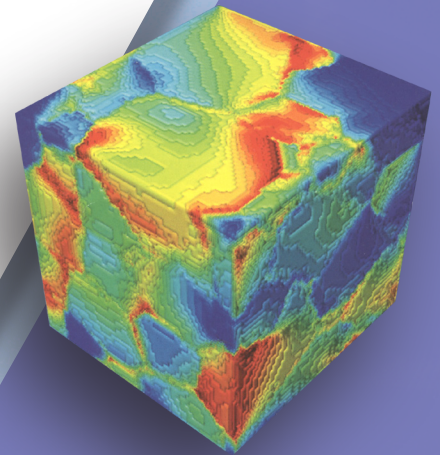


1st International Conference on

3DMS

3D Materials Science, 2012



PROGRAM PREVIEW

July 8-12, 2012 • Seven Springs Mountain Resort
Seven Springs, Pennsylvania, USA

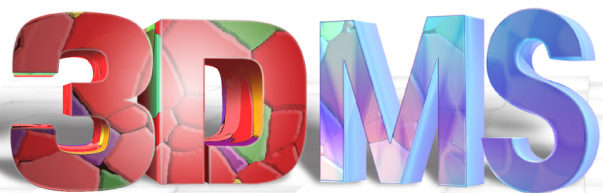
Register by June 7, 2012 and save!

www.tms.org/Meetings/Specialty/3D2012

Sponsored by:

TMS

The Minerals, Metals & Materials Society (TMS) and the TMS
Advanced Characterization, Testing and Simulation Committee



International Conference on 3D Materials Science, 2012

REGISTER NOW for the International Conference on 3D Materials Science, 2012!

Experience the first TMS specialty conference focused on this critical growth area of 3D materials science. This event will facilitate and promote rapid advancements in 3D materials science throughout the world. The goal is to provide the premier forum for presentations of current interest and significance to the three-dimensional characterization, visualization, quantitative analysis, modeling, and investigation of structure-property relationships of materials.

Register by June 7, 2012 and save \$100 off the registration fee!

ORGANIZERS & ADVISORS

Organizing Committee:

- Alexis Lewis** U.S. Naval Research Laboratory, USA
- Marc De Graef** Carnegie Mellon University, USA
- Henning Poulsen** Risø National Laboratory and DTU, Denmark
- Jeff Simmons** U.S Air Force Research Laboratory, USA
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- David Seidman** Northwestern University, USA
- Gary Shiflet** University of Virginia, USA
- Marco Stampanoni** ETH Zurich, Switzerland
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Registration

All conference attendees including authors, presenters, and session chairs are required to register. To receive the advance registration rate, register at:

www.tms.org/Meetings/Specialty/3D2012 by June 7, 2012.

Registration Fees

| | Through June 7, 2012 | After June 7, 2012 |
|--------------------|----------------------|--------------------|
| Member | \$575 | \$675 |
| Nonmember* | \$690 | \$790 |
| Student Member* | \$375 | \$375 |
| Student Nonmember* | \$475 | \$475 |

* Copy of student school identification card must accompany form.

* Includes TMS Membership for 2012.

Registration package includes:

- Technical sessions
- Conference proceedings CD-ROM
- Access to the exhibition
- Round-trip transportation to/from Pittsburgh International Airport
- Sunday welcome reception
- Monday, Tuesday, and Wednesday poster sessions and social hour
- Wednesday barbecue

Online registration will remain open through June 22. After this date you must register on-site.

NETWORKING & SOCIAL EVENTS

Sunday, July 8

Welcome Reception • 8:25 – 9:25 p.m.

Monday, July 9

Social Hour • 10:05 – 11:05 p.m.

Tuesday, July 10

Social Hour • 10:05 – 11:05 p.m.

Wednesday, July 11

Conference Barbecue • 4:30 – 6:30 p.m.

Social Hour • 10:05 – 11:05 p.m.



TECHNICAL PROGRAM

The 3D Materials Science technical program will include invited and contributed presentations on these symposia topics:

- Digital Representation of 3D Microstructures
- Microstructure Property Relationships in 3D
- Image Processing of 2D and 3D Microstructural Data
- 3D Interfaces and Microstructural Evolution
- Experimental Techniques for 3D Data Acquisition
- Storing and Sharing 3D Data
- Future Directions & Challenges for 3D Materials Science

Technical Sessions

All presentations will be held in the Sunburst Forum or Exhibit Hall of Seven Springs Mountain Resort. Interactive discussions will follow invited presentations during each session.

To view the conference session sheets, visit the 3D Materials Science Technical Program page at:

www.tms.org/Meetings/Specialty/3D2012/techprog.aspx

HOUSING & TRAVEL

A block of rooms has been reserved at **Seven Springs Mountain Resort** at a special rate. Accommodations must be secured by **June 7, 2012**.

Reservations include lodging in the main hotel and a coupon for complimentary breakfast each day. Single occupancy is **\$143/night** and double occupancy is **\$157/night**. Government employees must complete the PDF housing form and fax it to **814-352-2010** to receive the government rate. **Government identification is required when checking into the resort.**

Accommodations may be reserved by visiting:

www.tms.org/Meetings/specialty/3D2012/housing.aspx

Getting There

Seven Springs Mountain Resort is located approximately one hour southeast of Pittsburgh. It is easily accessible off exits 91 or 110 of the Pennsylvania Turnpike. Pittsburgh International Airport is the nearest metropolitan terminal.

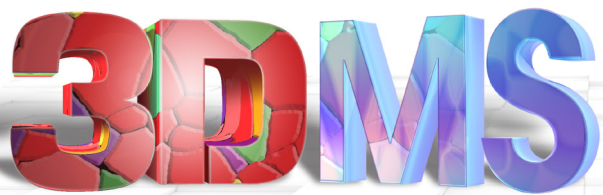
Complimentary Shuttle Service

Round-trip shuttle service to/from Pittsburgh International Airport will be available on Sunday and Thursday afternoons. You must complete the transportation requirement section of the registration form to secure shuttle service to/from the airport or to attend the 3D Microstructural Studies Workshop.

Visit the TMS 3D Materials Repository and Materials Cyberinfrastructure Portal Booth!

Upload your 3D experimental and simulations data to the **3D Materials Atlas** and access online materials innovation tools and databases at the **Materials Cyberinfrastructure Portal**, both accessible at this booth! TMS staff will be on hand to assist you with both of these valuable resources that offer the support you need to effectively interact with other researchers on 3D data sets, and implement materials and manufacturing innovation approaches and concepts.





International Conference on 3D Materials Science, 2012

EXHIBIT & SPONSORSHIP INFORMATION

Reservations are being accepted for a networking-focused tabletop exhibit relevant to session topics.

Corporate sponsorships offer high visibility at the conference receptions, coffee and refreshment breaks, and attendee social activities, as well as registration amenities, such as reusable canvas bags, badges, and lanyards.

For more information on exhibiting or purchasing a corporation sponsorship, visit:

www.tms.org/Meetings/specialty/3D2012/sponsorship.aspx

ABOUT THE VENUE Seven Springs Mountain Resort

The Seven Springs Mountain Resort also offers a multitude of on-site activities including a 6,685-yard, 18-hole golf course, as well as a tennis center, volleyball area, year-round swimming pool, exercise room, racquetball courts, bowling lanes, indoor miniature golf, family recreation center with video games, and numerous hiking trails surrounding the resort. Additional fees may apply.

For details on booking your accommodations please visit the 3D Materials Conference web page at:

www.tms.org/Meetings/Specialty/3D2012/housing.aspx



2012 Methods for 3D Microstructural Studies Workshop July 13-14, 2012 • Carnegie Mellon University Pittsburgh, Pennsylvania, USA

Register Now for this related educational event to continue the discussion cultivated at the 3D Materials Science Conference 2012. The workshop will combine lectures and hands-on exercises using the facilities at Carnegie Mellon University.

Focus

- Computational and experimental methodologies for characterization of 3D microstructures and grain boundary properties
- Quantifying and predicting microstructural evolution
- Linking materials properties to 3D microstructures

Advance registration for this two-day event will end June 7, 2012.

Workshop registration is offered on the 3D Materials Science Conference 2012 registration form.

