, Oak Ridge National Laboratory; Toni Karlsson, Idaho National Laboratory; Ping Yang, Los Alamos National Laboratory; Zachary Levin, Los Alamos National Laboratory

**Thursday AM | March 7, 2024**  
**Blue Spring II | Hyatt**

**Session Chair:** Ping Yang, Los Alamos National Laboratory

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**8:30 AM**

**Density Functional Theory Calculations of the Phonons in Gamma and Delta Phase Pu:** *Sven Rudin*<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**8:55 AM**

**Binding of Radionuclides and Surrogate to 18-Crown-6 Ether by Density Functional Theory:** *Yuan Liu*<sup>1</sup>; *An Ta*<sup>1</sup>; *Kyoung Park*<sup>2</sup>; *Shenyang Hu*<sup>3</sup>; *Natalia Shustova*<sup>2</sup>; *Simon Phillpot*<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of South Carolina; <sup>3</sup>Pacific Northwest National Laboratory

**9:20 AM**

**Diffusion Based Phase Equilibria Investigation of the Uranium-Techetium System:** *Josephine Libero*<sup>1</sup>; *Frederic Poineau*<sup>1</sup>; *Daniel Koury*<sup>1</sup>; <sup>1</sup>University of Nevada Las Vegas

9:45 AM

**Ab-Initio Molecular Dynamics Simulations of Actinide-containing Molten Salts:**

*Gaoxue Wang*<sup>1</sup>; Bo Li<sup>1</sup>; Ping Yang<sup>1</sup>; David A. Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

10:10 AM Break

10:30 AM

**Organic Diluent Radiolysis and the Impact of f-element Complexation on Ligand Stability for Spent Nuclear Fuel Reprocessing:**

*Jacy Conrad*<sup>1</sup>; Stephen Mezyk<sup>2</sup>; Cristian Celis-Barros<sup>3</sup>; Andrew Cook<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>Oak Ridge National Laboratory; <sup>4</sup>Brookhaven National Laboratory

10:55 AM

**Thermochemical Models to Address Impurities in Actinide Alloys:** *Emily Moore*<sup>1</sup>;

<sup>1</sup>Lawrence Livermore National Laboratory

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## MECHANICS OF MATERIALS

### Structure-Property Relationships of Bulk Metallic Glasses – Structure and Mechanical Properties II

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

Thursday AM | March 7, 2024

Rock Spring I and II | Hyatt

**Session Chair:** Daniel Soppa, Erich Schmid Institute, Austrian Academy of Sciences

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8:30 AM Invited

**Tailoring Structure, Residual Stresses and Heterogeneity in Metallic Glasses:**

*Jurgen Eckert*<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science

8:55 AM

**Tracking the Evolution of Local Strain Fields in Tailored Metallic Glass Composites during In-situ Deformation in the TEM:**

*Simon Fellner*<sup>1</sup>; Lukas Schretter<sup>1</sup>; Jürgen Eckert<sup>1</sup>; Christoph Gammer<sup>1</sup>; <sup>1</sup>Austrian Academy of Sciences

9:15 AM

**Size-effects in Deformation of Rejuvenated and Annealed Metallic Glass:**

*Akib Javed*<sup>1</sup>; *Golden Kumar*<sup>1</sup>; <sup>1</sup>University of Texas at Dallas

9:35 AM

**Bridging Necking and Shear-banding Mediated Tensile Failure in Glasses:**

*Ethen Lund*<sup>1</sup>; David Richard<sup>2</sup>; Jan Schroers<sup>1</sup>; Eran Bouchbinder<sup>3</sup>; <sup>1</sup>Yale University; <sup>2</sup>Université Grenoble Alpes, CNRS; <sup>3</sup>Weizmann Institute of Science

9:55 AM Break

10:15 AM

**A General Framework for the Mechanical Response of Metallic Glasses during Strain-rate-dependent Uniaxial Compression:** *Weiwei Jin*<sup>1</sup>; Amit Datye<sup>1</sup>; Udo Schwarz<sup>1</sup>; Mark Shattuck<sup>2</sup>; Corey O'Hern<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>The City College of New York

10:35 AM

**Influence of Strain Rate on Compressive Deformation Behavior of Pt-Cu-Ni-P Bulk Metallic Glass:** *Shuhan Zhang*<sup>1</sup>; Jennifer Hay<sup>2</sup>; Kurt Johanns<sup>2</sup>; Aaron Stein<sup>3</sup>; Udo Schwarz<sup>1</sup>; Amit Datye<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>KLA Inc; <sup>3</sup>Brookhaven National Laboratory

10:55 AM

**Super Elastic Strain Limit in Metallic Glass Films:** *Jianzhong Jiang*<sup>1</sup>; X. D. Wang<sup>1</sup>; Q. P. Cao<sup>1</sup>; D.X. Zhang<sup>1</sup>; <sup>1</sup>Zhejiang University

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## MATERIALS SYNTHESIS AND PROCESSING

### Ultrafine-grained and Heterostructured Materials (UFGH XIII) – UFGH-Microstructure and Properties After SPD

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

**Program Organizers:** Megumi Kawasaki, Oregon State University; Penghui Cao, University of California, Irvine; Mostafa Hassani, Cornell University; Rajib Kalsar, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Praveen Kumar, Indian Institute of Science; Dmytro Orlov, Lund University

Thursday AM | March 7, 2024

Celebration 10 | Hyatt

**Session Chairs:** Nilesh Kumar, The University of Alabama; Satyam Suwas, Indian Institute of Science, Bangalore

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8:30 AM Invited

**Microstructure -- Texture -- Property Relationship in a Niobium Alloy Subjected to High-pressure Torsion:** *Satyam Suwas*<sup>1</sup>; S. Mondal<sup>1</sup>; S.K. Makineni<sup>1</sup>; P. Ghosh<sup>2</sup>; <sup>1</sup>Indian Institute of Science; <sup>2</sup>Indian Institute of Technology

9:00 AM

**Microstructural Analysis of Pfnodal Alloy Processed by Friction Extrusion:** *Mageshwari Komarasamy*<sup>1</sup>; Brian Milligan<sup>1</sup>; Scott Whalen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

9:20 AM

**Tensile Deformation Behavior of a Nanocrystalline Cu-2.7at.%Zr Supersaturated Solid-Solution Alloy Processed by the High-Pressure Torsion:** *Takahiro Kunimine*<sup>1</sup>; Kenta Miyamoto<sup>1</sup>; Ryoichi Monzen<sup>1</sup>; Reza Gholizadeh<sup>2</sup>; Nobuhiro Tsuji<sup>2</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>Kyoto University

9:40 AM

**Synthesis of Ti-TiAl<sub>3</sub> Metal -- Intermetallic Nanolaminates via Accumulative Roll Bonding and Annealing:** *Thomas Nizolek*<sup>1</sup>; Rodney McCabe<sup>1</sup>; Yifan Zhang<sup>1</sup>; Carl Osborn<sup>1</sup>; Sean Raybon<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**10:00 AM Break**

**10:20 AM Invited**

**Temporary Alloying with Hydrogen to Create Hierarchical Microstructures in Titanium Alloys:** *Brady Butler*<sup>1</sup>; Michael Hurst<sup>1</sup>; Daniel Lewis<sup>2</sup>; Matthew Dunstan<sup>1</sup>; James Paramore<sup>2</sup>; <sup>1</sup>DEVCOM Army Research Laboratory; <sup>2</sup>Texas A&M University

**10:50 AM**

**Effect of Processing Parameter on the Grain Structure Evolution in ODS 14YWT Alloy Powders Consolidated by Friction Stir Processing:** *Shubhrodev Bhowmik*<sup>1</sup>; Nilesh Kumar<sup>1</sup>; Kumar Kandasamy<sup>2</sup>; <sup>1</sup>University of Alabama Tuscaloosa; <sup>2</sup>Enabled Engineering

**11:10 AM**

**Ultrasonic Vibration-assisted Microforming of UFG Metals Produced by ECAP:** *Wojciech Presz*<sup>1</sup>; <sup>1</sup>Warsaw University of Technology

**11:30 AM**

**Cryogenic Mechanical Properties of the Equal-channel Angular Pressed High-Mn Steel:** Young Hoon Jung<sup>1</sup>; Beom Joon Kim<sup>1</sup>; Hyeonseok Kwon<sup>2</sup>; Marina Abarmova<sup>3</sup>; Hyoung Seop Kim<sup>2</sup>; Nariman Enikeev<sup>3</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

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### 2D Materials – Preparation, Properties, Modeling & Applications – Preparation, Properties, Modeling & Simulation 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; Ramana Chintalapalle, University of Texas at El Paso

**Thursday PM | March 7, 2024**

**Celebration 16 | Hyatt**

**Session Chairs:** Dibakar Datta, New Jersey Institute of Technology; Anupama Kaul, University of North Texas

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**1:00 PM Introductory Comments**

**1:10 PM**

**Stability of Pseudocapacitive Energy Storage in  $Ti_3C_2T_x$  MXene in a Wide Temperature Range:** *Ruocun Wang*<sup>1</sup>; Mark Anayee<sup>1</sup>; Teng Zhang<sup>1</sup>; Mikhail Shekhirev<sup>1</sup>; Kateryna Shevchuk<sup>1</sup>; Yury Gogotsi<sup>1</sup>; <sup>1</sup>A.J. Drexel Nanomaterials Institute, Drexel University

**1:30 PM Invited**

**Well-defined 3D Printing of Titanium Carbide ( $Ti_3C_2T_x$ ) MXene Nanosheets into Complex and Hierarchical Microarchitectures with High Aspect Ratio:** *Rahul Panat*<sup>1</sup>; Bin Yuan<sup>1</sup>; Chunshan Hu<sup>1</sup>; Azahar Ali<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**1:50 PM Invited**

**Study of Contact Metals to Transition Metal Dichalcogenides:** *Alex Mazzone*<sup>1</sup>; Patrick Taylor<sup>1</sup>; Wendy Sarney<sup>1</sup>; Sina Najmaei<sup>1</sup>; Meg Sales<sup>2</sup>; Peter Litwin<sup>2</sup>; Stephen McDonnell<sup>2</sup>; Yangchen He<sup>3</sup>; Joshua Eickhoff<sup>3</sup>; Robert Boyd<sup>3</sup>; Daniel Rhodes<sup>3</sup>; <sup>1</sup>US Army Research Lab; <sup>2</sup>University of Virginia; <sup>3</sup>University of Wisconsin

**2:10 PM Invited**

**Thermal Oxidation of Monolayer WS<sub>2</sub>:** Ye Fan<sup>1</sup>; Maryam Kazemzadeh-Atoufi<sup>2</sup>; Ryo Mizuta<sup>1</sup>; Stephan Hofmann<sup>1</sup>; *Peter Voorhees*<sup>2</sup>; <sup>1</sup>Cambridge University; <sup>2</sup>Northwestern University

**2:30 PM Break****2:45 PM Invited**

**Theory of Mechanical Exfoliation of van der Waals Layered Materials:** *Daryl Chrzan*<sup>1</sup>; Haoye Sun<sup>2</sup>; Ozan Sahin<sup>2</sup>; Joel Ager<sup>1</sup>; Ali Javey<sup>1</sup>; <sup>1</sup>University of California, Berkeley and Lawrence Berkeley National Laboratory; <sup>2</sup>University of California

**3:05 PM**

**Exploring the Remarkable Gas Sensing Capability of Molybdenum Diselenide Nanoparticles:** Asishana Onivefu<sup>1</sup>; Esther Ikhuoria<sup>2</sup>; Muniratu Maliki<sup>3</sup>; *Ikhazuagbe Ifijen*<sup>4</sup>; <sup>1</sup>University of Delaware; <sup>2</sup>University of Benin; <sup>3</sup>Edo State University; <sup>4</sup>Rubber Research Institute of Nigeria

**3:25 PM**

**An Overview of the Synthetic Route of Molybdenum Diselenide Nanoparticles:** Ita Uwidia<sup>1</sup>; Esther Ikhuoria<sup>1</sup>; Stanley Omorogbe<sup>2</sup>; *Ikhazuagbe Ifijen*<sup>2</sup>; Muniratu Maliki<sup>3</sup>; Aireguamen Aigbodion<sup>4</sup>; <sup>1</sup>University of Benin; <sup>2</sup>Rubber Research Institute of Nigeria; <sup>3</sup>Edo State University, Iyamhu; <sup>4</sup>Benson Idahosa University

**NUCLEAR MATERIALS**

### Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Mechanical Behavior

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

**Thursday PM | March 7, 2024**

**Blue Spring I | Hyatt**

**Session Chairs:** Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company

**1:00 PM Invited**

**Current Status on Dislocation Modeling at the Atomic Scale in UO<sub>2</sub>:** *Adrien Pivano*<sup>1</sup>; Marion Borde<sup>2</sup>; Bruno Michel<sup>3</sup>; Jules-Elémir Suchorski<sup>3</sup>; Michel Freyss<sup>3</sup>; Emeric Bourasseau<sup>3</sup>; David Rodney<sup>4</sup>; Jonathan Amodeo<sup>5</sup>; <sup>1</sup>CEA; <sup>2</sup>CEA, DES, IRESNE, DEC, SESC, Centre de Cadarache, Université de Lyon, ILM UMR5306 CNRS ; <sup>3</sup>CEA, DES, IRESNE, DEC, SESC, Centre de Cadarache; <sup>4</sup>Université de Lyon, ILM UMR5306 CNRS; <sup>5</sup>Université Aix Marseille, Université de Toulon, IM2NP, CNRS

**1:30 PM**

**Plastic Deformation of Uranium Dioxide at High Temperature: Modeling of the Single Crystal Plastic Anisotropy:** *Jonathan Amodeo*<sup>1</sup>; Ronan Madec<sup>2</sup>; Luc Portelet<sup>3</sup>; Bruno Michel<sup>3</sup>; <sup>1</sup>CNRS, Aix-Marseille Univ.; <sup>2</sup>CEA DAM DIF; <sup>3</sup>CEA IRESNE DEC SESC

**1:50 PM**

**Atomistic-scale Simulations of Creep in Uranium Oxide Nuclear Fuel:** *Conor Galvin*<sup>1</sup>; David Andersson<sup>1</sup>; Ryan Sweet<sup>2</sup>; Laurent Capolungo<sup>1</sup>; Michael Cooper<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Idaho National Laboratory

**2:10 PM**

**The Role of Grain Boundaries in Irradiation Enhanced Creep: A Cluster Dynamics Study of UO<sub>2</sub>:** *William Neilson*<sup>1</sup>; Conor Galvin<sup>1</sup>; Michael Cooper<sup>1</sup>; David Andersson<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**2:30 PM**

**Assessment of Effective Elastic Constants of Irradiated U-10Mo Fuel Microstructures:** *Sourabh Bhagwan Kadambi*<sup>1</sup>; Larry Aagesen<sup>1</sup>; Yongfeng Zhang<sup>2</sup>; Benjamin Beeler<sup>3</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>University of Wisconsin-Madison; <sup>3</sup>North Carolina State University

**2:50 PM Break****3:10 PM**

**Thermal Dependence of Mechanical Anisotropy In Zircaloy-4 Cladding:** *Malachi Nelson*<sup>1</sup>; Shmuel Samuha<sup>2</sup>; Peter Hosemann<sup>1</sup>; David Kamerman<sup>3</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>NRCN; <sup>3</sup>Idaho National Laboratory

**3:30 PM**

**Effects of Heterogeneous Porosity on Buffer Layer Fracture Mode:** *Abdullah Masri*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; Aashique Rezwani<sup>2</sup>; Claire Griesbach<sup>1</sup>; Ramathasan Thevamaran<sup>1</sup>; Tyler Gerczak<sup>3</sup>; Wen Jiang<sup>4</sup>; <sup>1</sup>University of Wisconsin – Madison; <sup>2</sup>Sandia National Laboratory; <sup>3</sup>Oak Ridge National Laboratory; <sup>4</sup>Idaho National Laboratory

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## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning – Mechanics

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

**Thursday PM | March 7, 2024**  
**Orlando N | Hyatt**

**Session Chairs:** Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center; Jing Zhang, Indiana University-Purdue University Indianapolis

**1:00 PM**

**The Impact of Beam Shaping on Grain Morphology and Mechanical Response of Additively Manufactured Microstructures:** *Moore*<sup>1</sup>; Giovanni Orlandi<sup>2</sup>; Sergio Turteltaub<sup>3</sup>; Theron Rodgers<sup>4</sup>; Daniel Moser<sup>4</sup>; Fadi Abdeljawad<sup>1</sup>; <sup>1</sup>Lehigh University;

<sup>2</sup>Clemson University; <sup>3</sup>Delft University of Technology; <sup>4</sup>Sandia National Laboratories

**1:20 PM**

**Modeling the Hardening and Damage Evolution of Additively Manufactured Metal Matrix Composites Using a Large-strain Elasto-viscoplastic FFT-based Framework:** *Claire Ticknor*<sup>1</sup>; Jamila Khanfri<sup>2</sup>; Alex Butler<sup>2</sup>; Aaron Stebner<sup>2</sup>; Joshua Kacher<sup>2</sup>; Ashley Spear<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>Georgia Institute of Technology

**1:40 PM**

**Crystal Plasticity Modeling of Thermo-elastic-plastic Deformation during Laser-based Additive Manufacturing:** *Yazhuo Liu*<sup>1</sup>; Kunqing Ding<sup>1</sup>; Yin Zhang<sup>2</sup>; Ting Zhu<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology; <sup>2</sup>Peking University

**2:00 PM**

**Effect of Nonuniform Void Distributions on the Yield Strength of Metals:** *Aitor Cruzado*<sup>1</sup>; Amine Benzerga<sup>1</sup>; <sup>1</sup>Texas A&M University

**2:20 PM**

**Softening Mechanisms in Additively Manufactured 420 Stainless Steel at Elevated Temperatures:** Harveen Bongao<sup>1</sup>; *Thomas McCarthy*<sup>1</sup>; Kudakwashe Nyamuchiwa<sup>1</sup>; Jubert Pasco<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>Alloy Design & Materials Testing Laboratory, University of New Brunswick

**2:40 PM Break**

**3:00 PM**

**Micro-mechanical Computational Modeling of Dislocation Cell Structures:** *Anderson Nascimento*<sup>1</sup>; Nikhil Mohanan<sup>2</sup>; Juan Guillermo Santos Macías<sup>2</sup>; Manas Upadhyay<sup>2</sup>; Irene Beyerlein<sup>1</sup>; <sup>1</sup>University of California, Santa Barbara; <sup>2</sup>École Polytechnique

**3:20 PM**

**Modeling Inherent Anisotropic Deformation Behavior of Laser Powder Bed Fusion (LPBF) Manufactured Metals for Different Laser Beam Shapes:** *Venkatesh Ananchaperumal*<sup>1</sup>; Istemi Ozsoy<sup>2</sup>; Daniel Moore<sup>1</sup>; Fadi Abdeljawad<sup>1</sup>; Srikanth Pilla<sup>1</sup>; Gang Li<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Embry Riddle Aeronautical University

**3:40 PM**

**Crystal Plasticity Modeling for Prediction of Fatigue Crack Initiation in Defect-containing Additively Manufactured Al-10Si-0.4Mg Alloys:** *Deepali Patil*<sup>1</sup>; Anthony Spangenberg<sup>1</sup>; Diana Lados<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**4:00 PM**

**Towards Large-scale Grain Growth Modeling in Powder Bed Fusion:** *Michael Paleos*<sup>1</sup>; Shawn Hinnebusch<sup>1</sup>; Albert To<sup>1</sup>; <sup>1</sup>University of Pittsburgh

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — In situ Monitoring**

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

**Thursday PM | March 7, 2024**

Orlando M | Hyatt

**Session Chairs:** Sneha Narra, Carnegie Mellon University; Joy Gockel, Colorado School of Mines

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**1:00 PM**

**Using High-speed Imaging to Inform Process-control Models in Laser Powder Bed Fusion:** *Andrew Moore*<sup>1</sup>; Kyle Perkins<sup>1</sup>; Ioannis Bitharas<sup>1</sup>; <sup>1</sup>Heriot-Watt University

**1:20 PM**

**Empowering Additive Manufacturing Qualification through In-situ Process Monitoring:** *Michael Heiden*<sup>1</sup>; Jesse Adamczyk<sup>1</sup>; Dan Bolintineanu<sup>1</sup>; Anthony Garland<sup>1</sup>; Ana Love<sup>1</sup>; Hyein Choi<sup>1</sup>; David Moore<sup>1</sup>; Catherine Appleby<sup>1</sup>; David Saiz<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**1:40 PM**

**Enhancing Mass Transfer in LPBF: A Dive into Oscillating Laser Scan Strategies and Melt Pool Dynamics:** *Ioannis Bitharas*<sup>1</sup>; Kyle Perkins<sup>1</sup>; Diego Della Crociata<sup>2</sup>; Adam Clare<sup>3</sup>; Marco Simonelli<sup>2</sup>; Andrew Moore<sup>1</sup>; <sup>1</sup>Heriot-Watt University; <sup>2</sup>Nottingham University; <sup>3</sup>University of British Columbia

**2:00 PM**

**Harmonizing Sound and Light: X-ray Imaging Unveils Acoustic Signatures of Stochastic Inter-regime Instabilities during Single and Multi-material Laser Melting:** *Milad Hamidi Nasab*<sup>1</sup>; Lucas Schlenger<sup>2</sup>; Steven Van Petegem<sup>3</sup>; Roland Loge<sup>2</sup>; Yunhui Chen<sup>4</sup>; Alexander Rack<sup>5</sup>; Bey Vrancken<sup>1</sup>; <sup>1</sup>KU Leuven; <sup>2</sup>École Polytechnique Fédérale de Lausanne; <sup>3</sup>Paul Scherrer Institute; <sup>4</sup>RMIT University; <sup>5</sup>The ESRF - European Synchrotron Radiation Facility

**2:20 PM**

**In situ Monitoring and Closed-loop Control of Laser, Powder Blown Directed Energy Deposition Using a Coaxial Photodiode Array:** *Samantha Webster*<sup>1</sup>; Jihoon Jeong<sup>2</sup>; Alberto Castro<sup>3</sup>; Lars Jacquemetton<sup>3</sup>; Jon-Erik Mogonye<sup>4</sup>; Shuheng Liao<sup>2</sup>; Julian Rocher<sup>2</sup>; Kornel Ehmann<sup>2</sup>; Jian Cao<sup>2</sup>; <sup>1</sup>National Institute of Standards and Technology; <sup>2</sup>Northwestern University; <sup>3</sup>Sigma Additive Solutions; <sup>4</sup>U.S. Army DEVCOM Army Research Laboratory

**2:40 PM Break**

**2:50 PM**

**In-situ Study on Fracture Behavior of Friction Stir Deposited AA 6061:** *Rajashekara Sarvesha*<sup>1</sup>; Tyler Dolmetsch<sup>1</sup>; Richard Eberheim<sup>2</sup>; Aaron Birt<sup>2</sup>; Victor Champagne<sup>3</sup>; Arvind Agarwal<sup>1</sup>; <sup>1</sup>FIU College of Engineering and Computing; <sup>2</sup>Solvus Global; <sup>3</sup>ARL

**3:10 PM**

**Controlling Melt Pool Dynamics during Additive Manufacturing Using External Forces:** *Xianqiang Fan*<sup>1</sup>; Tristan Fleming<sup>2</sup>; Samul Clark<sup>3</sup>; Kai Zhang<sup>1</sup>; Harry Chapman<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Chu Lun Alex Leung<sup>1</sup>; Robert Atwood<sup>4</sup>; Andrew Kao<sup>5</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Queen's University; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>Diamond Light Source; <sup>5</sup>University of Greenwich

**3:30 PM**

**Quantifying Thermal History in Laser Powder Bed Fusion Using In-situ Fiber-optic Sensing Techniques:** *Holden Hyer*<sup>1</sup>; Daniel Sweeney<sup>1</sup>; Christian Petrie<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**3:50 PM**

**Strain Measurement Using Non-rigid Registration For Mechanical Applications: A Case Study On WAAM-ed Product:** Omar Oraby<sup>1</sup>; Khalil Elkhodary<sup>1</sup>; Hanadi Salem<sup>1</sup>; <sup>1</sup>The American University in Cairo



4:10 PM

**In-situ Characterisation of Directed Energy Deposition of Selected Nickel Superalloys:** *Harry Chapman*<sup>1</sup>; Imogen Cowley<sup>1</sup>; David Rees<sup>1</sup>; Kai Zhang<sup>1</sup>; Sebastian Marussi<sup>1</sup>; Ben Saunders<sup>2</sup>; Martyn Jones<sup>2</sup>; Chu Lun Leung<sup>1</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Rolls-Royce plc.

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Process-induced Microstructures and Defects — Modeling and Other Defects

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

Thursday PM | March 7, 2024  
Florida C | Hyatt

**Session Chair:** Nadia Kouraytem, Utah State University

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1:00 PM

**Influence of Mo Micro-particles on Crack Formation, Microstructure, and Mechanical Behaviour of Laser Powder Bed Fusion Fabricated CuZrAl Bulk Metallic Glass Composites:** *Parthiban Ramasamy*<sup>1</sup>; Pei Wang<sup>2</sup>; Yang Lei<sup>2</sup>; X. Liu<sup>3</sup>; Jürgen Eckert<sup>1</sup>; <sup>1</sup>Erich Schmid Institute of Materials Science; <sup>2</sup>Henan Key Laboratory of High Performance Carbon Fiber Reinforced Composites, Carbon Matrix Composites Research Institute; <sup>3</sup>Han's Laser Smart Equipment Group Co., Ltd

1:20 PM

**Correlation of Keyhole Geometry with Spatters and Droplets during Laser Powder Bed Fusion Additive Manufacturing of Aluminium:** *Da Guo*<sup>1</sup>; Rubén Lambert-García<sup>1</sup>; Ravi Shahani<sup>2</sup>; Martha Majkut<sup>3</sup>; Alexander Rack<sup>3</sup>; Chu Lun Alex Leung<sup>1</sup>; Peter Lee<sup>1</sup>; <sup>1</sup>University College London; <sup>2</sup>Constellium Technology Center; <sup>3</sup>European Synchrotron Radiation Facility

1:40 PM

**Microstructure and Properties of Additively Manufactured Aluminum Alloys Containing Quasicrystalline Dispersoids:** *Sarshad Rommel*<sup>1</sup>; Mingxuan Li<sup>1</sup>; Thomas Watson<sup>2</sup>; Callie Benson<sup>3</sup>; Rainer Hebert<sup>1</sup>; Mark Aindow<sup>1</sup>; <sup>1</sup>University of Connecticut; <sup>2</sup>Pratt & Whitney; <sup>3</sup>Collins Aerospace

2:00 PM

**Porosity Predictions in Additively Manufactured Al-10Si-0.4Mg and Ti-6Al-4V Alloys Using a Geometric Model:** *Akshatha Chandrashekar Dixith*<sup>1</sup>; Anthony G. Spangenberg<sup>1</sup>; Diana A. Lados<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

2:20 PM Break

2:40 PM

**Development of a Digital Twin for Laser Powder Bed Fusion of A205 Al-Alloy:** *Francesco Careri*<sup>1</sup>; Raja Khan<sup>2</sup>; Leonardo Stella<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>TWI Ltd

3:00 PM

**Unveiling Metal Additive Manufacturing Microstructure through Data-Driven Unsupervised Clustering of Crystallographic Texture:** *Aashique Rezwan*<sup>1</sup>; David Montes de Oca Zapiain<sup>1</sup>; Daniel Moser<sup>1</sup>; Michael Heiden<sup>1</sup>; Theron Rodgers<sup>1</sup>; <sup>1</sup>Sandia

National Laboratories

**3:20 PM**

**Enhancing the Productivity in Laser Powder Bed Fusion through Functionally Graded Structures:** *Alya Alhammadi*<sup>1</sup>; Hend Alqaydi<sup>1</sup>; Chinmay Phutela<sup>1</sup>; Rafael Santiago<sup>1</sup>; Nesma Aboulkhair<sup>1</sup>; <sup>1</sup>Technology Innovation Institute

**3:40 PM**

**Effect of Powder Based, Metal AM Processing Parameters on Resulting Grcop-42 Specimens:** *Elaina Walker*<sup>1</sup>; Judy Schneider<sup>2</sup>; <sup>1</sup>University of Alabama in Huntsville; <sup>2</sup>University of Alabama at Huntsville

**4:00 PM**

**Microstructural Control in Laser Powder Bed Fusion of Ti-6Al-4V Structures:** *Dina Fouad*<sup>1</sup>; Chinnapat Panwisawas<sup>2</sup>; Yu-Lung Chiu<sup>1</sup>; Moataz Attallah<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>Queen Mary University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 – Energy Conversion and Storage Mix II

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

**Thursday PM | March 7, 2024**  
**Celebration 13 | Hyatt**

**Session Chairs:** Seaton Ullberg, University of Florida; Esther Takeuchi, Stony Brook University; Susmita Sarkar, Purdue University; Aashutosh Mistry, Colorado School of Mines

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**1:00 PM**

**Understanding the Mechanics of Na<sup>+</sup> Storage into Hard Carbons from Real-time Stress Measurement During Electrochemical Cycling:** *Amit Chanda*<sup>1</sup>; Abdulrahman Alfadhli<sup>1</sup>; Akshay Pakhare<sup>1</sup>; Vijay Sethuraman<sup>2</sup>; Siva Nadimpalli<sup>1</sup>; <sup>1</sup>Michigan State University; <sup>2</sup>University of South Carolina/Faraday Laboratory LLC

**1:20 PM**

**Predicting Short-range Ordering in High Entropy Li-oxides using Density Functional Theory and Crystal Graph Neural Networks:** *R. Seaton Ullberg*<sup>1</sup>; John Langhout<sup>1</sup>; Megan Butala<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida

**1:40 PM**

**Statistical and Machine Learning-based Efficient Navigation of Parameters Space and Durability Testing for Energy Storage:** *Maher Alghalayini*<sup>1</sup>; Marcus Noack<sup>1</sup>; Stephen Harris<sup>1</sup>; <sup>1</sup>Lawrence Berkeley National Laboratory

**2:05 PM**

**Tunable Grain Boundary Conductivity in Sodium Doped High Entropy Oxides:** *Justin Cortez*<sup>1</sup>; Alexander Dupuy<sup>2</sup>; Hasti Vahidi<sup>1</sup>; Yiheng Xiao<sup>1</sup>; William Bowman<sup>1</sup>; Julie Schoenung<sup>1</sup>; <sup>1</sup>University of California Irvine; <sup>2</sup>University of Connecticut

2:25 PM Break

2:45 PM

**Effect of Aggregate Structures of Carbon Support on Electrode Reaction Activity in Cathode Catalyst Layer of Polymer Electrolyte Fuel Cells: Reactive Molecular Dynamics Simulation:** *Kaito Mori*<sup>1</sup>; Tetsuya Nakamura<sup>1</sup>; Shogo Fukushima<sup>1</sup>; Yixin Su<sup>2</sup>; Yuta Asano<sup>1</sup>; Yusuke Ootani<sup>1</sup>; Nobki Ozawa<sup>2</sup>; Momoji Kubo<sup>1</sup>; <sup>1</sup>Institute for Materials Research, Tohoku University; <sup>2</sup>New Industry Creation Hatchery Center, Tohoku University

3:05 PM

**Methane Chemical Looping Partial Oxidation over NiO/Ce<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub>-MgO Oxygen Carrier to Produce High Purity Syngas:** *Wang Chengrui*<sup>1</sup>; Songming Zheng<sup>1</sup>; Mujun Long<sup>1</sup>; Dengfu Chen<sup>1</sup>; Huamei Duan<sup>1</sup>; Yandong Li<sup>2</sup>; <sup>1</sup>Chongqing University; <sup>2</sup>Yangtze Normal University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advances in Magnetism and Magnetic Materials – Sustainability and Emerging Topics in Application and Characterization of Magnetic Materials

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

**Program Organizers:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

Thursday PM | March 7, 2024  
Bayhill 27 | Hyatt

**Session Chair:** Michael S. Kesler, Oak Ridge National Laboratory

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1:00 PM Invited

**High Entropy Magnetic and Invar Alloys:** *Dierk Raabe*<sup>1</sup>; Liuliu Han<sup>1</sup>; Ziyuan Rao<sup>1</sup>; <sup>1</sup>Max-Planck Institute

1:30 PM

**Combinatorial Synthesis and Characterization of Al<sub>x</sub>CrFeCoNi for Enhanced Magnetic Performance:** *Md Imran Noor*<sup>1</sup>; Michael Detisch<sup>1</sup>; Lance E. DeLong<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

1:50 PM Invited

**Current Results in Neutron Scattering for Structural Characterization of Magnetic Nanoparticles with Bio-macromolecules:** *Viktor Petrenko*<sup>1</sup>; <sup>1</sup>BCMATERIALS & IKERBASQUE

2:20 PM Invited

**Unraveling Optically Induced Ultrafast Modification of Nanoscale Magnetic Textures:** *Roopali Kukreja*<sup>1</sup>; *Rahul Jangid*<sup>2</sup>; <sup>1</sup>UC Davis; <sup>2</sup>NSLS-II, Brookhaven National Laboratory

2:50 PM Break

3:05 PM

**The Microstructure Stability of New Co-based Amorphous/Nanocomposite Alloys in Corrosive Environments:** *Yuankang Wang*<sup>1</sup>; Lauren Wewer<sup>1</sup>; Alex Leary<sup>2</sup>; Ronald D. Noebe<sup>2</sup>; Paul Ohodnicki<sup>1</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>NASA

**3:25 PM Invited**

**On the Nitrogenation Process of Nd-based 1:12 Rare Earth Magnets:** Daniel Salazar<sup>1</sup>; Jose Maria Porro<sup>1</sup>; Inés Puente-Orench<sup>2</sup>; Pablo Martinez-Outomuro<sup>3</sup>; Andrés García-Franco<sup>1</sup>; *Cristina Echevarria-Bonet*<sup>3</sup>; <sup>1</sup>BCMaterials; <sup>2</sup>Institut Laue Langevin; <sup>3</sup>Universidad de Oviedo

**3:55 PM**

**Ferrite Based Soft Magnetic Nanocomposites for High Frequency Power Electronic Applications:** *Suraj Mullurkara*<sup>1</sup>; Chris Bracken<sup>1</sup>; Paul Ohodnicki; <sup>1</sup>University of Pittsburgh

**MECHANICS OF MATERIALS**

### Advances in Multi-Principal Element Alloys III: Mechanical Behavior – Thermal and Other 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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

**Thursday PM | March 7, 2024**

**Barrel Spring II | Hyatt**

**Session Chairs:** Eric Lass, University of Tennessee-Knoxville; Eun Park, Seoul National University

**1:00 PM Invited**

**Microstructure and Properties of Refractory Compositionally Complex Alloys: A Thermodynamic Perspective:** *Eric Lass*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**1:20 PM**

**Underlying Micro-mechanisms of Creep Degradation of the AlMo<sub>0.5</sub>NbTa<sub>0.5</sub>TiZr Refractory High Entropy Superalloy:** *Patricia Suarez Ocano*<sup>1</sup>; Christian Gadelmeier<sup>2</sup>; Uwe Glatzel<sup>2</sup>; Guillaume Laplanche<sup>3</sup>; Reza Darvishi Kamachali<sup>1</sup>; Leonardo Agudo Jácome<sup>1</sup>; <sup>1</sup>Bundesanstalt für Materialforschung und -prüfung (BAM); <sup>2</sup>University of Bayreuth; <sup>3</sup>Ruhr University Bochum

**1:40 PM**

**Creep Behavior at Elevated Temperatures of Multiphase FeNiMnAlCr High Entropy Alloys:** *Edwin Jiang*<sup>1</sup>; Xiaoxue Gao<sup>1</sup>; Andrew Pike<sup>1</sup>; Ian Baker<sup>1</sup>; Jifeng Liu<sup>1</sup>; Geoffroy Hautier<sup>1</sup>; <sup>1</sup>Dartmouth College

**2:00 PM Invited**

**Optimization of Conflicting Properties through Tailored Compositional Complexity in Refractory High Entropy Alloys:** I.H. Kim<sup>1</sup>; J.K. Kim<sup>1</sup>; H. Oh<sup>1</sup>; *Eun Soo Park*<sup>1</sup>; <sup>1</sup>Seoul National University

**2:20 PM**

**Impact of Co and Fe Substitutions on Microstructural Evolution and Mechanical Characteristics of Quaternary Equiatomic High-entropy Alloys:** *Elyorjon Jumaev*<sup>1</sup>; Orifjon Mikhliev<sup>1</sup>; Dilshodbek Usmonov<sup>1</sup>; Mukhammadjon Usmonov<sup>1</sup>; Sarvar Rozikhodjaev<sup>1</sup>; <sup>1</sup>FDI Uzli Engineering LLC

2:40 PM Break

3:00 PM

**Ultrahigh Temperature Tensile and Creep Strength of Multi-principal Element Alloys:** *Michael Patullo*<sup>1</sup>; Syed I.A. Jalali<sup>1</sup>; Leah Mills<sup>2</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

3:20 PM

**Modeling and Analysis of the Extreme Process Conditions during the Fabrication of High-entropy Alloys by Shear Assisted Processing and Extrusion (ShAPE):** *Lei Li*<sup>1</sup>; Mohan Nartu<sup>1</sup>; Mageshwari Komarasamy<sup>1</sup>; Ayoub Soulami<sup>1</sup>; Isabella van Rooyen<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

3:40 PM

**The Impact of Compositional Variations on Microstructure and Nanomechanical Properties of Additively Manufactured AlCuFeNiTi High Entropy Alloy:** *Sandeep Khadka*<sup>1</sup>; Hubert Bilan<sup>1</sup>; Tao Ma<sup>2</sup>; Philip Yuya<sup>1</sup>; <sup>1</sup>Clarkson University; <sup>2</sup>University of Michigan

4:00 PM

**Unraveling Mechanistic Competition during Deformation of CoCrNi Medium Entropy Alloys:** *Ankit Gupta*<sup>1</sup>; Wu-Rong Jian<sup>2</sup>; ShuoZhi Xu<sup>3</sup>; Irene Beyerlein<sup>4</sup>; Garritt Tucker<sup>1</sup>; <sup>1</sup>Baylor University; <sup>2</sup>Stanford University; <sup>3</sup>University of Oklahoma; <sup>4</sup>University of California, Santa Barbara

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

**AI/Data Informatics: Computational Model Development, Verification, Validation, and Uncertainty Quantification — Session VIII**

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

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

**Thursday PM | March 7, 2024**  
**Bayhill 32 | Hyatt**

**Session Chair:** Anh Tran, Sandia National Laboratories

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1:00 PM

**Using Unsupervised Learning to Cluster Fatigue Life Based on Small Crack Characteristics:** *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 Lab; <sup>3</sup>University of Michigan, Ann Arbor

1:20 PM

**Using Deep Learning to Predict Microstructurally Small Crack Growth Behavior in Three-dimensional Microstructures:** *Vignesh Babu Rao*<sup>1</sup>; Ashley Spear<sup>1</sup>; <sup>1</sup>University of Utah

**1:40 PM**

**Predicting Fracture Toughness with Microstructure Sensitivity Using an Elastoviscoplastic Fast Fourier Transform Model:** *Milica Letic*<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

**2:00 PM**

**Role of Training Dataset on Machine Learning Based Grain Growth Model:** *Vishal Yadav*<sup>1</sup>; Cazlin Rains<sup>1</sup>; Cameron Chan<sup>1</sup>; Joseph Melville<sup>1</sup>; Yang Kang<sup>1</sup>; Joel Harley<sup>1</sup>; Michael Tonks<sup>1</sup>; <sup>1</sup>University of Florida

**2:20 PM Break****2:35 PM**

**Improving Prediction of Microstructures Using Physics-informed Machine Learning:** Joseph Hafen<sup>1</sup>; *Benjamin Rhoads*<sup>1</sup>; Samrat Choudhury<sup>1</sup>; <sup>1</sup>University of Mississippi

**2:55 PM**

**Leveraging Machine Learning to Increase Computational Efficiency in Electrochemical Systems: An Application to Galvanic Corrosion:** *David Montes De Oca Zapain*<sup>1</sup>; Demitri 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

**3:15 PM**

**Microstructural Analysis of Stainless Steel Backscatter Electron Images by Combining EBSD Data and Deep Learning:** *Julia Nguyen*<sup>1</sup>; Mohammad Fuad Nur Taufique<sup>1</sup>; Jenna Pope<sup>1</sup>; Julian Escobar<sup>1</sup>; <sup>1</sup>PNNL

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithm Development in Materials Science and Engineering – Algorithms for Massively Parallel Material Science Simulations

**Sponsored by:**

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

**Thursday PM | March 7, 2024**

**Bayhill 28 | Hyatt**

**Session Chair:** Eric Homer, Brigham Young University

**1:00 PM**

**A User-friendly Tool for Generating Printability Maps for Laser-powder Bed Fusion:** *Peter Morcos*<sup>1</sup>; Brent Vela<sup>1</sup>; Sofia Sheik<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Alaa Elwany<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**1:20 PM**

**Enabling Materials Science Simulations with the Cabana Library:** *Sam Reeve*<sup>1</sup>; Kwitae Chong<sup>1</sup>; John Coleman<sup>1</sup>; Steve DeWitt<sup>1</sup>; David Joy<sup>2</sup>; Austin Isner<sup>1</sup>; Matt Rolchigo<sup>1</sup>; Pablo Seleson<sup>1</sup>; Stuart Slattery<sup>1</sup>; Jamie Stump<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Auburn University

**1:40 PM Invited**

**Material Data Driven Design:** *David Montes De Oca Zapain*<sup>1</sup>; Benjamin Greene<sup>1</sup>; Hojun Lim<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**2:10 PM Break****2:30 PM**

**Monte Carlo Based Uncertainty Quantification of Crystal Plasticity Simulations Using ExaConstit:** *Venkata Sai Harshit Gaddam*<sup>1</sup>; Robert Carson<sup>2</sup>; Jim Belak<sup>2</sup>; Michael Sangid<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Lawrence Livermore National Laboratory

**2:50 PM**

**Challenges in Modularizing and Scaling DAMASK:** *Daniel Otto de Mentock*<sup>1</sup>; Sharan Roongta<sup>1</sup>; Pratheek Shanthraj<sup>2</sup>; Philip Eisenlohr<sup>3</sup>; Martin Diehl<sup>4</sup>; Franz Roters<sup>1</sup>; <sup>1</sup>Max Planck Institute for Iron Research; <sup>2</sup>Atomic Energy Authority; <sup>3</sup>Michigan State University; <sup>4</sup>KU Leuven

**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS****Alloys and Compounds for Thermoelectric and Solar Cell Applications XII – Session V**

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

**Thursday PM | March 7, 2024**  
**Bayhill 26 | Hyatt**

**Session Chairs:** Wan-Ting Chiu, Tokyo Institute of Technology; Pai-chun Wei, National Cheng Kung university

**1:00 PM Invited**

**Neutron Scattering Study on the Low Thermal Conductivity of the Argyrodite Ag<sub>8</sub>SnSe<sub>6</sub>:** *Jie Ma*<sup>1</sup>; Olivier Delaire<sup>2</sup>; <sup>1</sup>Shanghai Jiao Tong University; <sup>2</sup>Duke University

