Technical Meeting and Exhibition

ADNANCE PROGRAM BEGISTER BEFORE SEPTEMBER 23 TO SAVE MATERIALS SCIENCE & TECHNOLOGY

12

The leading forum addressing structure, properties, processing, and performance across the materials community.

SALT PALACE CONVENTION CENTER 1 SALT LAKE CITY, UTAH USA OCTOBER 23 - 27, 2016

Organizers:









Co-sponsored by:

di oße



PLENARY LECTURES Tuesday, October 25 | 8:00 – 10:40 a.m.

ACerS EDWARD ORTON JR. MEMORIAL LECTURE



Bruce Dunn, Nippon Sheet Glass Professor, Department of Materials Science and Engineering, University of California, Los Angeles

Designing Ceramics for Next-Generation Energy Storage Systems

The ability to design the chemistry and nanostructure of ceramics is already having a profound effect on the performance of electrode

materials for electrochemical energy storage and will continue to do so in the future. One significant contribution to the lithium-ion battery field has been the development of nanoscale materials whose shorter ion and electron path lengths have led to improvements in energy and power densities. The development of core-shell architectures represents another substantial advancement in the design of electrode materials. In particular, the use of electronically conducting shells provides a unique opportunity for transforming poorly conducting oxides into electrochemically active materials. Another important development is in the field of capacitors. Pseudocapacitors based on transition metal oxides offer the promise of a new generation of energy storage materials that combine the high power of capacitors and the high energy density of battery materials. In addition to key advances in the field, a number of future directions will be presented.

AIST ADOLF MARTENS MEMORIAL STEEL LECTURE



David K. Matlock, University Emeritus Professor, Advanced Steel Processing and Products Research Center, The George S. Ansell Department of Metallurgical and Materials Engineering, Colorado School of Mines

Matlock

Enhancing the Fatigue Performance of Steel: Have We Learned Anything from the Past?

Fatigue failures in operating equipment continue to occur even though there has been extensive research since the mid-1800's when the important basic aspects of fatigue were identified after multiple railroad axle failures led to several catastrophic accidents in Europe. At that time, it was realized that application of cyclic loads could lead to metal failures at peak applied loads or stress levels less than required to cause permanent deformation. Investigations were initiated to determine the root cause of the failures and basic test methods were established. Today the importance of understanding fatigue continues to be extremely important, particularly with the current emphasis on light weight designs and optimized material usage in many systems, e.g. transportation. As a consequence of optimization, higher operating stresses are often incorporated along with decreased

safety factors, both which may lead to increased potential for fatigue failures. In this presentation, selected historical aspects of fatigue testing and failures will be presented, the fundamental basis for fatigue will be reviewed, and opportunities to increase the fatigue performance, and thus safety, of operating equipment will be discussed. Selected results from failure analyses and several recent experimental studies in the author's laboratory will provide illustrations of some unique alloying and processing related variables that can lead to parts with improved fatigue performance. Examples in steel alloy systems relevant to automotive and power transmission systems include surface hardening to produce controlled microstructural gradients, and alloying and processing to produce steels with microstructures that are more stable in the presence of multiple load (i.e. strain) cycles. While improvements in steel processing have been successfully employed to enhance fatigue performance, the importance of simultaneously understanding design concepts, manufacturing methods, material properties, and the use of non-destructive testing to locate stable cracks prior to final fracture will also be discussed to provide an overall perspective on opportunities to increase the fatigue performance of components manufactured from steel and a variety of other alloy systems.

ASM/TMS JOINT DISTINGUISHED LECTURE IN MATERIALS AND SOCIETY



Julie A. Christodoulou, FASM, Director, Naval Materials, S&T Division, Sea Warfare and Weapons Department, Office of Naval Research

Elegant Solutions Exploration and Outcomes that Matter

New tools and new ways of using existing instruments are made available to us on a

Christodoulou

near-daily basis. Materials researchers can now explore structure at scales where chemical and physical

phenomena occur, allowing more confident identification and control of ultimate properties. In-situ and in-operandi tools provide critical insight into the complicated and rapidly changing environments in which real materials perform, challenging hypotheses and assumptions and forcing the development of more rigorous analysis. Similarly computational tools are guiding us toward the truly concurrent design of product, material and manufacturing. This is all great – but it also makes our work harder. More than developing scientific knowledge and engineered goods at an accelerated pace, harnessing the capability of these emerging tools gives scientists and engineers the opportunity and responsibility to change the approach to solving some of society's most urgent challenges. This talk will survey some of these new tools and explore strategies for impactful work.