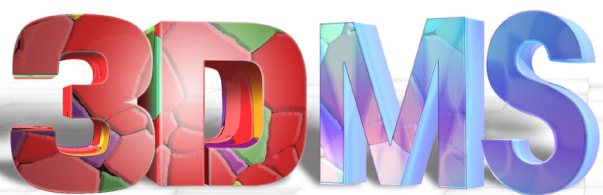
For more information on this workshop, visit: <http://www.tms.org/meetings/2012/3dworkshop/home.aspx>

For information on Housing, visit: <http://www.tms.org/meetings/2012/3dworkshop/housing.aspx>



SCHEDULE AT-A-GLANCE

| | Sunday, July 8 | Monday, July 9 | Tuesday, July 10 | Wednesday, July 11 | Thursday, July 12 |
|----------|-------------------|--|---|---|--|
| 8:15 AM | | Session 1: Applications of 3D Experimental Techniques Across Length Scales | Session 5: Microstructure-Property Relationships in 3D | Session 9: 3D Interfaces and Microstructural Evolution | Session 13: Future Directions in 3D Materials Science |
| 9:45 AM | | Discussion | Discussion | Discussion | Coffee Break |
| 10:00 AM | | Break | Break | Break | |
| 10:15 AM | | Session 2: Applications of 3D Experimental Techniques Across Length Scales: Destructive Techniques Session 3: Applications of 3D Experimental Techniques Across Length Scales: Structure-Property Relationships | Session 6: Microstructure-Property Relationships in 3D: Fatigue, Failure and Deformation Session 7: Microstructure-Property Relationships in 3D: Characterization and Simulation | Session 10: 3D Interfaces and Microstructural Evolution: Boundaries and Grain Growth Session 11: 3D Interfaces and Microstructural Evolution: Structure and Morphology | Session 13 (cont.) |
| 11:15 AM | | Coffee Break | Coffee Break | Coffee Break | Panel Discussion |
| 11:30 AM | | Session 2 (cont.) Session 3 (cont.) | Session 6 (cont.) Session 7 (cont.) | Session 10 (cont.) Session 11 (cont.) | |
| 12:30 PM | | Free Time | Free Time | Free Time | |
| 4:00 PM | | Poster Session 1: 3D Interfaces, Microstructural Evolution, Structure-Property Relationships | Poster Session 2: Image Processing, Digital Representations of 3D Microstructures, and Applications of 3D Experimental Techniques | Student Poster Session | |
| 5:30 PM | | Free Time | Free Time | Conference BBQ | |
| 6:30 PM | | Session 4: Image Processing of 2D and 3D Microstructural Data | Session 8: Digital Representation of 3D Microstructures | Session 12: Applications of 3D Experimental Techniques Across Length Scales: Non-Destructive Techniques | |
| 7:30 PM | Plenary Session | Discussion | Discussion | Discussion | |
| 8:25 PM | Welcome Reception | Session 4 (cont.) | Session 8 (cont.) | Session 12 (cont.) | |
| 8:45 PM | | Coffee Break | Coffee Break | Coffee Break | |
| 10:05 PM | | Session 4 (cont.) | Session 8 (cont.) | Session 12 (cont.) | |
| | | Social Hour | Social Hour | Social Hour | |



International Conference on 3D Materials Science, 2012

SCHEDULE OF EVENTS

Sunday, July 8, 2012

Plenary Session Room: Exhibit Hall

| | |
|---------|---|
| 7:30 PM | Introductory Comments |
| 7:35 PM | Plenary: Perspectives on Materials Science in 3D: Dorte Juul Jensen ¹ ; ¹ DTU Risø |

Monday, July 9, 2012

Session 1: Applications of 3D Experimental Techniques Across Length Scales Room: Exhibit Hall

| | |
|----------|---|
| 8:15 AM | Invited: Development of Multi-modal 3D Characterization Systems to Quantify Grain & Precipitate Microstructural Features in Aerospace Alloys: Michael Uchic ¹ ; Michael Groeber ¹ ; Megna Shah ² ; Patrick Callahan ¹ ; Adam Shiveley ³ ; Michael Chapman ³ ; ¹ Air Force Research Laboratory; ² UES, Inc.; ³ SOCHE |
| 8:45 AM | Invited: Three-dimensional Characterization of Dislocation-Defect Interactions: Ian Robertson ¹ ; Josh Kacher ¹ ; ¹ University of Illinois at Urbana-Champaign |
| 9:15 AM | Invited: Acquisition of 3-D Datasets for Property Prediction: Tresa Pollock ¹ ; McLean Echlin ¹ ; Alessandro Mottura ¹ ; Chris Torbet ¹ ; ¹ University of California Santa Barbara |
| 9:45 AM | Question and Answer Period |
| 10:00 AM | Break |

Session 2: Applications of 3D Experimental Techniques Across Length Scales: Destructive Techniques Room: Exhibit Hall

| | |
|----------|---|
| 10:15 AM | 3D Multi-scale Electron Microscopy for Nano-scale Carbide Mapping in a Tempered 9 Cr Martensitic Steel: Niven Monsegue ¹ ; Xin Jin ² ; Nana Kwame Yamoah ¹ ; Jeff Hawk ³ ; William Reynolds ¹ ; Ge Wang ¹ ; Mitsuhiro Murayama ¹ ; ¹ Virginia Tech; ² Tsinghua University; ³ U.S. Department of Energy |
| 10:35 AM | Combining Atom-Probe Tomography with Focused-Ion Beam Microscopy for Targeted 3D Materials Characterization with Sub-Nanometer Resolution: Dieter Isheim ¹ ; David Seidman ¹ ; ¹ Northwestern University |
| 10:55 AM | 3D Orientation Imaging with Transmission Electron Microscopy: Søren Schmidt ¹ ; Haihua Liu ² ; Andy Godfrey ³ ; Henning Poulsen ¹ ; Xiaoxu Huang ¹ ; ¹ Risø DTU, Technical University of Denmark; ² California Institute of Technology; ³ Tsinghua University |
| 11:15 AM | Break |
| 11:30 AM | Electron Tomography in Aberration-Corrected Transmission Electron Microscopes: Peter Ercius ¹ ; ¹ National Center for Electron Microscopy |
| 11:50 AM | New Horizons in Knife Edge Scanning Microscopy: Matthew Goodman ¹ ; Todd Huffman ¹ ; Cody Daniel ¹ ; Yoonsuck Choe ² ; ¹ 3Scan; ² Brain Networks Labs |
| 12:10 PM | FIB/SEM Determination of Sub-Surface Damage Caused by Micro-Tribology Scratching of WC/Co Hardmetal Samples: Mark Gee ¹ ; Ken Mingard ¹ ; Andrew Gant ¹ ; Helen Jones ¹ ; ¹ National Physical Laboratory |

Session 3: Applications of 3D Experimental Techniques Across Length Scales: Structure-Property Relationships
Room: Sunburst

| | |
|----------|---|
| 10:15 AM | Atom-Probe Tomography and the Science of a New Class of High-Temperature Al-Sc Based Alloys: David Seidman ¹ ; David Dunand ¹ ; ¹ Northwestern University |
| 10:35 AM | 3D Investigation of Cracking Behavior in a Ni Superalloy: Andrew Deal ¹ ; David Rowenhorst ² ; Brandon Laflen ¹ ; Ian Spinelli ¹ ; Anthony Barbuto ¹ ; Yuchi Huang ¹ ; Timothy Hanlon ¹ ; ¹ GE Global Research; ² Naval Research Laboratory |
| 10:55 AM | Building Three Dimensional Microstructure of AA5754 Aluminum Sheet for Formability Simulation: Jonathan Rossiter ¹ ; Kaan Inal ¹ ; Raja Mishra ² ; ¹ University of Waterloo; ² General Motors R&D |
| 11:15 AM | Break |
| 11:30 AM | The Influence of Microstructure on 3D Crack Morphologies in a New Naval Steel: Marie Cox ¹ ; David Rowenhorst ² ; Richard Fonda ² ; ¹ National Research Council Postdoctoral Fellow; ² U.S. Naval Research Laboratory |
| 11:50 AM | Shock Damage in Three Dimensions: Veronica Livescu ¹ ; John Bingert ¹ ; Ellen Cerreta ¹ ; Darcie Dennis-Koller ¹ ; Davis Tonks ¹ ; ¹ Los Alamos National Laboratory |
| 12:10 PM | Characterization and Modeling Via Three-Dimensional Reconstructions of Laser Welds in Stainless Steel: Jonathan Madison ¹ ; ¹ Sandia National Laboratories |

4:00 – 5:30 PM

Poster Session 1: 3D Interfaces, Microstructural Evolution, Structure-Property Relationships
Room: Exhibit Hall

3D Analysis of Surface Blisters, Subsurface Bubbles, and Underlying Microstructures of Implanted Metals: John Smugeresky¹; Dan Huber²; Robert Kolasinski¹; Don Cowgill¹; John Sosa²; Hamish Fraser²; ¹Sandia National Laboratories, CA; ²Ohio State University

3D Characterization of Recrystallization Boundaries: Yubin Zhang¹; Dorte Juul Jensen¹; ¹Danish-Chinese Center for Nanometals, Materials Research Division, Risø National Laboratory for Sustainable Energy, Technical University of Denmark

3D Microstructural Architectures for Metal and Alloy Components Fabricated by 3D Printing/Additive Manufacturing Technologies: E. Martinez¹; L. E. Murr¹; K. Amato¹; J. Hernandez¹; P. Shindo¹; S. Gaytan¹; D. Ramirez¹; F. Medina²; R. Wicker²; ¹University of Texas at El Paso, Metallurgical and Materials Engineering; ²University of Texas at El Paso, W. M. Keck Center for 3D Innovation

3D Microstructural Characterization of Uranium Oxide as a Surrogate Nuclear Fuel: Effect of Oxygen Stoichiometry on Grain Boundary Distributions: Karin Rudman¹; Patricia Dickerson²; Darrin Byler²; Robert Dickerson²; Harn Lim¹; Robert McDonald¹; Pedro Peralta¹; Kenneth McClellan²; ¹Arizona State University; ²Los Alamos National Laboratory

