The 3rd International Congress on

3DMS

3D Materials Science 2016

July 10–13, 2016 • Pheasant Run Resort • St. Charles, Illinois, USA

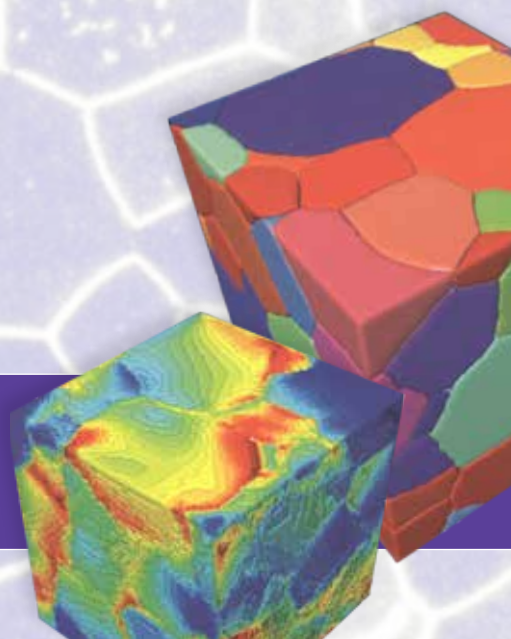## Register by June 10, 2016 and save!

PROGRAM PREVIEW

Sponsored by:

TMS
The Minerals, Metals & Materials Society

and the TMS Advanced Characterization, Testing & Simulation Committee

www.tms.org/3DMS2016/ab

REGISTER NOW

The 3rd International Congress on 3D Materials Science 2016

The 3rd International Congress on 3D Materials Science (3DMS 2016) is a not-to-be-missed opportunity that allows participants to immerse themselves for three days in a unique, highly focused technical meeting. This congress gives attendees the opportunity to collaborate and hear presentations of current interest and significance to the three-dimensional characterization, visualization, quantitative analysis, modeling, and investigation of structure-property relationships of materials. Join key researchers and established professionals in the field of 3D materials science as they assess the current state-of-the-art and roadmap crucial areas for future research.

The congress welcomes scientists, engineers, managers, government program officers, professors, and students involved in 3D materials science from around the world. Presentations will cover a range of topic areas, covering the most critical and rapidly-growing areas of 3D materials science.

CONGRESS ORGANIZERS

Organizing Committee:

Chair: Mike Groeber,
Air Force Research Laboratory, USA

Dorte Juul Jensen,
Danish Technological University/Risø National Laboratory, Denmark

Emmanuelle Marquis,
University of Michigan, USA

Paul Midgley,
Cambridge University, United Kingdom

Matt Miller,
Cornell University, USA

Henry Proudhon,
Centre des Matériaux Mines ParisTech, France

Hiroyuki Toda,
Kyushu University, Japan

International Advisory Committee:

Jon Almer,
Avanced Photon Source (APS), Argonne National Laboratory, USA

Michel Bornert,
École des Ponts ParisTech, France

Veerle Cnudde,
Ghent University, Belgium

Ricardo Lebensohn,
Los Alamos National Laboratory, USA

Javier Llorca,
IMDEA Materials, Spain

Eric Maire,
INSA-Lyon, France

Simon Ringer,
The University of Sydney, Australia

A.D. "Tony" Rollett,
Carnegie Mellon University, USA

Luc Salvo,
Grenoble INP, France

Ian Sinclair,
Southampton University, UK

Robert Suter,
Carnegie Mellon University, USA

Philip Withers,
University of Manchester, UK

REGISTRATION

All congress attendees, including authors, presenters, and session chairs, are required to register. To receive the discount registration rate, register at www.tms.org/3DMS2016/ab by June 10, 2016.

Registration Fees	Discount (through June 10, 2016)	Standard (after June 10, 2016)
Member	$695	$795
Nonmember+	$825	$925
Student Member*	$450	$450
Student Nonmember*	$525	$525

+Includes TMS membership through December 31, 2017.
*Must be a full-time graduate or undergraduate student; a copy of student school identification card is required; must mail or fax form.
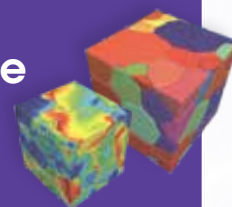
Registration package includes:

- Technical sessions
- Morning and afternoon refreshment breaks
- Sunday evening welcome reception
- Monday poster reception
- Tuesday evening congress dinner

Methods and Software Tools for 3D Microstructural Science
Scheduled in conjunction with 3DMS 2016
July 14–15, 2016 • Pheasant Run Resort • St. Charles, Illinois, USA

Enhance your congress experience by attending the Methods and Software Tools for 3D Microstructural Science Workshop. This 1.5-day workshop will teach you how to reconstruct, quantify, and analyze 3D materials data using the open-source software package Digital Representation Environment for the Analysis of Materials in 3D (DREAM.3D). A highlight of this workshop will be a tour of the Advanced Photon Source (APS) facilities at Argonne National Laboratory. To view a workshop outline and timed agenda, visit the Workshop page of the 3DMS 2016 website at **www.tms.org/3DMS2016/ab**. Sign up to attend this workshop when you register for 3DMS 2016

Workshop registration fees include a tour of the APS facilities, Thursday evening happy hour, workshop materials, morning and afternoon beverage breaks, and lunch.

Registration Fees	Discount (through June 10, 2016)	Standard (after June 10, 2016)
Member	$275	$325
Nonmember	$325	$375
Student*	$175	$200

*Must be a full-time graduate or undergraduate student; a copy of student school identification card is required; must mail or fax form.

The Introduction to DREAM.3D and SIMPL Webinar recording is available for freeon the Webinar page of the 3DMS 2016 website. Viewing the webinar is strongly recommended for workshop attendance, though it is not a requirement.

Meet the Instructors:

Sean Donegan, a research scientist at BlueQuartz Software, is one of the primary developers behind the DREAM.3D project.

Mike Groeber, a materials research scientist at the Air Force Research Laboratory, Wright-Patterson Air Force Base, is a principal developer and inventor of DREAM.3D.

Software links and instructions will be provided to registrants in advance of the workshop. Registrants will be bring their own PC's for use during the workshop. Workshop registration is required for all tour participants. All non-U.S. citizens, including legal permanent residents, must complete a visitor registration application and be approved by APS in order to participate in the tour. Visit the Workshop page on the 3DMS 2016 website for more information.

PROGRAM PREVIEW

LOCATION, HOUSING & TRAVEL

Congress Location: Pheasant Run Resort
Conveniently located in peaceful St. Charles, which is known for its close proximity to Chicago's big city perks, the 250-acre country property is one of the largest entertainment, conference center, and family vacation resorts in the Midwest. Just a short drive from Chicago, Pheasant Run Resort is practically a city itself, with everything you need onsite, including a theater, live comedy, diverse dining options, 18 holes of golf, tennis, and swimming.

For more information, visit
www.pheasantrun.com.

Note: admission to resort amenities is not included in your congress registration. Please contact the Pheasant Run Resort for more information about fees and availability.

Housing
A block of rooms has been reserved at the Pheasant Run Resort at a special rate for 3DMS 2016 attendees. Accommodations must be secured by June 17, 2016. Single/double occupancy is $135 per night.

**Visit www.tms.org/3DMS2016/ab
or call the resort at (630) 584–6300
to make your reservations.**

Getting There
The Pheasant Run Resort is approximately 26 miles from O'Hare Airport and 42 miles from Midway Airport. The congress has not arranged for shuttles between the hotel and either airport, but a number of transportation options are available.

For more information visit
www.pheasantrun.com.

NETWORKING and SOCIAL EVENTS

Sunday, July 10
Welcome Reception
6:30 p.m. to 7:30 p.m.

Monday, July 11
Poster Viewing/Reception
3:10 p.m. to 4:40 p.m.

Tuesday, July 12
Congress Dinner
6:30 p.m. to 8:30 p.m.

TECHNICAL PROGRAM

3DMS 2016 distills the most current knowledge on 3D modeling, characterization, and testing into one technical meeting. Participants will have the opportunity to connect with experts from a variety of disciplines to collaborate and discuss data collection processes, as well as learn new techniques on studying materials in three dimensions. Technical topics of interest for this congress include:

- Experimental techniques for 3D data acquisition
- Advances in reconstruction algorithms
- Image processing and digital representation of 2D and 3D microstructural data
- Advances in 3D materials modeling
- Process-microstructure-property relationships in 3D
- Future directions and challenges for 3D materials science

Plenary Speakers:

Jonathan Almer,
Argonne National Laboratory

Paul Dawson,
Cornell University

Invited Speakers:

Armand Beaudoin,
University of Illinois at Urbana-Champaign

Charles Bouman,
Purdue University

Marc DeGraef,
Carnegie Mellon University

Michael Ferry,
University of New South Wales

Henning Friis Poulson,
Technical University of Denmark

Satoshi Hata,
Kyushu University

Elizabeth Holm,
Carnegie Mellon University

Ulrich Lienert,
Deutsches Elektronen-Synchrotron

Jonathan Madison,
Sandia National Laboratories

Eric Maire,
INSA-Lyon

Darren Pagan,
Lawrence Livermore National Laboratory

Burton "Pat" Patterson,
University of Florida

Tresa Pollock,
University of California, Santa Barbara

Dave Rowenhorst,
Naval Research Laboratory

Akira Taniyama,
Nippon Steel

Akihisa Takeuchi,
SPring-8

NEW for 2016:
VENDOR SHOWCASE

Companies featured in the Vendor Showcase will have the opportunity to make 10-minute presentations during technical session hours on Tuesday, July 12. This unique event is a great way for vendors and developers to meet and discuss new tools and techniques in the field. This amazing opportunity to directly address congress attendees in a presentation setting is included with the price of an exhibit table top. You must be an exhibitor or sponsor to take part in the showcase.