TABLE OF CONTENTS

	REGIS	STER BEFORE SEPTEMB	
TABLE OF CONTE	ENTS	-L'TEMB	ER 23 TO SAVE
Program-at-a-Glance 4	Special Events	Short Courses 13	I IIII
Symposia 6	Calendar of Events 10	Exhibition 14	
Lectures	Student Activities 12	Hotel and Registration 15	

ORGANIZED BY FOUR LEADING MATERIALS SOCIETIES

The American Ceramic Society is the premier global membership organization for the technical ceramics and glass community. Celebrate with us Monday evening at the ACerS 118th Annual Honors and Awards Banquet for the induction of the 2016 Class of Fellows and awards presentations. The Society's prestigious award lectures will be presented at MS&T16: ACerS/NICE Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture, Frontiers of Science and Society-Rustum Roy Lecture, Edward Orton, Jr. Memorial Lecture, and Robert B. Sosman Lecture. All attendees are welcome to attend the ACerS lectures. Be sure to stop by the member lounge to relax between sessions, network with peers, hear what's new with the Society, and more. ceramics.org

The Association for Iron & Steel Technology is a non-profit entity with over 18,000 members from more than 70 countries. AIST is recognized as a global leader in networking, education and sustainability programs for advancing iron and steel technology. Serving the entire iron and steel community, including steel manufacturers, suppliers, consumers and academics, our mission is to advance the technical development, production, processing and application of iron and steel. The Iron & Steel symposia is just one of the highlights for AIST members. The Adolf Martens Memorial Steel Lecture is part of the plenary session beginning at 8 a.m. on Tuesday, October 25. Students with an interest in steel are encouraged to attend the Steel to Students Reception on Monday while at the conference! aist.org

ASM International® is the world's largest association of metals-centric materials engineers and scientists with over 30,000 members and 80+ professional chapters worldwide. Join us Monday for the ASM Women in Materials Engineering Breakfast, the Alpha Sigma Mu Lecture, and attend the ASM Leadership Awards Luncheon, where ASM Materials Education Foundation, Committee/ Council and ASM organizational unit awards will be presented. Attend ASM's

103rd Annual Meeting where officers will be elected for the 2016-2017 term and other ASM business will be transacted. Plan to experience Canadian hospitality at the ASM Canada Council Suite at the end of the day. On Tuesday, attend the ASM/TMS Distinguished Lecture in Materials and Society as included in the Plenary Session. Additionally, ASM will host the ASM Dome Design Competition sponsored by the ASM Student Board Members, and the Edward DeMille Campbell Memorial Lecture will be presented. You won't want to miss the ASM Awards Dinner on Tuesday evening! Join us in celebrating the accomplishments of this year's award recipients and the 2016 Class of Fellows. Tickets, which include the President's Reception, can be purchased via the registration form. asminternational.org

The Minerals, Metals & Materials Society (TMS) is a member-driven international professional society dedicated to fostering the exchange of learning and ideas across the entire range of minerals, metals, and materials science and engineering, from minerals processing and primary metals production, to basic research and the advanced applications of materials. Included among its 13,000 professional and student members are metallurgical and materials engineers, scientists, researchers, educators, and administrators from more than 90 countries on six continents. tms.org

CO-SPONSORED BY: NACE International, The Worldwide Authority Corrosion Society, is the world's largest and most recognized association for corrosion control. With over 36,000 members in 140 countries, NACE International is dedicated to protecting people, assets and the environment from the effects of corrosion. The association is involved in every industry and area of corrosion prevention and control, from chemical processing and water systems, to transportation and infrastructure protection. nace.org

THINGS TO DO IN SALT LAKE CITY

Whether it is a walking tour of downtown artisan breweries or an excursion to experience Robert Smithson's earthwork Spiral Jetty, Salt Lake City has so much to offer visitors. Below are ten things to get to know Salt Lake City.