A Three Dimensional EBSD Investigation on the Distribution of Recrystallization Embryo in the Grain Boundary Regions of a Cold Rolled Low Carbon Steel: Nasima Afrin¹; Md Zakaria Quadir¹; Michael Ferry¹; ¹University of New South Wales

A Toolbox for Geometric Grain Boundary Characterization: Krzysztof Glowinski¹; Adam Morawiec¹; ¹Institute of Metallurgy and Materials Science, Polish Academy of Sciences

An EBSD-based Characterization of Fe-9Ni and Fe-12Mn Martensitic Steels: Christopher Kinney¹; Ken Pytlewski¹; Y. Adachi²; J.W. Morris¹; ¹University of California, Berkeley; ²Kagoshima University

Application of 3-D EBSD to Bainitic Microstructures in Low Carbon Structural Steels: Joacim Hagström¹; Bevis Hutchinson¹; Oskar Karlsson¹; Peter Hedström²; Annika Borgenstam²; Peter Kolmskog²; Bartłomiej Winiarski³; Phillip Withers³; Ali Gholinia³; ¹SwereaKIMAB AB; ²Royal Inst. Technology; ³The University of Manchester

Atomic Density Function 3D Modeling of Crystal Growth with Different Symmetry: Helena Zapolsky¹; Armen Khachaturyan¹; Renaud Patte¹; ¹University of Rouen

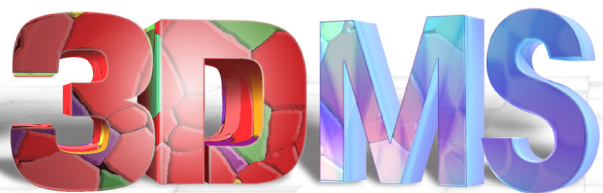
Computing Fatigue Properties of Polycrystalline Ni-based Superalloy Microstructures using an Image-based Computational Approach: Bin Wen¹; Nicholas Zabaraz¹; ¹Materials Process Design and Control Laboratory

Defects in Graphene and Their Effects on Three-dimensional Structure and Adsorption in Porous Carbons: James Morris¹; Yungok Ihm²; Junjie Guo²; Cristian Contescu¹; Nidia Gallego¹; Gerd Duscher²; Stephen Pennycook¹; Matthew Chisholm¹; ¹Oak Ridge National Laboratory; ²University of Tennessee

Effect of Grain Boundary Properties on Evolution of Lattice Orientations: Jaehyung Cho¹; Chang-Seok Oh¹; ¹Korea Institute of Materials Science

Elastic Behavior of the Percolating Eutectic Structure of a High Pressure Die Cast Magnesium Alloy: Bao Zhang¹; Anumalasetty Nagasekhar¹; Carlos Caceres¹; ¹The University of Queensland

Fragmentation of a Steel Ring under Explosive Loading: Jeremy Schreiber¹; Ivi Smid¹; Timothy Eden¹; ¹Penn State



International Conference on 3D Materials Science, 2012

Gas Fast Reactors Fuel Claddings: Braids Densification Simulations and Equivalent Thermal Conductivities Calculations: Sylvain Chupin¹; Patrick David¹; Denis Rochais¹; Francois Guillet¹; Laurent Chaffron²; ¹CEA-Le Ripault; ²CEA-Saclay

Gating System Optimisation Design Study of a Cast Automobile Component Made in Aluminium Alloy: Eytayo Olakanmi¹; ¹Federal University of Technology

Grain Boundary Networks in Polycrystalline Materials: Understanding Structure/Property Relationships: Alexis Lewis¹; Andrew Geltmacher¹; Siddiq Qidwai¹; ¹Naval Research Laboratory

In-situ Investigation of Damage and Strain Mechanisms in Structural Sheet Material via Synchrotron Radiation Laminography: Thilo Morgeneyer¹; Lukas Helfen²; Francois Hild³; Henry Proudhon¹; Ian Sinclair⁴; ¹Mines Paristech; ²KIT; ³ENS Cachan; ⁴University of Southampton

K-phase in Fe-Al-Mn-C Alloys: Morphologies and Crystallographic Aspects: Ian Zuazo¹; Helio Goldenstein²; Yves Bréchet³; Cyril Cayron⁴; ¹ArcelorMittal; ²University of São Paulo; ³SIMAP - Grenoble INP; ⁴CEA-Grenoble, DRT/LITEN/DEHT/LCPEM

Microstructural Analysis of MgB₂ Superconducting Wires by Electron Microscopy and X-ray Computed Tomography: Satoshi Hata¹; Yusuke Shimada¹; Masatoshi Mitsuahara¹; Ken-ichi Ikeda¹; Hideharu Nakashima¹; Akiyoshi Matsumoto²; Kazumasa Togano²; Hiroaki Kumakura²; Hitoshi Kitaguch²; Jung Ho Kim³; Shi Xue Dou³; Jeff Gelb⁴; Wenbing Yun⁴; ¹Kyushu University; ²National Institute for Materials Science; ³University of Wollongong; ⁴Xradia Inc.

Microstructure Visualization and Thermal Response Analysis of IF and Peritectic Mold Slag: Pabitra Palai¹; Shainu Suresh¹; T. K. Roy¹; V. V. Mahashabde¹; ¹Tata Steel Ltd., Jamshedpur, India

Numerical Analysis and Experimental Study on Dry Friction and Wear Performance of SiC 3D Continuous Network Ceramic Reinforced Fe-40Cr Alloy: Yu Liang¹; Jiang Yanli¹; Senkai Lu¹; Ru Hongqiang¹; Ming Fang¹; ¹Key Laboratory of New Processing Technology for Nonferrous Metals & Materials, Ministry of Education, College of Materials Science and Engineering

Numerical Implementations of Crystal Plasticity in the Spectral Representation: Bogdan Mihaila¹; Marko Knezevic¹; Andres Cardenas²; ¹Los Alamos National Laboratory; ²New York University

Calculation of Lorentz Force Field of the Innovation Cathode Cell: Jiang Yanli¹; Yu Liang¹; Feng Naixiang²; ¹Key Laboratory of New Processing Technology for Nonferrous Metals & Materials, Ministry of Education, College of Materials Science and Engineering; ²School of Materials and Metallurgy, Northeastern University

Numerical Simulations of Compression Properties of SiC/Fe-20Cr Co-continuous Composites: Yu Liang¹; Jiang Yanli¹; Lu Senkai¹; Ru Hongqiang¹; Fang Ming¹; ¹Key Laboratory of New Processing Technology for Nonferrous Metals & Materials, Ministry of Education, College of Materials Science and Engineering

On Modeling Texture Evolution and Embedded Single Grain Behavior in 3D FCC Aggregates Using CPFEM: Q. Ma¹; E.B. Marin¹; P.T. Wang¹; ¹Mississippi State University

On the Use of Realistic Microstructures to Model 3D Grain Evolution of Magnesium Alloy AZ61 via CPFEM: Yuxiong Mao¹; Quancang Ma¹; Paul Wang¹; Esteban Marin¹; Upadesh Acharya¹; ¹Mississippi State University

Parallel Potts Model for Recrystallization and Sintering: Sukbin Lee¹; Anthony Rollett¹; ¹Carnegie Mellon University

State-of-the-art in Finite Element Modeling of Microstructural Descriptors: Veera Sundararaghavan¹; Shang Sun¹; Abhishek Kumar¹; ¹University of Michigan

Stress Relaxation in Polycrystals - Insights from Full-field Crystal Plasticity Fast Fourier Transform Approach: Anand Kanjarla¹; Laurent Delannay²; Ricardo Lebensohn¹; Huamiao wang³; Carlos Tomé¹; ¹Los Alamos National Laboratory; ²Université Catholique de Louvain, Belgium; ³McMaster University

Structure-property Relationships in Screening of Databases of Nanoporous Materials: Maciej Haranczyk¹; Richard Martin¹; ¹Lawrence Berkeley National Laboratory

The Granular Bainite Formation Mechanism of Medium-Carbon Si-Mn-Mo Steel: Xian Zhang¹; ¹Naval Surface Warfare Center

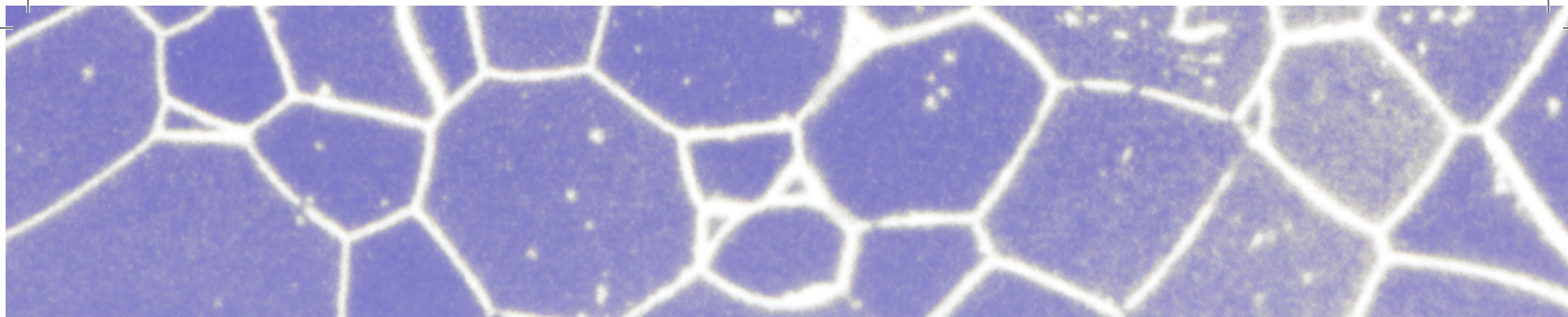
Three-Dimensional Simulation of Rechargeable Lithium-Ion Battery Microstructures: R. Edwin Garcia¹; ¹Purdue University