Only two spaces are left—book your spot in the Vendor Showcase today!

For information on how your company can be a part of the Vendor Showcase, contact Caron Gavrish, TMS Sales Specialist, at cgavrish@tms.org.

SPONSORSHIP OPPORTUNITIES

3DMS 2016 offers your company the chance to reach the tight-knit 3D materials science community. At this congress, you can meet scientists, engineers, managers, government program officers, and other researchers involved in 3D materials science. Corporate sponsorship offers high visibility at the congress reception, refreshment breaks, and attendee social activities, as well as on registration amenities like reusable canvas bags, badges, and lanyards.

For more information on purchasing a corporate sponsorship, visit the Sponsorship page of the 3DMS 2016 website: **www.tms.org/3DMS2016/ab**.

TECHNICAL PROGRAM

Monday, July 11, 2016

Plenary 1 Room: Salons V&VI	
8:00 AM	Developing Principle-Based Approaches to Quantify Mechanical Property Distributions of Titanium Alloys: *Paul Dawson*[1]; [1]Cornell University
9:00 AM	Break

Advances in 3D Materials Modeling: Deformation Modeling of Metallic Alloys Room: Salon V	
9:10 AM	**Invited** **Crack Deviation in an Aluminum Alloy for Structural Aerospace Application**: *Armand Beaudoin*[1]; Kamalika Chatterjee[1]; Robert Dodds[1]; Peter Kenesei[2]; Jun-Sang Park[2]; Sarvjit Shastri[2]; [1]University of Illinois at Urbana-Champaign; [2]Argonne National Laboratory
9:40 AM	**Image-Based Finite Element Analysis of Ductile Fracture via Hydrogen Pore Mechanism in an Aluminum Alloy**: *Akihide Hosokawa*[1]; Hiroyuki Toda[2]; Rafael Batres[3]; Osamu Kuwazuru[4]; Masakazu Kobayashi[5]; Han Li[2]; Hidetaka Yakita[2]; [1]National Institute of Advanced Science and Technology; [2]Kyushu University; [3]Tecnológico de Monterrey; [4]The University of Fukui; [5]Toyohashi University of Technology
10:00 AM	**Direct Numerical Simulation (DNS) of Failure Mechanisms in Brittle Polycrystalline Structures**: *Bo Li*[1]; Jiang Hao[1]; [1]Case Western Reserve University
10:20 AM	Break
10:40 AM	**3D Characterization of Inhomogeneous Deformation in Grain Microstructure of Aluminum Alloy**: *Masakazu Kobayashi*[1]; Aya Kouno[1]; Tomohiko Matsuyama[1]; Hiroyuki Toda[2]; Hiromi Miura[1]; Osamu Kuwazuru[3]; [1]Toyohashi University of Technology; [2]Kyushu University; [3]Fukui University
11:00 AM	**Non-destructive 3D Microstructure Measurement and Mechanical Deformation Modeling of Additively Manufactured Materials**: *Tugce Ozturk*[1]; Ross Cunningham[1]; David Menasche[1]; Robert Suter[1]; Anthony Rollett[1]; [1]Carnegie Mellon University
11:20 AM	**Image-Based Finite Element Analysis for Fatigue of Cast Aluminum Alloy**: *Osamu Kuwazuru*[1]; Masaki Teranishi[1]; Keigo Matsumura[1]; Shota Gennai[1]; Masakazu Kobayashi[2]; Hiroyuki Toda[3]; [1]University of Fukui; [2]Toyohashi University of Technology; [3]Kyushu University
11:40 AM	**Examining Interactions between Microscale Deformation and 3D Microstructure in an \945-Titanium Alloy**: *Zhe Chen*[1]; Samantha Daly[1]; [1]University of Michigan
12:00 PM	**Modeling, Analysis and Ultrafast Imaging of Lattice Dynamics in Core-Shell Bimetallic Nanocrystals**: *Kiran Sasikumar*[1]; Mathew Cherukara[1]; Ross Harder[1]; Jesse Clark[2]; Nicola Ferrier[1]; Thomas Peterka[1]; Subramanian Sankaranarayanan[1]; [1]Argonne National Laboratory; [2]SLAC National Accelerator Laboratory

Experimental Techniques for 3D Data Acquisition: Investigating Materials at the Nano and Dislocation Scale Room: Salon VI	
9:10 AM	**Invited** **Advances in Experimental Techniques for 3D Dislocation Image Acquisition Using Electron Microscopy**: *Satoshi Hata*[1]; [1]Kyushu University
9:40 AM	**Mapping of Embedded Dislocations in Diamond with Sub 200 nm Resolution**: *Anders Jakobsen*[1]; Hugh Simons[1]; Sonja Ahl[1]; Carsten Detlefs[2]; Jürgen Härtwig[2]; Henning Poulsen[1]; [1]DTU Physics; [2]ESRF
10:00 AM	**Dislocations Patterns in Plasticity: Formalism, Computational Algorithms and Connection with 3D X-Ray Microscopy**: *Anter El-Azab*[1]; Shengxu Xia[1]; Bennett Larson[2]; [1]Purdue University; [2]ORNL
10:20 AM	Break
10:40 AM	**Mapping Nano-Scale Strain and Orientation in Multiferroic Materials with Dark-Field X-Ray Microscopy**: *Hugh Simons*[1]; Sonja Ahl[1]; Anders Jakobsen[1]; John Daniels[2]; Dragan Damjanovic[3]; Carsten Detlefs[4]; Henning Poulsen[1]; [1]DTU; [2]University of New South Wales; [3]Swiss Federal Institute of Technology in Lausanne-EPFL; [4]The European Synchrotron - ESRF
11:00 AM	**Early Stage of Plastic Deformation in Metals Studied by In Situ X-Ray Synchrotron Topotomography and Crystal Plasticity FEM Simulations**: *Nicolas Gueninchault*[1]; Henry Proudhon[1]; Wolfgang Ludwig[2]; Samuel Forest[1]; [1]Mines Paristech; [2]ESRF
11:20 AM	**Understanding Microplasticity Processes Related to Fatigue Damage using High Energy X-Rays and a Crystal-Based Modeling Formulation**: *Mark Obstalecki*[1]; Robert Carson[1]; Paul Dawson[1]; Matthew Miller[1]; [1]Cornell University
11:40 AM	**Non Destructive Nanotomography Imaging in Structural Materials**: *Henry Proudhon*[1]; Thilo Morgeneyer[1]; Erembert Nizery[1]; Lucien Laiarinandrasana[1]; Peter Cloetens[2]; [1]MINES ParisTech; [2]ESRF
12:00 PM	**Scanning 3DXRD Technique using a Microbeam for In-situ Orientation and Stress Mapping**: *Yujiro Hayashi*[1]; Yoshiki Seno[1]; Daigo Setoyama[1]; [1]Toyota Central R&D Labs., Inc.

Advances in Reconstruction Algorithms: Use of Simulations and Forward Models in Data Reconstruction (Part 1) Room: Salon V	
2:00 PM	**Invited** **Thoughts About the Role of Forward Models in Microstructure Reconstructions**: *Marc De Graef*[1]; [1]Carnegie Mellon University

2:30 PM	**Improvements in Algorithms to Enable Real-Time Reconstruction of HEDM Data Using MIDAS**: *Hemant Sharma*[1]; Jonathan Almer[1]; [1]Argonne National Laboratory
2:50 PM	**A Novel Reconstruction Method for 3D-EBSD Data Sets**: *Peter Konijnenberg*[1]; Stefan Zaefferer[1]; Dierk Raabe[1]; [1]Max-Planck-Institute for Iron Research

Advances in 3D Materials Modeling: Deformation Modeling with Experimental Validation (Part 1)
Room: Salon VI

2:00 PM	**Invited** **Studying Slip System Activity in Deforming Crystals Using High-Energy X-ray Diffraction and Finite Element Crystal Plasticity Modeling**: *Darren Pagan*[1]; [1]Lawrence Livermore National Lab
2:30 PM	**In-Situ 3-D Characterization and Direct Micromechanical Modelling for Identification of Microstructure-Property Relationship in Polycrystalline Materials**: *Ricardo Lebensohn*[1]; Pokharel Reeju[1]; Bjorn Clausen[1]; Cristina Garcia-Cardona[1]; Evan Lieberman[1]; Chris Chen[1]; Marian Anghel[1]; Timothy Ickes[1]; James Hunter[1]; David Rogers[1]; Robert Suter[2]; Anthony Rollett[2]; Paul Shade[3]; Darren Dale[4]; Jonathan Almer[5]; [1]Los Alamos National Laboratory; [2]Carnegie-Mellon University; [3]Wright-Patterson AFRL; [4]Cornell High Energy Synchrotron Source; [5]Advanced Photon Source
2:50 PM	**Measurement of 3D Displacement Field from Few Tomographic Projections**: *Clément Jailin*[1]; Thibault Taillandier-Thomas[1]; Martin Poncelet[1]; François Hild[1]; Stéphane Roux[1]; [1]Laboratoire de Mécanique et Technologie, ENS Cachan/CNRS-UMR 8535/Univ. Paris-Saclay