State House **Temple Square** Summum Pyramid City Creek Center National Parks of Utah Robert Smithson's earthwork Spiral Jetty Natural History Museum of Utah at the Rio Tinto Center Kennecott Mine **City Tours** The Best Breweries in Salt Lake

visitsaltlake.com

Tue

a.m.

Tue

p.m.

Wed

a.m.

Wed

p.m.

Thu

a.m.

SALT PALACE CONVENTION CENTER I SALT LAKE CITY, UTAH USA

0CT0BER 23 – 27, 2016

PROGRAM-AT-A-GLANCE Tentative Schedule, subject to change Mon Mon a.m. p.m.

Additive Manufacturing for Surface Engineering of Materials . ٠ Additive Manufacturing of Composites and Complex Materials • • Additive Manufacturing of Metals: Microstructure, Material Properties, and Product Performance • • ٠ • • Additive Manufacturing of Shape Memory, Superelastic Alloys and Multifunctional Materials • • Additive Manufacturing: In-situ Process Monitoring, Defect Detection and Control • • • Recent Developments in Additive Manufacturing: Process and Equipment Development and Applications • • **BIOMATERIALS** Nanomaterials Working in the Near-Infrared: Biomedical Applications • • • Next Generation Biomaterials • . • • • • Surface Properties of Biomaterials • • • **CERAMIC AND GLASS MATERIALS** Ceramic Matrix Composites ٠ ٠ . ٠ **Ceramic Optical Materials** • • • Glass, Amorphous, and Optical Materials: Common Issues within Science & Technology • • . • • Innovative Processing and Synthesis of Ceramics, Glasses and Composites • • ٠ • • Multifunctional Oxides • Phase Transformations in Ceramics: Science and Applications • • • Zirconia Based Materials for Cutting Edge Technology • ٠ • **ELECTRONIC AND MAGNETIC MATERIALS** Advances in Dielectric Materials and Electronic Devices • • ٠ • Emerging Interconnect and Pb-free Materials for Advanced Packaging Technology • • • Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications • ٠ **ENERGY** 3D Graphene for Energy Conversion and Storage • • • Energy Storage VI: Materials, Systems and Applications Symposium . ٠ Materials and Processes for CO₂ Capture, Conversion and Sequestration ٠ • • Materials Development for Nuclear Applications and Extreme Environments • • ٠ • • Materials Issues in Nuclear Waste Management in the 21st Century • • • • • FUNDAMENTALS, CHARACTERIZATION, AND COMPUTATIONAL MODELING 3rd International Workshop of In-situ Studies with Photons, Neutrons and Electrons Scattering • ٠ • Advancements in In-situ Electron Microscopy Characterization ٠ ٠ **Computational Design of Ceramics and Glasses** • • Heterogeneity During Plastic Deformation - Synergy Between Experimental Investigation and Simulation ICME Accelerated Materials Discovery in Process & Product Development • Interfaces, Grain Boundaries, and Surfaces from Atomistic and Macroscopic Approaches -• • • • • Fundamental and Engineering Issues International Symposium on Defects, Transport and Related Phenomena • • • Materials Property Understanding through Characterization • . • ٠ • Measurement and Modeling of Medium-to-High Strain Rate Deformation • • Modeling of Multi-Scale Phenomena in Materials Processing and Advanced Manufacturing • Multi Scale Modeling of Microstructure Deformation in Material Processing • • Phase Stability, Diffusion Kinetics, and Their Applications (PSDK-XI) • • . • • Symposium on Applications of Low Emittance Synchrotron X-ray Sources to Mesoscale Materials Studies ٠ • Symposium on Large Fluctuations and Collective Phenomena in Materials III • • • • 4