Towards a Taylor-type Crystal Plasticity Model in the Spectral Representation for Low-symmetry Metals: Marko Knezevic¹; Rodney McCabe¹; Bogdan Mihaila¹; ¹Materials Science and Technology Division, Los Alamos National Laboratory

An Understanding of Embrittlement in Structural Materials Using 3D/4D Characterisation Methods: Chiradeep Gupta¹; Hiroyuki Toda¹; Masakazu Kobayashi¹; Christian Schlacher²; Christof Sommitsch²; Peter Mayr³; Yoshio Suzuki⁴; Kentaro Useugi⁴; Akihisa Takeuchi⁴; Darren Leclere¹; ¹Toyohashi University of Technology; ²Graz University of Technology; ³Chemnitz University of Technology; ⁴Japan Synchrotron Radiation Research Institute

A Microscale Tension Test and Subsequent Serial Sectioning of an α + β Titanium Alloy, Ti-6Al-2Sn-4Zr-6Mo: Christopher Szczepanski¹; S.K. Jha²; R. Wheeler³; P.A. Shade¹; J.M. Larsen¹; ¹US Air Force Research Laboratory; ²Universal Technology Corporation; ³UES, Inc.

Multi-scale Tomographic Analysis of Ductile Fracture in Ultrahigh Strength Steels: Stephanie Chan¹; Dave Rowenhorst²; George Spanos³; Erik Lauridsen⁴; Wolfgang Ludwig⁵; Greg Olson⁶; ¹NextGen Aeronautics, Inc.; ²Naval Research Laboratory; ³Currently The Minerals, Metals, and Materials Society; ⁴Risø National Laboratory; ⁵Laboratoire MATEIS; ⁶Northwestern University



Session 4: Image Processing of 2D and 3D Microstructural Data
Room: Exhibit Hall

| | |
|---------|---|
| 6:30 PM | Invited: Shape Analysis and Classification of Objects: Brent Neal ¹ ; John Russ ² ; ¹ Milliken & Company; ² North Carolina State University |
| 7:00 PM | Invited: Graph Cut Approaches for Materials Segmentation Preserving Shape, Appearance, and Topology: Jarrell Waggoner ¹ ; Jeff Simmons ² ; Marc De Graef ³ ; Song Wang ¹ ; ¹ University of South Carolina; ² Materials and Manufacturing Directorate, Air Force Research Labs; ³ Carnegie Mellon University |
| 7:30 PM | Question and Answer Period |
| 7:45 PM | Simulation of FIB-SEM Images for Segmentation of Porous Microstructures: Torben Prill ¹ ; Katja Schladitz ¹ ; Christian Wieser ² ; ¹ Fraunhofer ITWM; ² Adam Opel AG |
| 8:05 PM | A New Filtering Strategy for Noise Reduction on High Noise 3D Data Sets: Steven Van Boxel ¹ ; Nghia Vo ² ; Peter Lee ¹ ; Philip Withers ¹ ; ¹ University of Manchester; ² Singapore Synchrotron Light Source |
| 8:25 PM | Break |
| 8:45 PM | Microstructural Characterization of Porous Shape Memory Alloys using X-ray Tomography: David Rowenhorst ¹ ; Catherine Tupper ² ; David Dunand ² ; ¹ Naval Research Lab; ² Northwestern University |
| 9:05 PM | Model Based HAADF STEM Tomography: Singanallur Venkatakrishnan ¹ ; Lawrence Drummy ² ; Michael Jackson ³ ; Marc Graef ⁴ ; Charles Bouman ¹ ; Jeff Simmons ² ; ¹ Purdue University; ² AFRL; ³ BlueQuartz Software; ⁴ Carnegie Mellon University |
| 9:25 PM | Energy-based Segmentation Methods for Micrograph Analysis: Gunay Dogan ¹ ; Stephen Langer ² ; Andrew Reid ² ; ¹ Theiss Research; ² National Institute of Standards and Technology |
| 9:45 PM | Generalized Forward Projectors for the Iterative Reconstruction of Electron Beam Serial Sectioning Data Sets: Marc De Graef ¹ ; ¹ Carnegie Mellon University |

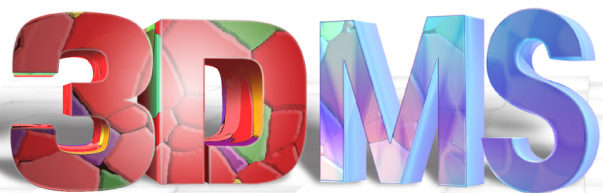
Tuesday, July 10, 2012

Session 5: Microstructure-Property Relationships in 3D
Room: Exhibit Hall

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|---------|---|
| 8:15 AM | Invited: 4D Materials Science: In Situ X-ray Synchrotron Tomography of Deformation in Metallic Materials: Nikhilesh Chawla ¹ ; ¹ Arizona State University |
| 8:45 AM | Invited: Combining X-ray Microtomography with Full Field Finite Elements Method to Study 3D Cracking in Structural Materials: Henry Proudhon ¹ ; Jia Li ¹ ; Vincent Chiaruttini ² ; Thilo Morgeneyer ¹ ; Lucien Lariarindrasana ¹ ; Samuel Forest ¹ ; Jean-Yves Buffière ³ ; Wolfgang Ludwig ³ ; ¹ MINES ParisTech; ² ONERA; ³ Université de Lyon |
| 9:15 AM | Question and Answer Period |
| 9:30 AM | Break |

Session 6: Microstructure-Property Relationships in 3D: Fatigue, Failure and Deformation
Room: Exhibit Hall

| | |
|----------|---|
| 9:45 AM | 3D Characterization and Modeling of Fatigue Cracks: Anthony Rollett ¹ ; Clayton Stein ¹ ; Reemu Pokharel ¹ ; Jonathan Lind ¹ ; Joseph Tucker ¹ ; Albert Cerrone ¹ ; Anthony Ingraffea ¹ ; Robert Suter ¹ ; Peter Kenesei ² ; Ulrich Lienert ² ; ¹ Carnegie Mellon University; ² Advanced Photon Source (APS) |
| 10:05 AM | 3D Visualization of Creep-Fatigue Crack Morphology in Alloy 617 using FIB Serial Sectioning: Rachael Madland ¹ ; Laura Carroll ² ; David Diercks ¹ ; Brian Gorman ¹ ; ¹ Colorado School of Mines; ² Idaho National Laboratory |



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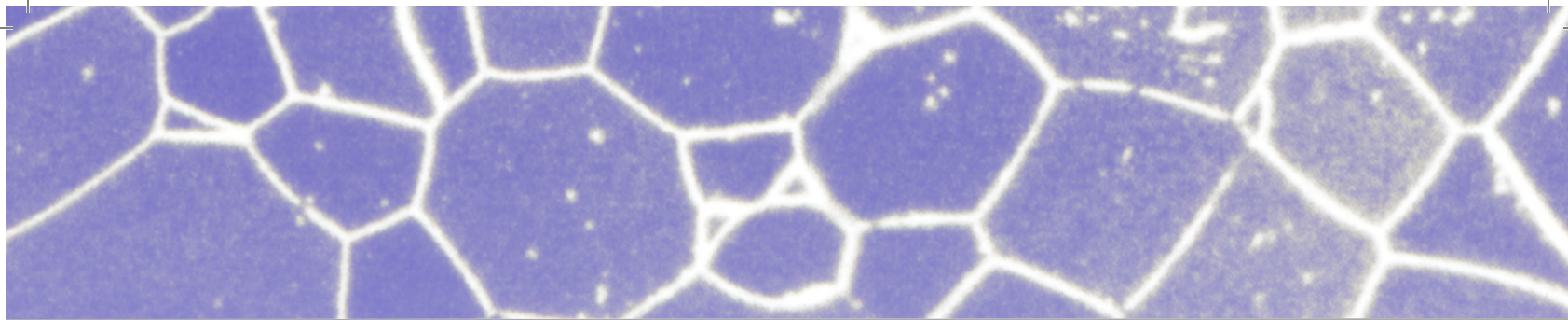
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| 10:25 AM | 3D Characterization and Modeling of the Influence of Porosity on Fatigue Properties of a Cast Al Alloy: Jean-Yves Buffiere ¹ ; Eric Maire ² ; Nicolas Vanderesse ³ ; ¹ Universite de Lyon INSA LYON ; ² Universite de Lyon INSA LYON; ³ Ecole de Technologie Supérieure |
| 10:45 AM | In-situ Measurement of Lattice Strain in Al-Li Alloys: Armand Beaudoin ¹ ; Mark Obstalecki ² ; Wesley Tayon ³ ; Ulrich Lienert ⁴ ; Peter Kenesei ⁴ ; ¹ University of Illinois at Urbana-Champaign; ² Cornell University; ³ NASA; ⁴ Argonne National Laboratory |
| 11:05 AM | Break |
| 11:20 AM | Numerical Simulation and Experimental Analysis of Notched Failure Processes in Composite Laminates: Ian Sinclair ¹ ; Qingda Yang ² ; Mark Mavrogordato ¹ ; Brian Cox ³ ; Mark Spearing ¹ ; ¹ University of Southampton; ² University of Miami; ³ Teledyne Scientific |
| 11:40 AM | 3D Image-based Modeling of Residual Stresses in Hybrid Shape Memory Alloy / Ceramic Composites: Brian Lester ¹ ; Yves Chemisky ¹ ; Dimitris Lagoudas ¹ ; Richard Everett ² ; Siddiq Qidwai ² ; Andrew Geltmacher ² ; ¹ Texas A&M University; ² Naval Research Laboratory |
| 12:00 PM | Integrated Experimental and Simulation Approaches for Mesoscopic Deformation of Polycrystalline Metal: Crystal Plasticity FEM: Yoon Suk Choi ¹ ; Michael Groeber ² ; Paul Shade ² ; Todd Turner ² ; Jay Schuren ² ; Michael Uchic ² ; Christopher Woodward ² ; Dennis Dimiduk ² ; Triplicane Parthasarathy ¹ ; ¹ UES, Inc.; ² Air Force Research Lab. |