**1:20 PM Invited**

**Phase Transition-induced Thermal Hysteresis and Their Significance in Thermoelectricity:** *Mona Zebarjadi*<sup>1</sup>; <sup>1</sup>University of Virginia

**1:40 PM Invited**

**Predictions via Machine Learning of the Thermoelectric Properties of Doped SnSe Materials with Experimental Validation:** *Holger Kleinke*<sup>1</sup>; <sup>1</sup>University of Waterloo

**2:00 PM Invited**

**A Sandwich-structured Ni-Mn-Ga Particles/Cu Foil Composite Material Toward the Applications of Magnetic Cooling: Experiments and Simulations:** *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>UPV/EHU Science Park

**2:20 PM**

**Surface Decorated BiFeO<sub>3</sub> with Au Nanoparticles for Effective Photodegradation:** *Jhen-Yang Wu*<sup>1</sup>; Tomoyuki Kurioka<sup>1</sup>; Chun-Yi Chen<sup>1</sup>; Masato Sone<sup>1</sup>; Satoshi Okamoto<sup>2</sup>; Tso-Fu Mark Chang<sup>1</sup>; Yung-Jung Hsu<sup>1</sup>; <sup>1</sup>Tokyo Tech; <sup>2</sup>Sumitomo Chemical

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## 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; Po-Yu Chen, National Tsing Hua University; Terry Lowe, Colorado School of Mines

**Thursday PM | March 7, 2024**  
**Celebration 12 | Hyatt**

**Session Chairs:** Terry Lowe, Colorado School of Mines; Hannes Schniepp, William & Mary University

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#### 1:00 PM Invited

**Exploring the 3-Dimensional Structure and Composition of Dental Enamel at the Nanoscale:** Jack Grimm<sup>1</sup>; Cameron Renteria<sup>2</sup>; Carli Marsico<sup>2</sup>; Juliana Fernández-Arteaga<sup>3</sup>; Arun Devaraj<sup>4</sup>; Dwayne Arola<sup>2,1</sup>; University of Washington; Pacific Northwest National Laboratory; <sup>2</sup>University of Washington; <sup>3</sup>Institución Universitaria Digital de Antioquia; <sup>4</sup>Pacific Northwest National Laboratory

#### 1:30 PM Invited

**Tailoring the Micro- and Nanostructure of Freeze-cast Scaffolds for Biomaterials:** Steven Naleway<sup>1</sup>; Tony Yin<sup>1</sup>; Maddie Schmitz<sup>1</sup>; Josh Fernquist<sup>1</sup>; Debora Lyn Porter<sup>2</sup>; Elise Hotz<sup>1</sup>; <sup>1</sup>University of Utah; <sup>2</sup>University of California, Merced

#### 2:00 PM

**Measuring and Calibrating Interfacial Forces at Hard and Soft Interfaces via Force Spectroscopy for Quantitative Materials Description:** Avishi Abeywickrama<sup>1</sup>; Hannes Schniepp<sup>1</sup>; <sup>1</sup>William & Mary

#### 2:20 PM Break

#### 2:35 PM

**A Neoteric Antibacterial Silver-Ceria Nanozyme for Abiotic Surfaces:** Abinaya Sindu Pugazhendhi<sup>1</sup>; Craig Neal<sup>1</sup>; Udit Kumar<sup>1</sup>; Fei Wei<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Andrew Ady<sup>1</sup>; Christina Drake<sup>1</sup>; Sudipta Seal<sup>1</sup>; Melanie Coathup<sup>1</sup>; <sup>1</sup>University of Central Florida

#### 2:55 PM

**Towards Effective Therapies for Bone Metastasis of Breast Cancer Using Novel Phenolic Compounds:** Kalpana Katti<sup>1</sup>; Preetham Ravi<sup>1</sup>; Haneesh Jasuja<sup>1</sup>; Dipayan Sarkar<sup>1</sup>; Kalidas Shetty<sup>1</sup>; Dinesh Katti<sup>1</sup>; <sup>1</sup>North Dakota State University

#### 3:15 PM

**Inkjet-printed Nanopatterned Aptasensors for Lateral Flow Detection of Foodborne Pathogens:** Ya-Ching Yu<sup>1</sup>; Zhijian Wang<sup>1</sup>; Ana Ulloa<sup>1</sup>; P. Allebach<sup>1</sup>; George T.-C. Chiu<sup>1</sup>; Amanda Deering<sup>1</sup>; Lia Stanciu<sup>1</sup>; <sup>1</sup>Purdue University

#### 3:35 PM

**Quantifying Surface Topographies on Antimicrobial Copper:** Terry Lowe<sup>1</sup>; Daniela Hirsch<sup>1</sup>; Beatrice Lowe<sup>1</sup>; Scott Dahl<sup>1</sup>; Clinton Hawkins<sup>1</sup>; Naveen Kailas<sup>2</sup>; Máté Szűcs<sup>3</sup>; Laszlo Toth<sup>3</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Université de Lorraine, CNRS 7239; <sup>3</sup>University of Miskolc

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## NUCLEAR MATERIALS



## Ceramics and Ceramic-based Composites for Nuclear Fission Applications — Cladding, Coating, Shield Materials, and More

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

**Program Organizers:** Dong Liu, University of Oxford; Assel Aitkaliyeva, University of Florida; Anne Campbell, Oak Ridge National Laboratory; Konstantina Lambrinou, University of Huddersfield; Cynthia Adkins, Idaho National Laboratory; Scarlett Widgeon Paisner, Los Alamos National Laboratory

**Thursday PM | March 7, 2024**  
**Rainbow Spring I | Hyatt**

**Session Chairs:** Elizabeth Sooby, University of Texas San Antonio; Scarlett Widgeon Paisner, LANL

**1:00 PM**

**Radiation Effects and Corrosion of Silicon Carbide in Nuclear Reactor Environments:** *Izabela Szlufarska*<sup>1</sup>; Jianqi Xi<sup>1</sup>; Hongliang Zhang<sup>2</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Fudan University

**1:40 PM**

**In Situ High-temperature 3D Imaging of the Damage Evolution in a SiC Nuclear Fuel Cladding Material:** Guanjie Yuan<sup>1</sup>; J. Paul Forna Kreutzer<sup>1</sup>; Peng Xu<sup>2</sup>; Sean Gonderman<sup>3</sup>; Christian Deck<sup>3</sup>; Luke Olson<sup>4</sup>; Edward Lahoda<sup>5</sup>; Robert Ritchie<sup>6</sup>; *Dong Liu*<sup>1</sup>; <sup>1</sup>University of Bristol; <sup>2</sup>Idaho National Laboratory; <sup>3</sup>General Atomics; <sup>4</sup>Westinghouse Electric Corporation; <sup>5</sup>Westinghouse Electric Company Llc; <sup>6</sup>University of California, Berkeley

**2:00 PM**

**Microstructure, Mechanical Properties, and Residual Stresses of Cr-Coated SiC Fuel Cladding for Light Water Reactors:** Kyle Quillin<sup>1</sup>; Hwasung Yeom<sup>2</sup>; *K.N. Sasidhar*<sup>1</sup>; Xiaofei Pu<sup>3</sup>; David Frazer<sup>4</sup>; Kumar Sridharan<sup>1</sup>; <sup>1</sup>University Of Wisconsin-Madison; <sup>2</sup>Pohang University of Science and Technology; <sup>3</sup>National Renewable Energy Laboratory; <sup>4</sup>Idaho National Laboratory

**2:20 PM**

**Thermo-mechanical Characterization of a Novel Alumina-Yttria Ceramic Coating for Lead Fast Reactors:** *Giacomo Leonardi*<sup>1</sup>; <sup>1</sup>X Nano

**2:40 PM Break**

**2:55 PM**

**Reduced Processing Temperature of Advanced Ceramic Composites:** *David Sprouster*<sup>1</sup>; B Cheng<sup>1</sup>; D Bhardwaj<sup>1</sup>; W Cunningham<sup>1</sup>; S Ghose<sup>2</sup>; Lance Snead<sup>1</sup>; J Trelewicz<sup>1</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Brookhaven National Laboratory

**3:15 PM**

**Correlating Atomic Structure with Elastic Properties in Non-textured Pyrocarbon:** *Raphaelle David*<sup>1</sup>; Yongfeng Zhang<sup>1</sup>; <sup>1</sup>UW-Madison

**3:35 PM**

**Steam Corrosion of Cr- and Zr-containing Uranium Nitride Fuels: Mechanistic Insights from In Situ Neutron Diffraction:** *Jennifer Stansby*<sup>1</sup>; Yulia Mishchenko<sup>2</sup>; Sobhan Patnaik<sup>3</sup>; Vanessa Peterson<sup>4</sup>; Chris Baldwin<sup>4</sup>; Patrick Burr<sup>1</sup>; Denise Adorno-Lopes<sup>5</sup>; Edward Obbard<sup>1</sup>; <sup>1</sup>School of Mechanical and Manufacturing Engineering, UNSW; <sup>2</sup>Nuclear Engineering Division KTH Royal Institute of Technology, Alba Nova University Centre; <sup>3</sup>Idaho National Laboratory; <sup>4</sup>Australian Nuclear Science

and Technology Organisation; <sup>5</sup>Nuclear Engineering Division KTH Royal Institute of Technology, Alba Nova University Centre, Sweden & Westinghouse Electric Sweden AB

**3:55 PM**

**Analyzing ZrN and LiF-doped ZrN as a Shield Material for Fusion and Space Reactors:** *Mediha Merve Karatas*<sup>1</sup>; Steven John Zinkle<sup>1</sup>; <sup>1</sup>University of Tennessee, Knoxville

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## MATERIALS SYNTHESIS AND PROCESSING

### **Composite Materials: Sustainable and Eco-Friendly Materials and Application – Eco Friendly and Sustainable Composite Materials: Applications**

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

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

**Thursday PM | March 7, 2024**  
**Celebration 4 | Hyatt**

**Session Chair:** Brian Wisner, Ohio University

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**1:00 PM**

**Coaxial Layered Carbon Fibers of PAN/Glass Fibers via Dry-jet Wet Spinning Process:** *Varunkumar Thippanna*<sup>1</sup>; Kenan Song<sup>1</sup>; <sup>1</sup>Arizona State University

**1:20 PM**

**Development and Characterization of Bio-epoxy by Cardanol for Polymeric Composites:** Cláudio Gomes da Hora<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; Sergio Neves Monteiro<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**1:40 PM**

**Enhancing the Physico-mechanical Properties of Clay Bricks Using Snail Shell Ash as a Sustainable Building Material:** *Nneka Ekwe*<sup>1</sup>; Fadimatu Dabai<sup>1</sup>; <sup>1</sup>University of Abuja

**2:00 PM**

**Magnetization of Al-based Alloys by Shear-assisted Solid Phase Processing:** *Farhan Ishrak*<sup>1</sup>; Michael Lastovich<sup>1</sup>; Charles Perkins<sup>1</sup>; Ravi Haridas<sup>2</sup>; Matthew Clary<sup>1</sup>; Joseph Tracy<sup>1</sup>; Kumar Kandasamy<sup>3</sup>; Rajiv Mishra<sup>2</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>University of North Texas; <sup>3</sup>Enabled Engineering

**2:20 PM Break**

**2:40 PM**

**Material Developments for 3D/4D Additive Manufacturing (AM) Technologies:** *Simona Hunyadi Murph*<sup>1</sup>; <sup>1</sup>Savannah River National Laboratory

**3:00 PM**

**Stabilization of Aluminum Dross by Coating With PEG:** *Tzu-Hsuan Yen*<sup>1</sup>; <sup>1</sup>National Central University

**3:20 PM**

**Influence of the Use of Anti-bubble Additives on the Permeability and Porosity of Anticorrosive Coatings:** David Coverdale Velasco<sup>1</sup>; Darcy Lucas Oliveira<sup>1</sup>; *Felipe Lopes*<sup>1</sup>; Djalma Souza<sup>1</sup>; Carlos Maurício Vieira<sup>1</sup>; <sup>1</sup>UENF - State University of the Northern Rio de Janeiro

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics – Microstructure Evolution

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Tournet, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

**Thursday PM | March 7, 2024**

**Bayhill 29 | Hyatt**

**Session Chairs:** Damien Tournet, IMDEA Materials Institute; Lenissongui Yeo, Oklahoma State University

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**1:00 PM**

**Phase Field Modeling of Anisotropic Bicrystal/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

**1:20 PM**

**A Phase Field Model for Grain Growth Capturing All Five Degrees of Freedom of the Grain Boundary Energy:** *Philip Staublin*<sup>1</sup>; James Warren<sup>2</sup>; Peter Voorhees<sup>1</sup>; <sup>1</sup>Northwestern University; <sup>2</sup>NIST

**1:40 PM**

**Phase Field Modeling of Abnormal Grain Growth Induced by Cyclic Heat Treatment:** *Zachary Croft*<sup>1</sup>; Marcel Chlupsa<sup>1</sup>; Guanglong Huang<sup>1</sup>; Eli Rotman<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**2:00 PM**

**Unusual Grain Boundary Stagnation Revealed by Atomistic Simulations:** *Xinyuan Song*<sup>1</sup>; Chuang Deng<sup>1</sup>; <sup>1</sup>University of Manitoba

**2:20 PM Break**

**2:40 PM**

**Phase-field Modeling of Microstructure Evolution during Post-printing Heat Treatment of Additively Manufactured Ti6Al4V Alloy:** *Adrian Boccardo*<sup>1</sup>; Mingming Tong<sup>2</sup>; Seán Leen<sup>2</sup>; Zhiyi Zou<sup>3</sup>; Marco Simonelli<sup>3</sup>; Javier Segurado<sup>4</sup>; Damien Tournet<sup>1</sup>; <sup>1</sup>IMDEA Materials; <sup>2</sup>University of Galway, I-Form Advanced Manufacturing Research Centre; <sup>3</sup>University of Nottingham; <sup>4</sup>Universidad Politecnica de Madrid & IMDEA Materials

**3:00 PM**

**Thermodynamically-consistent Phase Field Model for Metal-insulator Phase Transitions in VO<sub>2</sub>:** *Allison Kaye Arabelo*<sup>1</sup>; Arunabha Roy<sup>1</sup>; Vahid Attari<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

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## MECHANICS OF MATERIALS

### Defects and Interfaces: Modeling and Experiments — Multiscale Modeling II

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

**Thursday PM | March 7, 2024**  
**Coral Spring II | Hyatt**

*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chairs:** Brandon Runnels, Iowa State University; Hadi Ghaffarian, Korea Advanced Institute of Science and Technology

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**1:00 PM**

**Mechanics of Symmetric and Asymmetric Grain Boundary Migration with Phase Field:** Brandon Runnels<sup>1</sup>; *Abhijith Thoopul Anantharanga*<sup>1</sup>; <sup>1</sup>Iowa State University

**1:25 PM**

**Interfacial Fracture Energy Measurements of Ceramic/Metal Interfaces Using Novel Bending Geometries:** Saim Abbas<sup>1</sup>; Sanjay Sampath<sup>2</sup>; Sudhanshu Mallick<sup>1</sup>; *Nagamani Balila*<sup>1</sup>; <sup>1</sup>IIT Bombay; <sup>2</sup>Stony Brook University

**1:45 PM**

**Mean-field Based Approach for Crystal Plasticity Modeling of 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

**2:05 PM**

**Migration Velocities of Intergranular He Gas Bubbles Under Thermal Gradients in Fe by Phase-field Modeling:** *Yixi Shen*<sup>1</sup>; Peng Wen<sup>1</sup>; An Ta<sup>1</sup>; Simon Phillpot<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

**2:25 PM**

**Integrated Multiscale Modeling of Grain Growth in Olivine (Mg<sub>2</sub>SiO<sub>4</sub>) Using Molecular Dynamics and a Phase-field Approach:** *Maria Lee*<sup>1</sup>; Heechen Cho<sup>1</sup>; Caleb Miller<sup>1</sup>; John Baumgardner<sup>1</sup>; Mark Horstemeyer<sup>1</sup>; <sup>1</sup>Liberty University

**2:45 PM Break**

**3:00 PM**

**Molecular Dynamics Study of Hydrogen Effect on Screw Dislocation Motion and Their Interaction:** *Shuhe Shinzato*<sup>1</sup>; Jiaqin Xu<sup>1</sup>; Fan-Shun Meng<sup>1</sup>; Shigenobu Ogata<sup>1</sup>; <sup>1</sup>Osaka University

**3:20 PM**

**Slip-grain Boundary Interactions in Magnesium Alloys for Improved Strength and Ductility:** *Vaidehi Menon*<sup>1</sup>; Liang Qi<sup>1</sup>; <sup>1</sup>University of Michigan

**3:40 PM**

**First Principles Study on the Segregation of Metallic Solutes and Non-metallic Impurities in Cu Grain Boundary:** *Vasileios Fotopoulos*<sup>1</sup>; Jack Strand<sup>1</sup>; Manuel Petersmann<sup>2</sup>; Alexander Shluger<sup>1</sup>; <sup>1</sup>University College London (UCL); <sup>2</sup>KAI—Kompetenzzentrum Automobil- und Industrieelektronik GmbH

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

**Program Organizers:** Lang Yuan, University of South Carolina; Andrew Kao, University of Greenwich; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Kyle Fezi, Fort Wayne Metals

**Thursday PM | March 7, 2024**  
**Celebration 8 | Hyatt**

**Session Chairs:** Alex Plotkowski, Oak Ridge National Laboratory; Chu Lun Alex Leung, UCL

### 1:00 PM Invited

**X-ray Imaging of Die-shape Effects on Defect Formation During Pressurised Casting:** *Shishira Bhagavath*<sup>1</sup>; Utkarsh Godwal<sup>2</sup>; Sebastian Marussi<sup>1</sup>; Shashidhara Marathe<sup>3</sup>; Mei Li<sup>4</sup>; Bitu Ghaffari<sup>4</sup>; Chu Lun Alex Leung<sup>1</sup>; Peter Lee<sup>1</sup>; Shyamprasad Karagadde<sup>2</sup>; <sup>1</sup>University College London; <sup>2</sup>Indian Institute of Technology Bombay; <sup>3</sup>Diamond Light Source; <sup>4</sup>Ford Research and Advanced Engineering

### 1:25 PM Invited

**Revealing the Microstructural and Defects Evolution Mechanisms of Aluminum Alloys at Freezing Range by Multiscale Characterization, Synchrotron X-ray Tomography, and CALPHAD Approaches:** *Te-Cheng Su*<sup>1</sup>; Kai-Yu Liang<sup>1</sup>; Ling-En Yao<sup>1</sup>; Hao-Chuan Huang<sup>1</sup>; Mien-Chung Chen<sup>2</sup>; Sheng-Long Lee<sup>2</sup>; Pei-Tzu Lee<sup>3</sup>; Ying-Shuo Tseng<sup>3</sup>; Gung-Chian Yin<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Institute of Material Science and Engineering, National Central University; <sup>3</sup>National Synchrotron Radiation Research Center

### 1:50 PM

**In-suit Observation of the Formation of CeAlO<sub>3</sub> Clusters on the Surface of a Al-killed Molten Steel:** *Qiuyue Zhou*<sup>1</sup>; Lifeng Zhang<sup>2</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>North China University of Technology

### 2:10 PM

**The Visualisation of Hidden Damage in Cast Aluminium Components:** *Toni Bogdanoff*<sup>1</sup>; Jakob Olofsson<sup>1</sup>; Murat Tiryakioğlu<sup>2</sup>; <sup>1</sup>Jönköping University; <sup>2</sup>Jacksonville University

### 2:30 PM Break

### 2:50 PM Invited

**Varying Hall-Petch and Inverse Hall-Petch Regimes in Nanocrystalline CoCrFeMnNi High-Entropy Alloys under Shock Wave Loading:** *Wanghui Li*<sup>1</sup>; Aitken Zachary<sup>1</sup>; Shuai Chen<sup>2</sup>; Yilun Xu<sup>1</sup>; Xinyu Yang<sup>1</sup>; Qingxiang Pei<sup>1</sup>; Jian Wang<sup>3</sup>; Yong-Wei Zhang<sup>1</sup>; <sup>1</sup>Institute of High Performance Computing, Agency for Science, Technology and Research (A\*STAR); <sup>2</sup>Institute of High Performance Computing, Agency for Science, Technology and Research (A\*STAR); Shanghai University; <sup>3</sup>University of Nebraska-Lincoln

### 3:15 PM

**Casting Simulation of Ferrous Alloys Processed by Hybrid Casting:** *Edson Silva Junior*<sup>1</sup>; Rodolfo Leibholz<sup>1</sup>; Kahl Zilnyk<sup>1</sup>; Gabriel Peinado<sup>2</sup>; Antonio Ramirez<sup>2</sup>; <sup>1</sup>Aeronautics Institute of Technology (ITA); <sup>2</sup>Ohio State University

3:35 PM

**Kinetic Evolution of the Composition of Desulfurizers in the Molten Steel during RH Refining Process:** *Jujin Wang*<sup>1</sup>; Lifeng Zhang<sup>1</sup>; <sup>1</sup>North China University of Technology

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## MECHANICS OF MATERIALS

### Dynamic Behavior of Materials X – High Rate Deformation II

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

Thursday PM | March 7, 2024  
Coral Spring I | Hyatt

**Session Chairs:** Neil Bourne, University of Manchester; Gabriel Testa, University of Cassino

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1:00 PM

**Inertial Effects on Dynamic Indentation of Materials:** Zahra Ghasemi<sup>1</sup>; Tiago dos Santos<sup>2</sup>; Jose Rodriguez-Martinez<sup>3</sup>; *Ankit Srivastava*<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Universidade Federal de Santa Maria; <sup>3</sup>University Carlos III of Madrid, Leganés

1:20 PM

**Microstructure Effects on Dynamic Hardness in High Velocity Microparticle Impacts:** *Tyler Lucas*<sup>1</sup>; Alison Saunders<sup>2</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>MIT; <sup>2</sup>Lawrence Livermore National Laboratory

1:40 PM

**Characterization, Mechanical Behavior, and Failure of Mo-based TZM Alloy:** *Benjamin Morrow*<sup>1</sup>; Virginia Euser<sup>1</sup>; Carl Cady<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

2:00 PM

**Micromechanical Testing of Metals at High Strain Rates and Temperatures:** *Ian Dowding*<sup>1</sup>; Christopher Schuh<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

2:20 PM

**Designing Additively Manufactured Lattice Structures to Withstand Uniaxial Short Temporal Width Impulsive Loads Without Yielding:** *Brandon Zimmerman*<sup>1</sup>; Claudio Santiago<sup>1</sup>; David Quint<sup>1</sup>; Alison Saunders<sup>1</sup>; Jonathan Lind<sup>1</sup>; Eric Herbold<sup>1</sup>; Mukul Kumar<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

2:40 PM Break

3:00 PM

**Multiscale Models for the Mechanical Response of fcc Alloys Under High-strain Rates and Complex Triaxial Loads:** *Alejandro Strachan*<sup>1</sup>; Marisol Koslowski<sup>1</sup>; Ilias Billionis<sup>1</sup>; Shrenik Zinage<sup>1</sup>; Chunyu Li<sup>1</sup>; Ethan Holbrook<sup>1</sup>; Chongxi Yuan<sup>1</sup>; <sup>1</sup>Purdue University

3:20 PM

**Strain Rate Effects on Shear-band Behavior in Al-Sm System:** *Nuohao Liu*<sup>1</sup>; Xuanxin Liu<sup>1</sup>; Izabela Szlufarska<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

3:40 PM

**Evaluation of Microstructural Heterogeneity in Cast-cured Explosive Composites:**

*John Yeager*<sup>1</sup>; *Matthew Santoso*<sup>2</sup>; *Addison Wisniewski*<sup>3</sup>; *Matthew Stuthers*<sup>1</sup>; *Jesus Mares*<sup>4</sup>; *Christopher Molek*<sup>4</sup>; <sup>1</sup>University of Dayton Research Institute; <sup>2</sup>University of Texas at Austin; <sup>3</sup>Saint Louis University; <sup>4</sup>United States Air Force Research Laboratory

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**ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Energy Technologies and CO<sub>2</sub> Management — Renewable Energy, Combustion & Material Advances**

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

**Program Organizers:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Metals Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong (Marco) Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Onuralp Yucel, Istanbul Technical University; Alafara Baba, University of Ilorin

**Thursday PM | March 7, 2024**  
**Bayhill 33 | Hyatt**

**Session Chairs:** Donna Guillen, Idaho National Laboratory; Shafiq Alam, University of Saskatchewan

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**1:00 PM Introductory Comments**

**1:10 PM**

**Numerical Investigation on H<sub>2</sub> Reduction Characteristics of Fe<sub>3</sub>O<sub>4</sub> in Drop Tube Furnace:** *Zhou Zhenfeng*<sup>1</sup>; *Wan Zukang*<sup>1</sup>; *Wang Guang*<sup>1</sup>; <sup>1</sup>Shandong University of Science and Technology

**1:30 PM**

**Use of Over Stoichiometric Flame for Post-combustion, Burning VOC and Solid Fuel, Improving its Efficiency and Reducing the Carbon Footprint in Regular Lead Recovery Rotary Furnace Process:** *Brenno Ferreira*<sup>1</sup>; *Joachim von Scheele*<sup>1</sup>; *Edson Isihara*<sup>2</sup>; *Enio Breciani*<sup>3</sup>; *Altemir Dupond*<sup>3</sup>; <sup>1</sup>Linde Technology; <sup>2</sup>White Martins Gases Industriais - Linde plc; <sup>3</sup>SK Metais

**1:50 PM**

**The Synergistic Extraction Kinetics of Aluminum and Silicon From High-alumina Fly by Carbochlorination:** *Wang Long*<sup>1</sup>; *Zhang Zimu*<sup>2</sup>; *Ting-an Zhang*<sup>1</sup>; *Lv Guozhi*<sup>1</sup>; *Dou Zhihe*<sup>1</sup>; *Zhang Xiyu*<sup>1</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>Shenyang University of Chemical Technology

**2:10 PM**

**Pore Engineering and Surface Functionalization of Biochars From Sugar Beet Pulp for CO<sub>2</sub> Capture:** *Süleyman Sener Akın*<sup>1</sup>; *Ali Bertan Kir*<sup>1</sup>; *Zöhre Kurt*<sup>1</sup>; *Pnar Derin Güre*<sup>1</sup>; *Feyza Kazanc*<sup>1</sup>; <sup>1</sup>Middle East Technical University

**2:30 PM Concluding Comments**

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**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

**Thursday PM | March 7, 2024**  
**Bayhill 17 | Hyatt**

**Session Chairs:** Wenjun Cai, Virginia Tech; Yiren Chen, Argonne National Laboratory

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**1:00 PM Invited**

**Developing a Crystal-based Tribocorrosion Modeling Framework for Aluminum: An Integrated Experimental and Computational Study:** Kaiwen Wang<sup>1</sup>; Zhengyu Zhang<sup>1</sup>; Raja Dandu<sup>1</sup>; Wenjun Cai<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University

**1:25 PM**

**Directionally Isolated Sensitization Responses in 5XXX Series Aluminum Alloy Plate Microstructures:** Matthew Steiner<sup>1</sup>; Likun Sun<sup>1</sup>; Syeda Noor E Sumaiya<sup>1</sup>; <sup>1</sup>University of Cincinnati

**1:45 PM**

**Freeze-thaw Induced Damage Evolution in AA7075-T651:** Ankit Kumar<sup>1</sup>; Eshan Ganju<sup>1</sup>; Nikhilesh Chawla<sup>1</sup>; <sup>1</sup>Purdue University

**2:05 PM**

**Exploring the Nature of Passivation Film in Chloride Salt Solution Under Tensile Loading in a Non-equiatomic Metastable High Entropy Alloy:** Pranshul Varshney<sup>1</sup>; Nilesh Kumar<sup>1</sup>; <sup>1</sup>University of Alabama, Tuscaloosa

**2:25 PM Break**

**2:45 PM Invited**

**Cracking of Additively Manufactured 316L SS in LWR-relevant Condition:** Yiren Chen<sup>1</sup>; Bogdan Alexandreanu<sup>1</sup>; Xuan Zhang<sup>1</sup>; Wei-Ying Chen<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**3:10 PM**

**High-resolution Characterization of High-temperature Water Corrosion Under Compression vs Tension:** Daniel Schreiber<sup>1</sup>; Karen Kruska<sup>1</sup>; Ziqing Zhai<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**3:30 PM**

**Corrosion Behavior of Hot-wire Laser DED Stainless Steel 316L Using Four Print Directions:** Holly Martin<sup>1</sup>; Brandon Koenig<sup>1</sup>; Aayush Alok<sup>1</sup>; Bharat Yelamanchi<sup>1</sup>; Andrew Prokop<sup>1</sup>; Brian Vuksanovich<sup>1</sup>; John Carballo<sup>1</sup>; Jackie Ruller<sup>1</sup>; Pedro Cortes<sup>1</sup>; <sup>1</sup>Youngstown State University

**3:50 PM**

**Phase Field Modelling of Environmentally Assisted Cracking of Bioabsorbable Mg Alloys for Biomedical Applications:** Sasa Kovacevic<sup>1</sup>; Wahaaj Ali<sup>2</sup>; Emilio Martínez-Pañeda<sup>1</sup>; Javier Llorca<sup>3</sup>; <sup>1</sup>Imperial College; <sup>2</sup>IMDEA Materials Institute; <sup>3</sup>IMDEA Materials Institute & Technical University of Madrid



4:10 PM

**Using In Situ Crack Tip pH Measurements to Understand the Corrosion Fatigue Susceptibility in 2xxx (Al-Cu) and 7xxx (Al-Zn) Al Alloys:** *Gabby Montiel*<sup>1</sup>; Jenifer Locke<sup>1</sup>; <sup>1</sup>The Ohio State University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Functional Nanomaterials VIII: Structure-Property Relationships

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

**Thursday PM | March 7, 2024**  
**Bayhill 21 | Hyatt**

**Session Chairs:** Seungha Shin, University of Tennessee; Woochul Lee, University of Hawaii at Manoa; Mostafa Bedewy, University of Pittsburgh

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1:00 PM Invited

**Atomically Dispersed Metal Sites for the Electrochemical CO<sub>2</sub> Reduction Reaction:** *Davide Menga*<sup>1</sup>; Yang Shao-Horn<sup>1</sup>; <sup>1</sup>MIT

1:25 PM Invited

**Active Control/Change of Material Characteristics/Properties (Color, Shape, Stiffness, Temperature etc):** *Seung Hwan Ko*<sup>1</sup>; <sup>1</sup>Seoul National University

1:50 PM Invited

**Phase Control in Hafnia Nanoparticles: Towards Ferroelectric Nanoparticles:** *Jennifer Andrew*<sup>1</sup>; <sup>1</sup>University of Florida

2:15 PM Invited

**Extreme Environment Nanocrystalline Soft Magnetic Materials:** *Paul Ohodnicki*<sup>1</sup>; Tyler Paplham<sup>1</sup>; Lauren Wewer<sup>1</sup>; Yuankang Wang<sup>1</sup>; Alex Leary<sup>2</sup>; Ronald Noebe<sup>2</sup>; Vladimir Keylin<sup>2</sup>; <sup>1</sup>University of Pittsburgh; <sup>2</sup>NASA Glenn Research Center

2:40 PM Break

3:00 PM Invited

**Corrosion and Wear Behavior of Open-air Plasma Processed AM60 Mg Alloy with a Few Hundred Nanometer Thick Organosilicon Coating:** *Jiheon Jun*<sup>1</sup>; Yong Chae Lim<sup>1</sup>; Chanaka Ihala Gamaralalage<sup>1</sup>; Yi-Feng Su<sup>1</sup>; Daphne Pappas<sup>2</sup>; Ryan Robinson<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Plasmatreat USA

3:25 PM

**Unraveling Ordering Phenomena in Nanomaterials Using Advanced TEM Techniques:** *Lilian Vogl*<sup>1</sup>; Peter Schweizer<sup>2</sup>; Andrew Minor<sup>3</sup>; <sup>1</sup>University of California Berkeley; <sup>2</sup>The National Center for Electron Microscopy; <sup>3</sup>University of California Berkeley, National Center for Electron Microscopy

3:45 PM

**Wafer-scale Fabrication of III-nitride Nanowires:** *Yu Kee Ooi*<sup>1</sup>; Yong Lin Kong<sup>2</sup>; <sup>1</sup>Utah Valley Univeristy; <sup>2</sup>University of Utah

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## MATERIALS SYNTHESIS AND PROCESSING

### Functionally Graded Materials, Coatings and Claddings: Toward Microstructure and Property Control – Cladding and Composite Materials

**Sponsored by:** TMS Materials Processing and Manufacturing Division, TMS Structural Materials Division, TMS: Powder Materials Committee, TMS: Additive Manufacturing Committee, TMS: High Temperature Alloys Committee

**Program Organizers:** Aurelien Perron, Lawrence Livermore National Laboratory; Kaila Bertsch, Lawrence Livermore National Laboratory; Emma White, DECHEMA Forschungsinstitut; Iver Anderson, Iowa State University Ames Laboratory; Timothy Prost, Uniformity Labs; Matthew Dunstan, US Army Research Laboratory

**Thursday PM | March 7, 2024**

**Celebration 5 | Hyatt**

**Session Chair:** Aurelien Perron, LLNL

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#### 1:00 PM

**Developing Improved Die Materials for Forming Lightweight Auto Body Sheet:** *Iver Anderson*<sup>1</sup>; *Nicolas Argibay*<sup>2</sup>; *Andrew Kustas*<sup>3</sup>; *Andrew Vackel*<sup>3</sup>; *Yun Bai*<sup>4</sup>; *Stephen Luckey*<sup>4</sup>; *Joy Forsmark*<sup>4</sup>; *Duane Johnson*<sup>5</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>DOE Ames Laboratory; <sup>3</sup>Sandia National Laboratories; <sup>4</sup>Ford Motor Company; <sup>5</sup>Ames Laboratory/Iowa State University

#### 1:20 PM

**Solid-Liquid Fabrication Process of Copper and Aluminium Matrix Composites through Laser Powder Bed Fusion and Induction Heating:** *Antonios Baganis*<sup>1</sup>; *Xavier Maeder*<sup>2</sup>; *Florencia Malamud*<sup>3</sup>; *Fedor Klimashin*<sup>2</sup>; *Christian Leinenbach*<sup>1</sup>; <sup>1</sup>Empa & EPFL; <sup>2</sup>Empa; <sup>3</sup>PSI

#### 1:40 PM

**An Investigation on Cryomilling Assisted CNTs, SiC and Y2O3 Reinforced Al-based Metal Matrix Functionally Graded Composite Materials:** *Rajat Gupta*<sup>1</sup>; *Kausik Chattopadhyay*<sup>1</sup>; *N.K. Mukhopadhyay*<sup>1</sup>; <sup>1</sup>IIT-BHU

#### 2:00 PM

**Friction Extrusion of Enhanced Electrically Conductive Aluminum with Graphene Additives:** *Md Reza-E-Rabby*<sup>1</sup>; *Aditya Nittala*<sup>1</sup>; *Pedro Negrao*<sup>1</sup>; *Nicole Overman*<sup>1</sup>; *Keerti Kappagantula*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 2:20 PM Break

#### 2:40 PM

**Co-extrusion and Cladding via Shear Assisted Processing and Extrusion:** *Mageshwari Komarasamy*<sup>1</sup>; *Xiao Li*<sup>1</sup>; *Lei Li*<sup>1</sup>; *David Garcia*<sup>1</sup>; *Tanvi Ajantiwalay*<sup>1</sup>; *Ayoub Soulami*<sup>1</sup>; *Scott Whalen*<sup>1</sup>; *Jorge Dos Santos*<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

#### 3:00 PM

**Effect of Isomer Variation and Molecular Weight Dependency of Polyetherimide Coatings for Corrosion Protection of Aluminum Alloys:** *Tiffany Sill*<sup>1</sup>; <sup>1</sup>Texas A&M University

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels – Modeling and Microstructural Characterization

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

**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

**Thursday PM | March 7, 2024**  
**Bayhill 31 | Hyatt**

**Session Chair:** Amrita Lall, Pacific Northwest National Laboratory

**1:00 PM**

**Crystal Plasticity-based Finite Element Simulations of Hat-shaped Draw-bending to Predict Springback Behavior of Dual-phase Steels:** *Marko Knezevic*<sup>1</sup>;

<sup>1</sup>University of New Hampshire

**1:30 PM**

**A Neural Network Interatomic Potential for  $\alpha$ -Fe-C-H Ternary System:** *Fan-Shun Meng*<sup>1</sup>; Jun-Ping Du<sup>1</sup>; Shuhei Shinzato<sup>1</sup>; Nobuyuki Ishikawa<sup>2</sup>; Kazuki Matsubara<sup>2</sup>; Shigenobu Ogata<sup>1</sup>; <sup>1</sup>Osaka University; <sup>2</sup>Steel Research Laboratory, JFE Steel Corporation

**1:50 PM**

**Modeling Creep Deformation in Diffusion Bonded 316H Stainless Steel Microstructure:** *Sagar Bhatt*<sup>1</sup>; Mark Messner<sup>1</sup>; <sup>1</sup>Argonne National Laboratory

**2:10 PM**

**Modeling Magneto-structural Interactions in Austenitic Steels Using First-principles Calculations:** *Edwin Antillon*<sup>1</sup>; Colin Stewart<sup>1</sup>; Noam Bernstein<sup>1</sup>; Keith Knipling<sup>1</sup>; Patrick Callahan<sup>1</sup>; <sup>1</sup>Naval Research Laboratory

**2:30 PM Break**

**2:45 PM**

**Characterizing the Microstructural Evolution in Resistance Spot Welded MS1500 Advanced High Strength Steels:** *Madyson Canulette*<sup>1</sup>; Gregory Thompson<sup>1</sup>; Luke Brewer<sup>1</sup>; <sup>1</sup>The University of Alabama

**3:05 PM**

**Precipitation and Evolutionary Behavior of Eutectic Carbides in Electroslag Remelted 7Cr13N Steel:** *Shouhui Li*<sup>1</sup>; Jing Li<sup>1</sup>; Shuang Zhu<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**3:25 PM**

**Co-precipitation Kinetics of Cu and Ni(Al, Mn) Under Mo-alloying and High Magnetic Field Heat Treatment:** *Nianshuang Qiu*<sup>1</sup>; Tao Zhou<sup>2</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>KTH Royal Institute of Technology

**3:45 PM**

**Formation and Decomposition Mechanism of Carbides in AISI M35 High-speed Steel Produced by ESR:** *Wei Liang*<sup>1</sup>; Jing Li<sup>1</sup>; Jia-hao Li<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN**

**Local Ordering in Materials and Its Impacts on Mechanical Behaviors, Radiation Damage, and Corrosion — Local Ordering in Materials Out of Equilibrium III**

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

**Program Organizers:** Yang Yang, Pennsylvania State University; Penghui Cao, University of California, Irvine; Fadi Abdeljawad, Lehigh University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Robert Ritchie, University of California, Berkeley

**Thursday PM | March 7, 2024**  
**Bayhill 30 | Hyatt**

**Session Chairs:** Penghui Cao, University of California, Irvine; Yang Yang, The Pennsylvania State University; Judith Yang, Brookhaven National Laboratory; Irene Beyerlein, University of California, Santa Barbara

**1:00 PM Invited**

**Local Solute Clustering and Partially Active Segregation at Grain Boundaries in Nanocrystalline Sterling Silver Alloys:** *Frederic Sansoz*<sup>1</sup>; Pavel Nikitin<sup>1</sup>; <sup>1</sup>The University of Vermont

**1:30 PM Invited**

**Bridging the Gap between Quantum Materials Modeling and Experiments with Machine Learning Under Extreme Environments:** *Wissam Saidi*<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**2:00 PM**

**Ni<sub>2</sub>Cr Long Range Ordered Transgranular Precipitation-accelerated Corrosion of Ni-Cr Alloys in Chloride Molten Salt:** *Fei Teng*<sup>1</sup>; Trishelle Copeland-Johnson<sup>1</sup>; Julie Tucker<sup>2</sup>; Guoping Cao<sup>1</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>Oregon State University

**2:20 PM**

**Modeling Radiation-induced Segregation Near Nanosized Cavities in Fe-Cr Alloys:** *Xinyuan Xu*<sup>1</sup>; Xing Wang<sup>1</sup>; <sup>1</sup>Pennsylvania State University

**2:40 PM Break**

**2:55 PM**

**Nonequilibrium Short-range Order in High-entropy Alloys:** *Mahmudul Islam*<sup>1</sup>; Yifan Cao<sup>1</sup>; Killian Sheriff<sup>1</sup>; Rodrigo Freitas<sup>1</sup>; <sup>1</sup>Massachusetts Institute of Technology

**3:15 PM**

**Defect Energy Statistics in Concentrated Solid Solutions:** *Matthew Daly*<sup>1</sup>; Ritesh Jagatramka<sup>1</sup>; Amir Shirsalimian<sup>1</sup>; Novin Rasooli<sup>1</sup>; <sup>1</sup>University of Illinois-Chicago

**3:35 PM**

**Correlation between Severe Cr Charge Density Distortion and Large Variation of Stacking Fault Energy in Ni-based HEAs:** *Jacob Fischer*<sup>1</sup>; Gaurav Arora<sup>2</sup>; Dilpuneet Aidhy<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Fermilab

## MECHANICS OF MATERIALS

### Mechanical Behavior at the Nanoscale VII — Deformation Mechanisms II

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

**Thursday PM | March 7, 2024**  
**Manatee Spring I | Hyatt**

**Session Chairs:** Matthew Daly, University of Illinois Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology

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**1:00 PM Invited**

**Nanoscale Plasticity by Means of Stochastic Discrete Slip Events:** *Carlos Ruestes*<sup>1</sup>; Javier Segurado<sup>1</sup>; <sup>1</sup>IMDEA Materials Institute - Spain

**1:30 PM**

**Mechanical Insights for the Design of Nanostructured and Nanoarchitected Materials:** *Rebecca Gallivan*<sup>1</sup>; Mirco Nydegger<sup>1</sup>; Nikolaus Porenta<sup>1</sup>; Maxence Menetrey<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

**1:50 PM**

**Dynamic Behaviors of Multi-principal Element Alloys: Insights into Nanoscale:** *Wu-Rong Jian*<sup>1</sup>; Zhuocheng Xie<sup>2</sup>; Xiaohu Yao<sup>2</sup>; Shuozhi Xu<sup>3</sup>; Yanqing Su<sup>4</sup>; Irene Beyerlein<sup>5</sup>; <sup>1</sup>Stanford University; <sup>2</sup>South China University of Technology; <sup>3</sup>University of Oklahoma; <sup>4</sup>Utah State University; <sup>5</sup>University of California, Santa Barbara

**2:10 PM**

**Deviations in Hall-Petch Behavior in a CrCoNi Medium Entropy Alloy:** *Novin Rasouli*<sup>1</sup>; Farid Fattahpour<sup>1</sup>; Sara Kadkhodaei<sup>1</sup>; Matthew Daly<sup>1</sup>; <sup>1</sup>University of Illinois at Chicago