Advances in Reconstruction Algorithms: Use of Simulations and Forward Models in Data Reconstruction (Part 2)
Room: Salon V

4:40 PM	**Invited** **Dynamic Sampling and Reconstruction for Material Science**: *Charles Bouman*[1]; [1]Purdue University
5:10 PM	**Extracting the Magnetic Vector Potential of Magnetic Nanoparticles Using a Model Based Iterative Reconstruction Technique**: *KC Prabhat*[1]; Marc De Graef; Charles Bouman[2]; K. Aditya Mohan[2]; [1]Carnegie Mellon University; [2]Purdue University
5:30 PM	**Reconstructing 3D Polycrystalline Microstructure from Diffraction Contrast Tomography**: *Harsh Narula*[1]; Jitesh Vasavada[1]; Hrishikesh Bale[2]; Christian Holzner[2]; Leah Lavery[2]; Sushil Mishra[1]; Asim Tewari[1]; [1]IIT Bombay; [2]Carl Zeiss X-ray Microscopy Inc.
5:50 PM	**Diffraction Intensity Simulations in Near-Field High Energy Diffraction Microscopy Reconstructions**: *Robert Suter*[1]; David Menasche[1]; [1]Carnegie Mellon University

Advances in 3D Materials Modeling: Deformation Modeling with Experimental Validation (Part 2)
Room: Salon VI

4:40 PM	**Invited** **High-Resolution X-Ray Computed Tomography at SPring-8 and Improvements of Imaging Properties**: *Akihisa Takeuchi*[1]; Kentaro Uesugi[2]; Hiroyuki Toda[3]; Masakazu Kobayashi[4]; [1]JASRI / SPring-8; [2]Japan Synchrotron Radiation Research Insititute (JASRI)/SPring-8; [3]Kyushu University; [4]Toyohashi University of Technology
5:10 PM	**On the Origin of the Anisotropic Damage of X100 Line Pipe Steel using 3D in Situsynchroton-Radiation Tomography Investigation**: *Yazid Madi*[1]; Juan Garcia[2]; Thilo Morgeneyer[2]; Henry Proudhon[2]; Jacques Besson[2]; [1]EPF-Ecole d'ingénieurs / Centre des Matériaux Mines ParisTech; [2]Centre des Matériaux MInes ParisTech
5:30 PM	**Study of Residual Stress in a Ti-7Al Alloy**: *Kamalika Chatterjee*[1]; Armand Beaudoin[1]; [1]University of Illinois at Urbana-Champaign
5:50 PM	**Prediction of Atomic Structure of Interfaces using Electron Microscopy and Atomistic Simulations**: *Fatih Sen*[1]; Tadas Paulauskas[2]; Ce Sun[3]; Eric Schwenker[4]; Moon Kim[3]; Robert Klie[2]; Jianguo Wen[1]; Maria Chan[1]; [1]Argonne National Laboratory; [2]University of Illinois at Chicago; [3]University of Texas at Dallas; [4]Northwestern University

Poster Session (3:10 AM–4:40 PM)

	2-Dimensional Synchrotron Radiation Diffraction Measurement for 3-Dimensional Distribution of Strains with Sub-mm Spacial Resolution: *Hidehiko Kimura*[1]; Daigo Setoyama[1]; Satoshi Yamaguchi[1]; [1]Toyota Central R&D Labs., Inc.
	3-D Crystal Plasticity: Multi-Scale Simulation of Deformation Response in Metals: *Sriram Ganesan*[1]; Veera Sundararaghavan[1]; [1]Department of Aerospace Engineering, University of Michigan-Ann Arbor
	3-D Printing Emerging Technologies and Its Principles: Anurag Jha[1]; *Nirmal Singh*[1]; [1]ISM DHANBAD
	3-Dimensional Strain Distribution Measurement Inside Power Modules by Digital Image Correlation on Synchrotron X-Ray Laminography: *Hidehiko Kimura*[1]; Takashi Asada[1]; Satoshi Yamaguchi[1]; Takeshi Uyama[1]; Yujiro Hayashi[1]; [1]Toyota Central R&D Labs., Inc.
	3D-XRD Analysis of Localized Deformation in a Tensioned Polycrystalline NiTi Wire: *Petr Sittner*[1]; Pavel Sedmák[1]; Jan Pilch[1]; Ludek Heller[1]; Jonathan Wright[1]; Petr Sedlák[1]; Miroslav Frost[1]; [1]Institute of Physics ASCR
	3D Characterization of Powder for Additive Manufacturing via Synchrotron X-Ray Microtomography: *Ross Cunningham*[1]; Anthony Rollett[1]; [1]Carnegie Mellon University
	3D Chemical Analysis for Diffusion: *Lei Zhang*[1]; [1]Institute of Metal Research, Chinese Academy of Sciences
	3D Digital Representation of Knitted Textile Architectures: *Daniel Christe*[1]; Dani Liu[1]; Bahareh Shakibajahromi[2]; Chelsea Knittel[3]; David Breen[2]; Genevieve Dion[3]; Antonios Kontsos[1]; [1]Department of Mechanical Engineering and Mechanics, Drexel University; [2]College of Computing and Informatics; [3]Shima Seiki Haute Technology Laboratory, ExCITe Center, Drexel University

3D Grain Reconstruction Using Laboratory-based Diffraction Contrast Tomography: *Yubin Zhang*[1]; A. Lyckegaard[2]; P. Reischig[2]; C. Holzner[3]; E. Lauridsen[2]; [1]Technical University of Denmark; [2]Xnovo Technology ApS; [3]Carl Zeiss X-ray Microscopy, Inc.

3D In Situ Laminography and Digital Volume Correlation Study of Strain and Damage Interactions During Ductile Tearing: *Thilo Morgeneyer*[1]; Thibault Taillandier-Thomas[2]; Lukas Helfen[3]; Francois Hild[2]; [1]Mines ParisTech; [2]ENS Cachan/CNRS/PRES UniverSud Paris; [3]KIT

3D Modeling of Materials Processing at Melting Point for Metals Using Phase-Field Crystals and Finite Volume Method: *Ebrahim Asadi*[1]; Yousef Kanani[1]; Ahmad Nourian Avval[1]; [1]University of Memphis

3D Sintering Microstructure Construction and Quantitative Evaluation: *Kathy Lu*[1]; [1]Virginia Tech

3D Virtual Heterogeneous Microstructure for Real Particulate Materials Modeling: *Yang Lu*[1]; Stephen Thomas[1]; [1]Boise State University

3D Visualization of Kirkendall Pore Formation and Evolution in Metallic Wires via In Situ Synchrotron X-ray Tomographic Microscopy: *Ashley Paz y Puente*[1]; Dinc Erdeniz[1]; Julie Fife[2]; Xianghui Xiao[3]; David Dunand[1]; [1]Northwestern University; [2]Paul Scherrer Institut; [3]Argonne National Laboratory

4D In-Situ Nanoscale Imaging of the Fracture Behavior of CMC Microcomposites: *Hrishikesh Bale*[1]; Marty Leibowitz[1]; Sergey Etchin[1]; Luke Hunter[1]; Benjamin Hornberger[1]; Leah Lavery[1]; Robert Ritchie[2]; Brian Cox[3]; David Marshall[3]; [1]Carl Zeiss X-ray Microscopy, Inc.; [2]University of California, Berkeley; [3]Teledyne Scientific Company Inc

4D In Situ Solidification of Nano-Composites With and Without Ultrasonic Treatment: *Rémi Daudin*[1]; Sofiane Terzi[2]; Pierre Lhuissier[1]; Marco Di Michiel[3]; Mario Scheel[3]; Elodie Boller[3]; Luc Salvo[1]; [1]Université Grenoble Alpes, SIMAP; [2]European Space Agency; [3]ESRF-The European Synchrotron

A 3D Phase-Field Model for the Simulation of L12 Ordered K-Carbide Precipitates in Low Density Steels: *Mahsa Rahnama*[1]; Alireza Rahnama[2]; [1]Isfahan University of Technology; [2]University of Warwick

A Digital Image Correlation Study of Micro-Lattice Tension and Compression Testing: *Jonas Saarimäki*[1]; Johan Moverare[1]; Håkan Brodin[2]; [1]Linköping University; [2]Siemens Industrial Turbomachinery AB

A Framework for Modeling Microstructural Characterization Errors and Their Effect on the Accuracy of Grain Ensemble Statistics: *Gregory Loughnane*[1]; Michael Uchic[2]; Michael Groeber[2]; [1]Mound Laser & Photonics Center, Inc.; [2]Air Force Research Laboratories

A Geometric Morphometric and Finite Element Approach to the Study of Juvenile Long Bones from Medieval Wharram Percy: *Sarah Stark*[1]; Simon Mays[2]; Jo Sofaer[1]; Sonia Zakrzewski[1]; [1]University of Southampton; [2]English Heritage