Session 7: Microstructure-Property Relationships in 3D: Characterization and Simulation Room: Sunburst

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| 9:45 AM | Twin Connectivity in Wrought Magnesium Alloys: Matthew Barnett ¹ ; Alireza Ghaderi ¹ ; Mark Nave ¹ ; ¹ Deakin University |
| 10:05 AM | The Influence of 3D Networks of Aluminides on the Strength of Al-Si Piston Alloys: Guillermo Requena ¹ ; Zahid Asghar ¹ ; ¹ TU Vienna |
| 10:25 AM | Measurements of Materials During In-situ Experiments Using X-ray Tomography: Brian Patterson ¹ ; Kevin Henderson ¹ ; Robert Gilbertson ¹ ; Christopher Hamilton ¹ ; Kimberly Obrey ¹ ; Nickolaus Smith ¹ ; ¹ Los Alamos National Laboratory |
| 10:45 AM | Development of Fully Automated Serial-Sectioning 3D Microscope and Topological Approach to Pearlite and Dual-phase Microstructure in Steels: Yoshitaka Adachi ¹ ; Naoko Sato ¹ ; ¹ Kagoshima University |
| 11:05 AM | Break |
| 11:20 AM | Quantification of Primary Phase Undercooling of Rapidly Solidified Droplets with 3D Microtomography: Arash Ilbagi ¹ ; Hani Henein ¹ ; Dieter Herlach ² ; ¹ University of Alberta; ² c/o Institute of Materials Physics in Space, DLR |
| 11:40 AM | Using Combined EBSD/EDS to Characterise Nickel-Based Superalloys in 3D: Geoff West ¹ ; Rachel Thomson ¹ ; Daniel Child ¹ ; ¹ Loughborough University |
| 12:00 PM | Using Computational 3D Microstructural Models to Simulate and Predict Life of Materials: Ashley Clark ¹ ; ¹ VEXTEC Corporation |

Poster Session 2: Image Processing, Digital Representations of 3D Microstructures, and Applications of 3D Experimental Techniques Room: Exhibit Hall

- 3-D Characterization and Reconstruction of the Primary Austenite Dendrite and Interdendritic Space in Lamellar Cast Iron:** Attila Diószegi¹; Ruben Lora¹; Vasilios Fourlakis²; Guillem Prats Vilaseca¹; Álvaro Díaz de Aguilar¹; ¹Jönköping University; ²Swerea Swecast AB
- 3D Characterization of Damage within Copper Using Micro and Nano X-ray Tomography:** Brian Patterson¹; Kevin Henderson¹; Ellen Cerreta¹; J Escobedo-Diaz¹; Darcie Dennis-Koller¹; ¹Los Alamos National Laboratory
- 3D Characterization of High Burn-up MOX Fuel:** Melissa Teague¹; Jessica Riesterer¹; Brian Gorman¹; Michael Tonks¹; ¹Idaho National Laboratory
- 3D Identification of Inclusions in NiTi Alloy after Electropolishing:** Tadeusz Hryniewicz¹; Ryszard Rokicki¹; ¹Politechnika Koszalin
- Advances in 3D Imaging and Analysis of Materials Using Electron and Ion Beams:** Hans Fleurkens¹; Daniel Phifer¹; ¹FEI Company
- Automated Segmentation and Characterization of 2D/3D Fibrous Composite Optical Micrographs Using the Hough Transform:** Craig Przybyla¹; ¹Air Force Research Laboratory



Converting between 2-D and 3-D Grain Size Measurements: Kristina Lord¹; Alexander King¹; ¹The Ames Laboratory

Development of a Data Fusion Module to Register and Combine EBSD, EDS, and Electron-Optic Images: Megna Shah¹; Michael Uchic²; Michael Groeber²; ¹UES, Inc.; ²Air Force Research Laboratory

Digital Representation Environment for the Analysis of Microstructure in 3D (DREAM.3D): Michael Groeber¹; Michael Jackson²; ¹AFRL; ²BlueQuartz Software

FIB/SEM Tomography as a Tool to Study Bulk Membrane Recycling in Central Synapses: Liubov Belova¹; Oleg Shupliakov²; ¹KTH, Royal Institute of Technology; ²Karolinska Institute

3D Analysis of Phase Separation in Ferritic Stainless Steels: Joakim Odqvist¹; Jing Zhou¹; Wei Xiong¹; Peter Hedström¹; Mattias Thuvander²; Malin Selleby¹; John Ågren¹; ¹KTH (Royal Institute of Technology); ²Chalmers University of Technology

Generation of Micro-Architectures: Philippe Young¹; David Raymont¹; Liang Hao¹; Kerim Genc²; ¹University of Exeter; ²Simpleware Ltd.

Handling Misalignment and Drift in 3D EBSD Data Sets: Andrew Deal¹; Yuchi Huang¹; Brandon Laflen¹; Ian Spinelli¹; Anthony Barbuto¹; Timothy Hanlon¹; ¹GE Global Research

High Energy Diffraction Microscopy as a Tool for High Pressure Research: Joel Bernier¹; Nathan Barton¹; Donald Boyce²; Daniel Farber³; ¹Lawrence Livermore National Laboratory, Engineering Technologies Division; ²Cornell University, Sibley School of Mechanical and Aerospace Engineering; ³Lawrence Livermore National Laboratory, Condensed Matter and Materials Division

In-situ Investigations of the Interface Dynamics of Materials using Ultra-fast X-ray Tomographic Microscopy and Laser Heating: Julie Fife¹; Peter Voorhees²; Marco Stampanton³; ¹Paul Scherrer Institut; ²Northwestern University; ³Paul Scherrer Institut and ETH and University of Zurich

In situ Tomographic Imaging of 3D Microporous Composite Anode of Lithium-ion Batteries: Xianghui Xiao¹; Fikile Brushett¹; Lynn Trahey¹; John Vaughey¹; ¹Argonne National Laboratory

Optimizing Scholastic Process for Efficient Microstructure Reconstruction: Seun Ryu¹; Dongsheng Li¹; ¹Pacific Northwest National Laboratory

Investigating Shock Damage in Polycrystalline Cu through High-Energy Diffraction Microscopy: John Bingert¹; R.M. Suter²; J. Lind²; S.F. Li²; C.M. Hefferan²; C.P. Trujillo¹; ¹Los Alamos National Laboratory; ²Carnegie Mellon University

Investigation of the 3D Grain Size and Shape of WC in Cemented Carbides: Ali Gholinia¹; Bartłomiej Winiarski¹; Philip J. Withers¹; Ida Borgh²; Peter Hedström²; Joakim Odqvist²; Annika Borgenstam²; Ken Mingard³; Mark G Gee³; ¹University of Manchester; ²KTH Royal Institute of Technology; ³National Physical Laboratory

Measurement and Quantification of Grain Boundary Evolution in Three Dimensions During Grain Coarsening: S. F. Li¹; B. W. Reed¹; J. V. Bernier¹; C. M. Hefferan²; J. Lind²; R. M. Suter²; M. Kumar¹; ¹Lawrence Livermore National Lab; ²Carnegie Mellon University

Micro-Computed Tomography, a 3D Tool for Non-destructive Visualisation and Analysis: Evi Bongaers¹; Remy Van den Bosch²; ¹SkyScan N.V.; ²University of Antwerp

Modeling and Simulation of Constituent Particle Clustering and Distribution in Rolled Aluminum Alloys: Matthew Cullin¹; Gary Harlow²; Robert Wei²; ¹University of Alaska Anchorage; ²Lehigh University

Multi-Scale Homogenisation for 3D Microstructures: Philippe Young¹; David Raymont¹; Liang Hao¹; Kerim Genc²; ¹University of Exeter; ²Simpleware Ltd.