**2:30 PM Break**

**2:50 PM**

**Influence of the Structure and Chemistry of 5 Grain Boundaries on Microscale Strengthening in Cu Bicrystals:** *Mohammed Kamran Bhat*<sup>1</sup>; Tobias Brink<sup>1</sup>; Hui Ding<sup>1</sup>; Chanwon Jung<sup>1</sup>; James Best<sup>1</sup>; Gerhard Dehm<sup>1</sup>; <sup>1</sup>Max-Planck-Institut für Eisenforschung GmbH

**3:10 PM**

**Temperature Effect on the Mechanical Response of Spark Plasma Sintered Al<sub>2</sub>O<sub>3</sub> by In-situ Compression Tests:** *Chao Shen*<sup>1</sup>; Tongjun Niu<sup>1</sup>; Jaehun Cho<sup>2</sup>; Tianyi Sun<sup>1</sup>; Anyu Shang<sup>1</sup>; R. Edwin Garcia<sup>1</sup>; Haiyan Wang<sup>1</sup>; Xinghang Zhang<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Kumoh National Institute of Technology

**3:30 PM**

**Amorphous Shear Bands in Crystalline Materials as Drivers of Plasticity:** *Xuanxin Hu*<sup>1</sup>; Nuohao Liu<sup>1</sup>; Hongliang Zhang<sup>2</sup>; Izabela Szlufarska<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison; <sup>2</sup>Fudan University

**3:50 PM**

**Phase Instability and Strengthening Induced by Oxygen Interstitials in BCC Ti-Nb Alloys:** *Florent Mignerot*<sup>1</sup>; Ravit Silverstein<sup>1</sup>; Nicolás Maria della Ventura<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

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Phase Stability in Extreme Environments II — Phase Changes in Multi-component Systems and Nanostructured Materials

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

**Program Organizers:** David Frazer, Idaho National Laboratory; Andrew Hoffman, GE Research; Kinga Unocic, Oak Ridge National Laboratory; Janelle Wharry, Purdue University; Kaila Bertsch, Lawrence Livermore National Laboratory; Raul Rebak, GE Global Research; Tianyi Chen, Oregon State University; Marie Romedenne, Oak Ridge National Laboratory

**Thursday PM | March 7, 2024**  
**Bayhill 18 | Hyatt**

**Session Chair:** Janelle Wharry, Purdue University

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#### 1:00 PM Invited

**Creep Strength of Refractory High-Entropy Alloy TiZrHfNbTa and Comparison with Ni-base Superalloy CMSX-4:** *Ying Yang*<sup>1</sup>; Easo George<sup>2</sup>; Christian Gadelmeier<sup>3</sup>; Uwe Glatzel<sup>3</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>University of Tennessee Knoxville; <sup>3</sup>University of Bayreuth

#### 1:30 PM

**Microstructure Evolution in Cr<sub>0.5</sub>FeNiMn and CrFeNiCoPd<sub>0.75</sub> Alloys under Ion Irradiation:** *Anshul Kamboj*<sup>1</sup>; Emmanuelle Marquis<sup>1</sup>; <sup>1</sup>University of Michigan Ann Arbor

#### 1:50 PM

**Superior Radiation Resistance and Structural Stability in Nanotwinned High Entropy Thin Film under Extreme Radiation Damage:** *Wei-Cheng Chang*<sup>1</sup>; Fan-Yi Ouyang<sup>1</sup>; Maulik Patel<sup>2</sup>; <sup>1</sup>National Tsing Hua University; <sup>2</sup>University of Liverpool

#### 2:10 PM Break

#### 2:30 PM Invited

**Development of Novel Intermetallic Dispersion Strengthened Steels:** *Iris Carneiro*<sup>1</sup>; Alexander J. Knowles<sup>1</sup>; <sup>1</sup>University of Birmingham

#### 3:00 PM

**Advanced Manufacturing and Sensor Integration for Smart Sensing on Nuclear Packages:** *Kunal Mondal*<sup>1</sup>; Sam Hollifield<sup>1</sup>; Oscar Martinez<sup>1</sup>; Mingyan Li<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

#### 3:20 PM Invited

**Exceptional Fatigue Strength of a Microstructurally Stable Bulk Nanocrystalline Alloy:** *Kristopher Darling*<sup>1</sup>; Raj Koju<sup>2</sup>; B. Hornbuckle<sup>1</sup>; Saurabh Sharma<sup>3</sup>; Yuri Mishin<sup>2</sup>; Kiran Solanki<sup>3</sup>; <sup>1</sup>DEVCOM ARL; <sup>2</sup>George Mason University; <sup>3</sup>Arizona State University

#### 3:50 PM Invited

**Stability of Nanoporous Ultra-High Temperature Ceramics at High Temperatures:** Catherine Ott<sup>1</sup>; Luis Granadillo<sup>1</sup>; *Ian Mccue*<sup>1</sup>; <sup>1</sup>Northwestern University

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## MATERIALS SYNTHESIS AND PROCESSING

### Phase Transformations and Microstructural Evolution — Ferrous Alloys II

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

**Program Organizers:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

**Thursday PM | March 7, 2024**  
**Celebration 7 | Hyatt**

**Session Chair:** Ashley Paz y Puente, University of Cincinnati

**1:00 PM**

**Ordered Phase Equilibria and Order-Order Transformations in Fe-Pd:** Adrian Savovici<sup>1</sup>; William Soffa<sup>1</sup>; *Jerrold Floro*<sup>1</sup>; <sup>1</sup>University of Virginia

**1:20 PM**

**Analysis of Martensitic Transformation in Metastable Austenitic Stainless Steel during Electrochemical Polishing:** *Junyoung Chae*<sup>1</sup>; Hojun Gwon<sup>2</sup>; Chanwoo Jeong<sup>1</sup>; Guihyung Lee<sup>1</sup>; Hyukjae Lee<sup>1</sup>; Hyungjun Cho<sup>2</sup>; Sung-Joon Kim<sup>2</sup>; Heung Nam Han<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Graduate Institute of Ferrous Technology, Pohang University of Science and Technology

**1:40 PM**

**The Influence of Structural Defects on Local Phase Separation Tendencies in Spinodal Alloys:** *Michael Lastovich*<sup>1</sup>; Farhan Ishrak<sup>1</sup>; Mayur Pole<sup>2</sup>; Charles Perkins<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Lab

## MECHANICS OF MATERIALS

### Structure-Property Relationships of Bulk Metallic Glasses — Modeling, Machine Learning, and Accelerated Discovery

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

**Thursday PM | March 7, 2024**  
**Rock Spring I and II | Hyatt**

**Session Chair:** Yonghao Sun, The Chinese Academy of Sciences

**1:00 PM Invited**

**Machine Learning Predictions of Glass Forming Ability:** *Dane Morgan*<sup>1</sup>; Benjamin Afflerbach<sup>1</sup>; Lane Schultz<sup>1</sup>; Maciej Polak<sup>1</sup>; Paul Voyles<sup>1</sup>; Izabela Szlufarska<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**1:25 PM**

**Novel a Priori CalPhaD-based Screening for Glass-forming Ability: Development of a New 18K Gold-based BMG:** *Owain Houghton*<sup>1</sup>; A. Greer<sup>1</sup>; <sup>1</sup>University of Cambridge

**1:45 PM**

**Glass Formation in Binary Alloys Studied Through Combinatorial Sputtering:** *Salena Huang*<sup>1</sup>; Sebastian Kube<sup>2</sup>; Nathan Johnson<sup>3</sup>; Jinpeng Fan<sup>1</sup>; Apurva Mehta<sup>3</sup>; Jan Schroers<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>University of California at Santa Barbara; <sup>3</sup>SLAC National Accelerator Laboratory

**2:05 PM**

**Learned Structure of Metallic Glass: a Parametric Molecular Dynamics Study:** *Thomas Hardin*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**2:25 PM Break**

**2:45 PM**

**Bridging the Gap between Computational and Experimental Study of Atomic-level Structure in Metallic Glasses:** *Jun Ding*<sup>1</sup>; Zhen Zhang<sup>1</sup>; Evan Ma<sup>1</sup>; <sup>1</sup>Xi'an Jiaotong University

**3:05 PM**

**Identifying the Defects in Amorphous Solids that Generate Non-affine Displacement Fields in Response to Globally Applied Shear:** *Evan Willmarth*<sup>1</sup>; Weiwei Jin<sup>1</sup>; Dong Wang<sup>1</sup>; Mark Shattuck<sup>2</sup>; Corey O'Hern<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>The City College of New York

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## MATERIALS SYNTHESIS AND PROCESSING

### Ultrafine-grained and Heterostructured Materials (UFGH XIII) – UFGH-Mechanical Properties and Deformation Mechanism

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

**Program Organizers:** Megumi Kawasaki, Oregon State University; Penghui Cao, University of California, Irvine; Mostafa Hassani, Cornell University; Rajib Kalsar, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Praveen Kumar, Indian Institute of Science; Dmytro Orlov, Lund University

**Thursday PM | March 7, 2024**  
**Celebration 10 | Hyatt**

**Session Chairs:** Praveen Kumar, Indian Institute of Science, Bangalore; Klaus-Dieter Liss, University of Wollongong

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**1:00 PM Invited**

**Deformation Mechanism in Ultrafine Grained Magnesium:** *Amanda Carvalho*<sup>1</sup>; *Roberto Figueiredo*<sup>1</sup>; <sup>1</sup>Universidade Federal De Minas Gerais

**1:30 PM**

**Achieving Antimicrobial and Superior Mechanical Properties in a Scalable and Cost-effective Heterostructured Stainless Steel:** *Liliana Romero Resendiz*<sup>1</sup>; Yuntian Zhu<sup>1</sup>; <sup>1</sup>City University of Hong Kong

**1:50 PM**

**Bio-Compatibility of HPT-Processed Commercially Pure Mg and a MgZnCe Alloy:** *Praveen Kumar*<sup>1</sup>; Lochan Upadhayay<sup>1</sup>; Kaushik Chatterjee<sup>1</sup>; <sup>1</sup>Indian Institute of Science



**2:10 PM****Fracture Properties of the CrMnFeCoNi Alloy in the Nanocrystalline Regime:** *Simon Pillmeier*<sup>1</sup>; Juergen Eckert<sup>1</sup>; Anton Hohenwarter<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben**2:30 PM Break****2:50 PM****Structural Characterization and Thermal Evolution of Severe Plastic Deformation Processed Materials by Advanced Synchrotron and Neutron Methods:** *Klaus-Dieter Liss*<sup>1</sup>; Malte Blankenburg<sup>2</sup>; Megumi Kawasaki<sup>3</sup>; <sup>1</sup>University of Wollongong; <sup>2</sup>Deutsches Elektronen Synchrotron (DESY); <sup>3</sup>Oregon State University**3:10 PM****Evaluation of Serration Behavior and Localized Deformation in 22Mn-0.6C Steels with Various Grain Sizes:** *Sukyong Hwang*<sup>1</sup>; Myeong-Heom Park<sup>1</sup>; Yu Bai<sup>2</sup>; Akinobu Shibata<sup>3</sup>; Nobuhiro Tsuji<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Dalian university of Technology; <sup>3</sup>National Institute for Materials Science (NIMS)**3:30 PM****Improvement of Strength and Ductility of CuTa Composites by ECAE Processing:** *Charles Borenstein*<sup>1</sup>; Karl Hartwig<sup>2</sup>; Brady Butler<sup>3</sup>; James Paramore<sup>3</sup>; Michael Demkowicz<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>Texas A&M University, Shear Form, Inc; <sup>3</sup>Texas A&M University, DEVCOM-ARL Army Research Lab South**3:50 PM****Continuous Metal Processing of Ultrafine-grained Copper Sheets through the Cold Angular Rolling Process:** Isshu Lee<sup>1</sup>; Laxman Bhatta<sup>1</sup>; *Megumi Kawasaki*<sup>1</sup>; <sup>1</sup>Oregon State University**4:10 PM****Mechanical Studies of Heterogeneous Nanostructured Ni-based Superalloys:** *Ikponmwosa Iyinbor*<sup>1</sup>; Andrea Hodge<sup>1</sup>; <sup>1</sup>University of Southern California

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**SPECIAL TOPICS****2024 Technical Division Student Poster Contest — EPD 2024 Technical Division Graduate Student Poster Contest****Monday PM | March 4, 2024**  
**Regency R | Hyatt****SPG-1: Diffusion Bonding of Titanium Alloys and Magnesium Alloys:** *Muhammad Ali Shar Baloch*<sup>1</sup>; Tahir Khan<sup>1</sup>; <sup>1</sup>University of Bradford**SPG-2: Effects of Active Metal Brazed Microstructure on Mechanical Properties for Power Modules:** *Yun-Chan Kim*<sup>1</sup>; Dong-yurl Yu<sup>1</sup>; Shin-il Kim<sup>1</sup>; Dongjin Kim<sup>1</sup>; Chang-Woo Lee<sup>1</sup>; Sehoon Yu<sup>1</sup>; Dong-jin Byun<sup>2</sup>; Junghwan Bang<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea University**SPG-3: Enhancing Thiosulfate Stability and pH Control in Ammonium Thiosulfate Gold Leaching with Mg(OH)<sub>2</sub>:** *Sujin Chae*<sup>1</sup>; Farzaneh Sadri<sup>1</sup>; Yeonuk Choi<sup>1</sup>; Ahmad Ghahreman<sup>1</sup>; <sup>1</sup>Queen's University**SPG-4: Expanding the Study of Non-contact Modulation Calorimetry through Magnetohydrodynamic Modeling:** *Lydia Ellen Tonani*<sup>1</sup>; Gwendolyn Bracker<sup>2</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>DLR**SPG-5: Kinetic Study on Deoxidation of Molten Copper by the Carbon Monoxide**

**Gas Bubbling:** *So-Yeong Lee*<sup>1</sup>; Ho-Sang Sohn<sup>1</sup>; <sup>1</sup>Kyungpook National University

**SPG-6: Phytomining for Rare Earth Elements: A Comparative Life Cycle Assessment:** Mohsen Rabbani<sup>1</sup>; Frida Muthoni<sup>1</sup>; *Trista McLaughlin*<sup>1</sup>; Ehsan Vahidi<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**SPG-7: Project Tethys: Extracting Water from the Martian Environment:** *Lydia Ellen Tonani*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-8: Recovery of Rhenium from Superalloy Swarf, Grindings, Turnings, and Scrap:** *Morgan Simco*<sup>1</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>WPI

**SPG-9: Unraveling the Structural Dynamics of Cu<sub>6</sub>Sn<sub>5</sub> Hexagonal Phase under Electrical Current Stressing:** *Shubhayan Mukherjee*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

## SPECIAL TOPICS

**2024 Technical Division Student Poster Contest — FMD 2024 Technical Division Graduate Student Poster Contest**

Monday PM | March 4, 2024  
Regency R | Hyatt

**SPG-10: Effects of Grain Growth Mechanism in Cu-based Alloy Thin Films for Low Resistivity:** *Jihyeon Lim*<sup>1</sup>; Dong woo Lee<sup>1</sup>; <sup>1</sup>Sungkyunkwan University

**SPG-11: Engineering and Testing of Perovskite Solar Devices for Use on the Lunar Surface:** *Mason Placanica*<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**SPG-12: GenMG: A Tool for Predicting Novel Metallic Glasses with Application-specific Properties:** *Jerry Howard*<sup>1</sup>; Dev Chidambaram<sup>1</sup>; Leslie Mushongera<sup>1</sup>; Krista Carlson<sup>1</sup>; <sup>1</sup>University of Nevada, Reno

**SPG-13: In-situ Nucleation of MOF on Glass Fiber Surface: Investigating MOF Loading Effects and Electrochemical Performance:** *Zeru Wang*<sup>1</sup>; <sup>1</sup>Southern University of Science and Technology

**SPG-14: Liquid/Solid Interfacial Reactions between Lead-free Solders and the Cu-Ni-Si-Mg Alloy(C7025):** *Jing-ting Chou*<sup>1</sup>; Yi-chin Liou<sup>1</sup>; Yee-wen Yen<sup>1</sup>; <sup>1</sup>National Taiwan University of Science and Technology

**SPG-15: Mechanistic Investigation of Twinned Copper Nanowires as a Multi-functional Materials:** *Hsin-Yu Chen*<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University, ROC

**SPG-16: Novel SolidStir Extrusion Technology for Enhanced Conductivity Cable Manufacturing via In-situ Exfoliation of Graphite to Graphene:** *Aishani Sharma*<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Priyanka Agrawal<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Thomas Scharf<sup>1</sup>; Kumar Kandasamy<sup>2</sup>; Rajiv S. Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Enabled Engineering

**SPG-17: Tailoring the Performance of the LiNi<sub>0.8</sub>Mn<sub>0.1</sub>Co<sub>0.1</sub>O<sub>2</sub> Cathode using Al<sub>2</sub>O<sub>3</sub> and MoO<sub>3</sub> Artificial Cathode Electrolyte Interphase (CEI) Layers through Plasma-enhanced Atomic Layer Deposition (PEALD) Coating:** *Vijaykumar Jadhav*<sup>1</sup>; <sup>1</sup>Guangdong Technion-Israel Institute of Technology

**SPG-22: 3D Printed Stretchable Soft Electronics with Metamaterials-inspired Electromagnetic Architecture:** *LeiBin Li*<sup>1</sup>; Dwipak Sahu<sup>1</sup>; Jared Anklam<sup>1</sup>; Samuel Hales<sup>1</sup>; Samannoy Ghosh<sup>1</sup>; Yong Lin Kong<sup>1</sup>; <sup>1</sup>University of Utah

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**SPECIAL TOPICS**
**2024 Technical Division Student Poster Contest — FMD 2024 Technical Division Undergraduate Student Poster Contest**

Monday PM | March 4, 2024  
Regency R | Hyatt

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**SPU-2: Advanced Porous Scaffolding Design using Electrospun Nano/Microfibers for Tunable 2-dimensional Cell Culture Applications:** *Kibin Park*<sup>1</sup>; <sup>1</sup>University of Utah

**SPU-3: Ball-milling Synthesis Investigation of  $\text{MgAgSb}$  to Enhance Thermoelectric Properties & Reproducibility:** *Steph Meikle*<sup>1</sup>; Songyi Back<sup>2</sup>; Takao Mori<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>National Institute for Materials Science

**SPU-4: Functionalization and Performance Evaluation of Lignin-derived Carbon Fibers as Supercapacitor Electrodes:** *Jakob Scroggins*<sup>1</sup>; Lu Yu<sup>2</sup>; David Keffer<sup>1</sup>; David Harper<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville; <sup>2</sup>Oak Ridge National Laboratory

**SPU-5: Investigating the Correlation Between Tip-to-collector Distance and Electrical Current during Near-field Electrospinning Process:** *Hyunho Chae*<sup>1</sup>; Jiyoung Chang<sup>1</sup>; <sup>1</sup>University of Utah

**SPU-6: Optimization of VaspSol Solvation Free Energy Predictions:** *Sean Florez*<sup>1</sup>; Eric Fonseca<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

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**SPECIAL TOPICS**
**2024 Technical Division Student Poster Contest — LMD 2024 Technical Division Graduate Student Poster Contest**

Monday PM | March 4, 2024  
Regency R | Hyatt

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**SPG-18: Effect of Silicon Content on the Microstructure and Mechanical Properties of Aluminum-Cerium Based Alloys:** *Obidimma Ikeh*<sup>1</sup>; Dinc Erdeniz<sup>1</sup>; <sup>1</sup>University of Cincinnati

**SPG-19: Exploring High-temperature 7000 Series Aluminum Alloys: High-throughput DFT Calculations and Machine Learning Approaches:** *Yu-ning Chiu*<sup>1</sup>; Chung-yi Yu<sup>2</sup>; Wei-ting Lin<sup>1</sup>; Chia-chia Hsieh<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>China Steel Corporation

**SPG-20: Improving the Joint Strength of Ultrasonic Welded Mg/Al Joints by Insetting a Third Element Foil:** Shunta Tsunemori<sup>1</sup>; Yusuke Matsuoka<sup>1</sup>; *Mingzhe Bian*<sup>2</sup>; Yuhki Tsukada<sup>1</sup>; Toshiyuki Koyama<sup>1</sup>; Yasumasa Chino<sup>2</sup>; <sup>1</sup>Nagoya University; <sup>2</sup>National Institute of Advanced Industrial Science and Technology

**SPG-21: Modification of Twinning Behavior in Mg Alloys by Grain Boundary Intermetallic Particles:** *Benjamin Anthony*<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

**SPG-23: Understanding the Microstructure Evolution in the Selective Laser Melted Near-alpha Ti-6Al-2Sn-4Zr-2Mo Alloy using Advanced Characterization Techniques:** *Deepak Pillai*<sup>1</sup>; Sydney Fields<sup>1</sup>; Dian Li<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas

**SPG-24: Variations in Microstructural Characteristics and Mechanical Properties**

of High-speed-extruded Mg-Bi Alloys through Al Addition: Sang-Cheol Jin<sup>1</sup>; Sunghyuk Park<sup>1</sup>; <sup>1</sup>Kyungpook National University

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## SPECIAL TOPICS

### 2024 Technical Division Student Poster Contest — LMD 2024 Technical Division Undergraduate Student Poster Contest

Monday PM | March 4, 2024  
Regency R | Hyatt

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**SPU-7: Effects of LPBF Parameters on Fatigue Life of AlSi10Mg Alloys:** *Timothy Nice*<sup>1</sup>; Bhaskar Majumdar<sup>1</sup>; John O'Connell<sup>1</sup>; Nathaniel Badgett<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining & Technology

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## SPECIAL TOPICS

### 2024 Technical Division Student Poster Contest — MPMD 2024 Technical Division Graduate Student Poster Contest

Monday PM | March 4, 2024  
Regency R | Hyatt

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**SPG-25: A Comparative Study of Nitrogen Gas Purity for Cold Spray Applications: Bottled vs. Generated Nitrogen:** *Caroline Dowling*<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-26: A Comparison of the Generalizability of Machine Learning and Constitutive Modeling Approaches for the Prediction of Flow Stress:** *Thomas McCarthy*<sup>1</sup>; Jubert Pasco<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick

**SPG-27: Additive Manufacturing of CrCoMnFeNi via Novel Polymer-powder Composite:** *Arnoldas Sasnauskas*<sup>1</sup>; Minh-Son Pham<sup>2</sup>; Rocco Lupoi<sup>1</sup>; <sup>1</sup>Trinity College Dublin; <sup>2</sup>Imperial College London

**SPG-28: Additively Manufactured Niobium C103 via Laser-directed Energy Deposition: Fabrication Process, Microstructure Evolution, and Mechanical Behavior:** *Julio Ortega Rojas*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville

**SPG-29: Characterization of Microstructural Heterogeneities in EBM-PBF Haynes 282 using Linear and Random Scan Strategies:** *Alivia Mouro*<sup>1</sup>; Sriram Vijayan<sup>2</sup>; Joerg Jinschek<sup>3</sup>; Carolin Fink<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Michigan Technological University; <sup>3</sup>Technical University of Denmark

**SPG-30: 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

**SPG-31: Data-Driven Optimization of Wire Arc Directed Energy Deposition Manufacturing Conditions for Improved Bead Shape Prediction:** *Stephen Price*<sup>1</sup>; Danielle Cote<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Rodica Neamtu<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-32: Design and Tailoring of a Novel High-entropy Alloy for Additive Manufacturing:** *Sertac Altinok*<sup>1</sup>; Yunus Kalay<sup>1</sup>; <sup>1</sup>Middle East Technical University

**SPG-33: Development of a Low-cost Open-source Wire Arc Additive Manufacturing (WAAM) Machine:** *Vishnu Ramasamy*<sup>1</sup>; Bathlomew Ebika<sup>1</sup>; Robert Gao<sup>1</sup>; Kenneth

Loparo<sup>1</sup>; Bradley Jared<sup>2</sup>; Tony Schmitz<sup>2</sup>; Michael Groeber<sup>3</sup>; Sun Yi<sup>4</sup>; Kornel Ehmann<sup>5</sup>; John Lewandowski<sup>1</sup>; <sup>1</sup>Case Western Reserve University; <sup>2</sup>University of Tennessee; <sup>3</sup>Ohio State University; <sup>4</sup>North Carolina Agricultural and Technical State University; <sup>5</sup>Northwestern University

**SPG-34: Effect of Fastener Hole Repair on High-strength Aluminum Alloy Plates via Additive Friction Stir Deposition:** *Ismael Hidalgo*<sup>1</sup>; Paul Allison<sup>1</sup>; Brian Jordon<sup>1</sup>; <sup>1</sup>Baylor University

**SPG-35: Effects of Liquid Nitrogen Cryogenic Cooling on Nickel Aluminum Bronze Weld Metal Microstructure Manufactured with Directed Energy Deposition Process:** *Alexey Kuprienko*<sup>1</sup>; Sriram Vijayan<sup>2</sup>; Ashton Egan<sup>1</sup>; Carolin Fink<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>Michigan Technological University

**SPG-36: Electroplating Metal Powder for Cold Spray Application:** *Eric Klein*<sup>1</sup>; Elizabeth Hodges<sup>2</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>University of Massachusetts Amherst

**SPG-38: Grain Interface Functional Design to Create Damage Resistance in Polycrystalline Metallic Materials:** *Olajesu Olanrewaju*<sup>1</sup>; Manish Kumar<sup>1</sup>; Kevin Jacob<sup>1</sup>; Curt Bronkhorst<sup>2</sup>; Nan Chen<sup>2</sup>; Marko Knezevic<sup>3</sup>; William Musinsky<sup>4</sup>; Manny Gonzales<sup>4</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; <sup>4</sup>Air Force Research Laboratory

**SPG-39: Impact on Microstructure and Densification of High and Low Heating Rates Sintering for Copper Modern Advanced Manufacturing:** Santiago Vargas<sup>1</sup>; *Camilo Bedoya Lopez*<sup>1</sup>; Nived Sanjay<sup>1</sup>; Gil Rubia<sup>1</sup>; Carlos Castano<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University

**SPG-40: In Situ Correlative Transmission Electron Microscopy for Experimental Study of Grain Growth in Thin Films:** *Matthew Patrick*<sup>1</sup>; Katayun Barmak<sup>1</sup>; Jeffrey Rickman<sup>2</sup>; <sup>1</sup>Columbia University; <sup>2</sup>Lehigh University

**SPG-41: Microstructural and Mechanical Characterization of Al 7075 Parts Processed by Additive Friction Stir Deposition:** *Ehsan Bagheri*<sup>1</sup>; Saeid Zavari<sup>1</sup>; Huan Ding<sup>1</sup>; Noushin Adibi<sup>1</sup>; Shengmin Guo<sup>1</sup>; <sup>1</sup>Louisiana State University

**SPG-42: Microstructural Evolution in Austenitic Stainless Steels during Laser Sheet-metal Forming:** *Tianchen Wei*<sup>1</sup>; Nathan Fripp<sup>1</sup>; Benjamin Anthony<sup>1</sup>; Benjamin Begley<sup>1</sup>; Victoria Miller<sup>1</sup>; <sup>1</sup>University of Florida

**SPG-43: Modeling Electrospray of Water and Liquid Metals:** *Amanda Smith*<sup>1</sup>; Robert Hyers<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-44: Multi-material Hybrid Manufacturing for Desired Composition, Tailored Properties and Complex Geometries:** *Ganesan Gunasekaran*<sup>1</sup>; Neel Kamal Gupta<sup>1</sup>; Siddartha<sup>1</sup>; Shahu Rajaram Karade<sup>1</sup>; Narasimhan K<sup>1</sup>; Karunakaran K.P<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**SPG-45: Multiscale Microstructure and Mechanical Characterization of Cu-Ni Alloys Produced through Hydrogel Infusion-based Additive Manufacturing (HIAM):** *Thomas Tran*<sup>1</sup>; Rebecca Gallivan<sup>2</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology; <sup>2</sup>ETH Zurich

**SPG-46: Multi-stimuli Integration in Alloy Design: Friction-assisted Processing of Al-Mg Alloys for High-performance Nano-composite Materials:** *Md Jasim Uddin*<sup>1</sup>; Aniruddha Malakar<sup>1</sup>; Michael Lastovich<sup>1</sup>; Farhan Ishrak<sup>1</sup>; Caleb Schenck<sup>1</sup>; Josephine Hartmann<sup>1</sup>; Sourabh Saptarshi<sup>1</sup>; Dongsheng Li<sup>1</sup>; Tim Horn<sup>1</sup>; Elizabeth Kautz<sup>1</sup>; Arun Devaraj<sup>1</sup>; Christopher Rock<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University

**SPG-47: Ni/Ga Ratio Effect on Cu-Cu TLP Bonding Process:** *Tzu-hsuan Huang*<sup>1</sup>;

Jian-Wei Huang<sup>1</sup>; Zhih-Feng Lin<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**SPG-48: Predicting Microstructure of Gas Atomized Reaction Synthesis 14YWT ODS Steel: A Thermodynamic Simulation Approach for Laser Powder Bed Fusion:** *Sourabh Saptarshi*<sup>1</sup>; Mathew deJong<sup>1</sup>; Christopher Rock<sup>1</sup>; Iver Anderson<sup>2</sup>; Djamel Kaoumi<sup>1</sup>; Timothy Horn<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>AMES National Laboratory

**SPG-49: Properties of Additive Friction Stir Deposition Aluminum 7075:** *Lauren Miller*<sup>1</sup>; Peter Metz<sup>1</sup>; Joshua Kincaid<sup>1</sup>; Katherine Page<sup>1</sup>; Dayakar Penumadu<sup>1</sup>; Eric Lass<sup>1</sup>; Brett Compton<sup>1</sup>; Tony Schmitz<sup>1</sup>; <sup>1</sup>University of Tennessee

**SPG-50: Recycled Battlefield Titanium Scrap for Cold Spray Applications:** *Kiran Judd*<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-51: Recycling Titanium Feedstock Powders for Re-use in Cold Spray Additive Manufacturing:** *Ashton Lyon*<sup>1</sup>; Danielle Cote<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**SPG-52: Rheological Effects of Nanoparticles on Epoxy with Implications for DIW:** *Matthew Durfee*<sup>1</sup>; Sanchari Chowdhury<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

**SPG-53: SolidStir Extrusion: An Innovative Friction Stir Based Extrusion Process:** *Anurag Krishnakumar Gumaste*<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Sanya Gupta<sup>1</sup>; Supreeth Gaddam<sup>1</sup>; Kumar Kandasamy<sup>2</sup>; Brandon A. McWilliams<sup>3</sup>; Kyu C. Cho<sup>3</sup>; Rajiv S. Mishra<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Enabled Engineering; <sup>3</sup>DEVCOM Army Research Laboratory

**SPG-54: Tuning the Microstructure in the Direct Energy Deposited Metastable Beta Ti-5Al-5Mo-5V-3Cr Alloy for Aerospace Applications:** *Sydney Fields*<sup>1</sup>; Dian Li<sup>1</sup>; Deepak Pillai<sup>1</sup>; Yufeng Zheng<sup>1</sup>; <sup>1</sup>University of North Texas

**SPG-55: Voronoi Tessellation Validation for Analysis of Microstructural Data from Sintered Porous Metal Structures:** *Pierangeli Rodriguez De Vecchis*<sup>1</sup>; Markus Chmielus<sup>1</sup>; <sup>1</sup>University of Pittsburgh

**SPG-56: Wire-Arc Directed Energy Deposition (DED) of High-strength Low-alloy (HSLA) Steels for Replacement of Conventionally Manufactured HY-80:** *Jason Langevin*<sup>1</sup>; Kiran Judd<sup>1</sup>; Kyle Tsaknopoulos<sup>1</sup>; Danielle Cote<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

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**SPU-8: Additive Manufacturing of Carbon Steels via Direct Reduction of Oxide Precursor Inks and Gas Carburization:** *Elias Winterscheidt*<sup>1</sup>; Collin Stiers<sup>1</sup>; Joshua Kacher<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**SPU-10: Entrapment of Volatile Organic Compounds in UiO-66 Metal-organic-framework: An Ab Initio Molecular Dynamics Study:** *Brianne Boyd*<sup>1</sup>; Deep Choudhuri<sup>1</sup>; Scott Bobbitt<sup>2</sup>; <sup>1</sup>NMT; <sup>2</sup>Sandia National Laboratory

**SPU-11: Exploring Biofiber Properties and their Influence on Critical Biocomposite**

**Quality:** *Jocelyn Hess*<sup>1</sup>; *Oluwafemi Oyedeji*<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory

**SPU-13: Microstructure of Rapidly Solidified M2 High-Speed Steel by Multi-Beam Laser Melting:** *Takahashi Masamitsu*<sup>1</sup>; *Kholqillah Ardhian Ilman*<sup>1</sup>; *Yorihiro Yamashita*<sup>2</sup>; *Takahiro Kunimine*<sup>1</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>National Institute of Technology, Ishikawa College

**SPU-14: Open Cell Structure Volumetric Shrinkage in Additively Manufactured Alumina:** *Marcus Hansen*<sup>1</sup>; *Kelvin Xie*<sup>1</sup>; <sup>1</sup>Texas A&M University

**SPU-15: Spark Plasma Sintering of Graphitic Matrix for TRISO Compact Fabrication:** *Valentyna Pawlowska*<sup>1</sup>; *Madalena Spencer*<sup>2</sup>; *Lava Pilliari*<sup>3</sup>; *Anil Prasad*<sup>2</sup>; *Lukas Bichler*<sup>3</sup>; *Jeffery Battersby*<sup>2</sup>; *Patrick Morrison*<sup>2</sup>; *Catherine Thiriet*<sup>2</sup>; <sup>1</sup>University of Waterloo; <sup>2</sup>Canadian Nuclear Laboratories; <sup>3</sup>University of British Columbia

**SPU-16: Synthesis of Spherical Uranium Dioxide Powder Feedstock for Fused Deposition Modelling (FDM):** *Valentyna Pawlowska*<sup>1</sup>; *Alexi Buenaventura*<sup>2</sup>; *Anil Prasad*<sup>2</sup>; *Nikolaos Kotsios*<sup>2</sup>; <sup>1</sup>Canadian Nuclear Laboratories / University of Waterloo; <sup>2</sup>Canadian Nuclear Laboratories

**SPU-17: The Internal Temperature Profile of a Pyrometallurgical Furnace from External Fiber Optic Measurements using Distributed Temperature Sensing (DTS):** *Stefany Huanca Choque*<sup>1</sup>; <sup>1</sup>Universidad Mayor de San Andres

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**SPG-57: Anomalous Particle Formation in eGaln Exposed to Zinc Metal:** *Michael Mizak*<sup>1</sup>; *Victoria Miller*<sup>1</sup>; *Justin Norkett*<sup>2</sup>; <sup>1</sup>University of Florida; <sup>2</sup>NSWCCD

**SPG-58: Assessment of Strength-ductility Balance, Strain Hardening, and Fracture of Massive Ferrite in Ti-stabilized Interstitial-free Steel:** *Sandeep Yadav*<sup>1</sup>; *Sadhan Ghosh*<sup>2</sup>; <sup>1</sup>Indian Institute of Technology Roorkee; <sup>2</sup>Indian Institute of Technology, Roorkee

**SPG-59: Bonding Mechanisms between Steels and Mg Alloys having Different Composition using Ultrasonic Spot Welding:** *Yun-Ta Chung*<sup>1</sup>; *Jhe-Yu Lin*<sup>1</sup>; <sup>1</sup>National Taipei University of Technology

**SPG-60: Characteristics of Laser and Electron Beam Welds of Borated Stainless Steel for Neutron Absorbers and Structural Materials for Storage of Spent Nuclear Fuel:** *Joonghoon Kim*<sup>1</sup>; *Jongmin Han*<sup>1</sup>; *Tai-Bong Son*<sup>2</sup>; *Myung-Sub Roh*<sup>3</sup>; *Jin Young Park*<sup>3</sup>; *Daegeun Nam*<sup>1</sup>; *JB Jeon*<sup>4</sup>; *Byoungkoo Kim*<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology; <sup>2</sup>Korea Nuclear Industry Research Association; <sup>3</sup>DAEKYEONG engineering com; <sup>4</sup>Dong-A University

**SPG-61: Characterization of Microstructure Periodicity in Additively Manufactured Components Fabricated through Laser Powder Bed Fusion: An Analysis Based on Orientation Segmentation Image Analysis:** *Sahar Beigzadeh*<sup>1</sup>; *Jeffrey Shield*<sup>1</sup>; <sup>1</sup>University of Nebraska

**SPG-62: Compositional and Structural Non-uniformity in Refractory High Entropy Alloys:** *Sydney Fields*<sup>1</sup>; *Merbin John*<sup>1</sup>; *Deepak Pillai*<sup>1</sup>; *Lin Li*<sup>2</sup>; *Yufeng Zheng*<sup>1</sup>;

<sup>1</sup>University of North Texas; <sup>2</sup>Arizona State University

**SPG-64: Design of Novel Alloys via CALPHAD-based High Throughput Calculations:** *Shiddhartha Ramprakash*<sup>1</sup>; Shalini Roy Koneru<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; Hamish Fraser<sup>1</sup>; Yunzhi Wang<sup>1</sup>; <sup>1</sup>Ohio State University

**SPG-65: Effect of Compositional Changes on the Microstructure and Creep Resistance of High Entropy Superalloys:** *Hemanth Maradani*<sup>1</sup>; Dinc Erdeniz<sup>1</sup>; <sup>1</sup>University of Cincinnati

**SPG-66: Fracture Toughness of Additively Manufactured Tungsten:** *Aishwarya Jayadeep*<sup>1</sup>; Punit Kumar<sup>2</sup>; David Cook<sup>2</sup>; Patxi Fernandez-Zelaia<sup>3</sup>; Michael Kirka<sup>3</sup>; Robert Ritchie<sup>2</sup>; <sup>1</sup>University of California, Berkeley; <sup>2</sup>Lawrence Berkeley National Laboratory; University of California, Berkeley; <sup>3</sup>Oak Ridge National Laboratory

**SPG-67: High-temperature and High-pressure Water Chemical Wear Characteristics of Cobalt-free Reduced Activation Hard-facing Material for Light Water Reactor Valves:** *Jongmin Han*<sup>1</sup>; JoongHoon Kim<sup>1</sup>; Tai-Bong Son<sup>2</sup>; Myung-Sub Roh<sup>3</sup>; Jin Young Park<sup>3</sup>; Daegeun Nam<sup>1</sup>; JB Jeon<sup>4</sup>; Byoungkoo Kim<sup>1</sup>; <sup>1</sup>Korean Institute of Industrial Technology; <sup>2</sup>Korea Nuclear Industry Research Association; <sup>3</sup>Daekyeong Engineering Com; <sup>4</sup>Donga University

**SPG-68: High Entropy NiTiHfZrCu Shape Memory Alloys; Transformation temperatures, Microstructure, and Mechanical Performance:** *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 University

**SPG-69: Investigation of Fuel Chemical Cladding Interactions with UO<sub>2</sub> and UN using Diffusion Couples:** *Rebecca Manns*<sup>1</sup>; Josie Libero<sup>1</sup>; Daniel Koury<sup>1</sup>; <sup>1</sup>University of Nevada, Las Vegas

**SPG-70: Investigation of the Microstructural Analysis in Dwell Fatigue Tested Ti-6246 Alloy:** *Appala Naidu Surisetti*<sup>1</sup>; Vasisht Venkatesh<sup>2</sup>; Michael Mills<sup>1</sup>; Gopal Viswanathan<sup>1</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>Pratt and Whitney

**SPG-71: Mechanical Behavior of LLZO Solid Electrolytes: In Situ SEM Micropillar Compression and Ab Initio Insights:** *Zakariya Mohayman*<sup>1</sup>; Akihiro Kushima<sup>1</sup>; Tongjun Niu<sup>2</sup>; Nan Li<sup>3</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Los Alamos National Laboratory; <sup>3</sup>Los Alamos National Laboratory

**SPG-72: Microstructural Aspects and Mechanical Characterization of Laser Powder Bed Fusion Processed C103:** *Advika Chesetti*<sup>1</sup>; <sup>1</sup>University of North Texas

**SPG-73: Morphological Analysis of U<sub>3</sub>O<sub>8</sub> Particles using Machine Learning:** *John Mayer*<sup>1</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida

**SPG-74: Probing Structural and Compositional Heterogeneity in High Entropy Carbides: Impact of Cr Addition and Mechanical Stress:** *Caleb Schenck*<sup>1</sup>; Josephine Hartmann<sup>1</sup>; Elizabeth Kautz<sup>1</sup>; Farhan Ishrak<sup>1</sup>; Michael Lastovich<sup>1</sup>; William Fahrenholtz<sup>2</sup>; Donald Brenner<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Missouri University of Science and Technology

**SPG-75: Simulations of the Effect of Temperature on Deformation Behavior of Small Metal Nanoparticles:** *Douglas Zhang*<sup>1</sup>; Ruikang Ding<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

**SPG-76: Stabilization of Dendritic Copper Wick Structure through a Two-step Electrodeposition Process:** *Jie-Hau Liao*<sup>1</sup>; Chien-Neng Liao<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**SPG-77: Stress Fluctuations due to Random Interstitials in HCP Ti:** *Siyang Li*<sup>1</sup>; Daryl



Chrzan<sup>1</sup>; <sup>1</sup>UC Berkeley

**SPG-78: Structure Evolution and Sn Redistribution Accompanying Zircaloy-4 Oxidation:** *Josephine Hartmann*<sup>1</sup>; Tamas Varga<sup>2</sup>; Vaithiyalingam Shutthanandan<sup>2</sup>; Bharat Gwalani<sup>1</sup>; Arun Devaraj<sup>2</sup>; David Senior<sup>2</sup>; Elizabeth Kautz<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Pacific Northwest National Laboratory

**SPG-79: Temperature Effects on 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>; John Scully<sup>1</sup>; <sup>1</sup>University of Virginia

**SPG-80: Utilizing Machine Learning Techniques to Correlate Constituent Redistribution, Fission Gas Bubble Structures, and Thermal Conductivity Changes in Annular, Irradiated U-Zr Fuels:** *Mary Severt*<sup>1</sup>; Mitch 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

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**SPU-18: Studying the Effects of Aging on the Structure and Properties of Off-eutectic Pb-Sn Solder Joints for In-space Applications:** *Soren Hellyer*<sup>1</sup>; Caleb Ogden<sup>1</sup>; Manish Kumar<sup>1</sup>; Sid Pathak<sup>1</sup>; <sup>1</sup>Iowa State University

**SPU-19: The Novel Creation of Nanoporous Metal Oxides via the Oxidative Dealloying of Mo-alloys:** *Josh Baston*<sup>1</sup>; <sup>1</sup>University of Wisconsin-Madison

**SPU-20: Understanding and Protecting Refractory High Entropy Alloys from High Temperature Oxidation through Use of High Entropy Rare Earth Oxide Coatings:** *Isabella Marino*<sup>1</sup>; Jenifer Locke<sup>1</sup>; Elizabeth Opila<sup>2</sup>; Daniel Miracle<sup>3</sup>; <sup>1</sup>The Ohio State University; <sup>2</sup>University of Virginia; <sup>3</sup>Air Force Research Laboratory