A New 3D Automatic Meshing Technique Based on the Concept of Voronoi Geodesic Applied to a Composite Reinforced by Short Fibers: *Franck N'Guyen*[1]; [1]ENSMP

A New Fast Simulation Tool for Optimized X-Ray Micro-Tomography Data Acquisition: *Barbara Fayard*[1]; Arthur Sonzogni[1]; Olivier Guiraud[1]; Pierre Latil[1]; [1]NOVITOM - Advanced 3D Imaging

A New In-situ Far-Field High Energy Diffraction Microscopy Planar Biaxial Experiment: *Garrison Hommer*[1]; Jun-Sang Park[2]; Peter Collins[3]; Adam Pilchak[4]; Aaron Stebner[1]; [1]Colorado School of Mines; [2]Argonne National Laboratory; [3]Iowa State University; [4]Air Force Research Lab

A Potts Model Investigation of Complexion Transitions and Abnormal Grain Growth: *William Frazier*[1]; Gregory Rohrer[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

AI-Materials Science to Predict Stress-Strain Curve: *Yoshitaka Adachi*[1]; Sunao Sadamatsu[1]; [1]Kagoshima University

Approximate Method for Solving Freezing in Variable Property Porous Media: *Rahul Basu*[1]; [1]Sambhram Instt of Tech, VTU

Automation of Grain and Phase Identification of Low Symmetry Phases for High Energy Diffraction Microscopy: *Branden Kappes*[1]; Andrew Petersen[1]; Harshad Paranjape[1]; Ashley Bucsek[1]; Aaron Stebner[1]; [1]Colorado School of Mines

Case Studies of 3D Techniques as They Relate to ICME: *Thomas Kozmel*[1]; David Snyder[1]; Greg Olson[1]; [1]QuesTek Innovations LLC

Characterization of Graphite Morphology in Cast Iron by X-ray Computed Tomography: *Chih-Pin Chuang*[1]; Singh Dileep[1]; Peter Kenesei[1]; Jonathan Almer[1]; John Hryn[1]; [1]Argonne National Laboratory

Characterizing Grain Boundary Networks in 3D through Algebraic Topology: *Brian Lin*[1]; Gregory Rohrer[2]; Anthony Rollett[2]; [1]National Institute of Standards and Technology; [2]Carnegie Mellon University

Classification of 3D Reinforcement Fillers using Neural Networks and Genetic Algorithms from TEM Images: *Roberto Fernandez Martinez*[1]; Maider Iturrondobeitia[1]; Julen Ibarretxe[1]; Pello Jimbert[1]; [1]University of the Basque Country, UPV/EHU

Comparison of 3D Pore Size Distribution using X-ray Computed Micro-Tomography and Serial Sectioning: *Amanda Levinson*[1]; David Rowenhorst[1]; [1]Naval Research Laboratory

Comparison of the Mechanical Properties of Crumpled Foils and Entangled Monofilaments: *Justine Papillon*[1]; Eric Maire[1]; Olivier Ondel[2]; Damien Fabrègue[1]; Michel Pérez[1]; [1]INSA de Lyon; [2]Université Lyon

Correlative 3D Electron and X-Ray Microscopy Studies of Deformation of Austenitic Stainless Steels: *Rafael Borrajo-Pelaez*[1]; Ye Tian[1]; Ulrich Lienert[2]; Torben Fischer[3]; Peter Hedström[1]; [1]KTH Royal Institute of Technology; [2]Deutsches Elektronen-Synchrotron, DESY Photon Science; [3]Helmholtz-Zentrum Geesthacht, Zentrum für Material- und Küstenforschung GmbH

Data Assimilation for Phase-field Simulation using Ensemble Kalman Filter: *Kengo Sasaki*[1]; Akinori Yamanaka[1]; Shin-ichi Ito[2]; Hiromichi Nagao[2]; [1]Tokyo University of Agriculture and Technology; [2]Earthquake Research Institute, The University of Tokyo

Deformation at Triple Junctions in the Absence of Three-Dimensional Connectivity: *Ying Chen*[1]; Mingjie Li[1]; [1]Rensselaer Polytechnic Institute

Determination of Materials Parameters by Combined 4D Experiments and Phase-Field Simulations: *Jin Zhang*[1]; Stefan Poulsen[2]; Peter Voorhees[2]; Henning Poulsen[1]; [1]Technical University of Denmark; [2]Northwestern University

Distributions of Boundary Plane Normals from the Point of View of the Laboratory Reference Frame: *Krzysztof Glowinski*[1]; [1]Institute of Metallurgy and Materials Science, Polish Academy of Sciences

Dynamic In Situ Loading of Materials during Synchrotron 3D Tomographic Imaging: *Brian Patterson*[1]; Nikhilesh Chawla[2]; Sudhanshu Singh[2]; Angel Overjero[2]; Jason Williams[2]; Xianghui Xiao[3]; Kevin Henderson[1]; Robin Pacheco[1]; Nikolaus Cordes[1]; James Mertens[1]; [1]Los Alamos National Laboratory; [2]Arizona State University; [3]Argonne National Laboratory

Effect of Build Direction and Heat Treatment on Mechanical Behavior of IN 718 Fabricated by Selective Laser Melting: *Yen-Ling Kuo*[1]; Shota Horikawa[1]; Koji Kakehi[1]; [1]Tokyo Metropolitan University

Effect of Neutron Irradiation to Tensile Behavior in Fe-9Cr Alloy—A Study using 3D X-Ray Diffraction Microscopy: *Xuan Zhang*[1]; Chi Xu[2]; Jun-Sang Park[1]; Hemant Sharma[1]; Jonathan Almer[1]; Meimei Li[1]; [1]Argonne National Lab; [2]University of Florida

Electron Tomography and Spectroscopy of Advanced Transistor Architectures: *Andrew Herzing*[1]; [1]NIST

Evaluation of Crystallographic Deformation Behavior in Aluminium Alloy by Means of Diffraction-Amalgamated Grain-Boundary Tracking (DAGT) Technique: *Kyosuke Hirayama*[1]; Hiroyuki Toda[2]; Kentaro Uesugi[3]; Akihisa Takeuchi[3]; [1]Kyushu University; [2]Kyushu University; [3]Japan Synchrotron Radiation Research Institute

Evolution of 3D Microstructure in Phase Transforming and Twinning Materials – A Novel Micromechanical Modeling and Synchrotron Diffraction Based Study: *Harshad Paranjape*[1]; Ashley Bucsek[1]; Darren Dale[2]; Joel Bernier[3]; Aaron Stebner[1]; [1]Colorado School of Mines; [2]Cornell University; [3]Lawrence Livermore National Laboratory

Extraction of Fiber Orientation in Composite Materials from 3D Micro-Tomography: *Barbara Fayard*[1]; Pierre Latil[1]; Arthur Sonzogni[1]; Olivier Guiraud[1]; Moreno Trlin[1]; [1]NOVITOM

Finite Element Simulation of Damaged CFRP for Predicting Stiffness Degradation using 3D Stereology: *Chandrashekhar Hiremath*[1]; Swarnendu Bhattacharya[1]; Jigar Goda[1]; Anirban Guha[1]; Asim Tewari[1]; [1]IIT Bombay

Grain Boundary Curvature as a Function of Five Crystallographic Parameters: *Xiaoting Zhong*[1]; Gregory Rohrer[1]; [1]CMU

Grain Structure of an Irradiated Hafnium-Aluminum Metal Matrix Composite Material: *Donna Guillen*[1]; Zilong Hua[2]; Heng Ban[2]; [1]Idaho National Laboratory; [2]Utah State University

High-Speed In-Situ Microtomography of Deformation of Amorphous/Crystalline Metal Composites: *Therese Bormann*[1]; Remi Daudin[1]; Pierre Latil[2]; Elodie Boller[3]; Alexander Rack[3]; Pierre Lhuissier[1]; Luc Salvo[1]; [1]Université Grenoble Alpes; [2]Novitom; [3]ESRF - The European Synchrotron

In-Situ Energy Resolved Neutron Imaging and Tomography of Electrochemical Cells for Efficient Energy Conversion: *Malgorzata Makowska*[1]; Luise Theil Kuhn[1]; Markus Strobl[2]; Anton Tremsin[3]; Nikolay Kardjilov[4]; Takenao Shinohara[5]; [1]DTU Energy; [2]ESS; [3]Space Sciences Laboratory; [4]Helmholtz Centre Berlin ; [5]Materials and Life Science Facility Division

In-Situ Nano-Tomography at ID16B: The New Nano-Analysis Beamline at the ESRF: *Julie Villanova*[1]; Rémi Daudin[2]; Pierre Lhuissier[2]; Luc Salvo[2]; David Jauffrès[2]; Christophe Louis Martin[2]; Rémi Tucoulou[1]; [1]ESRF - The European Synchrotron; [2]SIMaP University Grenoble Alpes

In Situ 3D Laminography Observation of Failure in Cast Iron Under Shear and Tensile Loading: *Lutz Zybell*[1]; Maik Horn[1]; Meinhard Kuna[1]; Lukas Helfen[2]; *Thilo Morgeneyer*[3]; [1]TU Bergakademie Freiberg; [2]KIT; [3]Mines ParisTech