Study of Three Dimensional Microstructural Morphologies of Dendritically Solidified alpha-Mg(X): Mingyue Wang¹; Tao Jing²; ¹Tsinghua University & Arizona State University; ²Tsinghua University

Three Dimensional Composition Mapping of a White Spot VAR Defect in Nickel Alloy 718: Trevor Watt¹; Eric Taleff¹; ¹The University of Texas at Austin

Three Dimensional Segmentation and Reconstruction From Serial Micrographs of Powder Metallurgy Polycrystals: Michael Marsh¹; Laurent Bernard²; Murali Gorantla³; Yoon Suk Choi³; ¹Visualization Sciences Group; ²Noesis; ³UES

Tracking Geometrical Features using Near-field High Energy X-ray Diffraction Microscopy: S. F. Li¹; J. Lind²; C. M. Hefferan²; A. D. Rollett²; R. M. Suter²; ¹Lawrence Livermore National Lab; ²Carnegie Mellon University

X-ray Micro-Laue Diffraction in 3D at the Canadian Light Source: Renfei Feng¹; ¹Canadian Light Source

Characterization of Carbonate Rocks through X-Ray Microtomography: Debora Pilotto¹; Sérgio da Fontoura¹; Sidnei Paciornik²; Marcos Henrique Mauricio¹; ¹PUC-Rio; ²PUC-Rio

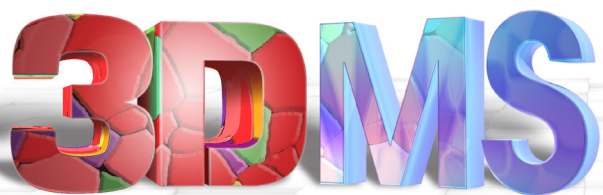
Characterization of Pores and Cracks in Underwater Welds by μ CT and Digital Optical Microscopy: Sidnei Paciornik¹; Timo Bernthaler²; Valter dos Santos³; Mauricio Monteiro³; Marcos Henrique Mauricio³; Alexandre Bracarense⁴; Ezequiel Pessoa⁵; ¹PUC-Rio; ²Hochschule Aalen - Technik und Wirtschaft; ³PUC-Rio; ⁴UFMG; ⁵CEFET-MG

Instrumentation Development for 4D Atom Probe Tomography: Brian Gorman¹; David Diercks¹; Rita Kirchhofer¹; ¹Colorado School of Mines

Session 8: Digital Representation of 3D Microstructures Room: Exhibit Hall

6:30 PM

Invited: Storage and Sharing of Large 3D Imaging Datasets: Richard Boardman¹; Ian Sinclair¹; Simon Cox¹; Philippa Reed¹; Kenji Takeda¹; Jeremy Frey¹; Graeme Earl¹; ¹University of Southampton



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| 7:00 PM | Invited: The State of 3D Synthetic Microstructure Generation and Its Novel Applications: Michael Groeber ¹ ; Anthony Rollett ² ; Joseph Tucker ² ; Michael Jackson ³ ; ¹ AFRL; ² Carnegie Mellon University; ³ BlueQuartz Software |
| 7:30 PM | Question and Answer Period |
| 7:45 PM | Model Reduction and Reconstruction of Realistic Microstructures for Computing Property Variability: Nicholas Zabaras ¹ ; Bin Wen ¹ ; ¹ Materials Process Design and Control Laboratory |
| 8:05 PM | The OOF Project at NIST: Stephen Langer ¹ ; Andrew Reid ¹ ; Günay Dogan ² ; ¹ National Institute of Standards and Technology; ² NIST/Theiss Research |
| 8:25 PM | Break |
| 8:45 PM | Modelling the Local Strut Thickness of Open Foams based on 3D Image Data: André Liebscher ¹ ; Claudia Redenbach ¹ ; ¹ TU Kaiserslautern |
| 9:05 PM | Fitting Laguerre Tessellations to the Microstructure of Cellular Materials: Irene Vecchio ¹ ; Katja Schladitz ¹ ; Claudia Redenbach ² ; ¹ Fraunhofer ITWM; ² University of Kaiserslautern |
| 9:25 PM | A Implicit Model for Generating Polycrystalline Structures and Unstructured Meshes: LiangXing Lv ¹ ; Liang Zhen ¹ ; Wenzhu Shao ¹ ; ¹ Harbin Institute of Technology |
| 9:45 PM | Stereology and 3D Grain Boundary Network Analysis: Bryan Reed ¹ ; Brent Adams ² ; Joel Bernier ¹ ; Chris Hefferan ³ ; Alisa Henrie ² ; Shiu Li ³ ; Jonathan Lind ³ ; Robert Suter ³ ; Mukul Kumar ¹ ; ¹ Lawrence Livermore National Laboratory; ² Brigham Young University; ³ Carnegie Mellon University |

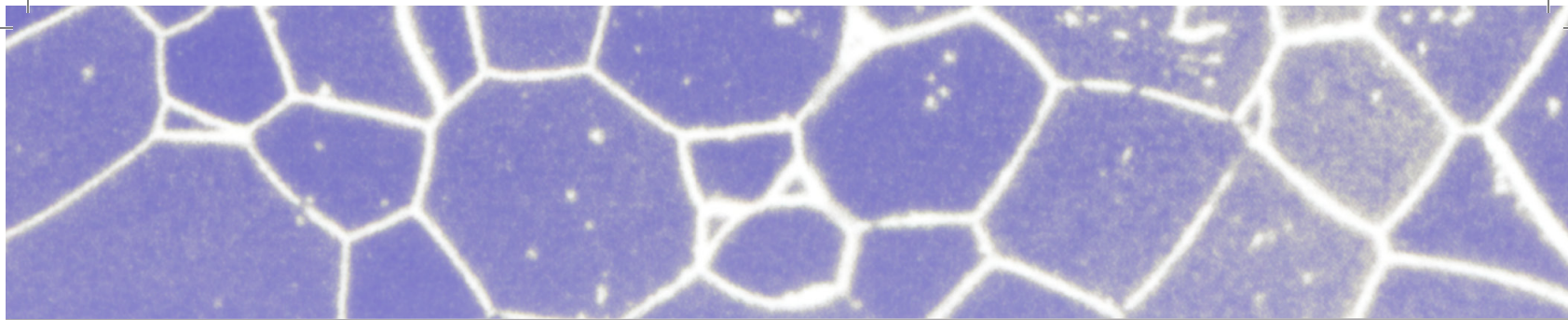
Wednesday, July 11, 2012

Session 9: 3D Interfaces and Microstructural Evolution Room: Exhibit Hall

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| 8:15 AM | Invited: Diffraction-based 3D Imaging of Microstructural Evolution: Erik Lauridsen ¹ ; ¹ Risø-DTU |
| 8:45 AM | Invited: Interfacial Morphology and Evolution in Solid-Liquid Mixtures: J. Gibbs ¹ ; J. Fife ² ; Peter Voorhees ¹ ; ¹ Northwestern University; ² Swiss Light Source |
| 9:15 AM | Invited: 3-dimensional Measurement and Description of the 5-parameter Grain and Phase Boundary Character in Steels: Stefan Zaeferrer ¹ ; Peter Konijnenberg ¹ ; ¹ Max-Planck-Institute for Iron Research |
| 9:45 AM | Question and Answer Period |
| 10:00 AM | Break |

Session 10: 3D Interfaces and Microstructural Evolution: Boundaries and Grain Growth Room: Exhibit Hall

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| 10:15 AM | Quantitative Analysis of Three-Dimensional Grain Growth: Trevor Keller ¹ ; Dan Lewis ¹ ; ¹ Rensselaer Polytechnic Institute |
| 10:35 AM | The Shapes of a 3D Grain Growth Microstructure: Emanuel Lazar ¹ ; Jeremy Mason ² ; Robert MacPherson ¹ ; David Srolovitz ³ ; ¹ Institute for Advanced Study; ² Lawrence Livermore National Laboratory; ³ Institute of High Performance Computing, A*Star |
| 10:55 AM | Topological Mechanism of Grain Growth: Burton Patterson ¹ ; Robert DeHoff ¹ ; Veena Tikare ² ; Zhiwei Sun ³ ; David Rule ¹ ; Amy Adams ¹ ; ¹ University of Florida; ² Sandia National Laboratory; ³ University of Alabama at Birmingham |
| 11:15 AM | Break |
| 11:30 AM | Distribution of Carbide Particles and Its Influence on Grain Growth of Ferrite in Fe-C alloys containing B and V: Takafumi Oikawa ¹ ; Masato Enomoto ¹ ; ¹ Ibaraki University |
| 11:50 AM | Modeling Grain Boundary Interfaces in Pure Nickel: Todd Turner ¹ ; Jay Schuren ¹ ; Paul Shade ¹ ; Michael Groeber ¹ ; ¹ Air Force Research Laboratory |



12:10 PM

3D Stochastic Ginzburg-Landau Model of Non-Classical Nucleation: Alexander Umantsev¹; ¹Fayetteville State University

Session 11: 3D Interfaces and Microstructural Evolution: Structure and Morphology
Room: Sunburst