**SPU-21: Using Bound Powder Extrusion for Multi-materials:** *Annika Bauman*<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology; Sandia National Laboratory

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## 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; Ramana Chintalapalle, University of Texas at El Paso

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**Session Chairs:** Nuggehalli Ravindra, New Jersey Institute of Technology; Sufian Abedrabbo, Khalifa University of Science & Technology

**A-1: Enhancing Gas Sensing Performance with 2D Material-integrated Sub-wavelength Grating Micro-ring Resonator: Improved Sensitivity and Selective Detection:** *Boxin Zhang*<sup>1</sup>; Harish Subbaraman<sup>1</sup>; <sup>1</sup>Oregon State University

**A-2: Exploring Stability of WSe<sub>2</sub> under Heavy Ion Irradiation:** *Sarah Lantzy*<sup>1</sup>; Aaron Rabin<sup>1</sup>; Khalid Hattar<sup>2</sup>; Assel Aitkaliyeva<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>University of Tennessee-Knoxville

## NUCLEAR MATERIALS

**Accelerated Qualification of Nuclear Materials Integrating Experiments, Modeling, and Theories — Poster Session**

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

**Program Organizers:** Tianyi Chen, Oregon State University; Assel Aitkaliyeva, University of Florida; Antoine Claisse, Westinghouse Electric Sweden; Caleb Clement, Westinghouse Electric Company; Michael Cooper, Los Alamos National Laboratory; Eric Focht, US Nuclear Regulatory Commission; David Frazer, Idaho National Laboratory; Lingfeng He, North Carolina State University; Walter Williams, Idaho National Laboratory/Nuclear Regulatory Commission

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**Application of the Internal State Variable (ISV) Constitutive Model for Creep-fatigue-induced Damage of Advanced High-temperature Nuclear Reactor Steels:** *Julian Tse Lop Kun*<sup>1</sup>; Heechen Cho<sup>1</sup>; Mark Horstemeyer<sup>1</sup>; <sup>1</sup>Liberty University

**E-1: Characterization of Alkylammonium Functionalized Smectite Organoclays from Molecular Dynamics Simulations:** *R. Seaton Ullberg*<sup>1</sup>; An Ta<sup>1</sup>; Emily Maulden<sup>1</sup>; Elizabeth Gager<sup>1</sup>; Maxime Pouvreau<sup>2</sup>; Juan Nino<sup>1</sup>; Nathalie Wall<sup>1</sup>; James Szecsody<sup>2</sup>; Carolyn Pearce<sup>2</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida; <sup>2</sup>Pacific Northwest National Laboratory

**E-2: Characterization of Proton Irradiation-induced Nanoscale Precipitates in Model Low Alloy Steels Using Transmission Electron Microscopy and Nanoindentation:** *Alexandra Dickinson-Lomas*<sup>1</sup>; Luke Hewitt<sup>2</sup>; Yu-Lung Chiu<sup>1</sup>; Chris Hardie<sup>2</sup>; Martin Freer<sup>1</sup>; <sup>1</sup>University of Birmingham; <sup>2</sup>UKAEA

**E-3: Coating Adherence Measurements Enabling Accelerated Screening of Accident Tolerant Claddings:** *Peter Beck*<sup>1</sup>; Mathew Hayne<sup>1</sup>; Tarik Saleh<sup>1</sup>; Benjamin Eftink<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**E-4: Cr-Coated Zircaloy-4 Surface Chemistry and Microstructure Following High Temperature Excursions and Quenching:** *Victoria Davis*<sup>1</sup>; Caleb King<sup>1</sup>; Colson Miller<sup>1</sup>; Braden Goddard<sup>1</sup>; Reza Mohammadi<sup>1</sup>; Carlos Castano<sup>1</sup>; Rajnikant Umretiya<sup>2</sup>; Andrew Hoffman<sup>2</sup>; Jessika Rojas<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University; <sup>2</sup>GE Research

**E-5: Development of Oxide Dispersion Strengthened Nickel-based Alloys for Enhanced Radiation Resistance:** *Ertugrul Demir*<sup>1</sup>; Fedi Fehri<sup>1</sup>; Jeff Bickel<sup>2</sup>; Megan Carter<sup>3</sup>; David Armstrong<sup>3</sup>; Peter Hosemann<sup>2</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina

State University; <sup>2</sup>University of California; <sup>3</sup>Oxford University

**Dust Particle Impact on Plasma-facing Materials in Tokamaks: Insights from Molecular Dynamics Simulations:** *Prashant Dwivedi*<sup>1</sup>; <sup>1</sup>Czech Technical University in Prague

**Evaluation of Low-length Kr Diffusion in UO<sub>2</sub> and ADOPT® using Time-of-flight Elastic Recoil Detection (ToF-ERDA):** *Denise Adorno Lopes*<sup>1</sup>; <sup>1</sup>Westinghouse

**E-6: Fundamental Surface Reconstruction and Formation of Phyllosilicate Waste Barrier Materials:** *An Ta*<sup>1</sup>; R. Seaton Ullberg<sup>1</sup>; Simon Phillpot<sup>1</sup>; <sup>1</sup>University of Florida

**E-7: High-temperature Nano-indentation Response of Al<sub>0.3</sub>Ti<sub>0.2</sub>Co<sub>0.7</sub>CrFeNi<sub>1.7</sub> High Entropy Alloy Processed Via Advanced Solid Phase Manufacturing Technique:** *Mohan Sai Kiran Nartu*<sup>1</sup>; Subhashish Meher<sup>1</sup>; Isabella Van Rooyen<sup>1</sup>; Mageshwari Komarasamy<sup>1</sup>; Rajarshi Banerjee<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory (PNNL); <sup>2</sup>University of North Texas

**E-8: High Temperature Compressive Creep Tests of Uranium Mononitride Using the Spark Plasma Sintering Apparatus:** Faris Sweidan<sup>1</sup>; *Elina Charatsidou*<sup>1</sup>; Pär Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**Irradiation-induced Helium Evolution and Damage Effects in REBCO Coated Conductors Used for Compact Fusion:** *Christopher Reis*<sup>1</sup>; Chase Gesteland<sup>2</sup>; Hamilton Parrish<sup>3</sup>; Mehdi Balooch<sup>2</sup>; Lee Bernstein<sup>1</sup>; Soren Prestemon<sup>4</sup>; Peter Hosemann<sup>2</sup>; <sup>1</sup>University of California, Berkeley; Lawrence Berkeley National Laboratory; <sup>2</sup>University of California, Berkeley; <sup>3</sup>University of California, Berkeley; Type One Energy; <sup>4</sup>Lawrence Berkeley National Laboratory

**E-9: Mechanical Investigations on Diffusion Bonding for Compact Heat Exchangers Utilizing Digital Image Correlation (DIC) and Electron Back-Scattering Diffraction (EBSD):** Hoon Lee<sup>1</sup>; *Mahmud Ovi*<sup>1</sup>; David Ehrhardt<sup>1</sup>; Peter Kurath<sup>1</sup>; James Stubbins<sup>1</sup>; <sup>1</sup>University of Illinois at Urbana-Champaign

**E-10: Microstructural Characterization of Harvested High Dose Zorita Light Water Reactor Internals by Atom Probe Tomography and High-resolution TEM:** *Sohail Shah*<sup>1</sup>; Mukesh Bachhav<sup>1</sup>; Boopathy Kombaiyah<sup>1</sup>; Cameron Howard<sup>1</sup>; Fei Teng<sup>1</sup>; Yachun Wang<sup>1</sup>; Jason Daniel<sup>2</sup>; <sup>1</sup>Idaho National Laboratory; <sup>2</sup>NRC

**E-11: Monte Carlo Modelling of Neutron Irradiation Displacement Damage in Uranium Mononitride (UN) Fuel When Used in A Small lead-cooled Fast Reactor:** *Fredrik Dehlin*<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**E-12: Post-irradiation Examination of High-dose Ion and Neutron Irradiated MA956 ODS Alloy:** *Yu Lu*<sup>1</sup>; *Yaqiao Wu*<sup>1</sup>; Ramprashad Prabhakaran<sup>2</sup>; Lin Shao<sup>3</sup>; Indrajit Charit<sup>4</sup>; <sup>1</sup>Boise State University; <sup>2</sup>Pacific Northwest National Laboratory; <sup>3</sup>Texas A&M University; <sup>4</sup>University of Idaho

**E-13: Proton Irradiation-induced Cracking and Microstructural Defects in UN and (U,Zr)N Composite Fuels:** *Elina Charatsidou*<sup>1</sup>; Maria Giamouridou<sup>1</sup>; Pär Olsson<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

**E-14: Quantifying the Spatial Distribution of Primary Radiation Damage in Real Materials:** *Matt Brand*<sup>1</sup>; Patrick Burr<sup>1</sup>; Edward Obbard<sup>1</sup>; <sup>1</sup>University of New South Wales

**E-15: Radiation Induced Segregation around Helium Bubbles in Reduced-Activation Ferritic/Martensitic (RAFM) Steels:** *Xingyu Liu*<sup>1</sup>; Jonathan Poplawsky<sup>2</sup>; Matthew Chancey<sup>3</sup>; Yongqiang Wang<sup>3</sup>; Xing Wang<sup>1</sup>; <sup>1</sup>Pennsylvania State University; <sup>2</sup>Oak Ridge National Laboratory; <sup>3</sup>Los Alamos National Laboratory

**E-16: Stability and Diffusion of Lanthanide Fission Products in HCP Zirconium and**

**BCC Iron Revealed by Density Functional Theory Calculations:** *Shehab Shousha*<sup>1</sup>; Benjamin Beeler<sup>2</sup>; Maria Okuniewski<sup>3</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>North Carolina State University, Idaho National Laboratory; <sup>3</sup>Purdue University

**E-17: Superionic-like Diffusion in Yttrium Hydride:** *Yuqing Huang*<sup>1</sup>; Jacob Eapen<sup>1</sup>; <sup>1</sup>North Carolina State University

**E-18: Surface Chemistry and Microstructure of FeCrAl Alloys Under High Heating Rates Post-quenching:** *Victoria Davis*<sup>1</sup>; Caleb King<sup>1</sup>; Colson Miller<sup>1</sup>; Braden Goddard<sup>1</sup>; Reza Mohammadi<sup>1</sup>; Carlos Castano<sup>1</sup>; Rajnikant Umretiya<sup>2</sup>; Andrew Hoffman<sup>2</sup>; Jessika Rojas<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University; <sup>2</sup>GE Research

**E-19: The Effects of Irradiation, Orientation, and Temperature on the Compressive Strength of Single-Crystal Zirconium via In-Situ TEM Micropillar Testing:** *Philip Alarcon-Furman*<sup>1</sup>; Matthew deJong<sup>1</sup>; Ryan Schoell<sup>1</sup>; Chris Smyth<sup>1</sup>; Geoffrey Beausoleil<sup>2</sup>; Djamel Kaoumi<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Idaho National Laboratory

**E-20: Tritium Population Near Dislocations in Zirconium from Molecular Dynamics:** Michael Foster<sup>1</sup>; *Xiaowang Zhou*<sup>1</sup>; <sup>1</sup>Sandia National Laboratories

**Unfaulting of Dislocation Loops in Metals: Atomistic Simulations and Continuum Modeling:** *Cheng Chen*<sup>1</sup>; Jun Song<sup>2</sup>; <sup>1</sup>Northwestern Polytechnical University; <sup>2</sup>McGill University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Functional and Structural Thin Films and Coatings — Poster Session

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

**Program Organizers:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Karine Mougin, Cnrs, Is2m; Ramana Chintalapalle, University of Texas at El Paso; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology

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**Session Chairs:** Gerald Ferblantier, University of Strasbourg - IUT LP / ICube Laboratory - CNRS; Adele Carrado, University of Strasbourg; Ramana Chintalapalle, University of Texas at El Paso; Karine Mougin, Cnrs - Is2m; Ravindra Nuggehalli, New Jersey Institute of Technology; Heinz Palkowski, Clausthal University of Technology Institute of Metallurgy

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**A-3: Beyond Traditional Engineering: the Use of Suspension Plasma Spray Technology in the Formation of Metal Oxide Nanoparticle-based Bioactive Coatings:** *Adriana Wrona*<sup>1</sup>; Alicja Duda<sup>2</sup>; Witold Kurylak<sup>2</sup>; Klaudia Pełowska<sup>2</sup>; Jacek Mazur<sup>2</sup>; Kinga Czechowska<sup>2</sup>; Alicja Hrynyszyn<sup>2</sup>; Marcin Lis<sup>2</sup>; <sup>1</sup>Lukasiewicz Research Network Institute of Non-Ferrous Metals; <sup>2</sup>Lukasiewicz Research Network Institute of Non-Ferrous Metals

**A-4: Composition Dependence of Electrical Properties in Cr<sub>x</sub>Mn<sub>1-x</sub>Te Thin Film:** *Mihyeon Kim*<sup>1</sup>; Yi Shuang<sup>1</sup>; Daisuke Ando<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University

**Enhanced Structural and Optical Quality of Rutile-phase Controlled GeO<sub>2</sub> Epitaxial Films on MgO(100) for Application in Optoelectronics:** *Paul Nalam*<sup>1</sup>; Debabrata Das<sup>1</sup>; Ramana Chintalapalle<sup>1</sup>; <sup>1</sup>The Center for Advanced Materials

Reserach, UTEP

**Influence of Alloying Agents on the Biodegradability of Zinc:** Alejandra Román<sup>1</sup>; Guadalupe Barrios Igoa<sup>1</sup>; Edgar Ibañez<sup>1</sup>; Natalia Zadorozne<sup>1</sup>; Claudia Méndez<sup>1</sup>; Alicia Ares<sup>1</sup>; <sup>1</sup>Universidad Nacional de Misiones (UNaM). Facultad de Ciencias Exactas, Químicas y Naturales (FCEQyN). Instituto de Materiales de Misiones (IMAM). Programa de Materiales y Fisicoquímica (ProMyF).

**Synthesis of Carbon Based Cost-effective Conductive Ink and Fabrication of Degradable Screen Printed Electrode Thereof:** *Deepanjali Sharma*<sup>1</sup>; <sup>1</sup>CSIR-CSIO

**A-5: The Influence of Chromium Content on Resistance Changes as a Function of Strain in Cr<sub>2</sub>Ge<sub>2</sub>Te<sub>6</sub> Thin Film:** *Yinli Wang*<sup>1</sup>; Yi Shuang<sup>2</sup>; Mayu Nakajima<sup>1</sup>; Daisuke Ando<sup>1</sup>; Fumio Narita<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>AIMR, Tohoku University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Materials for Energy Conversion and Storage 2024 — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee

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

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**Session Chairs:** Partha Mukherjee, Purdue University; Surojit Gupta, University of North Dakota; Susmita Sarkar, Purdue University; Bairav Vishnugopi, Purdue University

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**A-6: A Mechanistic Study of MXene Current Collectors for Lithium-metal-based Batteries:** *Ruocun Wang*<sup>1</sup>; Jaehoon Choi<sup>1</sup>; Yan Burets<sup>1</sup>; Mark Anayee<sup>1</sup>; Ray Unocic<sup>2</sup>; Geetha Valurouthu<sup>1</sup>; Wan-Yu Tsai<sup>2</sup>; Yury Gogotsi<sup>1</sup>; <sup>1</sup>A.J. Drexel Nanomaterials Institute, Drexel University; <sup>2</sup>Oak Ridge National Laboratory

**A-7: Diffuse Interface Methods to Resolve Grain Boundary Effects in Solid-state Electrolytes:** *Andrew Danbury*<sup>1</sup>; W. Andrews<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**Excellent Electrochemical Performance of Graphene-confined Self-healing Liquid Metal Anode Material Realized by Direct Drip Coating (DDC) Method:** Xingwang Zheng<sup>1</sup>; *Yuan Yuan*<sup>1</sup>; Dachong Gu<sup>1</sup>; <sup>1</sup>Chongqing University

**A-8: Mobile Solar Powered Pyrolysis Reactor:** *Maxwell Triepke*<sup>1</sup>; Xavier Vorhies<sup>1</sup>; Richard LaDouceur<sup>1</sup>; <sup>1</sup>Montana Tech

**The Ternary Alloy Anodes for Magnesium Ion Batteries:** *Dachong Gu*<sup>1</sup>; Yuan Yuan<sup>1</sup>; Xingwang Zheng<sup>1</sup>; Fusheng Pan<sup>1</sup>; <sup>1</sup>Chongqing University

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Advanced Soft Magnets and Magnetocaloric Materials: An FMD Symposium in Honor of Victorino Franco — Poster Session

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

**Program Organizers:** Daniel Salazar, BCMaterials; Alex Leary, NASA Glenn Research Center

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**Evidence of Large Cryogenic Magnetocaloric Effect in GdNi<sub>1-x</sub>Cox (0 < x < 0.15):** Anis Biswas<sup>1</sup>; T. Del Rose<sup>1</sup>; P. O. Ribeiro<sup>2</sup>; B. P. Alho<sup>2</sup>; V. S. R. de Sousa<sup>2</sup>; E. P. Nóbrega<sup>2</sup>; P. j. von Ranke<sup>2</sup>; Y. Mudryk<sup>1</sup>; <sup>1</sup>Ames National Laboratory; <sup>2</sup>Universidade do Estado do Rio de Janeiro

**Magnetocaloric Composite Wires for Regenerators:** Lukas Beyer<sup>1</sup>; Maria Krautz<sup>2</sup>; Tino Gottschall<sup>3</sup>; Jens Freudenberger<sup>1</sup>; Julia Kristin Hufenbach<sup>1</sup>; <sup>1</sup>Leibniz Institute for Solid State and Materials Research Dresden; TU Bergakademie Freiberg, Institute of Materials Science; <sup>2</sup>Leibniz Institute for Solid State and Materials Research Dresden; <sup>3</sup>Helmholtz-Zentrum Dresden-Rossendorf

## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Ceramic Materials and Processing — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Materials Characterization Committee, TMS: Powder Materials 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; Jinhong Li, China University of Geosciences; Ruigang Wang, Michigan State University; Alexander Dupuy, University of Connecticut

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**Session Chair:** Dipankar Ghosh, Old Dominion University

**Composite Materials Made from Battery Waste Ceramics:** Simon Restrepo Tobón<sup>1</sup>; Henry Colorado<sup>1</sup>; <sup>1</sup>Universidad de Antioquia

**C-1: Flash Crystallization of Li<sub>2</sub>O-Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub> Glass System:** Isabela Reis Lavagnini<sup>1</sup>; João Campos<sup>2</sup>; Eduardo Ferreira<sup>1</sup>; Ana Rodrigues<sup>2</sup>; <sup>1</sup>University of São Paulo; <sup>2</sup>Federal University of São Carlos

**Glass Waste Powders and Additives Based Ceramic Materials for Additive Manufacturing of Bricks:** Carlos Revelo<sup>1</sup>; Henrique M. G. Brochado<sup>1</sup>; Geovana Girondi<sup>1</sup>; Carlos M. F. Vieira<sup>1</sup>; Henry Colorado<sup>2</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF); <sup>2</sup>Universidad de Antioquia

**Mass Spectrometric Investigation of Thermodynamic Properties of CaSiO<sub>3</sub> Wollastonite:** Sergey Shornikov<sup>1</sup>; <sup>1</sup>Vernadsky Institute of Geochemistry of RAS

**Microwave-assisted Synthesis: A Facile Method for Fabrication of High-entropy Oxide Nanoparticles for Various Applications:** Hossein Minouei<sup>1</sup>; Mehdi Kheradmandfard<sup>2</sup>; Mohsen Saboktakin Rizi<sup>3</sup>; Sun Ig Hong<sup>1</sup>; <sup>1</sup>Chungnam National

University; <sup>2</sup>Yonsei University; <sup>3</sup>Kongju National University

**C-2: Production of Ceramic Tiles with Glass Waste and Kaolinitic Clay:** Layza dos Santos<sup>1</sup>; Geovana Carla Delaqua<sup>1</sup>; *Carlos Maurício Vieira*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro

**Synthesis of Hexagonal Boron Nitride at Low Temperature:** *He Mingsheng*<sup>1</sup>; <sup>1</sup>R&D Center of Wuhan Iron & Steel Co Ltd.

**Thermodynamic Analysis of Fe<sub>2</sub>AlB<sub>2</sub> Prepared by Molten Salt Electrochemical Method:** *Ning Han*<sup>1</sup>; Hongyan Yan<sup>1</sup>; Ju Meng<sup>1</sup>; Enze Cui<sup>1</sup>; Hui Li<sup>1</sup>; Jinglong Liang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

**Thermodynamic Analysis of Fe<sub>3</sub>Si Prepared from Steel Slag by Molten Salt Electrolytic:** *Enze Cui*<sup>1</sup>; Hongyan Yan<sup>1</sup>; Ju Mneg<sup>1</sup>; Ning Han<sup>1</sup>; Hui Li<sup>1</sup>; Jinglong Liang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

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## 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:** Jose Maria Porro, BCMaterials; Alexander Baker, Lawrence Livermore National Laboratory; Michael Kesler, Oak Ridge National Laboratory; Yongmei Jin, Michigan Technological University; Durga Paudyal, Ames Laboratory

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**Session Chairs:** Jose M. Porro, BCMaterials & Ikerbasque; Andoni Lasheras, University of the Basque Country

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**A-9: Enhanced Hard Magnetism of Synthetic L<sub>10</sub>-FeNi:** *Ihor Hlova*<sup>1</sup>; Yaroslav Mudryk<sup>1</sup>; Anis Biswas<sup>1</sup>; <sup>1</sup>Ames National Laboratory

**Impact of F and S Doping on (Mn,Fe)<sub>2</sub>(P,Si) Giant Magnetocaloric Materials:** *Fengqi Zhang*<sup>1</sup>; Niels van Dijk<sup>2</sup>; Ekkes Brück<sup>2</sup>; <sup>1</sup>City University of Hong Kong; <sup>2</sup>TU Delft

**A-10: Investigations of Microstructural and Phase Evolution of Sm<sub>60</sub>Ni<sub>40</sub> Alloy using Atom Probe Tomography:** *Chandrasekaran N*<sup>1</sup>; Pradeep K.G.<sup>1</sup>; <sup>1</sup>IIT Madras

**A-11: Magnetic Properties of Additively Manufactured Metal-Carbon Microcomposites:** *Sammy Shaker*<sup>1</sup>; Wenxin Zhang<sup>1</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology

**Recycling of Nd-Fe-B Magnets through Grain Boundary Diffusion with Rare Earth Fluorides:** *Ikenna Nlebedim*<sup>1</sup>; Xubo Liu<sup>1</sup>; <sup>1</sup>Ames National Laboratory

**Structure and Properties Evolution in Rapidly Annealed Fe<sub>73.5</sub>Ni<sub>10</sub>B<sub>14</sub>Cu<sub>0.7</sub> Amorphous Material:** *Maciej Kowalczyk*<sup>1</sup>; Aleksandra Kolano-Burian<sup>1</sup>; Agnieszka Grabias<sup>2</sup>; Piotr Błyskun<sup>3</sup>; Przemysław Zackiewicz<sup>1</sup>; Anna Wójcik<sup>4</sup>; Wojciech Maziarz<sup>4</sup>; Magorzata Gazińska<sup>5</sup>; <sup>1</sup>Lukasiewicz Research Network - Institute of Non-Ferrous Metals; <sup>2</sup>Lukasiewicz Research Network - Institute of Microelectronics and Photonics; <sup>3</sup>Warsaw University of Technology; <sup>4</sup>The Aleksander Krupkowski Institute of Metallurgy and Materials Science Polish Academy of Sciences; <sup>5</sup>Wrocław University of Science and Technology Faculty of Chemistry

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## MECHANICS OF MATERIALS

### Advances in Multi-Principal Element Alloys III: Mechanical Behavior – Poster Session

**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, FCA US LLC; Jamieson Brechtel, Oak Ridge National Laboratory; Gongyao Wang, Globus Medical

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**A Path to the Strongest Single-phase Multi-principal Element Alloy Design:** *Yang Tong*<sup>1</sup>; Dawei Zhou<sup>1</sup>; Caijuan Shi<sup>2</sup>; Zengrui Pei<sup>3</sup>; Weidong Li<sup>4</sup>; Fei Zhang<sup>2</sup>; Liang Jiang<sup>1</sup>; Peter Liaw<sup>4</sup>; <sup>1</sup>Yantai University; <sup>2</sup>Beijing Synchrotron Radiation Facility; <sup>3</sup>New York University; <sup>4</sup>The University of Tennessee-Knoxville

**D-1: Enhancing Mechanical Properties of a Medium-Entropy Alloy by Regulating Mo Addition:** *Chang-Yu Hung*<sup>1</sup>; Stoichko Antonov<sup>1</sup>; Paul Jablonski<sup>1</sup>; Martin Detroids<sup>1</sup>; <sup>1</sup>National Energy Technology Laboratory

**D-2: Control of Microstructure and Mechanical Response by Filler Material Selection In Gas Metal Arc Welding of CoCrFeMnNi High Entropy Alloys:** *Joao Oliveira*<sup>1</sup>; <sup>1</sup>Faculdade Ciencias Tecnologias

**D-3: Correlated Lattice Distortion and Vacancy Formation Energies in Multi-principal Element Alloys from DFT and Machine Learning:** *Nathan Linton*<sup>1</sup>; Dilpuneet Aidhy<sup>1</sup>; <sup>1</sup>Clemson University

**D-4: Dependence on Their Mn and Cr Contents of the Microstructures, Melting Range and High Temperature Creep Behaviors of Cantor's Alloy and Versions Strengthened by MC Carbides:** Corentin Gay<sup>1</sup>; Pauline Spaeter<sup>1</sup>; Nassima Chenikha<sup>1</sup>; Lionel Aranda<sup>1</sup>; *Patrice Berthod*<sup>1</sup>; <sup>1</sup>University of Lorraine

**D-5: Development of Light Weight High Entropy Alloys with Improved Strength and Ductility for Structural Applications:** *Manoj Mugale*<sup>1</sup>; Jay Desai<sup>1</sup>; Ganesh Walunj<sup>2</sup>; Amit Choudhari<sup>1</sup>; Sanoj Karki<sup>1</sup>; Satyavan Digole<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University; <sup>2</sup>Buffalo State University

**D-6: Dual-precipitation Strengthening of 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-7: Dynamic Mechanical Performance of FeNiCoAl-based High-entropy Alloy: Enhancement via Microbands and Martensitic Transformation:** *Aomin Huang*<sup>1</sup>; <sup>1</sup>University of California San Diego

**D-8: Effect of C Addition on Microstructure and Tensile Properties of CrFeNi<sub>2</sub>Al<sub>0.3</sub>Ti<sub>0.1</sub> High-entropy Alloys:** *Tao-Tsung Shun*<sup>1</sup>; Chien-Chang Wang Fang<sup>1</sup>; <sup>1</sup>Feng Chia University

**Effect of In-situ TiC Particles on the Microstructure and Mechanical Properties of Nb-Ta-V-Ti High Entropy Alloys:** *Hyuck Jae Choi*<sup>1</sup>; Jeong Pyo Lee<sup>1</sup>; Jeong Seon



Yoo<sup>1</sup>; Jin Kyu Lee<sup>1</sup>; <sup>1</sup>Kongju National University

**Effect of Silicon Addition on Mechanical Properties and Microstructure Evolution of FeMnCoCr High Entropy Alloy:** *Mohsen Saboktakin Rizl*<sup>1</sup>; Marzieh Ebrahimian<sup>1</sup>; Sun Ig Hong<sup>2</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>Chungnam National University

**Effects of Al and V on the Microstructure and Mechanical Properties of CoCuFeNi High Entropy Alloy:** *Jun Su Ha*<sup>1</sup>; Hae Jin Park<sup>1</sup>; Eui Kam Jeong<sup>1</sup>; Sung Hwan Hong<sup>1</sup>; Jin Kyu Lee<sup>2</sup>; Hyo Soo Lee<sup>3</sup>; Taek Jib Choi<sup>1</sup>; Ki Buem Kim<sup>1</sup>; <sup>1</sup>Sejong University; <sup>2</sup>Kongju National University; <sup>3</sup>Korea Institute of Industrial Technology

**Effects of Node Modification on Mechanical Properties of Periodic Micro-architected Lattices:** *Mayowa Dada*<sup>1</sup>; <sup>1</sup>University College London

**D-9: Effects of Titanium and Molybdenum Additions on Microstructures and Mechanical Properties of CoCrNi Medium Entropy Alloy:** *Jhen-Yu Yen*<sup>1</sup>; Chun-Hway Hsueh<sup>1</sup>; <sup>1</sup>National Taiwan University

**D-11: Elucidating the Tensile Properties in Ni-containing Medium-Mn Steel from the Perspective of Microstructure and Microtexture Evolution:** *Suman Kumar*<sup>1</sup>; Rahul Rakshit<sup>1</sup>; A Prasad<sup>2</sup>; Bhagyaraj Jayabalan<sup>2</sup>; Subrata Mukherjee<sup>2</sup>; Sumantra Mandal<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur; <sup>2</sup>TATA Steel Jamshedpur

**Enhanced Tensile Properties through Heterostructuring in a Face-centered Cubic Medium-entropy Alloy:** *Jae Wung Bae*<sup>1</sup>; Jungwan Lee<sup>2</sup>; Peyman Asghari-Rad<sup>3</sup>; Alireza Zargaran<sup>2</sup>; Auezhan Amanov<sup>4</sup>; Hyung Seop Kim<sup>2</sup>; <sup>1</sup>Pukyong National University; <sup>2</sup>Pohang University of Science and Technology (POSTECH); <sup>3</sup>Pennsylvania State University; <sup>4</sup>Sun Moon University

**D-12: Enhancing the Mechanical Properties of C-doped NiCoCr Medium-entropy Alloy by Utilizing Features of Laser-powder Bed Fusion Process:** *So-Yeon Park*<sup>1</sup>; Ji-Eun Ahn<sup>1</sup>; Young-Kyun Kim<sup>2</sup>; Kee-Ahn Lee<sup>1</sup>; <sup>1</sup>Inha University; <sup>2</sup>Inha University, Korea Institute of Materials Science

**D-13: High-throughput Fabrication of Refractory High-entropy Alloys:** *Rayna Mehta*<sup>1</sup>; Jesse Grant<sup>1</sup>; Tim Weihs<sup>1</sup>; <sup>1</sup>Johns Hopkins University

**D-14: High and Moderate Temperature Deformation Modeling of High Entropy Alloys:** *Charles Xu*<sup>1</sup>; Yunzhi Wang<sup>1</sup>; Babu Viswanathan<sup>1</sup>; Steve Niezgoda<sup>1</sup>; <sup>1</sup>The Ohio State University

**D-15: Hot Deformation Behavior of Non-equiatomic MnFeCoNiCu Alloy:** *Tibra Das Gupta*<sup>1</sup>; Thomas Balk<sup>1</sup>; <sup>1</sup>University of Kentucky

**D-16: Innovative Engineering to Create Massively Low-energy Interfaced Metastable High Entropy Alloys via Multi-directional Forging:** *Priyanka Agrawal*<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Aishani Sharma<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

**Investigating Alloying Effect on Dislocation Mechanisms in Multi-principal Element Alloys:** *Yujie Chen*<sup>1</sup>; Yan Fang<sup>1</sup>; Qian Yu<sup>1</sup>; <sup>1</sup>Zhejiang University

**Mechanical Behaviour of a Low-SFE FCC Ternary Medium Entropy Alloy Subjected to High Pressure Torsion:** *Saumya Jha*<sup>1</sup>; Krishanu Biswas<sup>1</sup>; Niles Guroo<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur

**D-17: Mechanical Properties and Deformation Mechanisms of Additive Manufactured CoCrNi and SS316L at 20K:** *You Sub Kim*<sup>1</sup>; Wanchuck Woo<sup>2</sup>; Wu Gong<sup>3</sup>; Stefanus Harjo<sup>3</sup>; E-Wen Huang<sup>4</sup>; Peter Liaw<sup>5</sup>; Soo Yeol Lee<sup>1</sup>; <sup>1</sup>Chungnam National University; <sup>2</sup>Korea Atomic Energy Research Institute; <sup>3</sup>Japan Atomic Energy Agency; <sup>4</sup>National Yang Ming Chiao Tung University; <sup>5</sup>The University of Tennessee

**D-18: Mechanical Properties of Multi-principal Element Alloys with Low Young's**

**Modulus for Biomedical Applications:** Konstantinos Georgarakis<sup>1</sup>; Jiacheng Zhang<sup>1</sup>; *Martin Stiehler*<sup>1</sup>; Mark Jolly<sup>1</sup>; <sup>1</sup>Cranfield University

**Mechanical Properties of Re Modulated Refractory NbMoTaW High-entropy Alloy Thin Films:** *Cheng-Hsien Yeh*<sup>1</sup>; Chuan-Feng Shih<sup>1</sup>; Bernad-Haochih Liu<sup>1</sup>; Wen-Dung Hsu<sup>1</sup>; Chan-Shan Yang<sup>2</sup>; Cheng-Hsing Hsu<sup>3</sup>; Hsuan-Ta Wu<sup>4</sup>; <sup>1</sup>National Cheng Kung University, Taiwan; <sup>2</sup>National Taiwan Normal University, Taiwan; <sup>3</sup>National United University, Taiwan; <sup>4</sup>Minghsin University of Science and Technology, Taiwan

**D-10: Microstructural Analysis of MoNbZrTiV Refractory High-Entropy Alloy Developed via High-energy Mechanical Alloying:** Marvin Tolentino<sup>1</sup>; *Aisa Grace Custodio*<sup>1</sup>; Gobinda Saha<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick

**Microstructural Evolution in and Concurrent Mechanical Properties of an Annealed High Entropy Alloy:** Akshit Dutta<sup>1</sup>; Amey Parnaik<sup>2</sup>; *Aditya Balpande*<sup>1</sup>; Lakshmi Ramasubramanian<sup>2</sup>; Ming-Hung Tsai<sup>3</sup>; Saurabh Nene<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Jodhpur; <sup>2</sup>Indian Institute of Technology Delhi; <sup>3</sup>National Chung Hsing University

**D-19: Microstructural Templating of HEAs: Deformation Processing of Hierarchical Structures:** *Michael Lastovich*<sup>1</sup>; Christopher Rock<sup>1</sup>; Michael Bodunrin<sup>2</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>University of the Witwatersrand

**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-20: 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>; Yevgeny Rakita<sup>4</sup>; Charlie Brandenburg<sup>5</sup>; Jean-Philippe Couzinie<sup>6</sup>; Loic Perriere<sup>6</sup>; Toshihiro Aoki<sup>7</sup>; Keith Knipling<sup>8</sup>; Patrick Callahan<sup>8</sup>; Benjamin Redemann<sup>1</sup>; Tyrel McQueen<sup>1</sup>; Elizabeth Opila<sup>5</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>Columbia University; <sup>5</sup>University of Virginia; <sup>6</sup>Univ Paris Est Creteil, CNRS; <sup>7</sup>University of California, Irvine; <sup>8</sup>U.S. Naval Research Laboratory

**Plasticity-induced Local Heating in High Entropy Alloys (HEAs):** Chunyu Li<sup>1</sup>; *Alejandro Strachan*<sup>1</sup>; <sup>1</sup>Purdue University

**Role of Formation and Dissolution of Brittle Sigma Phase on Mechanical Behavior of Ni<sub>46</sub>Al<sub>12</sub>Co<sub>18</sub>Cr<sub>8</sub>Fe<sub>12</sub>Mo<sub>4</sub> High Entropy Alloy Synthesized via Mechanical Alloying and Spark Plasma Sintering:** *Sudhansu Maharana*<sup>1</sup>; D.K.V.D. Prasad<sup>1</sup>; S.A. Seetharaman<sup>1</sup>; Tapas Laha<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**D-21: Temperature Dependent Deformation in Single Crystalline MoNbTi:** *Daniel Magnuson*<sup>1</sup>; Michael Patullo<sup>1</sup>; Syed Jalali<sup>1</sup>; Benjamin Redemann<sup>1</sup>; Shannon Bernier<sup>1</sup>; Morgan Jones<sup>2</sup>; Patrick McNutt<sup>2</sup>; Tyrel McQueen<sup>1</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

**D-22: Physics Informed Machine Learning Model for Predicting Mixing Enthalpy of Multi Principal Element Alloys:** *Cailey Ruderman*<sup>1</sup>; *Samuel Vogin*<sup>1</sup>; Christopher Tandoc<sup>1</sup>; Berk Soykan<sup>1</sup>; Migual Ferrer<sup>1</sup>; Yong-Jie Hu<sup>1</sup>; <sup>1</sup>Drexel University

**Terahertz Characteristics of High-entropy Alloys Nano-scale Films:** *Chan-Shan Yang*<sup>1</sup>; Wen-Dung Hsu<sup>2</sup>; Chuan-Feng Shih<sup>2</sup>; <sup>1</sup>Institute of Electro-Optical Engineering/ National Taiwan Normal University; <sup>2</sup>National Cheng Kung University

**D-23: Thermo-mechanical Behavior of HEA Alloys Containing Interdendritic MC Carbides:** *Patrice Berthod*<sup>1</sup>; Lionel Aranda<sup>1</sup>; Anne Vernière<sup>1</sup>; <sup>1</sup>University of Lorraine

**TWIP/TRIP CoCrFeMnNi Multi-principal Element Alloys Examined by In-situ Synchrotron X-ray Diffraction:** *David Silva*<sup>1</sup>; Jiajia Shen<sup>2</sup>; Gustavo Bertoli<sup>3</sup>; João

Oliveira<sup>2</sup>; Michael Kaufman<sup>1</sup>; Amy Clarke<sup>1</sup>; Francisco Coury<sup>3</sup>; Claudemiro Bolfarini<sup>3</sup>;  
<sup>1</sup>Colorado School of Mines; <sup>2</sup>NOVA University Lisbon; <sup>3</sup>Federal University of São Carlos

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Pyrometallurgy: Furnace Containment — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS: Pyrometallurgy Committee, TMS: Process Technology and Modeling Committee, TMS: Materials Characterization Committee, TMS: Industrial Advisory Committee

**Program Organizers:** Gerardo Alvear Flores, CaEng Associates; Camille Fleuriault, Eramet Norway; Dean Gregurek, RHI Magnesita; Quinn Reynolds, Mintek; Hugo Joubert, Tenova Pyromet; Stuart Nicol, Glencore Technology; Phillip Mackey, P.J. Mackey Technology, Inc.; Jesse White, Kanthal AB; Isabelle Nolet, Hatch

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**Corrosion Behavior of MgO-C Refractory in the Electric Arc Furnace that Entirely Uses Direct Reduced Iron as Raw Materials:** *Zhuogang Pang*<sup>1</sup>; Haibin Zuo<sup>1</sup>;  
<sup>1</sup>University of Science and Technology Beijing

**Corrosion of Alkali Metals on SiC-Si<sub>3</sub>N<sub>4</sub> Refractory of Pusher Kiln:** *Ruixin Hu*<sup>1</sup>; Jiang Diao<sup>1</sup>; Jinan Wang<sup>1</sup>; Deman Liu<sup>1</sup>; Wenfeng Tan<sup>1</sup>; Hongyi Li<sup>1</sup>; Bing Xie<sup>1</sup>; <sup>1</sup>Chongqing University

**Development of Prediction Criteria for Gas Channeling in Blast Furnace:** *Kratika Jain*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology ( Indian School of Mines), Dhanbad

**Long Long-term Safety Work of 3 # Blast Furnace Hearth:** *YuZhu Pan*<sup>1</sup>; <sup>1</sup>Hunan ValinXiangtan Iron & Steel Co., Ltd.