In Situ Dynamic Tomography and Its Applications in Material Science/Engineering at APS: *Xianghui Xiao*[1]; [1]Argonne National Laboratory

In Situ Study of Elasticity, Plasticity and Phase Transformations in 301L Stainless Steel: *Jinesh Dahal*[1]; Harshad Paranjape[1]; Jun-Sang Park[2]; Hemant Sharma[2]; Darren Dale[3]; Joel Bernier[4]; Aaron Stebner[1]; [1]Colorado School of Mines; [2]Argonne National Laboratory; [3]Cornell High Energy Synchrotron Source; [4]Lawrence Livermore National Laboratory

Investigation of Orientation Relationship and Growth Direction of Beta-Mn Phase in Austenite-Based Lightweight Steels Using 3D Microstructure Reconstruction: *Keunho Lee*[1]; Siwook Park[1]; Sang Sub Han[1]; Seong-Jun Park[2]; Kyu Hwan Oh[1]; Heung Nam Han[1]; [1]Seoul National University; [2]Korea Institute of Materials Science

Large Volume 3D Characterization of Microstructures by Xe-Ion Plasma FIB: *Madeleine Kelly*[1]; Noel Nuhfer[1]; Gregory Rohrer[1]; [1]Carnegie Mellon University

Mathematical Morphology Applied on the Development of Automatic Finite Element Meshing Tools in the Case of Biphases Heterogeneous Microstructures: *Franck N'Guyen*[1]; [1]ENSMP

Methods for Determining Integral Mean Curvature of Grain Boundaries in 3D Reconstructed and Simulated Structures: Robert DeHoff[1]; David Rowenhorst[2]; *Burton Patterson*[1]; Catherine Sahi[1]; [1]University of Florida; [2]U.S. Naval Research Laboratory

Microstructure Investigation of Long Period Stacking Ordered Structure Formation in Mg-Zn-Gd Alloys: *Satoru Yoshioka*[1]; Masahiro Ishida[1]; Tomokazu Yamamoto[1]; Kazuhiro Yasuda[1]; Syo Matsumura[1]; Shigeru Kimura[1]; [1]Kyushu University

Modeling Deformation Behavior of Two-Phase Titanium Alloys using Representative 3D Microstructures: *Sudipto Mandal*[1]; Anthony Rollett[1]; [1]Carnegie Mellon University

Modeling of Anti-Corrosion Coatings from Combustion Slag: *Oleg Chizhko*[1]; [1]Foreign Department of Association for German Engineers

Modeling of Localized Corrosion of Metals: *San-Qiang Shi*[1]; [1]The Hong Kong Polytechnic University

Modeling the Probability of Occurrence of Rarely Occurring Critical Microstructural Features: *Joseph Tucker*[1]; Tyler Weihing[2]; Michael Groeber[3]; Adam Pilchak[3]; [1]Exponent; [2]Southwestern Ohio Council for Higher Education; [3]Air Force Research Laboratory

TECHNICAL PROGRAM

Morphological Analysis of γ' Shape Evolution in Single Crystal Nickel-Base Superalloys: *Ryan Harrison*[1]; Patrick Callahan[2]; Tresa Pollock[2]; Marc De Graef[1]; [1]Carnegie Mellon University; [2]University of California, Santa Barbara

Multi-Scale Structure Characterisations and Image-Based Modelling of a Novel-Fabricated Tubular Solid Oxide Fuel Cell: *Xuekun Lu*[1]; Tao Li[2]; Kang Li[2]; Dan Brett[1]; Paul Shearing[1]; [1]University College London; [2]Imperial College London

Multiscale Characterization of Novel Copper-Carbon Materials: *Iwona Jasiuk*[1]; Sabrina Nilufar[1]; Gabriela Couvertier Santos[1]; [1]University of Illinois at Urbana-Champaign

Non-Destructive Internal Lattice Strains Measurement using High Energy Synchrotron Radiation: *Jun-Sang Park*[1]; John Okasinski[1]; Jonathan Almer[1]; [1]Argonne National Laboratory

Novel Capabilities of Neutron Imaging at Pulsed Sources: *Markus Strobl*[1]; [1]ESS

Novel Visualization Strategies for Investigating Correlations and Spatial Gradients in 3- and 4- Dimensional Datasets: *Michael Groeber*[1]; Michael Uchic[1]; Sean Donegan[2]; Adam Pilchak[1]; Craig Przybyla[1]; Edwin Schwalbach[1]; [1]AFRL; [2]BlueQuartz Software

Numerical Study of Internal SEN Design Effects on Jet Oscillations in a Funnel Thin Slab Caster: Hugo Arcos Gutierrez[1]; *Gerardo Barrera Cardiel*[1]; Ramiro Escudero Garcia[1]; [1]IIM-UMSNH

On the Use of Neural Networks to Train Denoising Filters for Tomographic Reconstruction of the Magnetic Vector Potential: *KC Prabhat*[1]; Marc De Graef[1]; [1]Carnegie Mellon University

One Approach for an Out-of-ROI Reconstruction: *Valeriy Titarenko*[1]; [1]University of Manchester

OOF 3D: A Materials-Science Focused Finite Element System: *Andrew Reid*[1]; Stephen Langer[1]; [1]NIST

Operando Bragg Coherent Diffractive Imaging of Energy Storage Materials: *Andrew Ulvestad*[1]; Brian Stephenson[1]; [1]Argonne National Laboratory

Optimization of Microstructure via 3D Image-Based Simulation: *Hiroyuki Toda*[1]; Han Li[1]; Dowon Seo[1]; Rafael Batres[2]; Osamu Kuwazuru[3]; [1]Kyushu University; [2]Tecnológico de Monterrey.; [3]Fukui University

Optimization of Partially-Sintered Metal Powder Porous Materials for Transpiration Cooling: *Sébastien Pinson*[1]; Remy Dendievel[1]; Cécile Davoine[2]; Audrey Guyon[3]; [1]Grenoble INP; [2]ONERA-The French Aerospace; [3]Sintertech SAS

Phase Field Based Microstructure Reconstruction for Modeling Nuclear Materials: *Bradley Fromm*[1]; Michael Tonks[2]; Melissa Teague[3]; David Field[1]; [1]Washington State University; [2]Pennsylvania State University; [3]Sandia National Laboratories

Porosity Analysis in Al-10Si-1Mg Components Additively Manufactured by Selective Laser Melting using Synchrotron X-Ray Computed Tomography: *Suraj Raghavendra Rao Krishna Rao*[1]; Ross Cunningham[1]; Tugce Ozturk[1]; Jaakko Suni[2]; Cagatay Yanar[2]; John Siemon[2]; Deborah Wihelmy[2]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Alcoa

Practical Considerations for Efficacy in Additive Manufacturing: *Vicki Barbur*[1]; Kenneth Sabo[1]; Michael Tims[1]; Daniel Widdis[1]; [1]Concurrent Technologies Corporation

Practical Issues with the Collection and Transfer of 3D Materials Data: *Sean Donegan*[1]; Mike Jackson[1]; [1]BlueQuartz Software

Present and Future of Neutron Imaging and Diffraction Techniques on Materials Science Beamline IMAT: *Genoveva Burca*[1]; W. Kockelmann[1]; J. Kelleher[1]; S. Kabra[1]; S.Y. Zhang[1]; J.A. James[2]; T. Minniti[1]; F. Montesino-Pousolz[1]; J.B. Nightingale[1]; E. Yang[3]; [1]STFC Rutherford Appleton Laboratory, ISIS Facility; [2]The Open University, Milton Keynes, UK; [3]STFC Rutherford Appleton Laboratory, SCD

Production of Nanobridges with Controlled Diameter by Layer-by-Layer Assembly: Yingmeng Zhang[1]; Nicholas Kotov[1]; *Qing Zhu*[1]; [1]University of Michigan

Quantification of Inter-Laminar Shear Strength in Cyclic Hydro-thermal Environments in GFRP by 3D X-Ray Micro-Tomography: *Swarnendu Bhattacharya*[1]; Chandrashekhar Hiremath[1]; Asim Tewari[1]; Anirban Guha[1]; [1]IIT BOMBAY

Quantitative Microstructure Analysis of Tungsten Heavy Alloy using Stereology: *Jitesh Vasavada*[1]; Saurabh Arvariya[2]; Sushil Mishra[1]; Asim Tewari[1]; [1]IIT Bombay; [2]General Motors India Pvt. Ltd.