		Mon	Mon	Tue	Tue	Wed	Wed	Thu
		a.m.	p.m.	a.m.	p.m.	a.m.	p.m.	a.m.
-	IRON AND STEEL (FERROUS ALLOYS)							
	Advanced High Strength Steel Design/Technological Exploitation	•	•		•	•	•	•
	Advances in Zinc-coated Sheet Steel Processing and Properties	•						
	Ferrous Metallurgy: From Past to Present	•						
	Gas/Metal Reactions, Diffusion and Phase Transformation during Heat Treatment of Steel					•	•	•
	MATERIALS-ENVIRONMENT INTERACTIONS							
		-	-					
	Advanced Coatings for Wear and Corrosion Protection	•	•		•			
	Advanced Materials for Harsh Environments	•	•					
	Advanced Materials for Oil and Gas Applications-Performance and Degradation						•	
	Degradation of Nonmetallic Materials	•				•	_	
	High Temperature Corrosion of Structural Materials	_				•	•	•
	Materials Degradation in Supercritical CO ₂ Power Cycles	•	•					
	Materials Selection and Characterization for Corrosion Control	•	•		•			
	Materials Tribology		•					
	Surface Protection for Enhanced Materials Performance: Science, Technology, and Application	_	_			•	•	•
	Thermal Protection Materials and Systems	•	•					
	NANOMATERIALS							
	Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials				•	•	•	•
	Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry	•	•		•			
	Responsive Functional Nanomaterials	•	•		•			
	PROCESSING AND MANUFACTURING							
	Advanced Manufacturing Technologies					•	•	•
	Advances in Metal Casting Technologies	•	•					
	Avant-garde Developments in the Processing, Properties and Performance of Multifunctional Ceramic- and						•	
	Metal-matrix Composites Boron, Boron Coatings, Boron Compounds and Boron Nanomaterials: Structure, Properties, Processing, and							
	Applications		•			•	•	•
	Construction and Building Materials for a Better Environment	•	•					
	Failure Analysis and Prevention	•	•		•	•	•	•
	Joining of Advanced and Specialty Materials (JASM XVIII)	•	•		•	•	•	•
	Light Metal Technology	•	•		•			
	Mechanochemical Synthesis and Reactions in Materials Science	•	•		•	•	•	•
	Panel Discussion on Advanced Manufacturing				•			
	Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers,							
	and Mechanical Work – Rustum Roy Symposium		•		•	•	•	
	S2P: Semi-Solid Processing of Alloys and Composites	•	•		•	•	•	
	Scaling-up from the Laboratory: Strategies, Examples, Challenges, and/or Solutions for Advanced Metal Manufacturing	•	•					
	Shaping and Forming of Composite Materials	•						
	Sintering and Related Powder Processing Science & Technologies	•	•		•	•	•	•
	Solid State Processing					•		
	The 8th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing		•		•	•	•	
	Ultra High Performance Metals, Metal Alloys, Intermetallics, and Metal Matrix Composites for Aerospace, Defense and Automotive Applications		•		•	•	•	
	SPECIAL TOPICS							
	Accelerated Insertion of Materials (AIM) Qualification	•	•					
	Accelerated insertion of Materials (AIM) Qualification Art and Cultural Heritage: Discoveries and Education	-	-		•	•	•	
	Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET Along the Way):				-	-	-	
	The Elizabeth Judson Memorial Symposium	•	•					
	International Standards for Properties and Performance of Advanced Ceramics – 30 Years of Excellence					•		
	Materials Genome Initiative/Materials Today – Data Grand Challenge	•						
	Perspectives for Emerging Materials Professionals	•	•					

REGISTER BEFORE SEPTEMBER 23 TO SAVE!

OCTOBER

SYMPOSIA

ADDITIVE MANUFACTURING

Additive Manufacturing for Surface Engineering of Materials

Additive Manufacturing of Composites and Complex Materials

- Frontiers in Additive Manufacturing
- Metals and Metallic Composites
- Processing
- Techniques

Additive Manufacturing of Metals: Microstructure, Material Properties, and Product Performance

- AM Processes and Post-deposition Treatment
- AM Processing of Light Metals
- Characteristics of AM Superalloys/Components Manufactured by AM
- Characterization Methods
- Effects of EBM Processing on Ti-6Al-4V
- Laser Processing of Superalloys
- Microstructure and Properties Control
- Modeling of AM Processes
- Powder Characteristics and Recycling
- Stainless Steels Processing and Properties
- Titanium: Processing and Properties
- Understanding AM Processes

Additive Manufacturing of Shape Memory, Superelastic Alloys and Multifunctional Materials