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## MATERIALS SYNTHESIS AND PROCESSING

### Advances in Surface Engineering VI — Poster Session

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

**Program Organizers:** Bharat Jasthi, South Dakota School of Mines & Technology; Arif Mubarak, PPG; Tushar Borkar, Cleveland State University; Rajeev Gupta, North Carolina State University; Venkataramana Gadhamshetty, South Dakota School of Mines & Technology

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**C-3: Evaluation of Mechanical Properties of AISI 8620 Steel's Surface Modified Through TIG Arcing Process:** *Sachin Balbande*<sup>1</sup>; Sourav Das<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Roorkee

**C-4: Graph Theoretical Analysis of the Micro/Nanostructures Formed on Femtosecond Laser Processed Copper:** *Daniel Egbebumi*<sup>1</sup>; Jeff Shield<sup>1</sup>; <sup>1</sup>University

of Nebraska

**C-5: Micro- and Nano-scale Surface Feature Growth Mechanisms During Single-spot Laser-processing of Copper:** *Suchit Sarin*<sup>1</sup>; Graham Kaufman<sup>1</sup>; Craig Zuhlke<sup>1</sup>; Jeffrey Shield<sup>1</sup>; <sup>1</sup>University of Nebraska Lincoln

**Structural and Electrical Properties of Aluminum oxide Thin Films by Atomic Layer Deposition for Passivation and Etch Stop Layer:** *Sangwoo Lee*<sup>1</sup>; In Gyu Choi<sup>2</sup>; Byeong Seong Choi<sup>2</sup>; Jaeyoung Yang<sup>2</sup>; Taekjib Choi<sup>1</sup>; <sup>1</sup>Sejong University; <sup>2</sup>TES Co., Ltd

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Alloys and Compounds for Thermoelectric and Solar Cell Applications XII — Poster Session

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

**Program Organizers:** Hsin-Jay Wu, National Chiao Tung 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, Tokyo Institute of Technology; Chenguang Fu, Zhejiang University

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**A-12: Co/Bi<sub>2</sub>Se<sub>3</sub> Interfacial Reactions and Bi-Co-Se Phase Equilibria:** *Cheng-Hsi Ho*<sup>1</sup>; He-Cheng Yang<sup>1</sup>; Yung-Chun Tsai<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**A-13: Defect-engineering in SnTe Alloys: From Dislocation Frame to Solid Solution:** *Bo-Chia Chen*<sup>1</sup>; Szu-Chien Wu<sup>1</sup>; Kuang-Kuo Wang<sup>2</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang-Ming Chiao Tung University; <sup>2</sup>National Sun Yat-sen University

**A-14: Developing Metal Chalcogenides as High Efficiency *n*-type Ag<sub>2</sub>Se Thermoelectric Materials:** *I-Lun Jen*<sup>1</sup>; You-Cheng Du<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**A-15: Development of Thermoelectric Diffusion Barrier via Phase Diagram Engineering:** *Wen-Ching Wu*<sup>1</sup>; Hsin-jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

**A-16: TE Thin Film on Self-healing Polymer Substrate:** *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

**A-17: Thermoelectric Properties and Whisker Formation in Ag<sub>2</sub>X-based Liquid-like Materials:** *Yun-Han Huang Lu*<sup>1</sup>; I-Lun Jen<sup>1</sup>; Hsin-Jay Wu<sup>1</sup>; <sup>1</sup>National Yang Ming Chiao Tung University

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## MATERIALS SYNTHESIS AND PROCESSING

### Composite Materials: Sustainable and Eco-Friendly Materials and Application — Poster Session

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

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

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**Session Chair:** Brian Wisner, Ohio University

**Artificial Marble From Waste Recycling: Physical and Mechanical Characterization:** Ruben Jesus Rodriguez<sup>1</sup>; Tcharllis João Demartini<sup>1</sup>; Fernanda Silva<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense E

**Characterization of a Novel Eco-friendly Polymeric Composites Based in Casuarina Powder:** Nicole Thomaz Aquino Drumond Coutinho<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Afonso Rangel Garcez de Azevedo<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**Characterization of Ramie Fiber for Polymeric Composites to be Used in High Performance Bikes:** Luís Fortunato de Freitas<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**Epoxy Matrix Reinforced With Kaolin for Production New Building Materials:** Miriane Pinheiro Alexandrino<sup>1</sup>; *Alisson Rios da Silva*<sup>1</sup>; Sérgio Neves Monteiro<sup>2</sup>; Verônica Scarpini Candido<sup>1</sup>; <sup>1</sup>Universidade Federal do Pará; <sup>2</sup> Military Engineering Institute

**C-6: Influence of Addition Waste Aluminum III Oxide on Mechanical and Thermal Properties of Concrete Glass Composite:** *Emil Kardaszuk*<sup>1</sup>; Marcin Malek<sup>2</sup>; Michal Gregorczyk<sup>1</sup>; <sup>1</sup>Military University of Technology; <sup>2</sup>Military University of Technology, Faculty of Civil Engineering and Geodesy

**Mechanical Characterization of Polymeric Composites Reinforced by Thin Fique Fabric:** Luis Ricardo Arrubla Agudelo<sup>1</sup>; David Coverdale Rangel Velasco<sup>1</sup>; Henry Alonso Colorado Lopera<sup>1</sup>; Carlos Fontes Vieira<sup>1</sup>; *Felipe Perissé Duarte Lopes*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense

**Recovery of Vanadium (IV) from Leaching Solution Using Fe-MOF Material:** *Wenjuan Wang*<sup>1</sup>; Yanfang Huang<sup>1</sup>; Guihong Han<sup>1</sup>; <sup>1</sup>Zhengzhou University

**Removal of Cr(III) Ions from Simulated Hydrometallurgical Wastewater by Fe-MOF:** *Hongfei Ma*<sup>1</sup>; Lulu Kou<sup>1</sup>; Wenjuan Wang<sup>1</sup>; Yanfang Huang<sup>1</sup>; Guihong Han<sup>1</sup>; <sup>1</sup>Zhengzhou University

**Study on the Adsorption of Selenium-containing Wastewater by MIL-101-NH<sub>2</sub>:** *Lulu Kou*<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

**Verification of the Tensile Strength of Polyester Matrix Laminated Composites Reinforced With Raffia, Jute and Glass Fibers:** Luciano Monteiro Almeida<sup>1</sup>; Sérgio Neves Monteiro<sup>2</sup>; *Alisson Rios da Silva*<sup>1</sup>; *Verônica Scarpini Candido*<sup>1</sup>; <sup>1</sup>Universidade Federal do Pará; <sup>2</sup>Military Engineering Institute

## Defects and Interfaces: Modeling and Experiments — Poster Session

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

**Program Organizers:** Jian Wang, University of Nebraska-Lincoln; Amit Misra, University of Michigan; Peter Anderson, Ohio State University; Blas Uberuaga, Los Alamos National Laboratory; Xinghang Zhang, Purdue University

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*Funding support provided by:* **Los Alamos National Laboratory**

**Session Chair:** Jian Wang, University of Nebraska - Lincoln

**D-24: 3D Discrete Dislocation Dynamics Simulations of Multiple Spiral Dislocation Sources:** Luo Li<sup>1</sup>; Tariq Khraishi<sup>1</sup>; <sup>1</sup>University of New Mexico

**D-25: In-situ Characterization of Martensitic Phase Transformation Interfaces in CuAlNi during Mechanical Cycling Using Dark Field X-ray Microscopy:** Edith Perez-Valenzuela<sup>1</sup>; Adam Creuziger<sup>2</sup>; Sangwon Lee<sup>1</sup>; Evan Rust<sup>2</sup>; Raquel Rodriguez Lamas<sup>3</sup>; Albert Zelenika<sup>3</sup>; Can Yildirim<sup>3</sup>; Carsten Detlefs<sup>3</sup>; Ashley Bucsek<sup>1</sup>; <sup>1</sup>University of Michigan; <sup>2</sup>National Institute of Standards and Technology (NIST); <sup>3</sup>European Synchrotron Radiation Facility

**D-26: Influence of Mn-Ni Precipitates on Dislocation Glide in Reactor Pressure Vessel Steels:** Ashley Foster<sup>1</sup>; Douglas Spearot<sup>1</sup>; <sup>1</sup>University of Florida

**D-27: Influence of Void Shape on the Propagation of Cracks in Energetic Materials:** Diane Patterson<sup>1</sup>; Kerry Ann Stirrup<sup>1</sup>; Marisol Koslowski<sup>1</sup>; Weinong Chen<sup>1</sup>; <sup>1</sup>Purdue University

## MATERIALS SYNTHESIS AND PROCESSING

### Defects and Properties of Cast Metals — Poster Session

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

**Program Organizers:** Lang Yuan, University of South Carolina; Andrew Kao, University of Greenwich; Brian Thomas, Colorado School of Mines; Peter Lee, University College London; Mark Jolly, Cranfield University; Alex Plotkowski, Oak Ridge National Laboratory; Kyle Fezi, Fort Wayne Metals

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**Control of Surface Longitudinal Cracks during the Continuous Casting of Steel:** Fengkang Wang<sup>1</sup>; Jie Zeng<sup>1</sup>; Wanglin Wang<sup>1</sup>; <sup>1</sup>Central South University

**C-7: Effect of RE Content on TiN Inclusions Formation in P110-grade Casing Steel:** Jinwen Liu<sup>1</sup>; Haiyan Tang<sup>1</sup>; Gen Li<sup>2</sup>; Kaimin Wang<sup>1</sup>; Yuhang Wang<sup>1</sup>; Jiaquan Zhang<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>Central Iron & Steel Research Institute

**C-8: Evolution of Inclusions in Rare Earth Treated Low Carbon Micro-alloyed Steel:**

*Nachiketa Yadav*<sup>1</sup>; Gour Gopal Roy<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur

**Rapid Removal of Lead from Lead Brass Melt via Super Gravity Enrichment:** *Shuai zhang*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**C-9: Restricting Carbide Growth in High-chrome White Iron Using Sr-containing Additives:** *Owais Waseem*<sup>1</sup>; Harry Tian<sup>1</sup>; <sup>1</sup>GIW Industries Inc. (A KSB Company)

**C-10: Study on Secondary Phase Precipitation Behavior of Ship Plate Steel Slab under Different Cooling Rates in Continuous Casting Process:** *Huisheng Wang*<sup>1</sup>; Qing Liu<sup>1</sup>; Biao Tao<sup>2</sup>; Jun Wu<sup>3</sup>; Ming Li<sup>2</sup>; Min Guan<sup>4</sup>; Weili Huang<sup>5</sup>; <sup>1</sup>University of Science and Technology Beijing; <sup>2</sup>Nanjing Iron & Steel Co., Ltd.; <sup>3</sup>Xinjiang Bayi Iron & Steel Co. Ltd.; <sup>4</sup>Technology Center, Jiangsu Boji Spray Systems Co., Ltd.; <sup>5</sup>Delong Steel Co. Ltd.

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## MECHANICS OF MATERIALS

### Dynamic Behavior of Materials X — Poster Session

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

**Program Organizers:** Eric Brown, Los Alamos National Laboratory; Saryu Fensin, Los Alamos National Laboratory; George Gray, Los Alamos National Laboratory; Marc Meyers, University of California-San Diego; Neil Bourne, University of Manchester; Cyril Williams, US Army Research Laboratory; Mukul Kumar, Lawrence Livermore National Laboratory; Nicola Bonora, University of Cassino

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**D-28: Assessing Interface Effects in Shock-Compressed Crystals with Time-resolved Raman Spectroscopy:** *Mahavir Singh*<sup>1</sup>; Esteban Campos<sup>1</sup>; Abhijeet Dhiman<sup>2</sup>; Vikas Tomar<sup>1</sup>; <sup>1</sup>Purdue University; <sup>2</sup>Intel Corporation

**D-29: Effects of Single Engineered Defects on Spall Damage Distribution in Metallic Samples:** Nicole Whyte<sup>1</sup>; Sharmila Nimbkar<sup>1</sup>; Candem Peterson<sup>1</sup>; *Pedro Peralta*<sup>1</sup>; <sup>1</sup>Arizona State University

**Hybrid EAM-RANN Potential for Binary Ti-Al Alloy:** Mashroor Nitol<sup>1</sup>; Saryu Fensin<sup>1</sup>; *Micah Nichols*<sup>2</sup>; Doyl Dickel<sup>2</sup>; Christopher Barrett<sup>2</sup>; <sup>1</sup>Los Alamos National Laboratory; <sup>2</sup>Mississippi State University

**Limited Neural Networks for the Prediction of Shockwave Initiation of Energetic Materials:** *Brenden Hamilton*<sup>1</sup>; Timothy Germann<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**D-30: Modeling the Evolution of Precipitates Assisted by Pipe Diffusion of Dislocations:** *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

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## MATERIALS SYNTHESIS AND PROCESSING

### Electrical Steels — Poster Session

**Sponsored by:** TMS Structural Materials 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

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**Effect of Superheat and Boron Element on Interfacial Heat Transfer of Silicon Steel during Sub-rapid Solidification:** *Yunli Zhang*<sup>1</sup>; *Wanlin Wang*<sup>1</sup>; *Peisheng Lyu*<sup>1</sup>; *Huihui Wang*<sup>1</sup>; *Lulu Song*<sup>1</sup>; *Xueying Lyu*<sup>1</sup>; <sup>1</sup>Central South University

**Effects of Pouring Temperature on Interfacial Contact Behavior Surface Quality and Microstructure of 2.5wt.% Si Non-oriented Silicon Steel Produced by Strip Casting:** *Lulu Song*<sup>1</sup>; *Wang Wanlin*<sup>1</sup>; *Lyu Xueying*<sup>1</sup>; *Zhang Yunli*<sup>1</sup>; *Wang Huihui*<sup>1</sup>; <sup>1</sup>Central South University

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Electronic Packaging and Interconnection Materials — Poster Session

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

**Program Organizers:** Christopher Gourlay, Imperial College London; Kazuhiro Nogita, University of Queensland; Albert T. Wu, National Central University; David Yan, San José State University; Praveen Kumar, Indian Institute of Science; Patrick Shamberger, Texas A&M University; Mohd Arif Anuar Salleh, Universiti Malaysia Perlis (Unimap); Yu-An Shen, Feng Chia University

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**Session Chairs:** Christopher Gourlay, Imperial College London, UK; Kazuhiro Nogita, University of Queensland, Australia

**A-18: Effect of Ni/Ga Ratio on Fabrication of Cu-to-Cu Joints by Using Electroplated Ga Layer and Ni UBM:** *Tzu-hsuan Huang*<sup>1</sup>; *Jian-wei Huang*<sup>1</sup>; *Zhih-feng Lin*<sup>1</sup>; *Shih-kang Lin*<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**A-19: Fatigue Life of Selective Laser Solder Joints of a MEMS Probe for Automotive Semiconductor Wafer Test:** *Won Sik Hong*<sup>1</sup>; *Myeongin Kim*<sup>1</sup>; *Mi Song Kim*<sup>1</sup>; <sup>1</sup>Korea Electronics Technology Institute (KETI)

**A-20: Self-organization Assembly Solder Resin for Fine Pitch Components Bonding Application:** *Bo Rong Huang*<sup>1</sup>; <sup>1</sup>National Central University

**A-35: Wetting Kinetics and Microstructure of Micro-textured Surface Modified Copper Substrate During Soldering:** *Juyana Wahab*<sup>1</sup>; *Mohd Arif Anuar Mohd Salleh*<sup>1</sup>; *Siti Faqihah Roduan*<sup>1</sup>; *Nurul Aida Husna Mohd Mahayuddin*<sup>1</sup>; *Dewi Suriyani Che Halin*<sup>1</sup>; *Rita Mohd Said*<sup>1</sup>; <sup>1</sup>Universiti Malaysia Perlis

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Energy Technologies and CO2 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:** Chukwunwike Iloeje, Argonne National Laboratory; Shafiq Alam, University of Saskatchewan; Donna Guillen, Idaho National Laboratory; Fiseha Tesfaye, Metso Metals Oy, Åbo Akademi University; Lei Zhang, University of Alaska Fairbanks; Susanna Hockaday, Curtin University, WASM; Neale Neelameggham, IND LLC; Hong (Marco) Peng, University of Queensland; Nawshad Haque, Commonwealth Scientific and Industrial Research Organization; Onuralp Yucel, Istanbul Technical University; Alafara Baba, University of Ilorin

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**A Multi-objective Scheduling Model for a Gas-Steam-Electricity Coupling System in the Steelwork Based on Time-of-Use Electricity Pricing:** *Weijian Tian*<sup>1</sup>; Haifei An<sup>1</sup>; Xiancong Zhao<sup>1</sup>; Hao Bai<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Analysis of a Chemical Looping Combustion System Through Computational Fluid Dynamics:** *Favio Ocampo Vaca*<sup>1</sup>; Rafael Maya<sup>1</sup>; Constantin Hernández-Bocanegra<sup>2</sup>; <sup>1</sup>Universidad Michoacana de San Nicolás de Hidalgo; <sup>2</sup>Instituto Tecnológico de Morelia

**Analysis of Factors Influencing Energy Consumption in Long Processes and Energy Reduction Techniques:** *Gele Qing*<sup>1</sup>; Xu Wenxuan<sup>1</sup>; <sup>1</sup>Shougang Group

**Design and Research of Three Stage Reactor of Carbonation Process of Calcified Residue:** *Li Xiang*<sup>1</sup>; Liu Yan<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Liu Guanting<sup>1</sup>; Li Xiaolong<sup>1</sup>; Wang Kun<sup>1</sup>; <sup>1</sup>Northeastern University

**Effect of Fe<sub>2</sub>O<sub>3</sub> on Blast Furnace Coal Combustion Under Local Oxygen-enrichment:** Zhou Zhenfeng<sup>1</sup>; *Wan Zukang*<sup>1</sup>; <sup>1</sup>Shandong University of Science and Technology

**Modeling Carbon Composite Briquette Reaction Under H<sub>2</sub>-H<sub>2</sub>O-CO-CO<sub>2</sub>-N<sub>2</sub> Atmosphere:** *Huiqing Tang*<sup>1</sup>; Siyuan Cheng<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Phase Equilibria and Thermodynamic Properties of Selected Compounds in the Ag-Ga-S-AgBr System for Modern Application in Energy Conversion Devices:** Mykola Moroz<sup>1</sup>; *Fiseha Tesfaye*<sup>2</sup>; Pavlo Demchenko<sup>3</sup>; Myroslava Prokhorenko<sup>4</sup>; Bohdan Rudyk<sup>1</sup>; Orest Pereviznyk<sup>3</sup>; Emanuela Mastronardo<sup>5</sup>; Daniel Lindberg<sup>6</sup>; Oleksandr Reshetnyak<sup>3</sup>; Leena Hupa<sup>2</sup>; <sup>1</sup>National University of Water and Environmental Engineering; <sup>2</sup>Åbo Akademi University; <sup>3</sup>Ivan Franko National University of Lviv; <sup>4</sup>Lviv Polytechnic National University; <sup>5</sup>University of Messina; <sup>6</sup>Aalto University

**Preparation of a Low-cost Tremella-like 3D Carbon Nanosheet With Superior Adsorption Properties for Gallium(III):** *Ying Xiong*<sup>1</sup>; <sup>1</sup>Liaoning University

**Reaction Behavior of High Rank Coal With Different Particle Sizes in Coal Gasification and Ironmaking Poly-generation Process:** *Yaqiang Yuan*<sup>1</sup>; Fusong Chen<sup>1</sup>; Wei Wang<sup>1</sup>; Haibin Zuo<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Research on Using Carbide Slag to Mineralize the Carbon Dioxide in Electrolytic Aluminum Waste Gas:** *Xiao Yadong*<sup>1</sup>; Liu Yan<sup>1</sup>; Ting-an Zhang<sup>1</sup>; Fang Yu<sup>1</sup>; Li Xiaolong<sup>1</sup>; Wang Kun<sup>1</sup>; <sup>1</sup>Northeastern University

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**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

**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, Karlsruhe Institute of Technology (KIT); Gerald Frankel, Ohio State University; ShinYoung Kang, Lawrence Livermore National Laboratory; Srujan Rokkam, Advanced Cooling Technologies, Inc.

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**B-1: A High Throughput CALPHAD Method of Designing Low Density, Compositionally-complex Alloys Toward Understanding Lightweighting Elements' Effects on Passivity:** *Peter Connors*<sup>1</sup>; *Sam Inman*<sup>1</sup>; *John Scully*<sup>1</sup>; <sup>1</sup>University of Virginia

**Aloe Saponaria Gel as a Green Corrosion Inhibitor of Carbon Steel in an Acid Medium:** *Flavia Schmidt*<sup>1</sup>; *Alicia Ares*<sup>1</sup>; *Claudia Méndez*<sup>1</sup>; <sup>1</sup>Universidad Nacional de Misiones (UNaM). Facultad de Ciencias Exactas, Químicas y Naturales (FCEQyN). Instituto de Materiales de Misiones (IMAM). Programa de Materiales y Fisicoquímica (ProMyF).

**B-2: Elemental Affinity Engineering for Improving Hydrogen Embrittlement in CoCrFeNiV High-entropy Alloys:** *Sang Yoon Song*<sup>1</sup>; *Gunjick Lee*<sup>1</sup>; *Dae Cheol Yang*<sup>1</sup>; *Min Young Sung*<sup>1</sup>; *Yuri Hur*<sup>1</sup>; *KenHee Ryou*<sup>2</sup>; *Hyeon-Seok Do*<sup>3</sup>; *Aparna Saksena*<sup>4</sup>; *Baptiste Gault*<sup>4</sup>; *Byeong-Joo Lee*<sup>3</sup>; *Won-Seok Ko*<sup>5</sup>; *Se-Ho Kim*<sup>1</sup>; *Seok Su Sohn*<sup>1</sup>; <sup>1</sup>Korea University; <sup>2</sup>Korea Advanced Institute of Science and Technology; <sup>3</sup>Pohang University of Science and Technology; <sup>4</sup>Max-Planck-Institut Für Eisenforschung GmbH; <sup>5</sup>Inha University

**High Entropy Alloys for Advanced Modular Reactors:** *Cameron Yousefian*<sup>1</sup>; *Alexander Knowles*<sup>1</sup>; <sup>1</sup>University of Birmingham

**B-3: High Temperature Oxidation of HEAs and NC-strengthened HEAs 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

**B-4: Investigation of Mechanical Stress and B10 Exposure on FKM Polymer:** *Frank Otremba*<sup>1</sup>; *Qi An*<sup>1</sup>; *Ralph Bäßler*<sup>1</sup>; *Andreas Hertwig*<sup>1</sup>; *Heike Strehlau*<sup>1</sup>; *Gundula Hidde*<sup>1</sup>; <sup>1</sup>BAM

**Wear Behavior of Multi-component Ultra-high Temperature Carbides:** *Gia Garino*<sup>1</sup>; *Ambreen Nisar*<sup>1</sup>; *Abhijith Sukumaran*<sup>1</sup>; *Arvind Agarwal*<sup>1</sup>; <sup>1</sup>Florida International University

## MATERIALS SYNTHESIS AND PROCESSING

**Formability and Spring-back Issues in Ultra-high Strength Steels and High Strength Aluminum Alloys — Poster Session**

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

**Program Organizers:** Mert Efe, Pacific Northwest National Laboratory; Piyush Upadhyay, Pacific Northwest National Laboratory; Lu Huang, General Motors; Gang Huang, ArcelorMittal; Yannis Korkolis, Ohio State University; Amir Asgharzadeh, EWI

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**Microstructure and Mechanical Properties According to Heat Treatment of High Tensile Strength Steel Alloy:** *Jung Han Kim*<sup>1</sup>; Ilgwon Jung<sup>1</sup>; Yun-Jae Song<sup>1</sup>; <sup>1</sup>Gyeongbuk Institute of IT Convergence Industry Technology

## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Functional Nanomaterials 2024 — Poster Session

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

**Program Organizers:** Mostafa Bedewy, University of Pittsburgh; Yong Lin Kong, University of Utah; Woochul Lee, University of Hawaii at Manoa; Changhong Cao, McGill University; Ying Zhong, Harbin Institute of Technology (Shenzhen); Michael Cai Wang, University of South Florida; Seungha Shin, University of Tennessee

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**Session Chairs:** Mostafa Bedewy, University of Pittsburgh; Ying Zhong, Harbin Institute of Technology

**A-21: 3D Atom Probe Tomography of Moisture Vulnerable Nano-structure Particles by Embedding in Liquid Metal:** *Tae-Hyeok Kang*<sup>1</sup>; Sun Jae Park<sup>1</sup>; Hyeon-Ji Kim<sup>1</sup>; Eun Seon Cho<sup>1</sup>; Pyuck-Pa Choi<sup>1</sup>; <sup>1</sup>KAIST

**A-22: Facile Hydrothermal Synthesis of Cubic-shaped Cerium Oxide Nanoparticles Modulated by Acetate Molecules:** *Yifei Fu*<sup>1</sup>; Craig Neal<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Sidra Munir<sup>2</sup>; Khoa Minh Ta<sup>2</sup>; Marco Molinari<sup>2</sup>; Sudipta Seal<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>University of Huddersfield

**A-23: Governing Particle Assembly in an Evaporative-driven Multiscale Additive Manufacturing:** *Samannoy Ghosh*<sup>1</sup>; Yong Lin Kong<sup>1</sup>; <sup>1</sup>University of Utah

**A-24: Non-equilibrium Phase Formations in Multicomponent Finite-Sized Systems:** *Sunil Dhapola*<sup>1</sup>; Jeffrey Shield<sup>1</sup>; <sup>1</sup>University of Nebraska-Lincoln

**Phytochemical-mediated Green Synthesis of Silver Oxide Nanoparticles for Potential Cholera Treatment:** *Rachel Okojie*<sup>1</sup>; Esther Ikhuoria<sup>1</sup>; Ita Uwidia<sup>1</sup>; Ikhazuagbe Ifijen<sup>2</sup>; Ikechukwu Chikaodili<sup>1</sup>; <sup>1</sup>University of Benin; <sup>2</sup>Rubber Research Institute of Nigeria

**Prospects of Utilizing Environmentally Friendly Iron Oxide Nanoparticles Synthesized from Musa Paradisiaca Extract for Potential COVID-19 Treatment:** *Esther Ikhuoria*<sup>1</sup>; Ita Uwidia<sup>1</sup>; Rachel Okojie<sup>1</sup>; Ikhazuagbe Ifijen<sup>2</sup>; Ikechukwu Chikaodili<sup>1</sup>;

<sup>1</sup>University of Benin; <sup>2</sup>Rubber Research Institute of Nigeria

**Recent Advances in the Application of Manganese Oxide Nanoparticles for Remediation of Soil Contaminated with Organic Pollutants:** *Bala Anege*<sup>1</sup>; Ikhazuagbe Ifjen<sup>2</sup>; <sup>1</sup>Faculty of Science, Federal University, Oye-Ekiti, Nigeria; <sup>2</sup>Rubber Research Institute of Nigeria

**A-25: Synthesis of TiNbTaZrO Nanotubes Array by Anodization and Its Application for Photoelectrochemical Water Splitting:** *Chun-Yi Chen*<sup>1</sup>; Yi-Hsuan Chiu<sup>2</sup>; Tso-Fu Mark Chang<sup>1</sup>; Masato Sone<sup>1</sup>; Yung-Jung Hsu<sup>2</sup>; <sup>1</sup>Tokyo Institute of Technology; <sup>2</sup>National Yang Ming Chiao Tung University

**Synthesis of Ternary Oxide Nanoparticles of Iron, Silver, and Vanadium from Blended Extracts for Potential Tuberculosis Treatment:** *Ita Uwidia*<sup>1</sup>; Esther Ikhuoria<sup>1</sup>; Rachel Okojie<sup>1</sup>; Ikhazuagbe Ifjen<sup>2</sup>; Ikechukwu Chikaodili<sup>1</sup>; <sup>1</sup>University of Benin; <sup>2</sup>Rubber Research Institute of Nigeria

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### High Temperature Electrochemistry: An FMD Symposium Honoring Uday B. Pal — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS: Energy Conversion and Storage Committee, TMS: Energy Committee, TMS: Recycling and Environmental Technologies Committee

**Program Organizers:** Soumendra Basu, Boston University; Srikanth Gopalan, Boston University; Adam Powell, Worcester Polytechnic Institute; Filippos Patsiogiannis, Bridgorth Aluminium Ltd; Xiaofei Guan, ShanghaiTech University

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**Session Chair:** Soumendra Basu, Boston University

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**Dissolution and Diffusion of Titanium in Liquid Tin and Electrochemical Behavior of Ti-Sn Alloy Separation in Molten Salt:** *Ruijing Kong*<sup>1</sup>; Shaolong Li<sup>1</sup>; Jianxun Song<sup>1</sup>; Zepeng Lv<sup>1</sup>; <sup>1</sup>Zhengzhou University

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## NUCLEAR MATERIALS

### Irradiation Testing: Facilities, Capabilities, and Experimental Designs — Poster Session

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

**Program Organizers:** Walter Luscher, Pacific Northwest National Laboratory; Peter Hosemann, University of California, Berkeley; Andrew Hoffman, GE Research; Joris Van den Bosch, SCK CEN; Brenden Heidrich, Nuclear Science User Facilities

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**E-21: High-Throughput Study of Temperature Effects on Void Swelling in Ion Irradiated SS304:** *Bao-Phong Nguyen*<sup>1</sup>; Nathan Curtis<sup>1</sup>; Nate Eklof<sup>1</sup>; Adrien Couet<sup>1</sup>;

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## 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; Jinsuo Zhang, Virginia Polytechnic Institute and State University; Nathaniel Hoyt, Argonne National Laboratory; Yu-chen Karen Chen-Wiegart, Stony Brook University / Brookhaven National Laboratory; Dino Sulejmanovic, Oak Ridge National Laboratory

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**A Comparative Study of Density and Viscosity of NaF-BeF<sub>2</sub> and NaF-BeF<sub>2</sub>-UF<sub>4</sub>:** *Maximilien Denis*<sup>1</sup>; D. Nathanael Gardner<sup>1</sup>; Raluca Scarlat<sup>1</sup>; <sup>1</sup>University of California, Berkeley

**A New Anode-Mg-Li Alloy for Magnesium-air Battery Was Prepared by Molten Salt Electrolysis:** *Hongxuan Liu*<sup>1</sup>; Ting-an Zhang<sup>1</sup>; <sup>1</sup>Northeastern University

**Assessing Corrosion Compatibility of Alloys by Cr and Fe Dissolution Studies in Molten NaCl-MgCl<sub>2</sub> Salt:** *July Reyes-Zacarias*<sup>1</sup>; <sup>1</sup>University of Tennessee Knoxville; Oak Ridge National Laboratory

**Effect of Chloride Molten Salt on the Structural Characteristics of Deposited Carbon-based Electrolysis Products:** *Tao Rong*<sup>1</sup>; Haibin Zuo<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Effect of Microwave on the Performance of Regenerated Spent LiFePO<sub>4</sub> Batteries in Molten Salt System:** *Yunke Wang*<sup>1</sup>; <sup>1</sup>R & D Center of Yunnan Yuntianhua Co., Ltd

**B-5: Exploring the Behaviour of Metallic Nanoparticles at the Interface with Molten Salt: A Multimodal Approach:** *Ankita Mohanty*<sup>1</sup>; Yuxiang Peng<sup>1</sup>; Kaifeng Zheng<sup>1</sup>; Bobby Layne<sup>2</sup>; Xiaoyang Liu<sup>3</sup>; Kazuhiro Iwamatsu<sup>2</sup>; Ellie Kim<sup>4</sup>; Phillip Halstenberg<sup>4</sup>; Mingyuan Ge<sup>2</sup>; Denis Leshchev<sup>2</sup>; Xianghui Xiao<sup>2</sup>; Sheng Dai<sup>4</sup>; Eli Stavitski<sup>2</sup>; Daniel Olds<sup>2</sup>; James Wishart<sup>2</sup>; Anatoly Frenkel<sup>5</sup>; Yu-chen Karen Chen-Wiegart<sup>6</sup>; <sup>1</sup>Stony Brook University; <sup>2</sup>Brookhaven National Laboratory; <sup>3</sup>Argonne National Laboratory; <sup>4</sup>University of Tennessee Knoxville; <sup>5</sup>Stony Brook University; Brookhaven National Laboratory; <sup>6</sup>Stony Brook University; National Synchrotron Light Source II (NSLS-II), Brookhaven National Laboratory

**B-6: Hot Corrosion Behavior of TP347H Under Various Thicknesses of Coal Ash:** *Youyuan Zhang*<sup>1</sup>; Shanshan Hu<sup>1</sup>; Xingbo Liu<sup>1</sup>; <sup>1</sup>West Virginia University

**B-7: Impurity Measurement and Determination of Li Isotopic Ratio in Fluoride Salts Using Chemical Composition Analysis Technique:** *Nayoung Kim*<sup>1</sup>; Weiyue Zhou<sup>1</sup>; Kevin Woller<sup>1</sup>; Michael Short<sup>1</sup>; Guiqiu Zheng<sup>2</sup>; Caroline Sorensen<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Commonwealth Fusion Systems

**Polyoxometalates as Metal Chelators and the Study of Their Stability in Aqueous and Molten Salt Conditions:** *Kirkland Sheriff*<sup>1</sup>; Dino Sulejmanovic<sup>2</sup>; Shiou-Jyh Hwu<sup>1</sup>; <sup>1</sup>Clemson University; <sup>2</sup>Oak Ridge National Laboratory

**Thermodynamic Analysis of Preparation of FeSi/Fe<sub>3</sub>Si Intermetallic by Treating**

**Valuable Elements in Red Mud with Molten Salt:** *Geng Chen*<sup>1</sup>; Hui Li<sup>1</sup>; Jinglong Liang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

**B-8: Understanding the Synergic Phenomena of Irradiation and Corrosion on Fe-based Alloy at an Atomic Level Using Epitaxially Grown Film:** *Jijo Christudasjustus*<sup>1</sup>; Kayla Yano<sup>1</sup>; Chongmin Wang<sup>1</sup>; Hyosim Kim<sup>2</sup>; Yongqiang Wang<sup>2</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

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## NUCLEAR MATERIALS

### Materials Corrosion Behavior in Advanced Nuclear Reactor Environments — Poster Session

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

**Program Organizers:** Trishelle Copeland-Johnson, Idaho National Laboratory; Cheng Sun, Clemson University; Caitlin Huotilainen, TerraPower; Nidia Gallego, Oak Ridge National Laboratory; Suraj Persaud, Queen's University; Osman Anderoglu, University of New Mexico; Adrien Couet, University of Wisconsin-Madison; Julie Tucker, Oregon State University

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**E-22: Corrosion Study of a Candidate Material for a Novel Telescopic Control Rod Design for High Temperature Gas Cooled Reactor Height Reduction:** *Gabriel Paramucchio*<sup>1</sup>; Ethan Fowler<sup>1</sup>; Benjamin Lindley<sup>1</sup>; Adrien Couet<sup>1</sup>; <sup>1</sup>University of Wisconsin Madison

**E-23: Experimental Design to Study Tribocorrosion Resistance of Perhydropolysilazane-derived Coatings on AISI 304 Steel:** *Raja Shekar Dandu*<sup>1</sup>; HyeonJoon Choi<sup>1</sup>; Edwin Klu<sup>1</sup>; Kathy Lu<sup>2</sup>; Wenjun Cai<sup>1</sup>; <sup>1</sup>Virginia Polytechnic Institute and State University; <sup>2</sup>University of Alabama Birmingham

**E-24: Slow Strain Rate Testing of Two Alumina Forming Austenitic Alloys In Liquid Lead and Lead-bismuth Eutectic:** *Christopher Petersson*<sup>1</sup>; <sup>1</sup>KTH Royal Institute of Technology

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## NUCLEAR MATERIALS

### Materials Informatics to Accelerate Nuclear Materials Investigation — Poster Session

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

**Program Organizers:** Miaomiao Jin, Pennsylvania State University; Yongfeng Zhang, University of Wisconsin; Tiankai Yao, Idaho National Laboratory; Anjana Talapatra, Los Alamos National Laboratory; Luca Messina, CEA Cadarache; Fei Xu, Idaho National Laboratory; Benjamin Afflerbach, University of Wisconsin-Madison

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**E-25: Feature Engineering for Construction of High-accuracy Thermal Conductivity Prediction Model for Uranium Compounds:** *koki Takeichi*<sup>1</sup>; Masaya Kumagai<sup>1</sup>; Yuji Ohishi<sup>2</sup>; Ken Kurosaki<sup>1</sup>; <sup>1</sup>Kyoto University; <sup>2</sup>Osaka University

**E-26: Materials Genomics Search for Possible Helium-absorbing Nano-phases in Fusion Structural Materials and Experimental Validation:** *So Yeon Kim*<sup>1</sup>; Haowei Xu<sup>1</sup>; Sina Kavak<sup>2</sup>; Kübra Bayrak<sup>3</sup>; Myeong Jun Lee<sup>4</sup>; Di Chen<sup>5</sup>; Emre Tekoglu<sup>1</sup>; Duygu Ağaoğulları<sup>2</sup>; Erhan Ayas<sup>3</sup>; Eun Soo Park<sup>4</sup>; Cheng Sun<sup>6</sup>; Ju Li<sup>1</sup>; <sup>1</sup>MIT; <sup>2</sup>Istanbul Technical University; <sup>3</sup>Eskiehler Technical University; <sup>4</sup>Seoul National University; <sup>5</sup>University of Houston; <sup>6</sup>Idaho National Laboratory

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## MATERIALS SYNTHESIS AND PROCESSING

### Materials Processing Fundamentals: Iron and Steel Production — Poster Session

**Sponsored by:** TMS Extraction and Processing Division, TMS Materials Processing and Manufacturing Division, TMS: Process Technology and Modeling Committee

**Program Organizers:** Samuel Wagstaff, Oculatus Consulting; Alexandra Anderson, Gopher Resource; Chukwunwike Iloeje, Argonne National Laboratory; Adrian Sabau, Oak Ridge National Laboratory

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**Analysis and Optimization Suggestions of Media-Carbon Microalloyed Steel Nozzle Clogging:** *Zifei Wang*<sup>1</sup>; Lu Zhang<sup>1</sup>; Xiangyu Xu<sup>1</sup>; Jianxun Fu<sup>1</sup>; <sup>1</sup>Shanghai University

**Analysis of the Causes of Drilling Cracks in Free-cutting Silver Bright Rods:** *Xiaoyu Zhang*<sup>1</sup>; Mengmeng Su<sup>1</sup>; Wei Shen<sup>1</sup>; Xiangyu Xu<sup>1</sup>; Jianxun Fu<sup>1</sup>; <sup>1</sup>Shanghai University

**Density Functional Theory (DFT) Simulation of Micro Surface Properties of FeO:** *Hao Wu*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Effect of Super-gravity Field on the Purification and Solidification Structure of Oxygen Free Copper (OFC):** *Lu Wang*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Modification and Evaluation of Desulfurization and Denitrification of 360m<sup>2</sup> Sintering Machine in Shougang Qian'an Company:** *Yapeng Zhang*<sup>1</sup>; Shuhai Ou<sup>2</sup>; Wen Pan<sup>3</sup>; Chulai Wang<sup>4</sup>; Huaiying Ma<sup>3</sup>; Sida Ren<sup>3</sup>; <sup>1</sup>Research Institute of Iron & Steel, Shougang Group Co., Ltd. Research Institute; <sup>2</sup> Shougang Qian'an Iron and Steel Company; <sup>3</sup>Research Institute of Iron & Steel, Shougang Group Co., LTD Research Institute; <sup>4</sup>Shougang Qian'an Iron and Steel Company

**Optimization of Submerged Nozzle and Chamfer Design in the Mold of Bloom Continuous Casting Process Using Numerical Simulation:** *Jingzhou Lu*<sup>1</sup>; Wanlin Wang<sup>1</sup>; Kun Dou<sup>1</sup>; Weiming Pan<sup>1</sup>; <sup>1</sup>Central South University

**Research and Practice on the Technology of Ultra-thick Bed Sintering of Iron Ore in Shougang Jingtang Sintering Plant:** *Yapeng Zhang*<sup>1</sup>; Wen Pan<sup>1</sup>; Shaoguo Chen<sup>1</sup>; Jingjun Zhao<sup>2</sup>; Dongqing Wang<sup>1</sup>; Huaiying Ma<sup>1</sup>; Suochao Qiu<sup>2</sup>; Yongjun Liu<sup>2</sup>; Huayang Liu<sup>2</sup>; <sup>1</sup>Research Institute of Iron & Steel, Shougang Group Co., LTD Research Institute of Technology; <sup>2</sup>Shougang Jingtang United Iron & Steel Co., Ltd

**The Behavior of Fine Dust from Materials Processing under the Acoustic Field:**

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## MECHANICS OF MATERIALS

### Mechanical Behavior at the Nanoscale VII — Poster Session

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

**Program Organizers:** Matthew Daly, University of Illinois-Chicago; Douglas Stauffer, Bruker Nano Surfaces & Metrology; Wei Gao, Texas A&M University; Changhong Cao, McGill University; Daniel Kiener, University of Leoben; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Niaz Abdolrahim, University of Rochester; Yu Zou, University of Toronto

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**A Study of Rate-Dependency of Size-dependent Response Based on a Single-crystal Gradient Plasticity Model:** *Habib Pouriayevali*<sup>1</sup>; <sup>1</sup>Eschollbrucker Str. 4

**D-31: Exploring Plasticity and Size Effects in Diamond-structured Semiconductors at Micro-scales Using Micromechanics:** *Ming Chen*<sup>1</sup>; Jeffrey Wheeler<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

**D-32: Mechanical Behavior of Additively Manufactured Metallic Nanolattices:** *Wenxin Zhang*<sup>1</sup>; Julia Greer<sup>1</sup>; <sup>1</sup>California Institute of Technology

**Mechanical Behavior of Nanoparticles: Impact of the Force Field Model Used for the Compression of Nanoparticles:** *Alla Ndiaye Dieng*<sup>1</sup>; Louise Grau<sup>1</sup>; Celine Gerard<sup>1</sup>; Jean-Claude Grandidier<sup>1</sup>; <sup>1</sup>Pprime Institute - Cnrs - Ensma

**D-33: Microstructural and Mechanical Property Characterization of Argillaceous, Kerogen-rich, and Bituminous Shale Rocks:** *Raj Patel*<sup>1</sup>; Kelvin Xie<sup>1</sup>; George Pharr<sup>1</sup>; Yuwei Zhang<sup>1</sup>; Youjun Deng; Youjun Deng<sup>1</sup>; ChiaWei Lin<sup>1</sup>; <sup>1</sup>Texas A&M University

**D-34: Modeling the Dynamic Behavior of Crosslinked Epoxy Resin Networks in Marine Environments Using Molecular Dynamics Simulations:** *Andrew Shortridge*<sup>1</sup>; <sup>1</sup>University of Connecticut - Computational Materials and Mechanics Group

**D-35: Pyrough: A New Tool to Model Rough Samples in Atomistic and Finite Element Simulations:** *Hugo Iteney*<sup>1</sup>; Javier Gonzalez<sup>2</sup>; Le Bourlot Christophe<sup>2</sup>; Thomas Cornelius<sup>1</sup>; Olivier Thomas<sup>1</sup>; Jonathan Amodeo<sup>1</sup>; <sup>1</sup>Aix-Marseille Université, Université de Toulon, CNRS, IM2NP, Marseille, France; <sup>2</sup>Université de Lyon, INSA-Lyon, MATEIS, UMR 5510 CNRS, 69621 Villeurbanne, France

**D-36: Subsurface Deformation and Cracking Behavior for Shale Rocks:** *Brenden Postma*<sup>1</sup>; <sup>1</sup>Texas A&M University

**D-37: Unveiling the Effect of Pre-strain on Nano-scale Plastic Yielding Response in a Ni Modified Fe-Mn-Al-C Steel:** *Debarpan Ghosh*<sup>1</sup>; Suman Kumar<sup>1</sup>; Roshan Jha<sup>1</sup>; Yahya Mozumder<sup>2</sup>; Sumantra Mandal<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kharagpur; <sup>2</sup>University of Manchester

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## MECHANICS OF MATERIALS

### Mechanical Response of Materials Investigated through Novel In-situ



## Experiments and Modeling — Poster Session

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

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

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**D-38: Oxidation and Post-quench Ductility of Chromium Coated Zircaloy-4:** *Victoria Davis*<sup>1</sup>; Caleb King<sup>1</sup>; Colson Miller<sup>1</sup>; Tristan Norrgard<sup>1</sup>; Braden Goddard<sup>1</sup>; Carlos Castano<sup>1</sup>; Reza Mohammadi<sup>1</sup>; Rajnikant Umretiya<sup>2</sup>; Jessika Rojas<sup>1</sup>; <sup>1</sup>Virginia Commonwealth University; <sup>2</sup>GE Research

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## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Nanostructured Materials in Extreme Environments II — Poster Session

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

**Program Organizers:** Haiming Wen, Missouri University of Science and Technology; Youxing Chen, University of North Carolina Charlotte; 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; Zhaoping Lu, University of Science and Technology Beijing

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**B-9: Composition Dependent Irradiation Resistance Behavior in Chemically Complex Alloys:** *Emily Hopkins*<sup>1</sup>; Annie Barnett<sup>1</sup>; Khalid Hattar<sup>2</sup>; Mitra Taheri<sup>1</sup>; <sup>1</sup>Johns Hopkins University; <sup>2</sup>University of Tennessee - Knoxville

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## ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS

### Phase Stability, Phase Transformations, and Reactive Phase Formation in Electronic Materials XXIII — 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; Chao-hong Wang, National Chung Cheng University; Chih-Ming Chen, National Chung Hsing University; Jaeho Lee, Hongik University; Zhi-Quan Liu, Shenzhen Institutes of Advanced Technology; Ming-Tzer Lin, National Chung Hsing University; Yee-wen Yen, National Taiwan University of Science and Technology; A.S.Md Abdul Haseeb, Bangladesh University of Engineering and Technology (BUET); Ligang Zhang, Central South University; Sehoon Yoo, KITECH; Ping-Chuan Wang, SUNY New Paltz; Yu-An Shen, Feng Chia University

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**Session Chair:** Yu-chen Liu, National Cheng Kung University

**A-27: Co/Bi<sub>2</sub>(Se,Te)<sub>3</sub> Interfacial Reactions and Bi-Co-Se-Te Phase Equilibria:** *Yung-Chun Tsai*<sup>1</sup>; He-Cheng Yang<sup>1</sup>; Cheng-Hsi Ho<sup>1</sup>; Sinn-wen Chen<sup>1</sup>; <sup>1</sup>National Tsing Hua University

**A-28: Cu Surface Protection Treatments for Anti-oxidation and Anti-corrosion:** *Ting Yu*<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; <sup>1</sup>National Chung Hsing University