Reveal Novel Channel Segregation Mechanism during Steel-Casting by Lab-Based High Resolution X-Ray Tomography: *Shao-Gang Wang*[1]; Yan-Fei Cao[1]; Su-Cheng Wang[1]; Lei Zhang[1]; [1]Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

Ring Artefact Suppression by a 2D Image Filtering: *Valeriy Titarenko*[1]; [1]University of Manchester

Segmentation of Individual Fibres of Uni-Directional Composite from 3D X-Ray Computed Tomography Data: Kristine Jespersen[1]; Monica Emerson[1]; Anders Dahl[1]; Knut Conradsen[1]; *Lars Mikkelsen*[1]; [1]Technical University of Denmark

Serial Sectioning of Nanocrystalline Grain Microstructures: *Dana Zöllner*[1]; Peter Streitenberger[1]; [1]Otto von Guericke University Magdeburg

Simulation of Controlling System of Shape Memory Nanotweezers: *Peter Lega*[1]; Victor Koledov[1]; [1]IRE RAS

Sintering Modeling of Compact Alumina: *Mohammed Al-Tameemi*[1]; Adil Al-Mossooeey[2]; Ilham Ibrheem[2]; [1]University of Technology; [2]University of Byblon

STEM-HAADF and Super-X™ XEDS Tomography of Complex Nano-scale Precipitates in High Entropy Alloys: Jacob Jensen[1]; *John Sosa*[1]; Daniel Huber[1]; Gopal Viswanathan[1]; Robert Williams[1]; Hamish Fraser[1]; [1]The Ohio State University

Stereological Constraints on Three-Point Correlation Functions: Jitesh Vasavada[1]; Sushil Mishra[1]; *Asim Tewari*[1]; [1]IIT Bombay

Structural Reconstruction of Solidification Kinetics in Cast Iron with Spherical Graphite: *Simon Lekakh*[1]; [1]MST

Synthetic Microstructure Realizations with Random Texture: Harsh Narula[1]; *Sushil Mishra*[1]; Asim Tewari[1]; [1]IIT Bombay

	Tailoring the Thermochemical Properties of Porous Solar Absorbers for Syngas Fuel Production: *Amir Masoud Parvanian*[1]; Mohammad Saadatfar[2]; Hamidreza Salimi Jazi[1]; Mohammadhossein Fathi[1]; [1]Isfahan University of Technology; [2]The Australian National University
	Techniques for Advanced Image Processing and Effective Material Property Calculation for Microstructural Data: *Kerim Genc*[1]; Thomas Spirka[1]; Philippe Young[2]; Wojciech Smigaj[2]; [1]Simpleware Inc.; [2]Simpleware Ltd
	The Application of 3D STEM Tomography for the State-of-Art Semiconductor Devices Failure Analysis: *Bianzhu Fu*[1]; Frieder Baumann[1]; Michael Gribelyuk[1]; Wayne Zhao[1]; Chao Fang[1]; Esther Chen[1]; Daniel Flatoff[1]; Randy Newkirk[1]; Brian Popielarski[1]; [1]Globalfoundries
	The Effect of 3D Microstructures on Nucleation of Voids in Dual Phase (DP) Steels: *Mayuko Kikuzuki*[1]; [1]Nippon Steel & Sumitomo Metal Corpolation
	The Grain Mapper at the HEMS Beamline, Petra III: *Torben Fischer*[1]; Lars Lottermoser[1]; Norbert Schell[1]; Martin Müller[1]; Andreas Schreyer[1]; [1]Helmholtz-Zentrum Geesthacht
	Three-Dimensional Analysis of Graphite Nodules in Ductile Cast Iron Using FIB-SEM: *Ehsan Ghassemali*[1]; Keivan Amiri Kasvayee[1]; Anders Jarfors[1]; [1]Jönköping University
	Three-Dimensional Microstructural Evaluation of Materials using Robo-Met.3D®: *Satya Ganti*[1]; Bryan Turner[1]; [1]UES Inc
	Three-Dimensional Nanostructure Determination Based on Scanning Electron Nanodiffraction: *Yifei Meng*[1]; Jian-Min Zuo[1]; [1]University of Illinois at Urbana-Champaign
	Three Dimensional Eutectic Colony Morphologies in Multi-Component, Multi-Phase Alloys: *Arka Lahiri*[1]; Abhik Choudhury[1]; [1]Indian Institute of Science
	Understanding Transformational Faulting as a Deep Focus Earthquake Mechanism: Correlating In-Situ Acoustic Emission Locations at High Pressure and Temperature with Post-Mortem Fault Imaging Using Synchrotron X-Ray Microtomography: *Yanbin Wang*[1]; Feng Shi[1]; Lupei Zhu[2]; Tony Yu[1]; Mark Rivers[1]; Alexandra Schubnel[3]; Nadege Hilairet[4]; Fabrice Brunet[5]; [1]University of Chicago; [2]St. Louis University; [3]ENS-Paris; [4]Université Lille1; [5]Université de Grenoble
	Volumetric Elemental Imaging and Quantification by Confocal X-Ray Fluorescence: *James Mertens*[1]; Brian Patterson[1]; Nikolaus Cordes[1]; Kevin Henderson[1]; Jeffrey Griego[1]; Thomas Day[1]; Derek Schmidt[1]; George Havrilla[1]; [1]Los Alamos National Laboratory
	Three-Dimensional Reconstruction, Visualization and Quantification of Dislocation Structures from STEM Stereo-Pairs: *Leonardo Agudo Jacome*[1]; Kai Pöthkow[2]; Olaf Paetsch[2]; Hans-Christian Hege[2]; [1]Federal Institute for Materials Research and Testing (BAM); [2]Zuse Insitut Berlin

Tuesday, July 12, 2016

Plenary 2
Room: Salons V&VI

8:00 AM	**Revealing Microstructures using High-Energy X-rays**: *Jonathan Almer*[1]; Peter Kenesei[1]; Jun-Sang Park[1]; Hemant Sharma[1]; Meimei Li[1]; Katherine Faber[2]; Stuart Stock[3]; [1]Argonne National Laboratory; [2]Caltech; [3]Northwestern University
9:00 AM	**Break**

Experimental Techniques for 3D Data Acquisition: Non-Destructive Methods for Investigating Material Response In-Situ
Room: Salon V

9:10 AM	**Invited** **Single Grain High Resolution Reciprocal Space Mapping**: *Ulrich Lienert*[1]; Wolfgang Pantleon[2]; [1]Deutsches Elektronen-Synchrotron; [2]Technical University of Denmark
9:40 AM	**Advanced In Situ Loading Environments for Synchrotron X-Ray Diffraction Experiments**: *Paul Shade*[1]; Todd Turner[1]; Jay Schuren[1]; Basil Blank[2]; Joel Bernier[3]; Shiu Fai Li[3]; Jonathan Lind[3]; David Menasche[4]; Robert Suter[4]; Ulrich Lienert[5]; Peter Kenesei[6]; Jun-Sang Park[6]; Jonathan Almer[6]; Darren Dale[7]; Ernest Fontes[7]; Matthew Miller[8]; [1]Air Force Research Laboratory; [2]PulseRay; [3]Lawrence Livermore National Laboratory; [4]Carnegie Mellon University; [5]DESY; [6]Advanced Photon Source; [7]Cornell High Energy Syncrotron Source; [8]Cornell University
10:00 AM	**Utilizing Non-Destructive Multimodal Experimental Techniques for 3D Characterization of Polycrystalline Materials**: *Reeju Pokharel*[1]; Donald Brown[1]; Ricardo Lebensohn[1]; [1]Los Alamos National Laboratory
10:20 AM	**Break**
10:40 AM	**Probing Morphology and Chemistry in AISI 316 Stainless Steel using Correlative X-Ray and TEM Tomography**: *Tim Burnett*[1]; Tom Slater[2]; R Bradley[2]; S Haigh[2]; P Withers[2]; [1]Manchester University/FEI; [2]University of Manchester
11:00 AM	**Multimodal X-ray Study of In-Situ Cracking in Titatium**: *David Menasche*[1]; Paul Shade[2]; TJ Turner[2]; Ulrich Lienert[3]; Joel Bernier[4]; Darren Pagan[4]; Peter Kenesei[5]; Jun-Sang Park[5]; Robert Suter[1]; [1]Carnegie Mellon University; [2]Air Force Research Lab; [3]Deutsches Elektronen-Synchrotron; [4]Lawrence Livermore National Laboratory; [5]Argonne National Lab Advanced Photon Source
11:20 AM	**Laboratory Diffraction Contrast Tomography – Applications and Future Directions**: *Erik Lauridsen*[1]; Christian Holzner[2]; Florian Bachmann[1]; Kenneth Nielsen[1]; Leah Lavery[2]; William Harris[2]; Peter Reischig[1]; Allan Lyckegaard[1]; [1]Xnovo Technology ApS; [2]Carl Zeiss X-ray Microscopy, Inc
11:40 AM	**Diffraction Contrast in Neutron Imaging for Evaluation of Phase, Texture and Strain**: *Robin Woracek*[1]; Dayakar Penumadu[2]; Anton Tremsin[3]; Nikolay Kardjilov[4]; Ingo Manke[4]; Markus Strobl[1]; [1]European Spallation Source; [2]University of Tennessee; [3]University of California at Berkeley; [4]Helmholtz Zentrum Berlin

TECHNICAL PROGRAM

12:00 PM	**In Situ Characterization of Interaction and Coalescence of Stress Corrosion Cracks by X-Ray Microtomography and Digital Volume Correlation**: *Thanh Tung Nguyen*[1]; José Bolivar[2]; Julien Rethore[3]; Marion Fregonese[2]; Jerome Adrien[2]; Jean-Yves Buffiere[2]; [1]LaMCoS INSA Lyon,CNRS; [2]MATEIS-INSA Lyon, CNRS; [3]LaMCoS INSA Lyon,CNRS