10:15 AM

On the Three-dimensional Microstructure of Martensite in Carbon Steels: Peter Hedström¹; Albin Stormvinter¹; Annika Borgenstam¹; Ali Gholinia²; Bartłomiej Winiarski²; Philip J. Withers²; Oskar Karlsson³; Joacim Hagström³; ¹KTH - Royal Institute of Technology; ²University of Manchester; ³Swerea KIMAB AB

10:35 AM

Morphology and Crystallography of Annealing Twins in Austenite: Milo Kral¹; Ben Gardiner¹; ¹University of Canterbury

10:55 AM

Three-dimensional Morphology Due to Phase Separation in an Fe-Ni-Al Alloy Studied by STEM Tomography: Syo Matsumura¹; Keisuke Ogata¹; Satoshi Hata¹; Minoru Doi²; Hideharu Nakashima¹; ¹Kyushu University; ²Aichi Institute of Technology

11:15 AM

Break

11:30 AM

3D Characterization of Microstructural Evolution in Anisotropic Ceramics: Melanie Syha¹; Wolfgang Rheinheimer¹; Michael Bäurer¹; Wolfgang Ludwig²; Erik Lauridsen³; Daniel Weygand¹; Peter Gumbsch¹; ¹Karlsruhe Institute of Technology; ²European Synchrotron Radiation Facility; ³Risø National Laboratory

11:50 AM

Structural Evolution of Nanoporous Gold during Thermal Coarsening as Determined by X-ray Nano-tomography: Yu-chen Chen¹; Steve Wang²; Yong Chu³; Wenjun Liu²; Ian McNulty²; Peter Voorhees⁴; David Dunand⁴; ¹Northwestern University, Argonne National Lab.; ²Argonne National Lab.; ³Brookhaven National Lab.; ⁴Northwestern University

12:10 PM

Exploring 3D Interfaces and Microstructural Evolution with Micro-Laue Diffraction: Rozaliya Barabash¹; Jon Tischler¹; John Budai¹; Wenjun Liu²; ¹Oak Ridge National Laboratory; ²Advanced Photon Source

3:30 – 4:30 PM

Student Poster Session
Room: Exhibit Hall

3-D Visualisation of Crystallographic Pitting: Alice Laferrere¹; Nick Parson²; Xiaorong Zhou¹; George Thompson¹; ¹The University of Manchester; ²Rio Tinto Alcan

3D Analysis on the Effect of Creep Behavior on Phase Morphology of Duplex 2205 during the Continuous Annealing: Heeyong Park¹; Bruno De Cooman¹; ¹GIFT, POSTECH

3D Atom Probe Investigation of Nanoscale Austenite Reversion at Interfaces in a Martensitic Stainless Steel: Lei Yuan¹; Dirk Ponge¹; Dierk Raabe¹; ¹Max-Planck-Institut fuer Eisenforschung

3D Microstructure Analysis in Macro-micro Scale: Yeom Kyu Jung¹; Seong Bum Son¹; Chan Soon Kang¹; Jong Soo Cho¹; Jeong Tak Moon²; Heung Nam Han¹; Kyu Hwan Oh¹; ¹Seoul National University; ²MK Electron

3D Microstructure Construction of Sintered ZrO₂ under Different Sintering Conditions: Zhenbo Xia¹; Kathy Lu¹; ¹Virginia Polytechnic Institute and State University

3D Microstructures of Sb₂Te₃ Precipitates in PbTe Matrix and Their Elongations with Prediction by a Weak Compatibility Condition: Xian Chen¹; Shanshan Cao²; Teruyuki Ikeda³; Jeffrey Snyder⁴; Dominique Schryvers⁵; Richard James¹; ¹University of Minnesota; ²South China University of Technology; ³PRESTO; ⁴California Institute of Technology; ⁵University of Antwerp

A New Technique to Analyze Thousands of Grains in 3D Using 3DXRD: Hemant Sharma¹; Richard Huizenga¹; S. Erik Offerman¹; ¹Delft University of Technology

Bulk Three-dimensional Magnetic Domain Structure in a Slightly Misoriented (110)[001] FeSi Single Crystal: Sunmi Shin¹; Rudolf Schaefer²; B. C. De Cooman¹; ¹Pohang University of Science and Technology; ²IFW Dresden

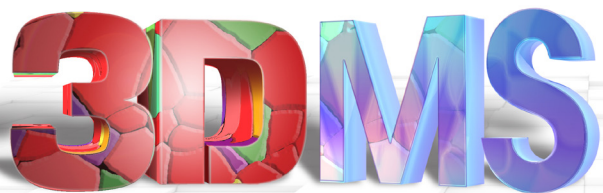
Calculation of Grain Boundary Character Distribution from Three Dimensional EBSD Data: Hadi Pirgazi¹; Roumen Petrov²; Leo Kestens¹; ¹Gent University; ²Delft University of Technology

Deformation Mechanisms Studied in Commercially Pure Titanium by Combined use of X-ray Diffraction Contrast Tomography (DCT) and Scanning Micro-diffraction Procedures: Laura Nervo¹; Michael Preuss²; João Quinta da Fonseca²; Wolfgang Ludwig³; Andrew King⁴; ¹ESRF & University of Manchester; ²University of Manchester; ³INSA de Lyon; ⁴ESRF

Design of Virtual 3D Microstructures with Controlled Grain Size and Orientation Distribution: Edgar de Araujo¹; K. Verbeken¹; L.A.I. Kestens¹; ¹Gent University

Four-Dimensional Characterization of Coarsening of Complex Microstructures via Phase-Field Method: Chal-Lan Park¹; Peter W. Voorhees²; Katsuyo Thornton¹; ¹University of Michigan; ²Northwestern University

In situ Characterisation of Entrainment Defects in Liquid Al-Si-Mg Alloy: Yang Yue¹; William Griffiths¹; Julie Fife²; Nick Green¹; ¹University of Birmingham, UK; ²Swiss Light Source, PSI