**A-29: Efficiency Enhancement of P-I-N Perovskite Solar Cells by Self-assembled Silane Treatment of Hole Transporting Layer:** *Ying-Jung Lu*<sup>1</sup>; Chieh-Ting Lin<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; <sup>1</sup>National Chung Hsing University

**A-30: Electric Current-induced Unexpected Phase Transition for the  $\delta$ -Cu<sub>6</sub>Sn<sub>5</sub> Phase at Low Temperatures:** *Shubhayan Mukherjee*<sup>1</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University

**A-31: Impurity Effects on Interfacial Reactions between Sn-Zn-based Solders and Electroplated Cu Films:** *Fang-Yu Chen*<sup>1</sup>; Chang-Ying Lin<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; Yu-An Shen<sup>2</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>Feng Chia University

**A-32: Silver Nanoparticles Modified Polyimide Covalent Organic Frameworks Composites for Dye-sensitized Solar Cells:** *Yu-Hsuan Chen*<sup>1</sup>; Chih-Ming Chen<sup>1</sup>; <sup>1</sup>National Chung Hsing University

**A-33: Study on the Stability of the Synergistic Inhibition Effect of Metal Ions and Nitrides on Copper Corrosion:** *Po-Cheng Chou*<sup>1</sup>; Tsung-Hao Yang<sup>2</sup>; Chih-Ming Chen<sup>1</sup>; <sup>1</sup>National Chung Hsing University; <sup>2</sup>Char May Advance Chemical Corporation

## 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:** Ashley Paz Y Puente, University of Cincinnati; Mark Aindow, University of Connecticut; Tushar Borkar, Cleveland State University; Adriana Eres-Castellanos, Colorado School of Mines; Sriswaroop Dasari, Idaho National Laboratory; Eric Payton, University of Cincinnati; Sophie Primig, University of New South Wales; Sriram Vijayan, Michigan Technological University; Le Zhou, Marquette University

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**C-11: Characteristics of Primary Carbide and Its Evolution during Hot Rolling in High-carbon Chromium Bearing Steel:** *Zhuang Zhang*<sup>1</sup>; Hao Geng<sup>1</sup>; Pu Wang<sup>1</sup>; Peng Lan<sup>1</sup>; Haiyan Tang<sup>1</sup>; Jiaquan Zhang<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**C-12: Crystalline Phase Evolution during Flash Sintering of Hydroxyapatite-zirconia Composites Using In-situ Synchrotron XRD:** *Isabela Reis Lavagnini*<sup>1</sup>; João Campos<sup>2</sup>; Anderson Lobo<sup>3</sup>; Rishi Raj<sup>4</sup>; Eliria Pallone<sup>1</sup>; <sup>1</sup>University of São Paulo; <sup>2</sup>Federal University of São Carlos; <sup>3</sup>Federal University of Piauí; <sup>4</sup>University of Colorado

**C-13: Design of Model Microstructures to Study the Effect of  $\gamma$ -phase on Mechanical Properties of Wrought Superalloys:** *Tim Storch*<sup>1</sup>; Christoph Somsen<sup>1</sup>; Jürgen Kiese<sup>2</sup>; Gunther Eggeler<sup>1</sup>; Guillaume Laplanche<sup>1</sup>; <sup>1</sup>Ruhr-Universität Bochum; <sup>2</sup>VDM Metals International

**C-14: Discovery of High-Pressure Phases – Integrating High-throughput DFT Simulations, Graphic Neural Networks, and Active Learning:** *Ching-Chien Chen*<sup>1</sup>; Robert Appleton<sup>1</sup>; Saswat Mishra<sup>1</sup>; Kat Nykiel<sup>1</sup>; Alejandro Strachan<sup>1</sup>; <sup>1</sup>Purdue University

**C-15: Effect of Interlayer Towards the Joint Properties Enhancement of Dissimilar Friction Welded SS321-AA2219:** *Neeraj Kumar Mishra*<sup>1</sup>; SGK Manikandan<sup>2</sup>; Neethu N<sup>2</sup>; C. Jebasiamony<sup>2</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay; <sup>2</sup>Indian Space Research Organisation

**C-16: Effect of Low-temperature Long-term Aging on the Mechanical Properties of Age-hardenable Aluminum Alloys:** *Philip Aster*<sup>1</sup>; Phillip Dumitraschkewitz<sup>1</sup>; Florian Schmid<sup>2</sup>; Katharina Strobel<sup>2</sup>; Peter Uggowitzer<sup>1</sup>; Stefan Pogatscher<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben; <sup>2</sup>AMAG rolling GmbH

**C-17: Effect of MgO on Mineral Phase and Structure of Vanadium Slag:** *Cancan Yu*<sup>1</sup>; Jinan Wang<sup>1</sup>; Yiyu Qiu<sup>1</sup>; Jiang Diao<sup>1</sup>; Hongyi Li<sup>1</sup>; Bing Xie<sup>1</sup>; <sup>1</sup>Chongqing University

**Effect of Rapid Tempering Thermal Parameters by Joule Heating on the Microhardness in a Medium-carbon Low-alloy Cr-Mo Steel:** *Perla Díaz-Villaseñor*<sup>1</sup>; *Ricardo Guzman-Garfias*<sup>1</sup>; Octavio Vázquez-Gómez<sup>1</sup>; Héctor Vergara-Hernández<sup>1</sup>; Martín Herrejón-Escutia<sup>1</sup>; Gerardo Chávez-Campos<sup>1</sup>; <sup>1</sup>Tecnológico Nacional de México / I.T. Morelia

**Effect of the Heating Rate on the Austenite Formation Kinetics by Isoconversion Method in Cr-Mo-V Steel:** *Ricardo Guzman-Garfias*<sup>1</sup>; Octavio Vázquez-Gómez<sup>1</sup>; Pedro Garnica-González<sup>1</sup>; Héctor Vergara-Hernández<sup>1</sup>; José Barrera-Godínez<sup>2</sup>; <sup>1</sup>Tecnológico Nacional de México / I.T. Morelia; <sup>2</sup>Universidad Nacional Autónoma de México

**C-18: Effect of Ti Addition on the X-phase Precipitation in Cu-Al-Ni Shape Memory Alloy Manufactured by Melt Spinning Process:** *Yejun Park*<sup>1</sup>; Pyuck-Pa Choi<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

**C-19: Evolution of Recrystallization Texture in Nickel-Cobalt Alloys: Stacking Fault Energy Dependence:** *Satyam Suwas*<sup>1</sup>; Gyan Shankar<sup>1</sup>; Luis Barrales-Mora<sup>2</sup>; <sup>1</sup>Indian Institute of Science Bangalore, India; <sup>2</sup>Georgia Institute of Technology, France

**Hydride Phase Formation and Hydrogen Evolution in NPZ Getters: Insights from In-situ XRD Analysis:** *Jose Marcial*<sup>1</sup>; Joshua Silverstein<sup>1</sup>; Jarrod Crum<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**C-20: In-situ Synchrotron X-ray Study of Shear Induced Phase Transformation**

**of Copper-bismuth Mixture Using a High-speed Rotational Diamond Anvil Cell (HS-RDAC):** *Tingkun Liu*<sup>1</sup>; Changyong Park<sup>2</sup>; Mayur Pole<sup>1</sup>; Mengkong Tong<sup>1</sup>; Arun Devaraj<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Argonne National Laboratory

**Microstructural Evolution during Homogenization Heat Treatment of AA 6063 Alloy in Batch and Continuous Furnaces:** Deniz Kavrar Urk<sup>1</sup>; Akin Obalı<sup>1</sup>; Mertol Gokelma<sup>2</sup>; Gökçen Gökçe<sup>1</sup>; *Murat Doğan*<sup>1</sup>; <sup>1</sup>Sistem Teknik Industrial Furnaces LTD.; <sup>2</sup>zmir Institute of Technology

**Microstructure and Mechanical Properties of Diffusion-bonded Fe-Ni-Mo/Invar Bimetal Materials:** *Hyeok Jae Choi*<sup>1</sup>; Jin Gyu Lee<sup>1</sup>; Jeong Seon Yoo<sup>1</sup>; Jun Hee Han<sup>2</sup>; Jae Yeol Jeon<sup>2</sup>; Dae Geun Kim<sup>3</sup>; Jin Kyu Lee<sup>1</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>KITECH; <sup>3</sup>Institute for Advanced Engineering

**Nano-scale Precipitate Evolution, Localization and Phase Transformations in Ni Alloyed Fe-Mn-Al-C Steel – A Correlative Microscopy Study:** *K. G. Pradeep*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Madras

**C-21: 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

**C-22: Phase Transformation and Microstructures of NiTi:** *Junfeng Xiao*<sup>1</sup>; Cyril Cayron<sup>1</sup>; Roland Loge<sup>1</sup>; <sup>1</sup>EPFL

**C-23: Phase Transformation Temperatures Evolution Under Plastic and Viscoplastic Deformation 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

**C-24: Phase Transformation Upon Dissimilar Laser Welding of Al5083 and SS304:** *Parth Nitinkumar Vaidya*<sup>1</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**C-25: Property and Microstructure of Ni<sub>50.3</sub>Ti<sub>29.7</sub>Hf<sub>20</sub> High-temperature Shape Memory Alloys with Different Aging Conditions:** *Jiaqi Dong*<sup>1</sup>; Alexander Demblon<sup>1</sup>; Tejas Umale<sup>1</sup>; Dexin Zhao<sup>1</sup>; Gianna Valentino<sup>2</sup>; Ibrahim Karaman<sup>1</sup>; Kelvin Xie<sup>1</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>University of Maryland

**Quantification of Microstructure Obtained during Isothermal Bainite Transformation: A Novel Dilatometry-based Model:** *Harish Donthula*<sup>1</sup>; Suman Neogy<sup>1</sup>; Vishwanadh B<sup>1</sup>; N. K. Sarkar<sup>1</sup>; S.B. Singh<sup>2</sup>; R Tewari<sup>1</sup>; <sup>1</sup>Bhabha Atomic Research Centre; <sup>2</sup>Indian Institute of Technology Kharagpur

**Reducing Functional Fatigue, Transition Stress and Hysteresis of NiTi Micropillars by One-step Overstressed Plastic Deformation:** *Kangjie Chu*<sup>1</sup>; <sup>1</sup>Southern University of Science and Technology

**C-26: Strain-Induced Phase Transformation in Al-Zn-Mg Alloys: A Molecular Dynamics Study for Metastable Nanoprecipitate Stabilization:** *Yu-ning Chiu*<sup>1</sup>; Chung-yi Yu<sup>2</sup>; Shih-kang Lin<sup>1</sup>; <sup>1</sup>National Cheng Kung University; <sup>2</sup>China Steel Corp, Aluminum Prod R&D Sect, New Mat R&D Dept

**Thermal Stability of AlTiCuZn-based Lightweight High-entropy Alloy:** *Intekhab Alam*<sup>1</sup>; Ahmed Alade Tihamiyu<sup>1</sup>; <sup>1</sup>University of Calgary

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## 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, Kennametal Inc.; Wenwu Xu, San Diego State University; Ma Qian, Royal Melbourne Institute of Technology

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**Preparation, Phase Structure, and Solubility of MnV<sub>2</sub>O<sub>6</sub> and Mn<sub>2</sub>V<sub>2</sub>O<sub>7</sub>:** *Zhuoyang Li<sup>1</sup>; Guishang Pei<sup>1</sup>; Mengjiao Jiao<sup>1</sup>; Yongda Li<sup>1</sup>; Ningyu Zhang<sup>1</sup>; Xuewei Lv<sup>1</sup>; <sup>1</sup>Chongqing University*

**C-27: Ultrasonic Powder Atomization of NiTi:** *Robert Caraway<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology*

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## **ELECTRONIC, MAGNETIC, AND ENERGY MATERIALS**

**Printed Electronics and Additive Manufacturing: Advanced Functional Materials, Processing Concepts, and Emerging Applications — Poster Session**

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

**Program Organizers:** Tolga Aytug, Oak Ridge National Laboratory; Pooran Joshi, Elbit Systems of America; Yong Lin Kong, University of Utah; Konstantinos Sierros, West Virginia University; Masoud Mahjouri-Samani, Auburn University; Changyong Cao, Case Western Reserve University; Dave Estrada, Boise State University; Ravindra Nuggehalli, New Jersey Institute of Technology

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**Session Chair:** Feresehteh Kouchi, Boise State University

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**A-34: 3D-printed PEDOT:PSS Composites for Multifunctional Flexible Sensor:** *Bo Mi Lee<sup>1</sup>; Quang Nguyen<sup>1</sup>; Wen Shen<sup>1</sup>; <sup>1</sup>University of Central Florida*

**A Meshfree Phase-field Model for Simulating the Sintering Process of Metallic Particles for Printed Electronics:** *Changyong Cao<sup>1</sup>; Zhida Huang<sup>1</sup>; <sup>1</sup>Case Western Reserve University*

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## **MATERIALS SYNTHESIS AND PROCESSING**

**Process Metallurgy and Environmental Engineering: An EPD Symposium in Honor of Takashi Nakamura — Poster Session**

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

**Program Organizers:** Takanari Ouchi, University of Tokyo; Gerardo Alvear Flores, CaEng Associates; Etsuro Shibata, Tohoku University; Leandro Andres Voisin, University of Chile; Yu-Ki Taninouchi, Kyushu University

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**Session Chair:** Takanari Ouchi, The University of Tokyo

**Acidic and Ammonium Sulphate Leaching of Historic Copper Tailings from Copperbelt Province, Zambia:** *Misozi Makangila*<sup>1</sup>; Yotarm Hara<sup>1</sup>; Kakoma Maseka<sup>1</sup>; Rainford Hara<sup>1</sup>; <sup>1</sup>The Copperbelt University

**Application of the Thiocyanate-Thiourea System for the Leaching of Copper Present in Tailings from Pachuca, Hidalgo, Mexico:** *Erick Muñoz Hernandez*<sup>1</sup>; Melissa Gordillo Salazar<sup>1</sup>; Martin Reyes Pérez<sup>1</sup>; Elia Guadalupe Palacios Beas<sup>2</sup>; Aislinn Michelle Teja Ruiz<sup>1</sup>; José Angel Cobos Murcia<sup>1</sup>; Ángel Ruiz Sánchez<sup>3</sup>; Julio Cesar Juarez Tapia<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo; <sup>2</sup>Instituto Politécnico Nacional; <sup>3</sup>Universidad Nacional Autónoma de México

**Assessment of the Glycine Concentration for the Leaching of Cu, Zn and Pb Contained In Tailings in the Presence of Thiourea:** *Erick Muñoz Hernandez*<sup>1</sup>; Melissa Gordillo Salazar<sup>1</sup>; Ángel Ruiz Sánchez<sup>2</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo; <sup>2</sup>Universidad Nacional Autónoma de México

**Characterization of Solid Mining Waste in the Urbanized Area of Zimapán, Hidalgo, for the Identification of Economically Valuable Elements and Trace Elements:** Aislinn Teja Ruiz<sup>1</sup>; Julio Cesar Juárez -Tapia<sup>1</sup>; *Gabriel Cisneros-Flores*<sup>1</sup>; Jesus Ivan Martínez- Soto<sup>1</sup>; Martin Reyes- Pérez<sup>1</sup>; Iván Alejandro Reyes- Domínguez<sup>1</sup>; Hugo Garcia Ortiz<sup>1</sup>; Uriel Mizraim Flores Guerrero<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo

**C-28: Comparative Study of the Carbothermal Reduction of Scales of Cast Steel Pieces Produced in the Thermal Treatment Using Mineral Coke and Charcoal:** *Mery Gomez Marroquin*<sup>1</sup>; Cristian Rodriguez-Ramos<sup>1</sup>; Leoncio Quiñonez-Castillo<sup>1</sup>; David Yaringaño-Rosales<sup>1</sup>; Cristhian Reyes-Palacios<sup>1</sup>; Enrique Dionisio-Calderón<sup>2</sup>; José Carlos D'Abreu<sup>2</sup>; <sup>1</sup>FIGMM UNI; <sup>2</sup>Pontifical Catholic University of Rio de Janeiro

**Correlation of the Initial Absorption Coefficient and the Compression Resistance of Concrete Blocks (Vibro-Compacted), with the Addition of Fly Ash and an Additive:** *Hugo Garcia Ortiz*<sup>1</sup>; Julio Juárez Tapia<sup>1</sup>; Martín Reyes Pérez<sup>1</sup>; Miguel Pérez Labra<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo

**Design of a Pb-Ag-Zn Complex Mineral Processing Plant with a Capacity of 50TMD for the "Bajaderia R.L." Mining Cooperative:** *Lizabeth Mamani*<sup>1</sup>; <sup>1</sup>UMSA

**Investigation of Roast- Leach of High Sulphur Containing Slag from Luanshya Zambia:** Yotamu Hara<sup>1</sup>; *Yaki Namiluko*<sup>1</sup>; Brenda Chitewo<sup>1</sup>; Rainford Hara<sup>1</sup>; Stephen Parirenyatwa<sup>1</sup>; <sup>1</sup>Copperbelt University

**C-29: Molten Salt Electrolysis of MgO Using an Ag Cathode and Vacuum Distillation for Efficient Mg Metal Production:** *Hyeong-Jun Jeoung*<sup>1</sup>; Tae-Hyuk Lee<sup>2</sup>; Jin-Young Lee<sup>2</sup>; Kyung-Woo Yi<sup>1</sup>; Jungshin Kang<sup>1</sup>; <sup>1</sup>Seoul National University; <sup>2</sup>Korea Institute of Geoscience and Mineral Resources

**Possibilities for Leachability Reduction of Heavy Metals Using Slag as Substitute for Natural Sand in Concrete:** *Christoph Woelfler*<sup>1</sup>; Gustav Hanke<sup>1</sup>; Jürgen

Antrekowitsch<sup>1</sup>; <sup>1</sup>Montanuniversität Leoben

**Recovery of Iron from Copper Tailings Using a Combined Direct Reduction-Magnetic Separation Process:** *Chen Buxin*<sup>1</sup>; Minghong Deng<sup>1</sup>; Mengjun Hu<sup>2</sup>; Mengyao Dong<sup>2</sup>; Meilong Hu<sup>1</sup>; <sup>1</sup>Chongqing University; <sup>2</sup>Chongqing Industry Polytechnic College

**Research Progress in Eddy Current Reduction of Molten Copper Slag:** *Bo Tong*<sup>1</sup>; Yan Liu<sup>1</sup>; Ting-an Zhang<sup>1</sup>; <sup>1</sup>Northeastern University

**Resource Utilization of Copper Slag with a Focus on Impoverishment and Reduction: A Review:** *Jun Hao*<sup>1</sup>; Zhi-he Dou<sup>1</sup>; Ting-an Zhang<sup>1</sup>; <sup>1</sup>Northeastern University

**C-30: Selective Leaching of Rare Earth Metals Using Novel Lixiviants:** Nikki A. Thiele<sup>1</sup>; *Ana Belen Cueva Sola*<sup>1</sup>; Janel Dempsey<sup>1</sup>; Briana R. Schrage<sup>1</sup>; Megan Sibley<sup>1</sup>; Megan E. Simms<sup>1</sup>; Alexander S. Ivanov<sup>1</sup>; Tamalika Ash<sup>2</sup>; Marilu Perez Garcia<sup>2</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Ames Laboratory

**The Leaching Behavior of Pre-reduced Mn Ore by Sulfuric Acid:** *Jonas Låstad*<sup>1</sup>; Jafar Safarian<sup>1</sup>; <sup>1</sup>Norwegian University of Science and Technology

## MATERIALS SYNTHESIS AND PROCESSING

### Rare Metal Extraction & Processing — Poster Session

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

**Program Organizers:** Kerstin Forsberg, KTH Royal Institute of Technology; 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 (Marco) Peng, University of Queensland; Athanasios Karamalidis, Pennsylvania State University

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**Effect of MgO, MnO and Al<sub>2</sub>O<sub>3</sub> on Vanadium Extraction in Sodium Roasting-water Leaching Process of Vanadium Slag:** *Jiang Liyuan*<sup>1</sup>; Jiang Diao<sup>1</sup>; Hao Qin<sup>1</sup>; Quan Zhang<sup>1</sup>; Wenfeng Tan<sup>1</sup>; Hong-Yi Li<sup>1</sup>; Bing Xie<sup>1</sup>; <sup>1</sup>Chongqing University

**C-31: Efficient Extraction of Cd in Zn Recovery Process by Wet Leaching of Zn-rich Dust:** *Yan Li*<sup>1</sup>; Xuefeng She<sup>1</sup>; Jingsong Wang<sup>1</sup>; Zeming Wang<sup>1</sup>; Qingguo Xue<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**Extraction Vanadium from High Calcium and High Phosphorus Vanadium Slag by Magnesiation Roasting-acid Leaching:** *Xin-Mian Chen*<sup>1</sup>; Hong-Yi Li<sup>1</sup>; Jing Tan<sup>1</sup>; Jie Cheng<sup>1</sup>; Jiang Diao<sup>1</sup>; Bing Xie<sup>1</sup>; <sup>1</sup>Chongqing University

**Theoretical Study on the Separation of Impurity Tellurium from Crude Selenium by Vacuum Distillation:** *Xin Yu*<sup>1</sup>; *Guozheng Zha*<sup>1</sup>; Wenlong Jiang<sup>1</sup>; <sup>1</sup>Kunming University of Science and Technology

## MATERIALS DEGRADATION AND DEGRADATION BY DESIGN

### Refractory Metals 2024 — Poster Session

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

**Program Organizers:** Christopher Thom, Rhenium Alloys, Inc.; Wolfgang Pantleon, Technical University of Denmark; Michael Kirka, Oak Ridge National Laboratory; Gaoyuan Ouyang, Ames Laboratory; Marie Charpagne, University of Illinois; Eric Taleff, University of Texas at Austin; Thomas Bieler, Michigan State University; John Perepezko, University of Wisconsin-Madison

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**Session Chair:** John Perepezko, University of Wisconsin Madison

**Development of a Novel Ba<sub>2</sub>YZrO<sub>5</sub>F Refractory: Synthesis, Stability Study and Interaction with Pure Ti:** *Guangyao Chen*<sup>1</sup>; Jian Liu<sup>1</sup>; Qisheng Feng<sup>1</sup>; Shihua Wang<sup>1</sup>; Chonghe Li<sup>1</sup>; <sup>1</sup>Shanghai University

**Experimental Investigation on Isothermal Section of ZrO<sub>2</sub>-SrO-BaO System at 1673K:** Mingrui Lv<sup>1</sup>; Qisheng Feng<sup>1</sup>; Chonghe Li<sup>1</sup>; Shihua Wang<sup>1</sup>; *Pengyue Gao*<sup>1</sup>; <sup>1</sup>Shanghai University

**B-10: Influence of Radiation on the Oxidation Behavior of Molybdenum:** *Wande Cairang*<sup>1</sup>; Dezhen Xue<sup>2</sup>; Xiangdong Ding<sup>2</sup>; <sup>1</sup>Massachusetts Institute of Technology; <sup>2</sup>Xi'an Jiaotong University

## MECHANICS OF MATERIALS

### Structure-Property Relationships of Bulk Metallic Glasses — Poster Session

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

**Program Organizers:** Sebastian Kube, University of Wisconsin - Madison; Robert Maass, Federal Institute of Materials Research and Testing (BAM); Katharine Flores, Washington University in St. Louis; Yonghao Sun, The Chinese Academy of Sciences; A. Lindsay Greer, University of Cambridge; Peter Derlet, Paul Scherrer Institut

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**D-39: High Temperature Tensile Creep Deformation in Bulk Metallic Glasses:** *Aurelia Moriyama-Gurish*<sup>1</sup>; Maria Korolik<sup>1</sup>; Shuhan Zhang<sup>1</sup>; Udo Schwarz<sup>1</sup>; Amit Datye<sup>1</sup>; <sup>1</sup>Yale University

**D-40: Machine Learning Based 4D-STEM Analysis of Variation in Structural Heterogeneity in Zr-based Metallic Glasses:** *Minhazul Islam*<sup>1</sup>; Gabriel Calderon<sup>1</sup>; Yuchi Wang<sup>1</sup>; Yuchu Wang<sup>2</sup>; Geun-Hee Yoo<sup>3</sup>; Eun Soo Park<sup>3</sup>; Yue Fan<sup>2</sup>; Yunzhi Wang<sup>1</sup>; Jinwoo Hwang<sup>1</sup>; <sup>1</sup>Ohio State University; <sup>2</sup>University of Michigan; <sup>3</sup>Seoul National University

**D-41: Mechanical Cycling-induced Evolution of Structure and Local Mechanical Properties in a Pd-Cu-Ni-P Bulk Metallic Glass:** *Shuhan Zhang*<sup>1</sup>; Xinzhe Wang<sup>1</sup>; Jennifer Hay<sup>2</sup>; Udo Schwarz<sup>1</sup>; Amit Datye<sup>1</sup>; <sup>1</sup>Yale University; <sup>2</sup>KLA Inc

## MATERIALS SYNTHESIS AND PROCESSING



## Towards a Future of Sustainable Production and Processing of Metals and Alloys — Poster Session

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

**Program Organizers:** Arun Devaraj, Pacific Northwest National Laboratory; Dierk Raabe, Max-Planck Institute; Suhas Eswarappa Prameela, Massachusetts Institute of Technology (MIT); Leora Dresselhaus-Marais, Stanford University; Petrus Pistorius, Carnegie Mellon University

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**C-32: Development of Stable Pulse MIG Welding Technology for Automotive Ultra-high Strength Steel:** *Kyohei Konishi*<sup>1</sup>; Koichi Taniguchi<sup>1</sup>; Chikaumi Sawanishi<sup>1</sup>; Satoshi Igi<sup>1</sup>; <sup>1</sup>JFE Steel Corporation

**C-33: Influence of Grain Size on the Hydrogen-based Reduction of Iron Oxide Films:** *Francelia Sanchez*<sup>1</sup>; Ajay Karakoti<sup>2</sup>; Arun Devaraj<sup>2</sup>; Vaithiyalingam Shutthanandan<sup>2</sup>; Ramana Chintalapalle<sup>1</sup>; Tiffany Kaspar<sup>2</sup>; Debabrata Das<sup>1</sup>; <sup>1</sup>The University of Texas at El Paso; <sup>2</sup>Pacific Northwest National Laboratory

**Research on Pellet Hydrogen Reduction Followed by Melting Separation for Utilizing Oolitic High-phosphorus Iron Ore:** *Huiqing Tang*<sup>1</sup>; Hao Yu<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

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## MATERIALS SYNTHESIS AND PROCESSING

### Ultrafine-grained and Heterostructured Materials (UFGH XIII) — Poster Session

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

**Program Organizers:** Megumi Kawasaki, Oregon State University; Penghui Cao, University of California, Irvine; Mostafa Hassani, Cornell University; Rajib Kalsar, Pacific Northwest National Laboratory; Nilesh Kumar, University of Alabama, Tuscaloosa; Praveen Kumar, Indian Institute of Science; Dmytro Orlov, Lund University

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**Session Chair:** Megumi Kawasaki, Oregon State University

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**C-34: In-situ Heating Mono- and Polychromatic Synchrotron X-ray Diffraction of Bulk Hetero-nanostructured Copper:** *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 Wollongong

**C-35: Multiple-step SPD Process for Ultrafine-grained Aluminum Sheets:** *Laxman Bhatta*<sup>1</sup>; Isshu Lee<sup>1</sup>; Brian Bay<sup>1</sup>; Megumi Kawasaki<sup>1</sup>; <sup>1</sup>Oregon State University

**C-36: Temperature Dependence of Deformation Behavior of Ultrafine-Grained Commercial Purity Titanium:** *Chihiro Watanabe*<sup>1</sup>; Norimitsu Koga<sup>1</sup>; Hiromi Miura<sup>2</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>Toyohashi University of Technology

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## ADDITIVE MANUFACTURING

### Additive Manufacturing and Innovative Powder/Wire Processing of Multifunctional Materials — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Structural Materials Division, TMS: Additive Manufacturing Committee, TMS: Magnetic Materials Committee

**Program Organizers:** Daniel Salazar, BCMaterials; Kyle Johnson, Sandia National Laboratories; Andrew Kustas, Sandia National Laboratories; Markus Chmielus, University of Pittsburgh

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**A Data-driven Approach for Rapid Process Parameter Optimization in Laser Powder Bed Fusion of Fe-Si Soft Magnetic Alloys:** *Joon Phil Choi*<sup>1</sup>; Taeho Ha<sup>1</sup>; Pil-Ho Lee<sup>1</sup>; Min-Kyo Jung<sup>1</sup>; Byeong Uk Song<sup>2</sup>; <sup>1</sup>Korea Institute of Machinery & Materials; <sup>2</sup>Korea Advanced Institute of Science and Technology

**F-1: Binder Jetting of Non-spherical Copper Powder:** Meisam Khademitab<sup>1</sup>; Ethan Jenssen<sup>1</sup>; John Barnes<sup>2</sup>; *Amir Mostafaei*<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology; <sup>2</sup>Metal Powder Works

**F-2: Comparison of Flowability and Characteristics of Inconel 625, Ti-6Al-4V, and SUS316L Powders for the DED Process:** *Kim Hyun Joong*<sup>1</sup>; Sungjae Jo<sup>1</sup>; Marzieh Ebrahimian<sup>1</sup>; Mohsen Saboktakin Rizi<sup>1</sup>; Geonwoo Baek<sup>1</sup>; Jaehong Kim<sup>1</sup>; Seunghye Jeong<sup>1</sup>; Jiwoon Lee<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University

**F-3: Effect of Sliding Conditions on Wear Behavior of Directed Energy Deposited CoCrFeMnNi High Entropy Alloy:** *Geonwoo Baek*<sup>1</sup>; SungJae Jo<sup>1</sup>; Mohsen Saboktakin Rizi<sup>1</sup>; Jaehong Kim<sup>1</sup>; Jihyeon Park<sup>1</sup>; Hyoungseop Kim<sup>2</sup>; Jongun Moon<sup>1</sup>; Gian Song<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; <sup>1</sup>Kongju National University; <sup>2</sup>Graduate Institute of Ferrous Technology (GIFT), Pohang University of Science and Technology (POSTECH)

**Fused Filament Fabrication (FFF) Additive Manufacturing of Bronze-based Materials:** *Simon Restrepo Tobón*<sup>1</sup>; Jaime Alberto Jaramillo Carvalho<sup>2</sup>; Henry Colorado<sup>1</sup>; <sup>1</sup>Universidad de Antioquia; <sup>2</sup>Servicio Nacional de Aprendizaje

**F-4: Geometric Characteristics in Polycaprolactone Scaffolds Fabricated by Melt Extrusion Additive Manufacturing:** *Ji-Woon Lee*<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; Jin-Kyu Lee<sup>1</sup>; Gian Song<sup>1</sup>; Jongun Moon<sup>1</sup>; <sup>1</sup>Kongju National University(CAMP2)

**F-5: Iron-based Shape Memory Alloy Coatings for Forging Dies:** *Willow Knight*<sup>1</sup>; Michael Wall<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Andy Spires<sup>2</sup>; Rob Mayer<sup>2</sup>; Narendra Dahotre<sup>1</sup>; Marcus Young<sup>1</sup>; <sup>1</sup>University of North Texas; <sup>2</sup>Queen City Forging

**Mechanical Behavior of Tension of Multipolymers through Fused Deposition Modeling:** *Victor Gonçalves*<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; Henry Colorado<sup>2</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy Ribeiro (UENF); <sup>2</sup>Universidad de Antioquia

**F-6: Revisiting the Effect of Alloying Elements on Crystal Structure, Microstructure, and Magnetic Properties Samarium Cobalt Supermagnets:** *Farhan Ishrak*<sup>1</sup>; Alex Helmer<sup>1</sup>; Sanoj Karki<sup>2</sup>; Tushar Borkar<sup>2</sup>; Rajeev Gupta<sup>1</sup>; Bharat Gwalani<sup>1</sup>; <sup>1</sup>North Carolina State University; <sup>2</sup>Cleveland State University

**F-7: Welding and Additive Manufacturing Wire Feedstocks Derived from Recycled Aluminum:** *Jamie McIntyre*<sup>1</sup>; John Carsley<sup>2</sup>; Amy Clarke<sup>1</sup>; Kester Clarke<sup>1</sup>;

Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School of Mines; <sup>2</sup>Novelis

**Wire Arc Thermal Spraying for Manufacturing of WC-Metal Matrix Powders:** *Philipp Meyer*<sup>1</sup>; Haneen Daoud<sup>1</sup>; Stefan Schwarte<sup>2</sup>; Daniel Riehle<sup>3</sup>; Uwe Glatzel<sup>4</sup>; <sup>1</sup>Neue Materialien Bayreuth GmbH; <sup>2</sup>Jäkel GmbH & Co. KG; <sup>3</sup>K.U.L.T. Kress Umweltschonende Landtechnik GmbH; <sup>4</sup>University of Bayreuth – Chair of Metals and Alloys

## ADDITIVE MANUFACTURING

### Additive Manufacturing Materials in Energy Environments — Poster Session

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

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

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**F-36: Electric Field Driven 3D Printing of Actuating Fibers for Soft Robotic Applications:** *Varunkumar Thippanna*<sup>1</sup>; Kenan Song<sup>1</sup>; <sup>1</sup>Arizona State University

**F-8: LPBF of Nd-based Permanent Magnets:** *Sudha Krishnan*<sup>1</sup>; Jeffrey Shield<sup>1</sup>; <sup>1</sup>University of Nebraska -Lincoln

**F-9: Mechanical Property and Microstructure of Laser Powder Bed Fused Hypereutectic Al-Ce-Mg Alloy:** *Haijian Yang*<sup>1</sup>; Thinh Huynh<sup>2</sup>; Kevin Graydon<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>Eck Industries, Inc

**F-10: SEM, XRD, and EDS investigation of Additive Manufactured 316H:** *Ousmane Ndiaye*<sup>1</sup>; Carly Romnes<sup>1</sup>; James Stubbins<sup>1</sup>; <sup>1</sup>UIUC

**F-11: Stress Relief Heat Treatment and Residual Stress Characterization for Additively Manufactured High ' Ni-base GammaPrint™-1100 Superalloy:** *Ning Zhou*<sup>1</sup>; Gian Colombo<sup>1</sup>; Stephane Forsik<sup>1</sup>; Austin Dicus<sup>1</sup>; Tao Wang<sup>1</sup>; Theresa Novak<sup>1</sup>; Mario Epler<sup>1</sup>; Michael Kirka<sup>2</sup>; Patxi Fernandez-Zelaia<sup>2</sup>; Christopher Ledford<sup>2</sup>; Daniel Ryan<sup>3</sup>; <sup>1</sup>Carpenter Technology Corporation; <sup>2</sup>ORNL; <sup>3</sup>Solar Turbines Incorporated

## ADDITIVE MANUFACTURING

### Additive Manufacturing Modeling, Simulation and Machine Learning — Poster Session

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

**Program Organizers:** Jing Zhang, Indiana University – Purdue University Indianapolis; Li Ma, Johns Hopkins University Applied Physics Laboratory; Charles Fisher, Naval Surface Warfare Center - Carderock; Brandon McWilliams, US Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology

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**Session Chairs:** Xiaoping Li, The University of New South Wales (UNSW Sydney); Charles Fisher, Naval Surface Warfare Center; Brandon McWilliams, CCDC Army Research Laboratory; Yeon-Gil Jung, Korea Institute of Ceramic Engineering & Technology; Li Ma, Johns Hopkins University Applied Physics Laboratory; Jing Zhang, Indiana University- Purdue University Indianapolis

**F-13: A Machine Learning Based Approach for Accelerated Textured Microstructure Generation:** *Gregory Wong*<sup>1</sup>; Anthony Rollett<sup>1</sup>; Gregory Rohrer<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**A Model Experiment of Meltpool Dynamics in Additive Manufacturing with Magnetic Fields:** *Valdemars Felcis*<sup>1</sup>; Koulis Pericleous<sup>2</sup>; Imants Kaldre<sup>1</sup>; Catherine Tonry<sup>2</sup>; Ivars Krastins<sup>2</sup>; Peter Soar<sup>2</sup>; Andrew Kao<sup>2</sup>; <sup>1</sup>University of Latvia; <sup>2</sup>University of Greenwich

**F-14: A Multi-scale Modelling Approach for Wire-based Laser Metal Deposition Process:** *Prashant Jadhav*<sup>1</sup>; Hugh Banes<sup>1</sup>; Hector Basoalto-Ibarra<sup>1</sup>; Magnus Anderson<sup>2</sup>; <sup>1</sup>University of Sheffield; <sup>2</sup>Thermo-Calc

**F-15: An Accurate Machine Learning Approach for Process Optimization in Directed Energy Deposition:** *Xiao Shang*<sup>1</sup>; Ajay Talbot<sup>1</sup>; Hui Lee<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

**Computationally Derived Additively Manufactured Microstructure-property Correlations for Nickel-based Superalloys:** *Hector Basoalto*<sup>1</sup>; <sup>1</sup>University of Sheffield

**F-16: Controlling Microstructures and Mechanical Properties of Nickel-based Superalloy Based on Multiscale Finite Element Thermal Analysis in Laser Powder Bed Fusion:** *Masahiro Kusano*<sup>1</sup>; Makoto Watanabe<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

**F-17: Coupling In-situ Monitoring and Machine Learning Towards Faster Laser-based Powder Bed Fusion Process Qualification:** *Giuseppe Del Guercio*<sup>1</sup>; Chinmay Phutela<sup>1</sup>; Jide Oyebanji<sup>1</sup>; Federico Bosio<sup>1</sup>; Nesma Aboulkhair<sup>1</sup>; <sup>1</sup>Technology Innovation Institute

**F-74: Crystal Plasticity Modeling for the Prediction of Mechanical Properties of Laser Powder Bed Fusion AlSi10Mg Parts:** Nathan March<sup>1</sup>; *Dayalan Gunasegaram*<sup>1</sup>; <sup>1</sup>CSIRO

**Development of a Multi Scale and Multi Physics Modeling Framework to Study the Defect Evolution in The Laser-based Powder Bed Fusion Process:** *Amrita Dixit*<sup>1</sup>; Pranjal Chauhan<sup>1</sup>; Amarendra Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur

**F-18: Efficient Process Parameter Optimization for Titanium Alloys in Additive Manufacturing:** *Thorsten Becker*<sup>1</sup>; Sabrina Rudolph<sup>1</sup>; <sup>1</sup>University of Cape Town

**Exploiting Hatching Geometry in Laser Powder Bed Fusion Components for**

**Increased Vibration Fatigue Strength:** *Sebastian Gersch*<sup>1</sup>; <sup>1</sup>Hochschule Anhalt

**F-19: High-strain Rate and High-temperature Properties of Additively Manufactured Alloy 718:** *Anjali Sankar*<sup>1</sup>; Manjaiah Mallaiah<sup>1</sup>; Thomas McCarthy<sup>1</sup>; Jubert Pasco<sup>1</sup>; Matthew Harding<sup>1</sup>; Clodualdo Aranas<sup>1</sup>; <sup>1</sup>University of New Brunswick

**ICME-based Integrated Modelling Framework for Additively Manufactured Ni-based Superalloys:** *Pranjal Chauhan*<sup>1</sup>; Amrita Dixit<sup>1</sup>; Amarendra Singh<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Kanpur

**F-65: Microstructure Control via Coordinated Dual-beam Laser Scanning:** *Kyle Perkins*<sup>1</sup>; Ioannis Bitharas<sup>1</sup>; Andrew Moore<sup>1</sup>; <sup>1</sup>Heriot-Watt University

**F-66: Numerical Analysis of Heat Accumulation during Wire Arc Additive Manufacturing:** *Ajay V*<sup>1</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**F-67: Particle Tracking in a Simulated Melt Pool of Laser Powder Bed Fusion:** *Hrudaya Jyoti Biswal*<sup>1</sup>; Prakash Gautam<sup>1</sup>; Janice Lucon<sup>1</sup>; Cristina Stefanescu<sup>1</sup>; Peter Lucon<sup>1</sup>; Richard LaDouceur<sup>1</sup>; <sup>1</sup>Montana Technological University

**F-68: Reducing Validation to Days, Enabling Rapidly Deployable Additive Manufacturing at the Front Line:** *Gareth Tear*<sup>1</sup>; Jose Videira<sup>1</sup>; James Bird<sup>1</sup>; <sup>1</sup>Synbiosys

**F-70: RLTube: Optimizing Path Planning in Wire Arc Additive Manufacturing for Customized Bent Tubes:** *Jan Petrik*<sup>1</sup>; <sup>1</sup>ETH Zurich

**Scanning Strategies Optimization for Gluing of Kraft Paper Using Laser in Laminated Additive Manufacturing:** *Sudhanshu Dubey*<sup>1</sup>; Bhanupratap Patel<sup>1</sup>; Shubham Maurya<sup>1</sup>; K.P. Karunakaran<sup>1</sup>; <sup>1</sup>IIT Bombay

**F-75: Some Guidelines for the Use of Machine Learning in Metal AM Process Parameter Development:** Najmeh Samadiani<sup>1</sup>; *Dayalan Gunasegaram*<sup>1</sup>; <sup>1</sup>Commonwealth Scientific and Industrial Research Organisation (CSIRO)

**Utilizing Additive Manufacturing and CFD Simulation to Enhance Investment Casting of Aluminum Alloys:** *Mohammed Junaid Shekh*<sup>1</sup>; Stephanie Hart<sup>1</sup>; Jacob Bair<sup>1</sup>; <sup>1</sup>Oklahoma State University

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Advanced Characterization with Synchrotron, Neutron, and In Situ Laboratory-scale Techniques III — Poster Session

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

**Program Organizers:** Fan Zhang, National Institute of Standards and Technology; Donald Brown, Los Alamos National Laboratory; Andrew Chuang, Argonne National Laboratory; Joy Gockel, Colorado School of Mines; Sneha Prabha Narra, Carnegie Mellon University; Tao Sun, Northwestern University

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**F-21: Characterization Using Nano-holotomography of the Healability of a New High Strength Healable AlMg Alloy Produced by Additive Manufacturing:** *Sophie De Raedemacker*<sup>1</sup>; Julie Gheysen<sup>2</sup>; Grzegorz Pyka<sup>1</sup>; Florent Hannard<sup>1</sup>; Bartomiej Winiarski<sup>3</sup>; David Tingaud<sup>4</sup>; Azziz Hocini<sup>4</sup>; Julie Villanova<sup>5</sup>; Lin Jiang<sup>3</sup>; Aude Simar<sup>1</sup>; <sup>1</sup>Université Catholique de Louvain; <sup>2</sup>École Polytechnique Fédérale de Lausanne;

<sup>3</sup>Thermo Fisher Scientific; <sup>4</sup>Université Sorbonne Paris Nord, LSPM; <sup>5</sup>ESRF – The European Synchrotron

**F-22: Effect of Shot Peening on Residual Stress of Additive Manufactured 316SS and Inconel 718 Alloys:** *Sivasubramanian Chandramouli*<sup>1</sup>; Michael Titus<sup>1</sup>; Michael Sealy<sup>1</sup>; <sup>1</sup>Purdue University