Processing-Structure-Property Relationships in 3D: Microstructure Effects on Mechanical Response
Room: Salon VI

9:10 AM	**Invited** **Process-Structure Relationships in Metallurgical Joining and Their Implications to Mechanical Response**: *Jonathan Madison*[1]; Olivia Underwood[1]; Lisa Deibler[1]; Jeff Rodelas[1]; Helena Jin[1]; Jay Foulk, III[1]; [1]Sandia National Laboratories
9:40 AM	**3D Mapping of Residual Stress Field in Shot-Peened Aluminum Alloy by Micro-Hole Drilling Method**: *Bartlomiej Winiarski*[1]; Tim Burnett[2]; Matteo Benedetti[3]; Philip Withers[2]; [1]FEI & University of Manchester; [2]University of Manchester; [3]University of Trento
10:00 AM	**Effect of Microstructure on Tensile Behavior and Retained Austenite Stability of Thermo-Mechanically Processed Transformation-Induced Plasticity Steel Studied using In-Situ Synchrotron X-Ray Diffraction**: *Elena Pereloma*[1]; Kun Yan[2]; Klaus-Dieter Liss[3]; [1]University of Wollongong; [2]University of Manchester; [3]Australian Nuclear Science and Technology Organisation
10:20 AM	**Break**
10:40 AM	**Indentifying Fatigue Failure Sites in Rene 88DT via TriBeam Tomography**: *William Lenthe*[1]; Jean-Charles Stinville[1]; McLean Echlin[1]; Tresa Pollock[1]; [1]University of California, Santa Barbara
11:00 AM	**Investigation of Nonmetallic Inclusion-Driven Failures**: *Diwakar Naragani*[1]; Michael Sangid[1]; Paul Shade[2]; Jay Schuren[2]; Hemant Sharma[3]; Jun-Sang Park[3]; Peter Kenesei[3]; Joel Bernier[4]; Todd Turner[2]; [1]Purdue University; [2]Air Force Research Laboratory; [3]Argonne National Laboratory; [4]Lawrence Livermore National Laboratory
11:20 AM	**Investigation of Neighborhood Effects on Crack Initiation Sites in Different Ti Microstructures**: *Vahid Tari*[1]; Michael Groeber[2]; Adam Pilchak[2]; Anthony Rollett[1]; [1]Carnegie Mellon University; [2]Air Force Research Laboratory (AFRL/RXCM)
11:40 AM	**Intragranular Orientation Spread Induced by Grain Interaction**: *Jette Oddershede*[1]; Grethe Winther[2]; [1]DTU Physics; [2]DTU Mechanical Engineering
12:00 PM	**Constraint Effects on the Grain-scale Transformation Kinematics of Shape Memory Alloys Studied using High Energy Diffraction Microscopy**: *Harshad Paranjape*[1]; Partha Paul[2]; Jun-Sang Park[3]; Hemant Sharma[3]; Aaron Stebner[1]; L. Catherine Brinson[2]; [1]Colorado School of Mines; [2]Northwestern University; [3]Argonne National Laboratory

Experimental Techniques for 3D Data Acquisition: Improving the Efficiency and Accuracy of 3D Data Collection
Room: Salon V

2:00 PM	**Invited** **A New 3d Computational Method for 3D Orientation Data Sets for Uncovering the True Nature of the Deformed and Annealed States in Metals and Alloys**: *Michael Ferry*[1]; [1]University of New South Wales
2:30 PM	**Efficient 3D Characterization of Titanium Microstructures via Serial Sectioning Combined with Correlative Microscopy Methods**: *Michael Uchic*[1]; Michael Groeber[1]; J. Michael Scott[2]; [1]Air Force Research Laboratory; [2]UES, Inc.
2:50 PM	**Accurate Measurement of Slice Geometry During Focused Ion Beam Tomography**: *Ken Mingard*[1]; Helen Jones[1]; David Cox[1]; Mark Stewart[1]; Mark Gee[1]; [1]National Physical Laboratory
3:10 PM	**Three-Dimensional Multimodal Imaging and Analysis of Ti–Ni–Sn Thermoelectric Materials**: *McLean Echlin*[1]; Jason Douglas[1]; William Lenthe[1]; Ram Seshadri[1]; Tresa Pollock[1]; [1]UC Santa Barbara
3:30 PM	**Dictionary-Based Approach to Indexing of Electron Channeling Patterns**: *Saransh Singh*[1]; Marc De Garef[1]; [1]Carnegie Mellon University
3:50 PM	**Break & Vendor Showcase**

Processing-Structure-Property Relationships in 3D: Microstructure Effects on the Evolution of Materials
Room: Salon VI

2:00 PM	**Invited** **Analysis of Integral Mean Curvature Driven Grain Growth in Iron Using Diffraction-Contrast Tomography**: Robert DeHoff[1]; Erik Lauridsen[2]; Dorte Juul Jensen[3]; *Burton Patterson*[1]; Yubin Zhang[3]; Catherine Sahi[1]; Christian Holzner[4]; [1]University of Florida; [2]Xnovo Technology; [3]Technical University of Denmark; [4]Carl Zeiss X-ray Microscopy, Inc.
2:30 PM	**Watching the Growth and Coarsening of Highly Anisotropic Alloys**: *Ashwin Shahani*[1]; Xianghui Xiao[2]; Peter Voorhees[1]; [1]Northwestern University; [2]Argonne National Laboratory
2:50 PM	**Serial-Sectioning and Phase Field Models: Coarsening of Dendrites in Solid-Liquid Mixtures**: *Thomas Cool*[1]; Peter Voorhees[1]; [1]Northwestern University
3:10 PM	**Tracking 3D Microstructure Evolution during Powder Sintering by Laboratory X-Ray Diffraction Contrast Tomography**: *Samuel McDonald*[1]; Peter Reischig[2]; Christian Holzner[3]; Erik Lauridsen[2]; Arno Merkle[3]; Michael Feser[3]; Philip Withers[1]; [1]University of Manchester; [2]Xnovo Technology ApS; [3]Carl Zeiss X-ray Microscopy
3:30 PM	*In-Situ* **Multiscale 3D-Mapping of Embedded Recrystallizing Grains in Aluminium**: *Sonja Ahl*[1]; Hugh Simons[1]; Anders Clemen Jakobsen[1]; Dorte Juul Jensen[1]; Henning Friis Poulsen[1]; [1]Technical University of Denmark
3:50 PM	**Break & Vendor Showcase**

4:50 PM	**Characterizing Evolution in Commercial Li-Ion Batteries Across Space and Time using X-Ray, Light, and Scanning Electron Microscopy**: *Jeff Gelb*[1]; Donal Finegan[2]; Paul Shearing[2]; Dan Brett[2]; [1]Carl Zeiss X-ray Microscopy; [2]University College London
5:10 PM	**A Principle Curvature Analysis to Reveal the Isothermal Evolution of Nanoporous Gold**: *Markus Ziehmer*[1]; Kaixiong Hu[1]; Ke Wang[2]; Erica Lilleodden[1]; [1]Helmholtz-Zentrum Geesthacht; [2]Technische Universität Hamburg-Harburg
5:30 PM	**Three Dimensional Self-Organization during Three-Phase Eutectic Growth**: *Abhik Choudhury*[1]; [1]Indian Institute of Science
5:50 PM	**A Correlative Six-Dimensional Study of a First-Order Phase Transformation in Ni-Al Alloys at the Subnano-to-Nanoscale Levels**: *David Seidman*[1]; [1]Northwestern University

Processing-Structure-Property Relationships in 3D: Measurement and Understanding of Local Stresses and Nucleation Events
Room: Salon V

4:50 PM	**In Situ Characterization of Nanoscale Precipitate Nucleation and Growth in Aluminum Alloys Using Transmission X-Ray Microscopy (TXM)**: C. Shashank Kaira[1]; Sudhanshu Singh[1]; Vincent De Andrade[2]; Francesco De Carlo[2]; *Nikhilesh Chawla*[1]; [1]Arizona State University; [2]Advanced Photon Source, Argonne National Laboratory
5:10 PM	**Microstructural Effects on Void Nucleation in Polycrystalline Copper**: *Evan Lieberman*[1]; Anthony Rollett[2]; Curt Bronkhorst[1]; Ricardo Lebensohn[1]; [1]Los Alamos National Laboratory; [2]Carnegie Mellon University
5:30 PM	**Measured Resolved Shear Stresses on Slip Systems in Austenitic Steel Grains**: *Nicolai Juul*[1]; Grethe Winther[1]; Jette Oddershede[1]; [1]Technical University of Denmark
5:50 PM	**Quantitative 3D Mapping of Local Stresses Near Dislocation Channel-Grain Boundary Interaction Sites in Irradiated Stainless Steel**: *Drew Johnson*[1]; Bryan Kuhr[2]; Diana Farkas[2]; Gary Was[1]; [1]University of Michigan; [2]Virginia Tech

Wednesday, July 13, 2016

Advances in Reconstruction Algorithms: Interface Quantification and the Registry of Multi-Modal Data
Room: Salon V