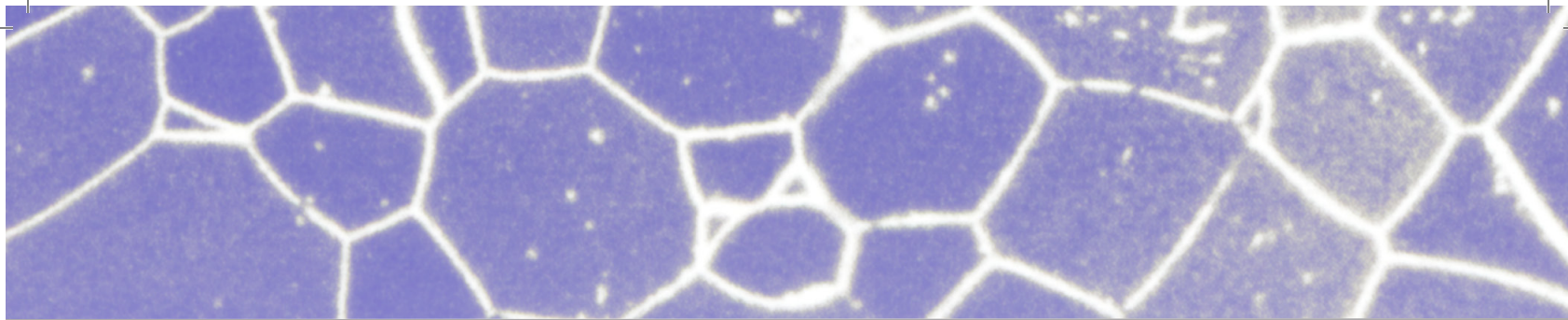


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- Influence of Serial Section Thickness on the Measurement Precision of 3D Grain Volume and Surface:** Binbin Zhang¹; Guoquan Liu¹; ¹USTB
- Investigation of Creep Damage in Martensitic 9-12% Cr Steel using Synchrotron X-ray Micro-tomography:** Christian Schlacher¹; Peter Mayr²; Francisca Mendez Martin³; Chiradeep Gupta⁴; Hiroyuki Toda⁵; Kentaro Uesugi⁵; Yoshio Suzuki⁵; Christof Sommitsch³; ¹Graz University of Technology; ²Chemnitz University of Technology; ³Graz University of Technology; ⁴Toyohashi University of Technology; ⁵Japan Synchrotron Radiation Research Institute
- Microstructure-Based Life Modeling of Ni-Based Superalloys:** Joseph Tucker¹; Albert Cerrone²; Anthony Rollett¹; Anthony Ingraffea²; ¹Carnegie Mellon University; ²Cornell University
- Microstructure Change of SOFC Anode during Long Term Operation using 3D Reconstruction:** Harshil Parikh¹; Arthur Heuer¹; Mark De Guire¹; Zhien Liu²; Richard Goetler²; ¹Case Western Reserve University; ²Rolls-Royce Fuel Cell Systems (US) Inc.
- Modeling 3D Grain Coarsening Based on Tomography Data:** Melanie Syha¹; Daniel Weygand¹; Peter Gumbsch²; ¹Karlsruhe Institute for Technology; ²Karlsruhe Institute of Technology
- Novel 3-D Characterization for the Advanced Understanding of Stereological Quantification of $\alpha+\beta$ Titanium Alloys:** John Sosa¹; Daniel Huber¹; Vikas Dixit¹; Peter Collins²; Hamish Fraser¹; ¹The Ohio State University; ²University of North Texas
- Pitfalls in Direct 3-D Characterization for Microstructural Quantification of $\alpha+\beta$ Titanium Alloys:** Daniel Huber¹; John Sosa¹; Margaret Noble¹; Vikas Dixit¹; Peter Collins²; Hamish Fraser¹; ¹The Ohio State University; ²University of North Texas
- Quantifying the Effect of Spatial Resolution on the Accuracy of 3-D Feature Characterization:** Gregory Loughnane¹; Ramana Grandhi¹; Raghavan Srinivasan¹; Michael Uchic²; Michael Groeber²; Matthew Riley³; Megna Shah⁴; ¹Wright State University; ²Air Force Research Laboratory; ³University of Idaho; ⁴UES, Inc.
- Quantitative Analysis and Comparison of γ Precipitate Shapes in a Series of Ni-based Superalloys:** Patrick Callahan¹; Marc De Graef¹; ¹Carnegie Mellon University
- Reconstruction of γ Precipitate Shapes in Ni-base Superalloys by Means of 3D Zernike Functions:** Patrick Callahan¹; Marc De Graef¹; ¹Carnegie Mellon University
- Rendering of Virtual Tours of Three-Dimensional Model for Application in Higher Education:** José Cendejas¹; ¹Universidad Tecnológica de Morelia
- Representation in 3D and Stress Response of Tin Whiskers:** Benjamin Anglin¹; Pulin Sarobol²; Aaron Pedigo²; Wei-Hsun Chen²; Ricardo Lebensohn³; John Blendell²; Carol Handwerker²; Anthony Rollett¹; ¹Carnegie Mellon University; ²Purdue University; ³Los Alamos National Laboratory
- SEM-Based Electron Tomography of Turfs Comprised of Lineal Structures:** Osama Fakron¹; D.P. Field¹; ¹WSU
- The Microstructure of RR1000 Nickel-Base Superalloy: The FIB-SEM Dual-Beam Approach:** Stephen Croxall¹; Mark Hardy²; Howard Stone¹; Paul Midgley¹; ¹University of Cambridge; ²Rolls Royce plc
- The Time Evolution of Three Grains in a Thin Film:** Vadim Derkach¹; Amy Novick-Cohen¹; Arcady Vilenkin²; ¹Technion-IIT; ²Hebrew University
- The TriBeam System: Femtosecond Laser Based Serial Sectioning:** McLean Echlin¹; Alessandro Mottura¹; Tresa Pollock¹; ¹UC Santa Barbara
- Three-dimensional Atomic and Defect Structures of Ultra Thin Au and Au-alloy Nanowires:** Chun-Hsien Wu¹; Niven Monsegue¹; William Reynolds¹; Deborah Aruguete²; Michael Hochella¹; Xin Jin¹; Ge Wang¹; Mitsuhiro Murayama¹; ¹Virginia Tech; ²National Science Foundation
- Three-dimensional Investigation of Void Growth Leading to Fracture in Commercially Pure Titanium:** Marina Pushkareva¹; Jérôme Adrien²; Eric Maire²; Arnaud Weck¹; ¹University of Ottawa; ²INSA de Lyon
- Three Dimensional Simulation of Dendritic Solidification by Lattice Boltzmann and Cellular Automaton Methods:** Mohsen Eshraghi¹; Sergio Felicelli¹; ¹Mississippi State University
- Subgrain Boundary Identification in 3D EBSD Data through Fast Multiscale Clustering:** Brian Soe¹; Cullen McMahon¹; David Golay¹; Zakaria Quadir²; Michael Ferry²; Lori Bassman¹; ¹Harvey Mudd College; ²University of New South Wales

Session 12: Applications of 3D Experimental Techniques Across Length Scales: Non-Destructive Techniques Room: Exhibit Hall

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| 6:30 PM | Invited: Ultra Fast Tomography: New Developments for 4D Studies in Material Science: Pierre Lhuissier ¹ ; Mario Scheel ² ; Marco Di Michiel ² ; Elodie Boller ² ; Jérôme Adrien ³ ; Eric Maire ³ ; Luc Salvo ¹ ; Jean-Jacques Blandin ¹ ; Michel Suery ¹ ; ¹ SIMaP/GPM2-CNRS-Grenoble University; ² ESRF; ³ MATEIS - INSA Lyon |
| 7:00 PM | Invited: High Energy X-ray Diffraction Microscopy Microstructure Mapping: Robert Suter ¹ ; Shiu Fai Li ² ; Christopher Hefferan ¹ ; Jonathan Lind ¹ ; Reemu Pokharel ¹ ; Ulrich Lienert ³ ; Anthony Rollett ¹ ; ¹ Carnegie Mellon University; ² Lawrence Livermore National Laboratory; ³ Argonne National Laboratory |
| 7:30 PM | Question and Answer Period |
| 7:45 PM | High-speed Micro Imaging with Polychromatic Hard X-ray Synchrotron Radiation for Academic and Industrial Applications: Elodie Boller ¹ ; Paul Tafforeau ¹ ; Alexander Rack ¹ ; Carmen Soriano ¹ ; Sophie Sanchez ¹ ; ¹ ESRF |



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| 8:05 PM | X-ray Dark Field Microscopy: Henning Poulsen ¹ ; Andrew King ² ; Wolfgang Ludwig ² ; Anatoly Snigirev ² ; ¹ Risoe DTU; ² ESRF |
| 8:25 PM | Break |
| 8:40 PM | Characterization of Orientation and Elastic Strain Gradients Inside Bulk Grains by Means of X-ray Diffraction Imaging Techniques: Wolfgang Ludwig ¹ ; Andrew King ² ; Peter Reischig ² ; Nicola Vigano ¹ ; Laura Nervo ² ; ¹ Université de Lyon; ² ESRF |
| 9:00 PM | Diffraction-Amalgamated Grain-Boundary Tracking (DAGT) Technique Applied to Al-3mass%Cu: Darren LeClere ¹ ; Takanobu Kamiko ¹ ; Masakazu Kobayashi ¹ ; Kentaro Uesugi ² ; Akihisa Takeuchi ² ; Yoshio Suzuki ² ; Hiroyuki Toda ¹ ; ¹ Toyohashi University of Technology; ² Japan Synchrotron Radiation Research Institute |
| 9:20 PM | X-ray Tomographic Microscopy at TOMCAT: Resolving the Dynamics of Materials: Julie Fife ¹ ; Rajmund Mokso ¹ ; Michel Rappaz ² ; Marco Stamparoni ³ ; ¹ Paul Scherrer Institut; ² Ecole Polytechnique Fédérale de Lausanne; ³ Paul Scherrer Institut and ETH and University of Zurich |

Thursday, July 12, 2012

Session 13: Future Directions in 3D Materials Science
Room: Exhibit Hall

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| 8:15 AM | Invited: Exploiting Advances in Microscopy for Direct 3-D Characterization of Materials: Hamish Fraser ¹ ; Daniel Huber ¹ ; John Sosa ¹ ; Brian Welk ¹ ; Robert Williams ¹ ; Peter Collins ² ; ¹ The Ohio State University; ² University of North Texas |
| 8:45 AM | Invited: The Five Parameter Grain Boundary Character Distribution of a TWIP Steel Determined from Three-dimensional Data Sets: Hossein Beladi ¹ ; Gregory Rohrer ² ; ¹ Deakin University; ² Carnegie Mellon University |
| 9:15 AM | Invited: A Workshop to Promote the use of High-energy X-ray Diffraction Experiments and Detailed Computational Analyses for Understanding Multiscale Phenomena in Crystalline Materials: Matthew Miller ¹ ; Robert Suter ² ; Ulrich Lienert ³ ; Armand Beaudoin ⁴ ; ¹ Cornell University; ² Carnegie Mellon University; ³ Argonne National Laboratory; ⁴ University of Illinois at Urbana Champaign |
| 9:45 AM | Break |
| 10:00 AM | Invited: Future Directions for 3D Imaging in the (S)TEM: Paul Midgley ¹ ; ¹ University of Cambridge |
| 10:30 AM | Invited: 3D Materials by Design: From Genome to Flight: Greg Olson ¹ ; ¹ Northwestern University |
| 11:00 AM | Invited: The Critical Role of Digital 3-D Structure in Advanced Materials Research and Development: Julie Christodoulou ¹ ; ¹ Office of Naval Research |
| 11:30 AM | Panel Discussion |



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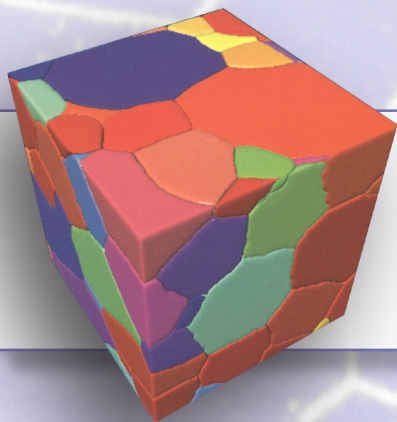
For more information on *IMMI* contact IMMI@tms.org
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PROGRAM PREVIEW



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