**F-23: Examining Process Parameter Effect on Defects in Direct Energy Deposited Stainless Steel 316 Using X-ray Computed Tomography:** William Chuirazzi<sup>1</sup>; Michael McMurtrey<sup>1</sup>; Asa Monson<sup>1</sup>; *Swapnil Morankar*<sup>1</sup>; <sup>1</sup>Idaho National Laboratory

**F-24: From Part Geometry to Melt Pool Geometry: Scan Strategies to Predict and Prevent Defects:** *Alexander Sloane*<sup>1</sup>; Chu Lun Alex Leung<sup>2</sup>; David McArthur<sup>2</sup>; Vincent Fernandez<sup>3</sup>; Partha Paul<sup>4</sup>; Joseph Brunet<sup>2</sup>; Minh Anh Luan Phan<sup>1</sup>; Henry Saunders<sup>1</sup>; Lukas Jiranek<sup>5</sup>; Abdullah Azam<sup>5</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>ESRF; <sup>4</sup>University of Manchester; <sup>5</sup>Boeing Co

**Improving Porosity Characterization and Analysis in Additive Manufacturing Through 3D X-ray Microscopy Coupled with Deep Learning-based Resolution Recovery:** Nathan Johnson<sup>1</sup>; *Hrishi Bale*<sup>1</sup>; Yulia Trenikhina<sup>1</sup>; Stephen Kelly<sup>1</sup>; <sup>1</sup>Carl Zeiss Microscopy, Llc

**F-25: In-situ Acoustic Emission Process Monitoring for Powder-blown Laser Directed Energy Deposition of Refractory Alloys:** *Emmeline Evans*<sup>1</sup>; Aaron Stebner<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

**F-26: Innovative Strategies for Enhanced Reconstruction in Laboratory-based Diffraction Contrast Tomography (LabDCT):** *Hao Zhu*<sup>1</sup>; Marc DeGraef<sup>1</sup>; Amanda Krause<sup>1</sup>; <sup>1</sup>Carnegie Mellon University

**F-27: Machine Learning-aided Laser Absorptance Prediction and Keyhole Feature Simulation in Laser Powder Bed Fusion:** *Jiahui Zhang*<sup>1</sup>; Yu Zou<sup>1</sup>; <sup>1</sup>University of Toronto

**F-28: Phase Evolution during Multi-material Laser Powder-Bed Fusion via Operando Synchrotron X-ray Diffraction and Imaging:** Andaç Özsoy<sup>1</sup>; *Steven Van Petegem*<sup>1</sup>; <sup>1</sup>Paul Scherrer Institut

**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

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## ADDITIVE MANUFACTURING

**Additive Manufacturing: Length-Scale Phenomena in Mechanical Response – Poster Session**

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

**Program Organizers:** Yu Zou, University of Toronto; Sezer Ozerinc, University of Illinois at Urbana-Champaign; Tianyi Chen, Oregon State University; Wendy Gu, Stanford University; Eda Aydogan, Middle East Technical University; Meysam Haghshenas, University of Toledo

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**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>; Jungho Choe<sup>1</sup>; Kyung Tae Kim<sup>1</sup>; Ji-Hun Yu<sup>1</sup>; Yoon-Uk Heo<sup>3</sup>; Hyoung Seop Kim<sup>2</sup>; <sup>1</sup>Korean Institute of Materials Science; <sup>2</sup>Pohang University of Science and Technology; <sup>3</sup>Graduate Institute of Ferrous and Energy Materials Technology

**F-29: Effect of Post-heat Treatment on Microstructure and Mechanical Behavior of 5% Cr Cold Work Tool Steel Manufactured via Laser Direct Energy Deposition:** *Jung-Hyun Park*<sup>1</sup>; Jin-Young Kim<sup>2</sup>; Hyo-Yun Jung<sup>3</sup>; Kee-Ahn Lee<sup>1</sup>; <sup>1</sup>Inha University; <sup>2</sup>Hanwha Aerospace; <sup>3</sup>Korea Institute of Industrial Technology

**F-30: Grain-Based Corrosion Mapping of Commercially Pure Titanium Fabricated via Wire Direct Energy Deposition:** *Katrina Rodriguez*<sup>1</sup>; Blanca Palacios<sup>1</sup>; Arvind Agarwal<sup>1</sup>; Tony Thomas<sup>1</sup>; <sup>1</sup>Florida International University

**Morse-code Inspired Architectures to Improve Damage Resistance of 3D Printed PLA:** Deepesh Yadav<sup>1</sup>; *Balila Jaya*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology, Bombay

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Materials Design and Alloy Development VI – Closed-Loop Alloy Design — Student Poster Session

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

**Program Organizers:** Behrang Poorganji, University of Toledo; James Saal, Citrine Informatics; Hunter Martin, HRL Laboratories LLC; Orlando Rios, University of Tennessee; Atieh Moridi, Cornell University; Jiadong Gong, Questek Innovations LLC; S. Mohadeseh Taheri-Mousavi, Carnegie Mellon University

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**F-31: Design and Rapid Verification of Alloys Suitable for Laser Powder Bed Fusion Process for Aerospace Applications:** *Evelyn Quansah*<sup>1</sup>; Congyuan Zeng<sup>1</sup>; Patrick Mensah<sup>1</sup>; <sup>1</sup>Southern University and A&M College

**Experimental Evaluation of Pitting Corrosion Resistance of Nickel Silicide (NiSi12-wt.%) Laser Cladded Surfaces:** *Ibrahim Mohammad*<sup>1</sup>; Christopher Hulme<sup>2</sup>; Geir Grasmø<sup>1</sup>; Ragnhild Aune<sup>3</sup>; <sup>1</sup>University of Agder; <sup>2</sup>KTH Royal Institute of Technology; <sup>3</sup>Norwegian University of Science and Technology

**F-32: Fabrication of Compositionally Gradient Chromium in Steel Alloy by Wire Arc Additive Manufacturing:** *Ganesan Gunasekaran*<sup>1</sup>; Neel Kamal Gupta<sup>1</sup>; Siddhartha .1; Shahu Karade<sup>1</sup>; Narasimhan K<sup>1</sup>; Karunakaran K.P.<sup>1</sup>; <sup>1</sup>IIT Bombay

**Improving DMA 304L Stainless Steel Chemical Homogeneity by L-PBF Scan Strategy Tuning:** *Thomas Rader*<sup>1</sup>; <sup>1</sup>Montana Tech

**F-33: Viscosity Characterization of an Energetic Initiator Ink for 3D Printing and Machine Learning Models:** *Hannah Morgan-Smith Myers*<sup>1</sup>; Chelsey Hargather<sup>1</sup>; <sup>1</sup>New Mexico Institute of Mining and Technology

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## ADDITIVE MANUFACTURING

### Additive Manufacturing: Process-induced Microstructures and Defects — Poster Session

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

**Program Organizers:** Nadia Kouraytem, Utah State University; Sneha Prabha Narra, Carnegie Mellon University; Dillon Watring, National Science Foundation

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**F-73: Additive Manufacturing of a Martensitic Chromium Steel: Process Parameters, Microstructure and Mechanical Properties:** *Nicole Ofner*<sup>1</sup>; Sabine Bodner<sup>1</sup>; Christin Aumayr<sup>2</sup>; Christoph Turk<sup>2</sup>; Liang Wu<sup>3</sup>; Witalij Gridin<sup>3</sup>; Jozef Keckes<sup>1</sup>; <sup>1</sup>Montanuniversitaet Leoben; <sup>2</sup>voestalpine Böhler Edelstahl GmbH&CoKG; <sup>3</sup>voestalpine Additive Manufacturing Center GmbH

**Additive Process Parameter Optimisation, Heat Treatment and High Cycle Fatigue of Ti6242:** *Satyam Suwas*<sup>1</sup>; Dipankar Banerjee<sup>1</sup>; Gyan Shankar<sup>1</sup>; Hitardha Rama<sup>1</sup>; Saem Ahmed<sup>1</sup>; Vasisht Venkatesh<sup>2</sup>; Goudu Appa Rao<sup>3</sup>; <sup>1</sup>Indian Institute of Science Bangalore, India; <sup>2</sup>Materials Modeling & Behavior at Pratt & Whitney; <sup>3</sup>Defence Metallurgical Research Laboratory (DMRL), Hyderabad

**F-34: Characterization of Microstructure and Defects in a CrMnFeCoNi High-Entropy Alloy Processed by Multi-Beam Laser Directed Energy Deposition:** *Kholqillah Ardhian Ilman*<sup>1</sup>; Naoya Nishikawa<sup>1</sup>; Yorihiro Yamashita<sup>2</sup>; Takahiro Kunimine<sup>3</sup>; <sup>1</sup>Kanazawa University; <sup>2</sup>National Institute of Technology, Ishikawa College; <sup>3</sup>Institute of Science and Engineering, Kanazawa University

**F-35: Characterization of Surface Integrity and Mechanical Properties in XM-19 Alloy Manufactured by Powder Bed Fusion with Various Process Parameters:** *Yejun Park*<sup>1</sup>; Pyuck-Pa Choi<sup>1</sup>; <sup>1</sup>Korea Advanced Institute of Science and Technology

**F-37: Determination of Process Parameters from Bead-on-Plate Experiments for AA6061 in Laser Powder Bed Fusion:** *Sivaji Karna*<sup>1</sup>; Rimah Al-Aridi<sup>1</sup>; Tianyu Zhang<sup>1</sup>; Timothy Krentz<sup>2</sup>; Dale Hitchcock<sup>2</sup>; Andrew Gross<sup>1</sup>; Lang Yuan<sup>1</sup>; <sup>1</sup>University of South Carolina; <sup>2</sup>Savannah River National Lab

**Effect of Heat Treatment Condition on the Mechanical Properties of Laser-Powder Bed Fusion-Processed 18Ni300 Maraging Steel:** *Kun Woo No*<sup>1</sup>; Jong Hyun Jung<sup>1</sup>; Gyu Mi Han<sup>1</sup>; Jung Gi Kim<sup>1</sup>; <sup>1</sup>Gyeongsang National University

**F-38: Effect of Induction Heating Temperature on Inconel 718 Deposited by Induction-heating-assisted Laser-directed Energy Deposition:** *Junmyoung Jang*<sup>1</sup>; Seung Hwan Lee<sup>1</sup>; <sup>1</sup>Hanyang University

**F-39: Effects of Low-temperature Heat Treatment on Mechanical and Thermophysical Properties of Cu-10Sn Alloys Fabricated with Laser Powder Bed Fusion:** *Edem Doe Honu*<sup>1</sup>; Congyuan Zeng<sup>1</sup>; Patrick Mensah<sup>1</sup>; <sup>1</sup>Southern University and A&M College

**Evaluation of Porosity in Aluminum Deposits:** *Nick Gandara*<sup>1</sup>; Michael Strohmeyer<sup>1</sup>; Bernard Gaskey<sup>1</sup>; Justin Cross<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**F-40: Evolution of Precipitate Structure and Composition as a Function of Heat Input for Additive Friction Stir Deposition of AA7050:** *Jacob Strain*<sup>1</sup>; Nick Palya<sup>2</sup>; M.Y. Rekha<sup>1</sup>; Paul Allison<sup>2</sup>; Brian Jordon<sup>2</sup>; Luke Brewer<sup>1</sup>; <sup>1</sup>University of Alabama; <sup>2</sup>Baylor University

**Friction Stir Additive Manufacturing of Al Alloy Composites:** *Mani Krishna Karri*<sup>1</sup>; Sameehan Joshi<sup>1</sup>; Shashank Sharma<sup>1</sup>; Shreyash Patil<sup>1</sup>; Narendra Dahotre<sup>1</sup>; <sup>1</sup>University



of North Texas

**F-41: Influence of Process Parameters on Mechanical Behavior of 316L Stainless Steel Samples Processed by Wire-Laser Directed Energy Deposition:** *Matthew Engquist*<sup>1</sup>; Amir Shakibi<sup>1</sup>; Mohsen Eshraghi<sup>1</sup>; <sup>1</sup>California State University, Los Angeles

**Investigating Al(FeMn)Si Nanoprecipitate Formation in Hybrid Wire Arc Additively Manufactured (HWAAM) 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

**Investigating the Influence of Controlling Aluminium Alloy Powder Characteristics on the Directed Energy Deposition Process:** *Sung-jae Jo*<sup>1</sup>; Mohsen Saboktakin Rizi<sup>1</sup>; Geonwoo Baek<sup>1</sup>; Eunha Go<sup>1</sup>; HyunJoong Kim<sup>1</sup>; HongRan Choe<sup>1</sup>; Jongun Moon<sup>1</sup>; Jinkyu Lee<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; <sup>1</sup>Center for Advanced Materials and Parts of Powders, Kongju National University

**F-42: Investigating the Relationship between Interfacial Microstructure and Joint Strength in Ultrasonically-Welded Ni/Al/Ni Multilayer Composites:** *Kuan-Chieh Hu*<sup>1</sup>; Jhe-Yu Lin<sup>1</sup>; <sup>1</sup>National Taipei University of Technology

**F-43: Laser Powder Bed Fusion of Pure Iron:** *Thinh Huynh*<sup>1</sup>; Kevin Graydon<sup>1</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida

**Manipulation of Microstructure of Additively Manufactured 316L Stainless Steels Using Diverse Scan Strategies:** *Parisa Moazzen*<sup>1</sup>; Mohsen Mohammadi<sup>1</sup>; <sup>1</sup>University of New Brunswick

**F-72: Mechanical and Microstructural Characterization of DED Additively Manufactured QT 17-4+ Steel:** *Vyas Mani Sharma*<sup>1</sup>; Vladimir Popov<sup>1</sup>; Amir Farkoosh<sup>2</sup>; Dieter Isheim<sup>2</sup>; David Seidman<sup>2</sup>; Noam Eliaz<sup>1</sup>; <sup>1</sup>Tel Aviv University; <sup>2</sup>Northwestern University

**F-44: Microscopy Image Post Processing Accelerated with an Open-sourced Image Alignment and Blending Program.:** *Jess Garnett*<sup>1</sup>; <sup>1</sup>University of Maryland

**Microstructural and Mechanical Characteristics of Binder Jet Processed AISI M2 High-Speed Tool Steel:** *Amit Choudhari*<sup>1</sup>; James Elder<sup>1</sup>; Jay Desai<sup>1</sup>; Manoj Mugale<sup>1</sup>; Sanoj Karki<sup>1</sup>; Satyavan Digole<sup>1</sup>; Tushar Borkar<sup>1</sup>; <sup>1</sup>Cleveland State University

**F-71: Microstructural and Mechanical Properties of Parts Produced through the Bound-Metal FFF Additive Manufacturing Process:** *Eric Faierson*<sup>1</sup>; Peter Collins<sup>1</sup>; <sup>1</sup>Iowa State University

**F-45: Microstructural Evolution and Anisotropy in Stainless Steel 316L from Wire Arc Additive Manufacturing:** *Neeraj Mishra*<sup>1</sup>; Jignesh Nakrani<sup>1</sup>; Ajay V<sup>1</sup>; Amber Shrivastava<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**F-46: Microstructure and Mechanical Characterization of AISI 4340 Steel Additively Manufactured by Laser Powder Bed Fusion:** *Felix Aguilar*<sup>1</sup>; Thinh Huynh<sup>1</sup>; Yongho Sohn<sup>1</sup>; <sup>1</sup>University of Central Florida

**F-48: Microstructure and Mechanical Properties of Triple Weld Bead Wire Arc Additively Manufactured ER70s-6:** *Sahar Beigzadeh*<sup>1</sup>; Jeffrey Shield<sup>1</sup>; <sup>1</sup>University of Nebraska

**Nanoparticles-Enabled Laser Powder Bed Fusion of High Strength 6061 Aluminum Alloy:** *Tianqi Zheng*<sup>1</sup>; Changyu Ma<sup>2</sup>; Narayanan Murali<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

**F-49: Nanotechnology-enabled Wire Arc Direct Energy Deposition of Aluminum**

**Alloy 2024:** *Yitian Chi*<sup>1</sup>; Xiaochun Li<sup>1</sup>; <sup>1</sup>University Of California Los Angeles

**Optimizing Mechanical Properties of Additive Manufactured Alloy through Taguchi Analysis and Intermetallic Phase Quantification via Image Processing:** *Dongyong Park*<sup>1</sup>; Hyeon Jeong Park<sup>1</sup>; Yoon Sun Lee<sup>1</sup>; Young Rok Moon<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**Optimizing the DED 3D Printing Process for Improved Microstructure and Mechanical Performance:** *Nana Arthur*<sup>1</sup>; <sup>1</sup>Council for Scientific and Industrial Research

**Powder Recyclability and the Effect of Recycled Powder on the Microstructure and Mechanical Behavior of 316L Stainless Steel Manufactured by Directed Energy Deposition:** Inseo Kim<sup>1</sup>; Sungjae Jo<sup>1</sup>; Yeeun Lee<sup>1</sup>; Saboktakin Rizi Mohsen<sup>1</sup>; Hyungseop Kim<sup>2</sup>; Jungwook Cho<sup>2</sup>; Jiwoon Lee<sup>1</sup>; *Soonjik Hong*<sup>1</sup>; <sup>1</sup>Center for Advanced Materials and Parts of Powders, Kongju National University; <sup>2</sup>Graduate Institute of Ferrous Technology (GIFT), Pohang University of Science and Technology (POSTECH)

**F-51: Prediction of Build Geometry to Prevent Lack of Fusion and Bead Stacking in Arc Wire Directed Deposition (AW-DED):** *Sophia Hill*<sup>1</sup>; Jonah Klemm-Toole<sup>1</sup>; <sup>1</sup>Colorado School of Mines

**F-52: Process-Induced Texture Formation in 316L Stainless Steel Samples Processed by Wire-Laser Directed Energy Deposition:** Mohsen Eshraghi<sup>1</sup>; *Amirhesam Shakibizadeh*<sup>1</sup>; Matthew Engquist<sup>1</sup>; <sup>1</sup>California State University, Los Angeles

**F-53: Processing, Microstructure and Mechanical Properties of Multi-layer Friction Surfacing in 7075 Aluminium Alloy:** Jishuai Li<sup>1</sup>; *Matthieu Jadot*<sup>2</sup>; Jichang Xie<sup>3</sup>; Matthieu Lezaack<sup>1</sup>; Thaneshan Sapanathan<sup>4</sup>; Mohamed Rachik<sup>3</sup>; Aude Simar<sup>1</sup>; <sup>1</sup>Universite Catholique De Louvain; <sup>2</sup>Université Catholique de Louvain; <sup>3</sup>Université de Technologie de Compiègne; <sup>4</sup>Curtin University

**F-54: Room and Cryogenic Mechanical Properties and Microstructure of Additively Manufactured CrNiMn Steels:** *JunYoung Park*<sup>1</sup>; BeomJun Kim<sup>1</sup>; Junggi Kim<sup>1</sup>; <sup>1</sup>Gyeongsang National University

**F-55: Secondary Phase Characterisation of Wire Arc Additive Manufactured Superalloys:** *William James*<sup>1</sup>; Supriyo Ganguly<sup>1</sup>; Goncalo Pardal<sup>1</sup>; <sup>1</sup>Cranfield University

**Solid State Deposition of Inconel Super Alloy: Structure and Property Relationship:** Neeraj Mishra<sup>1</sup>; Jignesh Nakrani<sup>1</sup>; *Amber Shrivastava*<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**F-56: Surface Heterostructuring of Laser-clad 316L Stainless Steel Through Texture-driven Deformation Twinning:** *Jongun Moon*<sup>1</sup>; Rae Eon Kim<sup>2</sup>; Eun Seong Kim<sup>3</sup>; Jungwan Lee<sup>3</sup>; Soon-Jik Hong<sup>1</sup>; Ji-Woon Lee<sup>1</sup>; Gian Song<sup>1</sup>; Hyung Seop Kim<sup>2</sup>; <sup>1</sup>Kongju National University, CAMP2; <sup>2</sup>Graduate Institute of Ferrous & Energy Materials Technology; <sup>3</sup>Pohang University of Science and Technology

**F-57: The Effect of Deposition Offset on Material Flow for Solid-state Volumetric Restoration of Al-Zn-Mg-Cu Alloy via Friction Stir Additive Manufacturing:** *Victor Rojas*<sup>1</sup>; Ismael Hidalgo<sup>1</sup>; Brian Jordon<sup>1</sup>; Paul Allison<sup>1</sup>; <sup>1</sup>Baylor University

**The Response of 3D Printed 17-4 PH to Heat Treatment:** *Ipfi Mathoho*<sup>1</sup>; <sup>1</sup>Council for Scientific and Industrial Research, Pretoria Campus; University of Johannesburg

**F-58: Thermally-Stable Invar-Cu Intrinsic Composites Formed by Laser Powder Bed Fusion:** *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

**F-59: Understanding Role of Sintering Environment on Densification Behavior and Mechanical Properties of Binder Jet Shell Printed Parts:** Meisam Khademitab<sup>1</sup>; Kejsi Bishaj<sup>1</sup>; Mohammad Jamalkhani<sup>1</sup>; Mohammadreza Asherloo<sup>1</sup>; Amir Mostafaei<sup>1</sup>; <sup>1</sup>Illinois Institute of Technology

**F-60: Using Part-scale In-situ Defect Formation Monitoring to Predict Fatigue Performance in LPBF:** Ziheng Wu<sup>1</sup>; Justin Patridge<sup>1</sup>; Nicholas Calta<sup>1</sup>; <sup>1</sup>Lawrence Livermore National Laboratory

**F-61: Variable Mechanical Properties in Additively Manufactured Components Using Profilometry-based Indentation Plastometry (PIP):** Thomas Southern<sup>1</sup>; Jimmy Campbell<sup>1</sup>; Kyriakos Kourousis<sup>2</sup>; Gael Guetard<sup>3</sup>; <sup>1</sup>Plastometrex; <sup>2</sup>University of Limerick; <sup>3</sup>Alloyed

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## 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, Pennsylvania State University Harrisburg; Vinoy Thomas, University of Alabama at Birmingham

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**Session Chair:** Fariborz Tavangarian, Pennsylvania State University Harrisburg

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**H-1: Bioactive Glass-ceramic Nanoparticle for Medical Implants:** Sun Latt<sup>1</sup>; Pedram Sotoudeh Bagha<sup>1</sup>; Andres Larraza<sup>1</sup>; Mehdi Razavi<sup>1</sup>; <sup>1</sup>UCF

**Bone Reconstruction Patient-specific Implants Based on PEI:** Sahar Halevi<sup>1</sup>; Galit Katarivas Levy<sup>1</sup>; <sup>1</sup>Ben Gurion University of the Negav

**Improvisation of Phase Stability and Texture in Biomedical Ti-based Alloys for Ultra Low Modulus Applications:** Muhammad Farzik Ijaz<sup>1</sup>; <sup>1</sup>King Saud University

**Optimizing the Bio-degradability and Biocompatibility of a Biogenic Collagen Membrane Through Cross-linking And Zinc-doped Hydroxyapatite:** You Wu<sup>1</sup>; Shouchen Chen<sup>1</sup>; Zhuofan Chen<sup>1</sup>; <sup>1</sup>Hospital Of Stomatology, Sun-yat Sen University

**Orthopedic Patient Specific 3D Printed Implants Based on Novel Composite PEEK Filaments:** Itamar Tulpan<sup>1</sup>; Galit Katarivas levy<sup>1</sup>; <sup>1</sup>Ben Gurion University

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## ADVANCED CHARACTERIZATION METHODS

### Advanced Characterization Techniques for Quantifying and Modeling Deformation — Poster Session

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

**Program Organizers:** Mariyappan Arul Kumar, Los Alamos National Laboratory; Irene Beyerlein, University of California, Santa Barbara; Wolfgang Pantleon, Technical University of Denmark; C. Tasan, Massachusetts Institute of Technology; Olivia Jackson, Sandia National Laboratory

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**G-1: A Multiscale Approach to Correlating Microstructure and Failure Behavior in Boron Carbide Reinforced Aluminum Metal Matrix Composites:** *Alex Butler*<sup>1</sup>; Aaron Stebner<sup>1</sup>; Josh Kacher<sup>1</sup>; Jamila Khanfri<sup>1</sup>; <sup>1</sup>Georgia Institute of Technology

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## 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

**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

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**G-2: Enhancement of Ultrasound Imaging via Ultrasonic Sheared Nanobubbles:** *Tara Pattilachan*<sup>1</sup>; Pedram Sotoudeh Bagha<sup>1</sup>; Mehdi Razavi<sup>1</sup>; <sup>1</sup>Biionix Cluster, University of Central Florida College of Medicine

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## BIOMATERIALS

### Advances in Biomaterials for 3D Printing of Scaffolds and Tissues — Poster Session

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

**Program Organizers:** Changxue Xu, Texas Tech University; Zhengyi Zhang, Huazhong University of Science and Technology; Yifei Jin, University of Nevada Reno; Jun Yin, Zhejiang University

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**H-2: 3D Printable Bioscaffolds for Musculoskeletal Tissue Engineering using Ti<sub>3</sub>C<sub>2</sub> MXene Nanoparticles to Enhance Conductivity and Improve Cell Viability:** *Annaka Tibbits*<sup>1</sup>; Miranda Nelson<sup>2</sup>; Hailey Burgoyne<sup>2</sup>; Fereshteh Rajabi Kouchi<sup>2</sup>;

Raquel Montenegro-Brown<sup>2</sup>; David Estrada<sup>2</sup>; <sup>1</sup>Grand Canyon University; <sup>2</sup>Boise State University

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## LIGHT METALS

### Advances in Titanium Technology — Poster Session

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

**Program Organizers:** Rongpei Shi, Harbin Institute of Technology; Yu Zou, University of Toronto; Iman Ghamarian, The University of Oklahoma; Yu Lung Chiu, University of Birmingham; Yufeng Zheng, University of North Texas

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**A New Low-cost, Short-flow and Clean Preparation Process for Ti6Al4V Alloys:** *DaoGuang Du*<sup>1</sup>; JiShen Yan<sup>2</sup>; ZhiHe Dou<sup>1</sup>; Ting-an Zhang<sup>1</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>Nanyang Institute of Technology

**Microstructure and Mechanical Properties of Ti-39Nb-6Zr Alloy by Selective Laser Melting Process:** *DaeKyeom Kim*<sup>1</sup>; Sangmin Park<sup>1</sup>; Myungsuk Song<sup>1</sup>; Taek-Soo Kim<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technol

**New Hydrometallurgical Technique for Extracting Titanium From Natural Ilmenite:** *Mohammed El Khalloufi*<sup>1</sup>; Gervais Soucy<sup>1</sup>; <sup>1</sup>Université de Sherbrooke

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## 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: Computational Materials Science and Engineering Committee

**Program Organizers:** Kamal Choudhary, National Institute of Standards and Technology; Saaketh Desai, Sandia National Laboratories; Dennis Dimiduk, BlueQuartz Software LLC; Shreyas Honrao, Nasa Ames Research Center; Dehao Liu, Binghamton University; Darren Pagan, Pennsylvania State University; Saurabh Puri, VulcanForms Inc; Ashley Spear, University of Utah; Francesca Tavazza, National Institute of Standards and Technology; Anh Tran, Sandia National Laboratories; Huseyin Ucar, California Polytechnic University, Pomona; Yan Wang, Georgia Institute of Technology; Houlong Zhuang, Arizona State University

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**J-1: Accelerating Materials Discovery Using Conditional Generative Adversarial Networks:** *Sam Dong*<sup>1</sup>; Richard Hennig<sup>1</sup>; <sup>1</sup>University of Florida

**J-2: Communicative Ensemble Monte Carlo Tree Search for Inverse Materials Design Application: Heat Treatment Optimization for Ni-base Alloy:** *Sae Dieb*<sup>1</sup>; Vicky Nandal<sup>1</sup>; Keitaro Sodeyama<sup>1</sup>; Masahiko Demura<sup>1</sup>; <sup>1</sup>National Institute for Materials Science

**J-3: Data-augmented Modelling for Melt Pool Dimensions of Laser Powder Bed Fusion Process:** *Peter Morcos*<sup>1</sup>; Brent Vela<sup>1</sup>; Ibrahim Karaman<sup>1</sup>; Alaa Elwany<sup>1</sup>;

Raymundo Arroyave<sup>1</sup>; <sup>1</sup>Texas A&M University

**J-4: Development of Machine Learning Interatomic Potentials for Complex Ceramics:** *Kimia Ghaffari*<sup>1</sup>; Salil Bavdekar<sup>1</sup>; Douglas Spearot<sup>1</sup>; Ghatu Subhash<sup>1</sup>; <sup>1</sup>University of Florida

**J-5: Modeling the Precipitation of Ni<sub>4</sub>Ti<sub>3</sub> in Near-equiatomic NiTi Alloys:** *Raymond Neuberger*<sup>1</sup>; <sup>1</sup>Texas A&M University

**Simulating Castable Aluminum Alloy Microstructures With AlloyGAN Deep Learning Model:** Biao Yin<sup>1</sup>; *Yangyang Fan*<sup>2</sup>; <sup>1</sup>Worcester Polytechnic Institute; <sup>2</sup>DeepAlum

**Temperature Prediction of Continuous Casting Slab Based on Improved Extreme Learning Machine:** *Kun-chi Jiang*<sup>1</sup>; Ming-mei Zhu<sup>1</sup>; Cheng-hong Li<sup>1</sup>; Xian-Wu Zhang<sup>1</sup>; Hong-yu Lin<sup>1</sup>; Kai-tian Zhang<sup>1</sup>; Zhong Zheng<sup>1</sup>; <sup>1</sup>Chongqing University

**J-6: XtalGen: A Crystal Generative Model for Composition-to-Structure Predictions via Text-to-Image Models:** *Hasan Muhammad Sayeed*<sup>1</sup>; Sterling Baird<sup>1</sup>; Taylor D. Sparks<sup>1</sup>; <sup>1</sup>University of Utah

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Algorithm Development in Materials Science and Engineering — Poster Session

**Sponsored by:**

**Program Organizers:** Adrian Sabau, Oak Ridge National Laboratory; Douglas Spearot, University of Florida; Eric Homer, Brigham Young University; Hojun Lim, Sandia National Laboratories; Vimal Ramanuj, Oak Ridge National Laboratory; Richard Hennig, University of Florida; Arunima Singh, Arizona State University; Jeremy Mason, University of California, Davis

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**Session Chair:** Eric Homer, Brigham Young University

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**J-7: Capturing Hydrogen Embrittlement Effects with Hydrogen Diffusion Simulation and Crystal Plasticity:** *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.

**J-8: DFT-based Kinetic Monte Carlo Framework for the Growth of Multiphase Thin Films:** *Ahmad Ahmad*<sup>1</sup>; Haiyan Wang<sup>1</sup>; Anter El-Azab<sup>1</sup>; <sup>1</sup>Purdue University West Lafayette

**J-9: On the Effect of Nucleation Undercooling on Phase Transformation Kinetics:** *Jose Mancias*<sup>1</sup>; Vahid Attari<sup>1</sup>; Raymundo Arroyave<sup>1</sup>; Damien Tournet<sup>2</sup>; <sup>1</sup>Texas A&M University; <sup>2</sup>IMDEA Materials

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## LIGHT METALS

### Aluminum Alloys: Development and Manufacturing — Poster Session

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

**Program Organizers:** Christopher Hutchinson, Monash University; Sazol Das, Novelis; Samuel Wagstaff, Oculatus Consulting

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**K-1: Effect of Mg on Cryogenic Impact Toughness of Al-Mg Alloys via Cryogenic Charpy Impact Tests:** *Ji-Woon Lee*<sup>1</sup>; Soon-Jik Hong<sup>1</sup>; Gian Song<sup>1</sup>; Jongun Moon<sup>1</sup>; Junhee Han<sup>1</sup>; Hyo-Seop Kim<sup>2</sup>; <sup>1</sup>Kongju National University(CAMP2); <sup>2</sup>Korea Institute of Industrial Technology

**Effect of Mg Solute on Microstructural Evolution of Aluminum During a Biaxial Alternate Forging:** *Jin-Kyu Lee*<sup>1</sup>; Seong-Ho Ha<sup>2</sup>; Young-Chul Shin<sup>2</sup>; <sup>1</sup>Nice LMS Co., LTD; <sup>2</sup>Korea Institute of Industrial Technology

**Effect of Surface Condition on Corrosion Behavior of High Pressure Die Cast A383 Aluminum Alloys:** Namhyuk Seo<sup>1</sup>; Junhyub Jeon<sup>1</sup>; Ji-Woo Park<sup>1</sup>; Dae-Up Kim<sup>1</sup>; *Min-Su Kim*<sup>1</sup>; <sup>1</sup>Korea Institute of Industrial Technology

**Fabricate Sputter Targets and Evaluate Sputter Characteristics Using High-purity Al Refined Material:** *Sun Ki Kim*<sup>1</sup>; Seong-Ho Ha<sup>2</sup>; Young-Kyun Kim<sup>3</sup>; Jin-Kyu Lee<sup>1</sup>; <sup>1</sup>NICELMS Co., Ltd; <sup>2</sup>Korea Institute of Industrial Technology; <sup>3</sup>Institute for Advanced Engineering

**Machine Learning Assisted Development of Aluminum Alloys With High Strength at Elevated Temperatures:** *Jinshian Huang*<sup>1</sup>; Daisuke Ando<sup>1</sup>; Yuji Sutou<sup>1</sup>; <sup>1</sup>Tohoku University

**Mechanical Behavior of a Novel Aluminum Alloy With Transition Elements Additions Developed for Laser Powder Bed Fusion:** *Chiara Monti*<sup>1</sup>; Markus Bambach<sup>1</sup>; <sup>1</sup>ETH Zürich

**Mechanical Improvement of Al-Ce Alloys:** *Devin Davis*<sup>1</sup>; Vishal Soni<sup>2</sup>; Roberto Menchaca<sup>2</sup>; Naveen Kumar<sup>2</sup>; Vijay Vasudevan<sup>2</sup>; Rajiv Mishra<sup>1</sup>; Adam Loukus<sup>3</sup>; Davis Weiss<sup>3</sup>; <sup>1</sup>Innovative Materials & Processes Lab (IMAP) at University of North Texas; <sup>2</sup>University of North Texas; <sup>3</sup>Loukus Technologies, Inc.

**K-2: Metallurgical and Rheological Properties of the Equiaxed Semi-solid Aluminum Alloys Under Compression: A Combined Study Between Electron Microscopy and Synchrotron X-ray Tomography:** Te-Cheng Su<sup>1</sup>; *Ling-En Yao*<sup>1</sup>; Kai-Yu Liang<sup>1</sup>; Hao-Chuan Huang<sup>1</sup>; Mien-Chung Chen<sup>2</sup>; Sheng-Long Lee<sup>2</sup>; Pei-Tzu Lee<sup>3</sup>; Ying-Shuo Tseng<sup>3</sup>; Gung-Chian Yin<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>Institute of Material Science and Engineering, National Central University; <sup>3</sup>National Synchrotron Radiation Research Center

**K-3: Microstructure and Mechanical Properties of Additive Friction Stir Deposited Al-Ce Alloys:** *Vishal Soni*<sup>1</sup>; Devin Davis<sup>1</sup>; Roberto Menchaca<sup>1</sup>; Ramit Kaushik<sup>1</sup>; N. Naveen Kumar<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, Inc.

**K-4: Microstructure and Mechanical Property of Sand Cast AA356 Aluminum Alloy Modified With Cerium:** *Ian Horder*<sup>1</sup>; Haijian Yang<sup>1</sup>; David Weiss<sup>2</sup>; Le Zhou<sup>1</sup>; <sup>1</sup>Marquette University; <sup>2</sup>Eck Industries, Inc

**Preparation of High Porosity Aluminum Foam by Supergravity Infiltration Method:** *Yuan Li*<sup>1</sup>; <sup>1</sup>University of Science and Technology Beijing

**K-5: Role of Intermetallic Compounds on Hot Tearing and Heat Treatment Characteristics of Wrought Aluminum Alloys: A Combined Study Among**

**Multiscale Characterization, Synchrotron X-ray Tomography and CALPHAD Approaches:** Te-Cheng Su<sup>1</sup>; Kai-Yu Liang<sup>1</sup>; Hao-Chuan Huang<sup>1</sup>; Ling-En Yao<sup>1</sup>; Mien-Chung Chen<sup>2</sup>; Sheng-Long Lee<sup>2</sup>; Pei-Tzu Lee<sup>3</sup>; Ying-Shuo Tseng<sup>3</sup>; Gung-Chian Yin<sup>3</sup>; <sup>1</sup>National Taiwan University; <sup>2</sup>National Central University; <sup>3</sup>National Synchrotron Radiation Research Center

**K-6: Solid Phase Recycling and Upcycling: Direct Extrusion High Strength Aluminum From AA 6063 Chips:** Xiao Li<sup>1</sup>; Tianhao Wang<sup>1</sup>; Tingkun Liu<sup>1</sup>; Xiang Wang<sup>1</sup>; Jorge Dos Santos<sup>1</sup>; <sup>1</sup>Pacific Northwest National Laboratory

**K-7: Synergistic Enhancement of Strength and Ductility in Novel Solid-Stir Continuous Extrusion: Influence of Heterogeneous Microstructure and Alloy Chemistry:** Aishani Sharma<sup>1</sup>; Abhijeet Dhal<sup>1</sup>; Anurag Gumaste<sup>1</sup>; Supreeth Gaddam<sup>1</sup>; Ravi Sankar Haridas<sup>1</sup>; Rajiv Mishra<sup>1</sup>; <sup>1</sup>University of North Texas

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## 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; Po-Yu Chen, National Tsing Hua University; Terry Lowe, Colorado School of Mines

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**AerosolJet Printing MXenes: On-demand Manufacturing of Wearable Electronics:** Alejandra Almaraz<sup>1</sup>; Fereshteh Rajabi-Kouchi<sup>1</sup>; Hailey Burgoyne<sup>1</sup>; Naqsh Mansoor<sup>1</sup>; Jessica Koehne<sup>2</sup>; David Estrada<sup>1</sup>; <sup>1</sup>Boise State University; <sup>2</sup>NASA

**H-7: Broad Spectrum, Potent and Durable Ceria Nanoparticles Inactivate RNA Virus Infectivity by Targeting Virion Surfaces and Disrupting Virus-receptor Interactions:** Candace Fox<sup>1</sup>; Kritika Kedarinath<sup>1</sup>; Craig Neal<sup>1</sup>; Elayaraja Kolanthai<sup>1</sup>; Udit Kumar<sup>1</sup>; Christina Drake<sup>2</sup>; Sudipta Seal<sup>1</sup>; Griffith Parks<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Kismet Technologies

**H-8: Carbon Negative Deeply Structured Hierarchical Ceramics Derived From Biogenic Silica:** Aidan Lucas<sup>1</sup>; Hannes Schniepp<sup>1</sup>; <sup>1</sup>College of William & Mary

**H-9: Collagen Platform Exploring Antimicrobial Peptide-polymer Hybrids:** Nur 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

**Continuous Flow Process of Surface-engineered, pH-responsive CeO<sub>2</sub> Nanozymes With Tumour-killing Potency**  
: Sayoni Sarkar<sup>1</sup>; Ajit Kulkarni<sup>1</sup>; <sup>1</sup>Indian Institute of Technology Bombay

**H-10: Cooperative Surface Self-assembly Kinetics of Metal Binding Peptides by Spectral Rate Distribution:** Taylor Bader<sup>1</sup>; Kyle Boone<sup>1</sup>; Christopher Johnson<sup>1</sup>; Cindy Berrie<sup>1</sup>; Candan Tamerler<sup>1</sup>; <sup>1</sup>University of Kansas

**Durability Performance of Enzymatic Self-healing Concrete:** Sara Heidarneshad<sup>1</sup>; Nima Rahbar<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**Durable Enzymatic Construction Materials (ECM-):** Shuai Wang<sup>1</sup>; <sup>1</sup>Worcester



Polytechnic Institute

**H-11: Low-cost Customizable 3D Printed Biohybrid Scaffolds:** *Nate Lucas*<sup>1</sup>; *Aya Cloyd*<sup>1</sup>; *Candan Tamerler*<sup>1</sup>; <sup>1</sup>University of Kansas Bioengineering

**H-12: Machine Learning-guided Identification of Antimicrobial Peptides Targeting Oral Health:** *Kalea Chu*<sup>1</sup>; *Aya Cloyd*<sup>1</sup>; *Nur Ceren*<sup>1</sup>; *Kyle Boone*<sup>1</sup>; *Candan Tamerler*<sup>1</sup>; <sup>1</sup>University of Kansas

**H-13: Multi-functional Peptide-polymer Hybrids for Dental Tissue Repair:** *Aya Cloyd*<sup>1</sup>; *Erhan Demirel*<sup>1</sup>; *Kyle Boone*<sup>1</sup>; *Paulette Spencer*<sup>1</sup>; *Candan Tamerler*<sup>1</sup>; <sup>1</sup>University of Kansas

**Rapid Prototyping of Additively Manufactured Cell Culture Chambers With Integrated Nano-biosensors:** *Michael Eppel*<sup>1</sup>; *Monet Sawyer*<sup>1</sup>; *Hailey Burgoyne*<sup>1</sup>; *Brian Cummings*<sup>1</sup>; *Josh Eixenberger*<sup>1</sup>; *Raquel Montenegro-Brown*<sup>1</sup>; *David Estrada*<sup>1</sup>; <sup>1</sup>Boise State University

**H-14: siRNA and Cerium Oxide Delivery With Ultrasound-sensitive Nanobubbles for Bone Disease Treatment:** *Pedram Sotoudehbagha*<sup>1</sup>; *Elayaraja Kolanthai*<sup>2</sup>; *Fei Wei*<sup>1</sup>; *Craig Neal*<sup>2</sup>; *Udit Kumar*<sup>2</sup>; *Melanie Coathup*<sup>1</sup>; *Sudipta Seal*<sup>2</sup>; *Mehdi Razavi*<sup>1</sup>; <sup>1</sup>Biionix™ (Bionic Materials, Implants & Interfaces) Cluster, University of Central Florida; <sup>2</sup>University of Central Florida

**H-15: The Nanoscale Interface and Structure Function Properties of Cortical Bone:** *Elizabeth Montagnino*<sup>1</sup>; *William Bush*<sup>1</sup>; *Thomas Siegmund*<sup>1</sup>; *John Howarter*<sup>1</sup>; <sup>1</sup>Purdue University

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## BIOMATERIALS

### Biological Materials Science — Poster Session

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

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

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**Session Chairs:** *Grace Gu*, University of California, Berkeley; *Yuxiao Zhou*, Texas A&M University; *Ning Zhang*, Baylor University; *Steven Naleway*, University of Utah; *Debra Lyn Porter*, University of California, Merced; *Ling Li*, Virginia Tech

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**H-3: Characterization of Dental Tissue Biomechanical Properties Using Atomic Force Microscopy:** *Hutomo Tanoto*<sup>1</sup>; *Donggi Ha*<sup>1</sup>; *Yuxiao Zhou*<sup>1</sup>; <sup>1</sup>Texas A&M University

**H-20: CoCr-based Superelastic Alloys With Low Young's Modulus for Biomedical Applications:** *Xiao Xu*<sup>1</sup>; *Takumi Odaira*<sup>1</sup>; *Sheng Xu*<sup>1</sup>; *Kenji Hirata*<sup>2</sup>; *Toshihiro Omori*<sup>1</sup>; *Kosuke Ueki*<sup>3</sup>; *Kyosuke Ueda*<sup>1</sup>; *Takayuki Narushima*<sup>1</sup>; *Makoto Nagasako*<sup>1</sup>; *Stefanus Harjo*<sup>4</sup>; *Takuro Kawasaki*<sup>4</sup>; *Lucie Bodnárová*<sup>5</sup>; *Petr Sedlák*<sup>5</sup>; *Hanus Seiner*<sup>5</sup>; *Ryosuke Kainuma*<sup>1</sup>; <sup>1</sup>Tohoku University; <sup>2</sup>Tohoku University, AIST; <sup>3</sup>Tohoku University, Kindai University; <sup>4</sup>JAEA; <sup>5</sup>Czech Academy of Sciences

**Effect of Calcium Phosphorous Molar Ratio on Biocompatibility of 316L Stainless Steel:** *Sreeparna Ghosh*<sup>1</sup>; *P. K. Mitra*<sup>1</sup>; *Mahua Ghosh Chaudhuri*<sup>1</sup>; <sup>1</sup>Jadavpur University

**H-4: Electrospun Metal Mediated Cerium Oxide/Silk Nanocomposites for Wound**

**Dressing:** *Elayaraja Kolantha*<sup>1</sup>; Craig Neal<sup>1</sup>; Yifeng Fu<sup>1</sup>; Wesley Matthiesen<sup>1</sup>; Sudipta Seal<sup>1</sup>; <sup>1</sup>University of Central Florida

**H-5: Enhancing Mechanical Properties of 3D-printed Composite Structures Inspired by Sea Sponge:** *Ailin Chen*<sup>1</sup>; Grace Gu<sup>1</sup>; <sup>1</sup>University of California Berkeley

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## ADVANCED CHARACTERIZATION METHODS

### Characterization of Minerals, Metals and Materials 2024: Process-Structure-Property Relations and New Technologies — Poster Session

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

**Program Organizers:** Zhiwei Peng, Central South 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

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**Regency R | Hyatt**

**Session Chairs:** Zhiwei Peng, Central South University; Yunus Kalay, Middle East Technical University

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**Analysis of Creep Behavior of Ni-based Heat Resistant Alloys with Addition of Alloy Elements:** *Jaihyun Park*<sup>1</sup>; <sup>1</sup>Research Institute of Industrial Science and Technology

**Characterization of a Zeolite Obtained by Means of a Hydrothermal Synthesis Process:** Francisco Barrientos Hernández<sup>1</sup>; *Marcelino Garcia Ramirez*<sup>1</sup>; María Isabel Valderrama<sup>1</sup>; Julio Juárez Tapia<sup>1</sup>; Martín Reyes Pérez<sup>1</sup>; Xochitl Álvarez Álvarez<sup>1</sup>; Karent Fuentes Trejo<sup>1</sup>; <sup>1</sup>Universidad Autonoma del Estado de Hidalgo

**Characterization of Bacterial Cellulose from Kombucha as a Potential Resource for its Application on Biodegradable Films:** *Régula Hernández*<sup>1</sup>; Rosa Vázquez García<sup>1</sup>; José Villagómez Ibarra<sup>1</sup>; Raúl Velasco Azorsa<sup>1</sup>; Nery Islas Rodríguez<sup>1</sup>; Sofía Vázquez Rodríguez<sup>1</sup>; María Veloz Rodríguez<sup>1</sup>; <sup>1</sup>UAEH

**G-3: Characterization of Properties of Ceramic Mass Structural Masonry:** *Niander Cerqueira*<sup>1</sup>; Jonathan Madalena<sup>1</sup>; Bruno Silva<sup>1</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>UENF

**G-4: Concrete Using Crushed Rubber as a Substitute for Fine Aggregate:** *Niander Cerqueira*<sup>1</sup>; Victor Souza<sup>2</sup>; Afonso Azevedo<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense - UENF; <sup>2</sup>Faculdade Redentor

**G-5: Cryogenic Toughness of Austenitic Stainless Steels After Aging:** Maribel Saucedo-Muñoz<sup>1</sup>; *Victor Lopez-Hirata*<sup>1</sup>; Jose Villegas-Cardenas<sup>1</sup>; Felipe Hernandez-Santiago<sup>1</sup>; <sup>1</sup>Instituto Politecnico Nacional-ESIQIE

**Effect of Aqueous Ferrous Ion on Collectorless Flotation of Pyrite:** Martín Reyes Perez<sup>1</sup>; *Esmeralda Camacho Gutiérrez*<sup>1</sup>; Ramiro Escudero García<sup>2</sup>; Mizraim Uriel Flores Guerrero<sup>3</sup>; Miguel Pérez Labra<sup>4</sup>; Iván Alejandro Reyes Domínguez<sup>5</sup>; Julio Cesar Juárez Tapia<sup>1</sup>; Francisco Raúl Barrientos Hernández<sup>1</sup>; Angel Ruiz Sánchez<sup>6</sup>; <sup>1</sup>Universidad Autonoma Del Estado de Hidalgo; <sup>2</sup>Institute of Research in Metallurgy and Materials University Michoacana of San Nicolas of Hidalgo; <sup>3</sup>Technological

University of Tulancingo; <sup>4</sup>Autonomous University of the State of Hidalgo; <sup>5</sup>Institute of Metallurgy, Autonomous University of San Luis Potosi; <sup>6</sup>Tecnológico Nacional de México.