Additive Manufacturing: In-situ Process Monitoring, Defect Detection and Control

- Directed Energy Deposition and Related Technologies
- Electron Beam Powder Bed Fusion and Related Technologies
- Laser Beam Powder Bed Fusion and Related Technologies

Recent Developments in Additive Manufacturing: Process and Equipment Development and Applications

BIOMATERIALS

Nanomaterials Working in the Near-Infrared: Biomedical Applications

- Multifunctional Architectures & Nanothermometry II
- Novel Methods & Materials' Characterization
- Probes & Nanothermometry I
- Therapy & Imaging

Next Generation Biomaterials

Surface Properties of Biomaterials

- 3D Printing and Tribology
- Bioactivity and Biocompatibility
- Processing, Coating and Surface Modifications

CERAMIC AND GLASS MATERIALS

Ceramic Matrix Composites

- Additive Manufacturing and Ceramic Fiber Composites
- Ceramic Fiber Composite Degradation
- Environmental Effects and Fiber Degradation
- Processing and Properties of Ceramic Composites

Ceramic Optical Materials

Glass, Amorphous, and Optical Materials: Common Issues within Science & Technology

- ACerS Alfred R. Cooper Award Session
- Crystallization and Glass Transition of Glass Forming Melts
- Electrical Properties of Glass
- Mechanical Properties of Glass
- Optical Properties of Glass
- Structures of Glass I: Correlation to Physical Properties
- Structures of Glass II: Simulations and Experiments

Innovative Processing and Synthesis of Ceramics, Glasses and Composites

- Ceramic Processing
- Polymer-Derived Ceramics
- SPS/Sintering

Multifunctional Oxides

Phase Transformations in Ceramics: Science and Applications

- Nanoscale Phenomena
- Prediction and Simulation
- Transformation Mechanisms at the Atomic Scale

Zirconia Based Materials for Cutting Edge Technology

ELECTRONIC AND MAGNETIC MATERIALS

Advances in Dielectric Materials and Electronic Devices

- Dielectrics
- Ferroics and Multiferroics
- Piezoelectrics

Emerging Interconnect and Pb-free Materials for Advanced Packaging Technology

Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications

ENERGY

- 3D Graphene for Energy Conversion and Storage
 - 3D Graphene in Energy Storage
 - 3D Graphene and Graphene Like Materials

Energy Storage VI: Materials, Systems and Applications Symposium

Materials Development for Nuclear Applications and Extreme Environments

- Accident Tolerant Fuels and Classing Materials
- Advanced Modeling in Nuclear Materials
- Irradiation Effects in Nuclear Materials
- Processing and Microstructure Analysis of Nuclear Materials
- Processing and Monitoring of Nuclear Materials
- Zircaloy and Corrosion in Nuclear Materials





Materials Issues in Nuclear Waste Management in the 21st Century

- Advanced Waste Form Technologies and Waste Forms
- Immobilization and Capture of Radionuclides/Radiation Effects
- Immobilization of Radioactive Wastes into Glass
- Stability of Waste Forms
- The Impact of Extended Dry Storage on Used Nuclear Fuel
 Waste Forms Development

Materials and Processes for CO₂ Capture, Conversion and Sequestration

- Carbon Dioxide Conversion
- Physical and Electrochemical Carbon Dioxide Capture and Sequestration
- Sorbent and Metal-Organic Framework Materials

FUNDAMENTALS, CHARACTERIZATION, AND COMPUTATIONAL MODELING

3rd International Workshop of In-situ Studies with Photons, Neutrons and Electrons Scattering

Advancements in In-situ Electron Microscopy Characterization

- Combining In-situ Electron Microscopy with Advanced Mapping
- In-situ Electron Microscopy in Complex Enviroments

Computational Design of Ceramics and Glasses

- Ceramics Materials Structure and Properties
- Disordered Materials and Irradiation Effects
- Interfaces, Mesoscale, and Continuum

Heterogeneity During Plastic Deformation – Synergy Between Experimental Investigation and Simulation

- Advances in Experimental and Characterization Techniques
- Advances in Numerical Techniques and Constitutive Modeling
- Deformation of Twinned and Martensitic Microstructures
- Plastic Interactions at the Atomistic and Nanoscale
- Synergy Between Experiment and Simulation