8:00 AM	**Invited** **Accurate Reconstruction of Interface Geometries from Serial-Sectioning Data**: *David Rowenhorst*[1]; [1]The US Naval Research Laboratory
8:30 AM	**Multi-Modal Fusion of Experimental and Simulated Materials Data**: *Sean Donegan*[1]; Mike Groeber[2]; Mike Uchic[2]; Adam Pilchak[2]; Dennis Dimiduk[1]; [1]BlueQuartz Software; [2]Air Force Research Laboratory
8:50 AM	**High Accuracy Heterogeneous CAD Against Tomography Registration**: *Yann Le Guilloux*[1]; [1]Safran Paris-Saclay
9:10 AM	**Atom Probe Tomography Quantization and Autocorrelation Mapping for Studying Grain Boundary Networks and Solute Segregation in Nanocrystalline Alloys**: *Ying Chen*[1]; [1]Rensselaer Polytechnic Institute
9:30 AM	**Break**

Advances in 3D Materials Modeling: In-situ Experiments and Phase Field Simulations
Room: Salon VI

8:00 AM	**Invited** **In Situ Experiments in X Ray Tomography**: *Eric Maire*[1]; [1]Mateis Universite Lyon INSA
8:30 AM	**Three-Dimensional Phase-Field Simulation of Concurrent Dendrite Growth and Coarsening During Solidification in Al-Cu Alloys**: *Yue Sun*[1]; Ahmet Cecen[2]; K. Aditya Mohan[3]; Xianghui Xiao[4]; Peter Voorhees[1]; [1]Northwestern University; [2]Georgia Institute of Technology; [3]Purdue University; [4]Argonne National Laboratory
8:50 AM	**GPU-Accelerated 3D Phase Field Crystal Simulation of Grain Boundary Motion in Bcc Bicrystal**: *Akinori Yamanaka*[1]; Kevin McReynolds[2]; Peter Voorhees[2]; [1]Tokyo University of Agriculture and Technology; [2]Northwestern University
9:10 AM	**A Multi-Component Phase-Field Simulation of Ordered Intermetallic Compounds in Low Density Steels**: *Alireza Rahnama*[1]; Richard Dashwood[1]; Sridhar Seetharaman[1]; [1]University of Warwick
9:30 AM	**Break**

Image Processing and Digital Representation of Microstructure: Quantification of Structure and Improvement of Data Quality
Room: Salon V

10:00 AM	**Invited** **Microstructural Image Analysis using Computer Vision and Machine Learning**: *Elizabeth Holm*[1]; Brian DeCost[1]; [1]Carnegie Mellon University
10:30 AM	**A New Technique to Estimate the Bias and Precision of Measurements Made from Tomography Scans**: *Robert Bradley*[1]; Philip Withers[1]; [1]The University of Manchester
10:50 AM	**Fidelity Analysis of EBSD-Based Orientations and Disorientations Obtained by Two Type of Analyses: (1) Based on the 2D-HT and (2) Based on a Dictionary of Dynamical, Forward-Modeled EBSPs**: *Farangis Ram*[1]; Marc De Graef[1]; Stefan Zaefferer[2]; Tom Jäpel[2]; Dirk Raabe[2]; [1]Carnegie Mellon University; [2]Max-Planck Institut für Eisenforschung GmbH

11:10 AM	**MIPAR™: 2D and 3D Characterization Software Designed for Materials Scientists, by Materials Scientists**: *John Sosa*[1]; Jacob Jensen[1]; Daniel Huber[1]; Hamish Fraser[1]; [1]The Ohio State University
11:30 AM	**Numerical Descriptors of Polycrystals for Combined High-Energy X-Ray Diffraction Experiments and Polycrystal Computations**: *Romain Quey*[1]; Loïc Renversade[1]; [1]Ecole des Mines / CNRS
11:50 AM	**Enhancing Structural Resolution of Lithium-Ion Battery Particles by Multimodal Analysis of TXM and STEM Datasets**: *Xiaogang Yang*[1]; Charudatta Phatak[1]; Doga Gursoy[1]; Francesco De Carlo[1]; Vincent De Andrade[1]; Begum Gulsoy[2]; [1]Argonne National Laboratory; [2]Northwestern University

Processing-Structure-Property Relationships in 3D: Experimental Investigation and Modeling of Deformation and Failure
Room: Salon VI

10:00 AM	**Invited** **Dark-Field X-Ray Microscopy: Multiscale Structure and Stress Mapping**: *Henning Poulsen*[1]; Frederik Stöhr[1]; Sonja Ahl[1]; Annika Diederichs[1]; José Trujillo[1]; Hugh Simons[1]; Anders Jakobsen[1]; Søren Schmidt[1]; Wolfgang Pantleon[1]; Jakob Bowen[1]; Wolfgang Ludwig[2]; Carsten Detlefs[2]; [1]DTU; [2]ESRF
10:30 AM	**Microstructure-Property Relationships in Metallic Castings: A Multi-Scale X-Ray Study**: *James Mertens*[1]; Amy Clarke[1]; Brian Patterson[1]; Ricardo Lebensohn[1]; Kevin Henderson[1]; Damien Tourret[1]; Clarissa Yablinsky[1]; John Gibbs[1]; Seth Imhoff[1]; [1]Los Alamos National Laboratory
10:50 AM	**In Situ X-Ray Tomographic Characterisation and Modeling of Low Cycle Fatigue Crack Behavior in a Cast Al Alloy at High Temperature**: *Sébastien Dézécot*[1]; Jean-Yves Buffiere[1]; vincent Maurel[2]; Fabien Szmytka[3]; Alain Koster[2]; [1]INSA de Lyon; [2]MINES ParisTech; [3]PSA Peugeot Citroen
11:10 AM	**Microstructurally-Short Crack Growth Driving Force Identification: Combining DCT, PCT, Crystal Plasticity Simulation and Machine Learning Technique**: *Andrea Rovinelli*[1]; Michael Sangid[1]; Ricardo Lebensohn[2]; Wolfgang Ludwig[3]; Yoann Guilhem[4]; Henry Proudhon[5]; [1]Purdue University; [2]Los Alamos National Lab; [3]ESRF; [4]ENS de Cachan; [5]MINES ParisTech
11:30 AM	**Modelling of the Plastic Anisotropy of Steel under Different Strain Rates and Temperatures by Crystal Plasticity Finite Element Method**: *Junhe Lian*[1]; Sihwa Sung[1]; Deok-Chan Ahn[2]; Dong-Chul Chae[2]; Sebastian Münstermann[3]; Wolfgang Bleck[1]; [1]RWTH Aachen University; [2]POSCO; [3]Jülich Research Centre
11:50 AM	**4D Monitoring of Fibre Failure on CFRP by In Situ Ultrafast X-Ray Computed Tomography**: *Serafina Consuelo Garcea*[1]; Philip Withers[1]; [1]The University of Manchester

Future Directions and Challenges in 3D Materials Science: Experimental Capabilities
Room: Salon V

2:00 PM	**Invited Talk**: *Tresa Pollock*[1]; [1]University of California, Santa Barbara
2:30 PM	**Multi-Scale 3D Experimental Workflow of an Aluminum 7075 Alloy**: *Arno Merkle*[1]; Nikhilesh Chawla[2]; Sudhanshu Singh[2]; Lorenz Lechner[1]; [1]Carl Zeiss X-ray Microscopy; [2]Arizona State University
2:50 PM	**Using X-Ray Tomography to Study Damage under Load: Current Possibilities, Limits and Challenges**: *Jean-Yves Buffiere*[1]; [1]Universite de Lyon INSA LYON
3:10 PM	Break

Future Directions and Challenges in 3D Materials Science: Synergy of Experiments and Modeling and Industry Application
Room: Salon VI

2:00 PM	**Invited** **3D Analysis in the Research and Development of Steel Products. Current Topics and Future Anticipations**: *Akira Taniyama*[1]; [1]Nippon Steel
2:30 PM	**Comparison of Experiment and Simulation in Deformation of Polycrystals**: *Anthony Rollett*[1]; Jon Lind[2]; Reeju Pokharel[3]; Ricardo Lebensohn[3]; Robert Suter[1]; [1]Carnegie Mellon University; [2]Lawrence Livermore National Laboratory; [3]Los Alamos National Laboratory
2:50 PM	**3D Materials Science and Engineering: Progress Toward Engineering Capabilities**: *Dennis Dimiduk*[1]; Sean Donegan[1]; Michael Jackson[1]; Michael Uchic[2]; Michael Groeber[2]; [1]BlueQuartz Software, LLC; [2]Air Force Research Laboratory
3:10 PM	Break

Panel Discussion
Room: Salons V&VI

3:30 PM	**Panel Discussion**

The 3rd International Congress on 3DMS

3D Materials Science 2016

Register by June 10, 2016 and save!

July 10–13, 2016 • Pheasant Run Resort • St. Charles, Illinois, USA

PROGRAM PREVIEW

Registration is NOW OPEN:
SAVE $100 through June 10, 2016!

Experience
- Technical sessions and access to the exhibition
- Poster session and reception

Enjoy
- Sunday welcome reception
- Tuesday congress dinner

Join the discussion and unlock the potential of 3D Materials Science to produce great benefits in cost effective, efficient, materials and process design.

Sponsored by:

TMS
The Minerals, Metals & Materials Society

and the TMS Advanced Characterization, Testing & Simulation Committee

www.tms.org/3DMS2016/ab