**Effect of Hematite Concentrate on Iron Ore Pellet Quality:** *Yun Wu*<sup>1</sup>; Simin Xiang<sup>2</sup>; Fanqiu Zou<sup>1</sup>; Zhiwei Peng<sup>2</sup>; Luben Xie<sup>1</sup>; Gaoming Liang<sup>1</sup>; Xiaoyi Wang<sup>1</sup>; Qiang Zhong<sup>2</sup>; <sup>1</sup>Valin Xiangtan Steel; <sup>2</sup>Central South University

**Effect of Raw Material Size on Sintering Quality:** *Jie Liu*<sup>1</sup>; Xianguo Ma<sup>1</sup>; Jizhong Tang<sup>1</sup>; Qiang Zhong<sup>2</sup>; Wenzheng Jiang<sup>2</sup>; Hui Zhang<sup>1</sup>; Libing Xu<sup>1</sup>; Xun Jin<sup>1</sup>; <sup>1</sup>Iron and Steel Research Institute of Angang Group; <sup>2</sup>Central South University

**Effects of the Rice Husk Ashes and Titanium Dioxide on Properties of ABS Composites Parts Obtained by 3D Printing:** Gustavo Souza<sup>1</sup>; Rene Oliveira<sup>1</sup>; Durval Rodrigues Jr<sup>2</sup>; *Rita Rodrigues*<sup>2</sup>; Esperidiana Barretos de Moura<sup>1</sup>; <sup>1</sup>Instituto de Pesquisas Energéticas e Nucleares; <sup>2</sup>Escola de Engenharia de Lorena, Universidade de Sao Paulo

**Evaluation of Geopolymer Composites, Based on Red Mud and Metakaolin, for Building Application:** Cássia Souza<sup>1</sup>; Beatryz Mendes<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; Carlos Maurício Vieira<sup>2</sup>; <sup>1</sup>Universidade Federal De Vicosa; <sup>2</sup>State University of Northern Rio de Janeiro

**G-6: Evaluation of the Mechanical Properties of Geopolymers Manufactured in Molds of Different Sizes:** José Linhares Junior<sup>1</sup>; Leandro Oliveira<sup>1</sup>; Davi Andre Junior<sup>1</sup>; Thereza Mello<sup>1</sup>; Markssuel Marvila<sup>1</sup>; Carlos Mauricio Vieira<sup>1</sup>; Sergio Monteiro<sup>2</sup>; Maria Carrollina da Silva<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense; <sup>2</sup>IME

**G-7: Evaluation of the Performance of Sustainable Paints Using Red Mud:** Jean Dias<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; Márcia Lopes<sup>1</sup>; Hellen Moura<sup>1</sup>; Júlia Figueiredo<sup>1</sup>; <sup>1</sup>Universidade Federal de Viçosa

**G-8: Evaluation of the Properties in the Fresh and Hardened State of a Metakaolin Geopolymeric Mortar Reinforced with Açaí Fibers:** Leandro Oliveira<sup>1</sup>; Elias Gonçalves Junior<sup>1</sup>; Davi Andre Junior<sup>1</sup>; José Linhares Junior<sup>1</sup>; Markssuel Marvila<sup>2</sup>; Sergio Monteiro<sup>3</sup>; Carlos Mauricio Vieira<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense; <sup>2</sup>UFV; <sup>3</sup>IME

**Evaluation of the Properties of Red Ceramics Prepared with Ornamental Rock:** *Euzebio Zanelato*<sup>1</sup>; Afonso Azevedo<sup>2</sup>; Markssuel Marvila<sup>3</sup>; Jonas Alexandre<sup>2</sup>; Sergio Neves<sup>4</sup>; <sup>1</sup>IFF; <sup>2</sup>UENF; <sup>3</sup>UFV; <sup>4</sup>IME

**Formation of Solid Solutions of Ba TiO<sub>3</sub> Doped with Eu<sup>3+</sup> by Solid State Reaction:** *J. P. Hernández-Lara*<sup>1</sup>; A. Hernández-Ramírez<sup>1</sup>; J. A. Romero-Serrano<sup>1</sup>; M. Pérez-Labra<sup>2</sup>; F. R. Barrientos-Hernández<sup>2</sup>; M. Reyes-Perez<sup>2</sup>; R. Martinez-Lopez<sup>2</sup>; M.I. Valenzuela-Carrillo<sup>2</sup>; <sup>1</sup>ESIQIE-IPN; <sup>2</sup>Autonomous University of the State of Hidalgo

**G-9: Homogenizing Treatment of AISI 420 Stainless and AISI 8620 Steels:** *Victor Lopez-Hirata*<sup>1</sup>; Maribel Saucedo-Muñoz<sup>1</sup>; Nadia Rodriguez-Rodriguez<sup>1</sup>; Hector Dorantes-Rosales<sup>1</sup>; <sup>1</sup>Instituto Politecnico Nacional-ESIQIE

**Influence of Ordinary Portland Cement (OPC) during Collectorless Flotation of Galena:** Martín Reyes Perez<sup>1</sup>; *Saul García Perez*<sup>1</sup>; Ramiro Escudero García<sup>2</sup>; Iván Alejandro Reyes Domínguez<sup>3</sup>; Miguel Pérez Labra<sup>1</sup>; Francisco Raúl Barrientos Hernández<sup>1</sup>; Julio Cesar Juárez Tapia<sup>1</sup>; Gustavo Urbano Reyes<sup>1</sup>; Mizraim Uriel Flores Guerrero<sup>4</sup>; <sup>1</sup>Universidad Autonoma Del Estado de Hidalgo; <sup>2</sup>Institute of Research in Metallurgy and Materials University Michoacana of San Nicolas of Hidalgo; <sup>3</sup>Institute of Metallurgy, Autonomous University of San Luis Potosi; <sup>4</sup>Technological University of Tulancingo

**G-10: Influence of the Solution Heat-treatment on the Microstructure Changes**

**of the Directionally Solidified MAR-M247 Ni-based Superalloy:** *Dorota Wyrobek*<sup>1</sup>; Rafal Cygan<sup>2</sup>; Konrad Wysocki<sup>1</sup>; Jadwiga Pipata<sup>1</sup>; Łukasz Rakoczy<sup>3</sup>; <sup>1</sup>Consolidated Precision Products Corporation; <sup>2</sup>Consolidated Precision Products; <sup>3</sup>AGH University of Science and Technology

**G-11: Mapping Mechanical Properties to Composition for TiAlNb and TiNiNb Alloys:** *Colton Basar*<sup>1</sup>; Shuhan Zhang<sup>1</sup>; Salena Huang<sup>1</sup>; Jan Schroers<sup>1</sup>; Udo Schwarz<sup>1</sup>; Amit Datye<sup>1</sup>; <sup>1</sup>Yale University

**G-12: Material Characterization of Surface-functionalized Aluminum for Enhanced Liquid Transport in Microgravity Applications:** *Daniel Egbebumi*<sup>1</sup>; Graham Kaufman<sup>1</sup>; Syed Gnani Peer Mohamed<sup>1</sup>; Jeff Shield<sup>1</sup>; Craig Zhulke<sup>1</sup>; <sup>1</sup>University of Nebraska

**Microstructural Characterization of ((Ba 0.5-x TiO3) La0.5+x) Synthesized by the Polymeric Precursor Method (Pechini):** *J.A. Palmas-León*<sup>1</sup>; M. Pérez-Labra<sup>1</sup>; F.R. Barrientos-Hernandez<sup>1</sup>; J.A. Romero-Serrano<sup>2</sup>; R. Martínez-López<sup>2</sup>; M.I. Valenzuela-Carrillo<sup>1</sup>; M. Reyes-Pérez<sup>1</sup>; R. Escudero-García<sup>3</sup>; <sup>1</sup>Autonomous University of Hidalgo State; <sup>2</sup>ESIQIE-IPN; <sup>3</sup>Institute of Metallurgic Research; Universidad Michoacana de San Nicolas de Hidalgo

**Microstructural Evolution of the CoCrFeNiMo0.2 High Entropy Alloy Under Different Annealing Conditions:** *Fabio Garcia Filho*<sup>1</sup>; Sergio Monteiro<sup>1</sup>; <sup>1</sup>Military Institute of Engineering

**G-13: Mortar Rheology with Partial Replacement of Lime with Dredging Residue:** Isabela Batista<sup>1</sup>; Markssuel Marvila<sup>1</sup>; Johnata Freitas<sup>1</sup>; Euzebio Zanelato<sup>2</sup>; Sergio Monteiro<sup>3</sup>; Juliane Carneiro<sup>4</sup>; Gustavo Xavier<sup>1</sup>; Gustavo Cruz<sup>4</sup>; Jonas Alexandre<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense; <sup>2</sup>IFF; <sup>3</sup>IME; <sup>4</sup>PORTO DO AÇU

**G-14: Numerical Modeling and Simulation of Pressed Ceramic Blocks of Red Ceramic:** *Niander Cerqueira*<sup>1</sup>; Jonathan Madalena<sup>1</sup>; Bruno Silva<sup>1</sup>; Jonas Alexandre<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>UENF

**Obtaining Ferroelectric Tetragonal Phase Type  $Ba_{1-3x}La_{2x}Ti_{1-3x}Bi_{4x}O_3$  ( $0 \geq x \leq 0.0075$ ) Using the Mechanical Grinding Method:** *María Inés Valenzuela Carrillo*<sup>1</sup>; Miguel Pérez Labra<sup>1</sup>; Francisco Barrientos Hernández<sup>1</sup>; Ricardo Martínez López<sup>1</sup>; Martín Reyes Pérez<sup>1</sup>; <sup>1</sup>Autonomous University of Hidalgo State

**G-15: Performance Comparison between Sustainable Paints Based on Granite and Marble Waste:** *Márcia Lopes*<sup>1</sup>; *Leonardo Pedroti*<sup>1</sup>; José Maria Carvalho<sup>1</sup>; José Carlos Ribeiro<sup>1</sup>; Hellen Moura<sup>1</sup>; Jean Dias<sup>1</sup>; <sup>1</sup>Federal University of Viçosa

**G-16: Performance Evaluation of Açaí Fiber as Reinforcement in Coating Mortars:** Juliana Natalli<sup>1</sup>; Iully Pereira<sup>1</sup>; Elias Gonçalves Junior<sup>1</sup>; Samuel Malafaia<sup>1</sup>; Isabela Devesa<sup>1</sup>; Marcus Vinicius Barbosa<sup>1</sup>; Markssuel Marvila<sup>2</sup>; Frederico Margem<sup>1</sup>; Thuany Lima<sup>1</sup>; Sergio Monteiro<sup>3</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual Do Norte Fluminense; <sup>2</sup>UFV; <sup>3</sup>IME

**Phase Equilibrium in Solid Solutions of BaTiO3 Doped With Eu+3 and Gd+3:** *Ricardo Martinez Lopez*<sup>1</sup>; Miguel Pérez Labra<sup>1</sup>; Francisco Raúl Barrientos Hernández<sup>1</sup>; José Antonio Romero Serrano<sup>2</sup>; Aurelio Hernández Ramírez<sup>2</sup>; Juan Pablo Hernández Lara<sup>2</sup>; María Inés Valenzuela Carrillo<sup>1</sup>; Martín Reyes Pérez<sup>1</sup>; <sup>1</sup>Autonomous University of the State of Hidalgo; <sup>2</sup>Higher School of Chemical Engineering and Extractive Industries (ESIQIE)-IPN

**G-17: Physical and Mechanical Characterization of an Artificial Granite Using Matrix of Epoxy Resin Mixed With Cashew Nut Shell:** *Maria Luiza Gomes*<sup>1</sup>; Pablo Jacintho<sup>1</sup>; José Lucas Lirio<sup>1</sup>; Elaine Carvalho<sup>1</sup>; Sérgio Monteiro<sup>2</sup>; *Carlos Maurício Vieira*<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense Darcy

Ribeiro; <sup>2</sup>Instituto Militar de Engenharia

**Preparation and Characterization of 3D Printed Biobased Composites From a PBAT/PLA Blend With Lignin and Titanium Dioxide:** *Gustavo Souza*<sup>1</sup>; *Rene Oliveira*<sup>1</sup>; *Janetty Barros*<sup>1</sup>; *Deepa Kodali*<sup>2</sup>; *Vijaya Rangari*<sup>3</sup>; *Esperidiana Barretos de Moura*<sup>1</sup>; <sup>1</sup>Instituto de Pesquisas Energéticas e Nucleares; <sup>2</sup>Christian Brothers University; <sup>3</sup>Tuskegee University

**Preparation and Characterization of Rare-Earth-Doped Upconversion Nanoparticles:** *Moshira Ibrahim*<sup>1</sup>; *Elayaraja Kolanthai*<sup>1</sup>; *Christina Drake*<sup>2</sup>; *Sudipta Seal*<sup>1</sup>; <sup>1</sup>Advanced Materials Processing and Analysis Center-UCF; <sup>2</sup>Nanoscience Technology Center, College of Medicine, University of Central Florida

**G-21: Production and Characterization of Artificial Stone for the Making of Permeable Pavement:** *Elaine Costa*<sup>1</sup>; *Rafael Bittencourt Miranda*<sup>1</sup>; *Renan Guimarães*<sup>1</sup>; *Afonso Azevedo*<sup>1</sup>; *Sérgio Neves Monteiro*<sup>2</sup>; *Carlos Maurício Vieira*<sup>1</sup>; <sup>1</sup>Universidade Estadual do Norte Fluminense; <sup>2</sup>Military Engineering Institute

**Properties and Microstructure of a Novel TiZrNbVFeCr-based Non-equiatom HEA:** *Fabio Garcia Filho*<sup>1</sup>; *Sergio Monteiro*<sup>1</sup>; <sup>1</sup>Military Institute of Engineering

**Reducing MgO Content of Blast Furnace Slag:** *Jie Liu*<sup>1</sup>; *Dongming Zhao*<sup>1</sup>; *Qiang Zhong*<sup>2</sup>; *Hui Zhang*<sup>1</sup>; *Libing Xv*<sup>1</sup>; *Jin Xun*<sup>1</sup>; <sup>1</sup>Iron and Steel Research Institute of Angang Group; <sup>2</sup>Central South University

**Reduction of Zn-bearing Dust Using Biomass Char:** *Jianbo Zhao*<sup>1</sup>; *Xiaohua Liu*<sup>1</sup>; *Fupeng He*<sup>1</sup>; *Yongjie Liu*<sup>1</sup>; *Zhixiong You*<sup>1</sup>; <sup>1</sup>Chongqing University

**Research and Application of Pellet Homogenization in Belt Roaster:** *Tian Yunqing*<sup>1</sup>; <sup>1</sup>Research Institute of Technology, Shougang Group Corporation

**Structural Evolution of Er<sup>3+</sup> and Cr<sup>3+</sup> Doped BaTiO<sub>3</sub> Synthesized by Mechanical Grinding Method:** *E.R. Ramírez-Martínez*<sup>1</sup>; *M. Pérez-Labra*<sup>1</sup>; *F.R. Barrientos-Hernández*<sup>1</sup>; *J.A. Romero-Serrano*<sup>2</sup>; *R. Martínez-López*<sup>1</sup>; *M.I. Valenzuela-Carrillo*<sup>1</sup>; *M. Pérez-Reyes*<sup>1</sup>; *A. Hernández-Ramírez*<sup>2</sup>; *J.C. Juárez-Tapia*<sup>1</sup>; <sup>1</sup>Autonomous University of Hidalgo; <sup>2</sup>ESIQIE-IPN

**Study on Reduction Kinetics of Biomass Carbon-coated Iron Ore Powder:** *Wufeng Jiang*<sup>1</sup>; *SuJu Hao*<sup>1</sup>; *Zheng Liu*<sup>2</sup>; <sup>1</sup>North China University of Science & Technology; <sup>2</sup>North China University of Science and Technology

**Synthesis and Characterization of TiO<sub>2</sub> Nanoparticles by Green Chemistry, Using Aloe Vera:** *Mizraim Flores*<sup>1</sup>; *Ruben Olcay*<sup>2</sup>; *Iván Reyes*<sup>3</sup>; *Elia Palacios*<sup>4</sup>; *Laura García*<sup>1</sup>; *Pedro Ramírez*<sup>1</sup>; *Laura Guzmán*<sup>1</sup>; <sup>1</sup>Universidad Tecnológica de Tulancingo; <sup>2</sup>Universidad Arturo Prat; <sup>3</sup>Universidad Autónoma de San Luis Potosí; <sup>4</sup>Instituto Politécnico Nacional

**Synthesis and Electrical Characterization of Ba<sub>1-x</sub>/2Ti<sub>1-x</sub>NbxO<sub>3</sub> Ceramics:** *Francisco Raúl Barrientos Hernández*<sup>1</sup>; *Miguel Pérez Labra*<sup>1</sup>; *Martín Reyes Pérez*<sup>1</sup>; *José Agustín Palmas León*<sup>1</sup>; *Edgar Cardoso Legorreta*<sup>1</sup>; *Juan Pablo Hernández Lara*<sup>1</sup>; *Edgar Ramírez Martínez*<sup>1</sup>; *Iván Alonso Lira Hernández*<sup>1</sup>; *Ramiro Escudero García*<sup>2</sup>; <sup>1</sup>Universidad Autónoma del Estado de Hidalgo; <sup>2</sup>Universidad Michoacana de San Nicolás de Hidalgo

**G-18: The Ascast Microstructure and Oxidation Resistance of the X40 Cobased Superalloy for Aerospace Applications:** *Rafal Cygan*<sup>1</sup>; *Dorota Wyrobek*<sup>2</sup>; *Mirosław Antosz*<sup>1</sup>; *ukasz Rakoczy*<sup>3</sup>; <sup>1</sup>Consolidated Precision Products Corporation; <sup>2</sup>Consolidated Precision Products Poland; <sup>3</sup>AGH University of Science and Technology

**Use of Red Mud in Soil Stabilization for Pavement Through Alkali Activation:** *Sarah Silva*<sup>1</sup>; *Beatryz Mendes*<sup>1</sup>; *Taciano Silva*<sup>1</sup>; *Emerson Lopes*<sup>1</sup>; *Flávio Ferreira*<sup>1</sup>; *Leonardo*

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Chemistry and Physics of Interfaces — Poster Session

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

**Program Organizers:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

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**Session Chairs:** Douglas Medlin, Sandia National Laboratories; Eva Zarkadoula, Oak Ridge National Laboratory; Prashant Singh, Ames Laboratory; Shen Dillon, University of California, Irvine

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**J-10: An Atomistic Study of the Radiation Resistance of Grain Boundaries in High Entropy Alloys:** *Sarah Paguaga*<sup>1</sup>; Ian Chesser<sup>1</sup>; Saryu Fensin<sup>1</sup>; <sup>1</sup>Los Alamos National Laboratory

**J-11: Compositional and Interfacial Effects on Stabilization of BCT Phase in Electron-beam Welded Low-alloy Steel:** *Grayson Nemets*<sup>1</sup>; Ching-Heng Shiau<sup>2</sup>; Zhongxia Shang<sup>1</sup>; Elliot Marrero<sup>1</sup>; Jasmyne Emerson<sup>1</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

**J-12: Design and Characterization of Novel Nanomaterial for Potential in Enhanced Oil Recovery:** *Vijayeta Himani*<sup>1</sup>; V. Raja<sup>1</sup>; Smrutiranjana Parida<sup>1</sup>; <sup>1</sup>IIT Bombay

**J-13: Dislocation Descriptions for Grain Boundary Junctions:** *Douglas Medlin*<sup>1</sup>; Elton Chen<sup>1</sup>; James Nathaniel<sup>1</sup>; Rémi Dingreville<sup>1</sup>; C. Barry Carter<sup>2</sup>; <sup>1</sup>Sandia National Laboratories; <sup>2</sup>University of Connecticut

**J-14: Friction and Wear Characterization of Carbon Composites for Continuous Electric-field Assisted Sintering:** *Tomas Grejtak*<sup>1</sup>; Harshvardhan Singh<sup>1</sup>; Andrew Gorman<sup>2</sup>; James Klett<sup>1</sup>; Jun Qu<sup>1</sup>; <sup>1</sup>Oak Ridge National Laboratory; <sup>2</sup>Idaho National Laboratory

**J-15: Frictional Molecular Dynamics Simulations of the TiO<sub>2</sub>/SiO<sub>2</sub> Passive Films Toward the Improvement of Oxidation Resistance of MoSiBTiC Alloy:** *Keaki Watanabe*<sup>1</sup>; Shogo Fukushima<sup>1</sup>; Yixin Su<sup>2</sup>; Yuta Asano<sup>1</sup>; Yusuke Ootani<sup>1</sup>; Nobuki Ozawa<sup>2</sup>; Momoji Kubo<sup>1</sup>; <sup>1</sup>Institute for Materials Research, Tohoku University; <sup>2</sup>New Industry Creation Hatchery Center, Tohoku University

**J-16: Molecular Dynamics Study on Tribochemical Reaction Mechanism of Zinc Dialkyl Dithiophosphate Lubricant Additives at Steel Sliding Interface:** *Takuya Tozawa*<sup>1</sup>; Kento Hosono<sup>1</sup>; Arisa Chiba<sup>1</sup>; Ryutaro Kudo<sup>1</sup>; Mizuho Yokoi<sup>1</sup>; Masayuki Kawaura<sup>1</sup>; Yixin Su<sup>2</sup>; Shogo Fukushima<sup>1</sup>; Yuta Asano<sup>1</sup>; Yusuke Ootani<sup>1</sup>; Nobuki Ozawa<sup>2</sup>; Momoji Kubo<sup>1</sup>; <sup>1</sup>Institute for Materials Research, Tohoku University; <sup>2</sup>New Industry Creation Hatchery Center, Tohoku University

**J-17: Reactive Molecular Dynamics Simulations Clarifying the Effect of Carbon Nanotube (CNT) Defects on Mechanical Properties of CNT/SiC Composites:** *Yixin Su*<sup>1</sup>; Shogo Fukushima<sup>2</sup>; Yuta Asano<sup>3</sup>; Yusuke Ootani<sup>3</sup>; Nobuki Ozawa<sup>1</sup>; Momoji Kubo<sup>3</sup>; <sup>1</sup>New Industry Creation Hatchery Center, Tohoku University; <sup>2</sup>Institute for Materials Research, Tohoku University; <sup>3</sup>Institute for Materials Research, Tohoku University

University

**Shear-punch Testing and Microstructural Evolution of Pure Cu and CuCr Alloys:** *Julian Escobar*<sup>1</sup>; Joshua Silverstein<sup>1</sup>; Mert Efe<sup>1</sup>; Lei Li<sup>1</sup>; Shuang Li<sup>1</sup>; Farhan Ishrak<sup>2</sup>; Anqi Yu<sup>1</sup>; Suveen Mathaudhu<sup>3</sup>; Arun Devaraj<sup>1</sup>; Bharat Gwalani<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>North Carolina State University; <sup>3</sup>Colorado School of Mines

**J-18: Stress Corrosion Cracking Simulation of High Entropy Alloys by Molecular Dynamics Method Based on Neural Network Potentials:** *Kai Nakajima*<sup>1</sup>; Ryutaro Kudo<sup>1</sup>; Shogo Fukushima<sup>1</sup>; Yixin Su<sup>2</sup>; Yuta Asano<sup>1</sup>; Yusuke Ootani<sup>1</sup>; Nobuki Ozawa<sup>2</sup>; Momoji Kubo<sup>1</sup>; <sup>1</sup>Institute for Material Research, Tohoku University; <sup>2</sup>New Industry Creation Hatchery Center, Tohoku University

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## ADDITIVE MANUFACTURING

### Cold Spray Additive Manufacturing: Part Quality and Performance — Poster Session

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

**Program Organizers:** Ahmed Alade Tiamiyu, University Of Calgary, Canada; Tanaji Paul, Florida International University; Julio Villafuerte, CenterLine Windsor Ltd; Aaron Nardi, VRC Metal Systems; Joseph Heelan, Solvus Global

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**Session Chair:** Tanaji Paul, Florida International University

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**F-50: Corrosion Behavior Characterization for Cold Sprayed Scalmalloy Coatings:** *Craig Neal*<sup>1</sup>; Anil Lama<sup>2</sup>; Elayaraja Kolanthai<sup>1</sup>; Yifei Fu<sup>1</sup>; Arvind Agarwal<sup>2</sup>; Sudipta Seal<sup>1</sup>; <sup>1</sup>University of Central Florida; <sup>2</sup>Florida International University

**F-62: Developing of Chromium-carbide/ Nickel-chromium Coatings for Railroad Repairs by Cold Spray Technology:** *Sohayb Batwa*<sup>1</sup>; Ahmad Nourian<sup>1</sup>; David Brennan<sup>2</sup>; Sinan Müftü<sup>1</sup>; <sup>1</sup>Northeastern University; <sup>2</sup>VRC Metal Systems

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Computational Thermodynamics and Kinetics — Poster Session

**Sponsored by:** TMS Functional Materials Division, TMS Materials Processing and Manufacturing Division, TMS: Chemistry and Physics of Materials Committee, TMS: Computational Materials Science and Engineering Committee

**Program Organizers:** Anirudh Raju Natarajan, École Polytechnique Fédérale de Lausanne (EPFL); Seth Blackwell, Los Alamos National Laboratory; Rinkle Juneja, Oak Ridge National Laboratory; Eva Zarkadoula, Oak Ridge National Laboratory; Damien Turrett, IMDEA Materials Institute; Fadi Abdeljawad, Lehigh University

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**J-19: Finite Element Analysis for Metal Purification with G-METS Distillation:** *Armaghan Ehsani Telgerafchi*<sup>1</sup>; Carl Meinhart<sup>2</sup>; Adam Powell<sup>1</sup>; <sup>1</sup>Worcester Polytechnic

Institute; <sup>2</sup>University of California Santa Barbara (UCSB)

**J-20: Modeling the Interactions between a Solidification Front and Nanoparticles Using a Phase-field Model:** Zachary Croft<sup>1</sup>; Alexander Mensah<sup>1</sup>; Jaime Coronado<sup>1</sup>; Shanmukha Kiran<sup>1</sup>; Jonathan Goettsch<sup>1</sup>; Alan Taub<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**J-21: Multiphysics Simulation of Biochar Adsorption Rates:** Joseph Salerno<sup>1</sup>; Amirhosein Riahi<sup>1</sup>; Richard LaDouceur<sup>1</sup>; <sup>1</sup>Montana Technological University

**J-22: Nanoscale Phenomena during Joining of Dissimilar Metallic Materials: A Molecular Dynamics Study:** Jiayi Chen<sup>1</sup>; Hemantha Yeddu<sup>1</sup>; <sup>1</sup>LUT University

**Phase-field Modeling of Friction Stir Welded 316 Stainless Steel Microstructure:** Stephanie Hart<sup>1</sup>; Jacob Bair<sup>2</sup>; <sup>1</sup>Pacific Northwest National Laboratory; <sup>2</sup>Oklahoma State University

**J-23: Smoothed Boundary Method for Simulating Intermetallic Growth in the Presence of Nanoparticles: Application to Al-Based Metal Matrix Nanocomposites:** Jason Landini<sup>1</sup>; Lingxia Shi<sup>1</sup>; Jonathan Goettsch<sup>1</sup>; Shanmukha Kiran Aramanda<sup>1</sup>; Jaime Perez Coronado<sup>1</sup>; Alan Taub<sup>1</sup>; Ashwin Shahani<sup>1</sup>; Katsuyo Thornton<sup>1</sup>; <sup>1</sup>University of Michigan

**Thermodynamic Simulation Calculation of Precipitation Phases in FeCr17Mn11Mo3Nx Powder Based on JmatPro:** Dongjia Wang<sup>1</sup>; Guolong Ni<sup>1</sup>; Shuhuan Wang<sup>1</sup>; <sup>1</sup>North China University of Science and Technology

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### High Performance Steels — Poster Session

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

**Program Organizers:** C. Tasan, Massachusetts Institute of Technology; Adriana Eres-Castellanos, Colorado School of Mines; Krista Limmer, DEVCOM Army Research Laboratory; Josh Mueller, Los Alamos National Lab; Wesley Roth, Carpenter Technology; Jonah Kleem-Toole, Colorado School of Mines; Pello Uranga, CEIT and TECNUN (University of Navarra)

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**J-24: Effect of Deformation Temperature on Strengthening Mechanism in Fe-22Mn-0.6C:** Hirokazu Kato<sup>1</sup>; Sukyoung Hwang<sup>1</sup>; Myeong-heom Park<sup>1</sup>; Si Gao<sup>1</sup>; Nobuhiro Tsuji<sup>1</sup>; <sup>1</sup>Kyoto University

**J-25: Evaluation of the Correlation between Hardness Distribution and Hole Expansion Ratio on Complex-phase Steel by Using Nanoindentation:** Eunji Song<sup>1</sup>; Younghoon Kim<sup>2</sup>; So-Hyeon Lee<sup>2</sup>; Minho Park<sup>3</sup>; Hyunbo Shim<sup>3</sup>; Ju-Young Kim<sup>2</sup>; <sup>1</sup>University of Michigan, Ann Arbor; <sup>2</sup>UNIST (Ulsan National Institute of Science and Technology); <sup>3</sup>Hyundai Steel

**J-26: Investigating the Effects of Heat Treatment on the Microstructure and Mechanical Properties of Low Carbon, Low Alloy, and High Yield Strength Steels Undergoing Temper Embrittlement:** Shannon Gerard<sup>1</sup>; Aroba Saleem<sup>1</sup>; Michele Manuel; <sup>1</sup>University of Florida

**Investigation of Retained Austenite Stability in Bearing Steels:** Mina Amiri<sup>1</sup>; Annika Borgenstam<sup>1</sup>; Per-Lennart Larsson<sup>1</sup>; Peter Hedström<sup>1</sup>; <sup>1</sup>KTH Royal Institute



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## LIGHT METALS

### Magnesium Technology 2024 — Poster Session

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

**Program Organizers:** Aerial Murphy-Leonard, Ohio State University; Steven Barela, Terves, Inc; Neale Neelameggham, IND LLC; Victoria Miller, University of Florida; Domonkos Tolnai, Institute of Metallic Biomaterials, Helmholtz-Zentrum Hereon

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**K-9: A Reduced Order Model of Magnesium Distillation:** *Artem Iurkovskyi*<sup>1</sup>; Adam Powell<sup>1</sup>; Amy Telgerafchi<sup>1</sup>; Daniel Sehar<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**Bioabsorbable Magnesium Composite Sheared at High Temperatures for Use in Bone Implants:** *Andres Larraza*<sup>1</sup>; Pedram Sotoudeh Bagha<sup>1</sup>; Mehdi Razavi<sup>1</sup>; <sup>1</sup>UCF Burnette School of Biomedical Sciences

**Effect of Temperature and Strain Rate on Microstructure and Mechanical Properties of AXM Alloys Processed through Differential Speed Rolling:** *Christopher Hale*<sup>1</sup>; <sup>1</sup>North Carolina A & T State University

**Interaction and Solution Behavior of Alloying Elements in Mg Alloys:** *Tao Chen*<sup>1</sup>; Yuan Yuan<sup>2</sup>; Li Yang<sup>2</sup>; Jiajia Wu<sup>2</sup>; Fusheng Pan<sup>1</sup>; <sup>1</sup>Lanxi Magnesium Materials Research Institute; <sup>2</sup>Chongqing University

**K-10: Mechanical Behavior and Constitutive Modeling of Mg-Zn-Y Alloy in Electrically-assisted Tensile Test:** *Zhichao Xu*<sup>1</sup>; Di Wang<sup>1</sup>; <sup>1</sup>Henan Polytechnic University

**Microstructure Refinement through Ultrasonic Melt Treatment of a Biodegradable Magnesium Composite:** *Andres Larraza*<sup>1</sup>; Pedram Sotoudeh Bagha<sup>1</sup>; Mehdi Razavi<sup>1</sup>; <sup>1</sup>UCF Burnette School of Biomedical Sciences

**K-11: Porosity and Mechanical Properties of Squeeze Cast and Permanent Mold Cast Wrought Mg Alloy AZ31:** Ali Dhaif<sup>1</sup>; Wutian Shen<sup>1</sup>; *Hongfa Hu*<sup>1</sup>; <sup>1</sup>University of Windsor

**Study of the Precipitation of Calcium and Magnesium in the Form of Phosphates from Residual Brine from the Salar De Uyuni, After the Respective Recovery of Potassium Chloride by Evaporation – Crystallization:** *Alejandra Murillo López*<sup>1</sup>; <sup>1</sup>Technical University of Oruro; Association of Metallurgical Engineers of Bolivia (AIMET)

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## BIOMATERIALS

**Materials Science for Global Development -- Health, Energy, and Environment: An SMD Symposium in Honor of Wole Soboyejo — Poster Session**

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

**Program Organizers:** Jing Du, Pennsylvania State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

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**Session Chairs:** Jing Du, Penn State University; Jun Lou, Rice University; Nima Rahbar, Worcester Polytechnic Institute; Jingjie Hu, North Carolina State University; John Obayemi, Worcester Polytechnic Institute

**A Web Based Interactive Tool for Ease Access and Visualization of Materials Availability Risk:** *Trupti Mohanty*<sup>1</sup>; Jude A. Horsley<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

**H-16: Corrosion Behavior of As-cast and Homogenized VCoNi and CrCoNi in an Acidic Medium:** Nicola Rundora<sup>1</sup>; Michael Bodunrin<sup>1</sup>; Lebidike Mampuru<sup>2</sup>; *Tabiri Asumadu*<sup>3</sup>; Mobin Vandadi<sup>4</sup>; Desmond Klenam<sup>1</sup>; Nima Rahbar<sup>4</sup>; Wole Soboyejo<sup>4</sup>; <sup>1</sup>Wits University; <sup>2</sup>Mintek; <sup>3</sup>Sunyani Technical University; <sup>4</sup>Worcester Polytechnic Institute

**Experimental Study on Preparation of Aluminate Cement with Secondary Aluminium Ash as Partial Replacement of Bauxite:** *Wenqing Ma*<sup>1</sup>; <sup>1</sup>Anhui University of Technology

**Influence of Lattice Distortion on Dislocation Dynamics in High Entropy Alloys:** *Mobin Vandadi*<sup>1</sup>; Nima Rahbar<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**H-17: Mechanical Heterogeneity of Trabecular Bone at Nanoscale:** *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>The Pennsylvania State University; <sup>2</sup>Texas A&M University

**H-18: Mechanical Investigation of a Tandem Embolization-visualization System for Minimally Invasive Procedures:** *Peng Chen*<sup>1</sup>; Jingjie Hu<sup>1</sup>; <sup>1</sup>North Carolina State University

**H-19: Plastic-Coconut Fiber Composite: A Sustainable Roofing Material:** *Enis Agyeman Boateng*<sup>1</sup>; Robert Krueger<sup>1</sup>; Winston Soboyejo<sup>1</sup>; <sup>1</sup>Worcester Polytechnic Institute

**Synthesis of Milk Protein Based Biodegradable Film:** *Umar Fayyaz*<sup>1</sup>; <sup>1</sup>Institute of Space Technology

## LIGHT METALS

### Melt Processing, Casting and Recycling — Poster Session

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

**Program Organizers:** Anne Kvithyld, SINTEF; Tao Wang, Rio Tinto; Samuel Wagstaff, Oculatus Consulting

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**K-12: Fractional Crystallization Process With Electromagnetic Stirring for**

**Upgrade Recycling of Aluminum:** *Yuichiro Murakami*<sup>1</sup>; Keiji Shiga<sup>1</sup>; Naoki Omura<sup>1</sup>;  
<sup>1</sup>National Institute of Advanced Industrial Science and Technology

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## 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: Nanomechanical Materials Behavior Committee

**Program Organizers:** Wendy Gu, Stanford University; Mostafa Hassani, Cornell University; Christian Leinenbach, Empa, Swiss Federal Laboratories for Materials Science and Technology; Christoph Eberl, Fraunhofer IWM

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**F-63: Composition Control of Alloy Fabrication Using Localized Electrochemical Deposition for Small-Scale Additive Manufacturing:** *Nikolaus Porenta*<sup>1</sup>; Mirco Nydegger<sup>1</sup>; Maxence Menétrey<sup>1</sup>; Rebecca Gallivan<sup>1</sup>; Ralph Spolenak<sup>1</sup>; <sup>1</sup>ETH Zurich

**F-64: Powder Flow Analysis of Low-reflectivity Nanoporous Copper Powders and Corresponding Hybrid Feedstocks with Copper Nanoparticles for Laser Powder Bed Fusion:** *Laura Duenas Gonzalez*<sup>1</sup>; Natalya Kublik<sup>1</sup>; Bruno Azeredo<sup>1</sup>; <sup>1</sup>Arizona State University

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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 Structural Materials 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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**G-19: Accessing the Microstructure State Space:** *Dylan Miley*<sup>1</sup>; Jeremy Mason<sup>1</sup>;  
<sup>1</sup>UC Davis

**G-20: TESCANTENSORa4D-STEM for Multimodal Characterization of Challenging and Interesting Specimens:** *Robert Stroud*<sup>1</sup>; <sup>1</sup>Tescan USA

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## DATA-DRIVEN AND COMPUTATIONAL MATERIALS DESIGN

### Thermodynamics and Kinetics of Alloys II — Poster Session

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

**Program Organizers:** Chuan Zhang, CompuTherm LLC; Ji-Cheng Zhao, University of Maryland; Shuanglin Chen, CompuTherm LLC; Wei Xiong, University of Pittsburgh

**Tuesday PM | March 5, 2024**  
**Regency R | Hyatt**

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**The Diffusion Behaviours and Kinetic Descriptions of Mg-based Systems:** *Yang Li*<sup>1</sup>; Yuan Yuan<sup>1</sup>; Fusheng Pan<sup>1</sup>; <sup>1</sup>Chongqing University