ICME Accelerated Materials Discovery in Process & Product Development

Interfaces, Grain Boundaries and Surfaces from Atomistic and Macroscopic Approaches – Fundamental and Engineering Issues

- Kinetics
- Properties Structure & Chemistry of Interfaces
- Structure & Chemistry of Intern
 Wotting & Absorption
- Wetting & Absorption

International Symposium on Defects, Transport and Related Phenomena

Materials Property Understanding through Characterization

Measurement and Modeling of Medium-to-High Strain Rate Deformation

Modeling of Multi-Scale Phenomena in Materials Processing and Advanced Manufacturing

- Modeling of Microstructural Evolution
- Predicting Deformation, Damage, and Failure Through Multi-scale Modeling
- Process Modeling and Prediction of Process-Structure-Property Relationships

Multi Scale Modeling of Microstructure Deformation in Material Processing

Phase Stability, Diffusion Kinetics, and Their Applications (PSDK-XI)

- General Sessions
- Gibbs Sessions
- Tracer Sessions

Symposium on Large Fluctuations and Collective Phenomena in Materials III

- Crystals and Dislocations
- Granular Materials and Other Topics
- Metallic Glasses
- Multicomponent and High Entropy Alloys

Symposium on Applications of Low Emittance Synchrotron X-ray Sources to Mesoscale Materials Studies

- Applications, Motivators, and Enabling Technologies
- Coherent Diffraction and Combined Techniques

IRON AND STEEL (FERROUS ALLOYS)

Advanced High Strength Steel Design/Technological Exploitation

- AHSS and Sheet Steels
- Plate, Bar, and Structural Steels
- Stainless and High Alloy Steels
- Steelmaking and Casting

Advances in Zinc-coated Sheet Steel Processing and Properties

Ferrous Metallurgy: From Past to Present

Gas/Metal Reactions, Diffusion and Phase Transformation during Heat Treatment of Steel

MATERIALS-ENVIRONMENT INTERACTIONS

Advanced Coatings for Wear and Corrosion Protection

Advanced Materials for Harsh Environments

Advanced Materials for Oil and Gas Applications-Performance and Degradation

- Combating Corrosion in Oil & Gas Applications
- Manufacturing of Materials for Oil & Gas Industry

Degradation of Nonmetallic Materials

High Temperature Corrosion of Structural Materials

Materials Degradation in Supercritical CO, Power Cycles

- High-temperature Oxidation in Supercritical CO₂
 Materials and Expriration Issues for Components of
- Materials and Fabrication Issues for Components of Supercritical $\rm CO_2$ Power Cycles

Materials Tribology

Materials Selection and Characterization for Corrosion Control

Surface Protection for Enhanced Materials Performance: Science, Technology, and Application

Thermal Protection Materials and Systems

- Thermal Protection Materials: Ablators and Ceramic Composites
- Thermal Protection Materials: Special Materials and Applications

OCTOBER

SYMPOSIA

NANOMATERIALS

Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials

Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry

Responsive Functional Nanomaterials

- Responsive Functional Nanomaterials General
- Responsive Nanomaterials Design
- Responsive Nanomaterials Synthesis and Applications

PROCESSING AND MANUFACTURING

Advanced Manufacturing Technologies

- Advanced Manufacturing- Machines, Equipment and Systems
- Advanced Manufacturing- Materials
- Advanced Manufacturing- Processes

Advances in Metal Casting Technologies

Avant-garde Developments in the Processing, Properties and Performance of Multifunctional Ceramic- and Metalmatrix Composites

Boron, Boron Coatings, Boron Compounds and Boron Nanomaterials: Structure, Properties, Processing, and Applications

- Atomically Thin Boron
- Bulk Materials
- Coatings and Nanostructures
- Physical Properties

Construction and Building Materials for a Better Environment

Failure Analysis and Prevention

- Complex and Historical Cases
- Energy (Monday PM)
- Fatigue and Fracture
- High Performance Vehicles/Corrosion
- Non-Metallic Materials
- Tools and Techniques

Joining of Advanced and Specialty Materials (JASM XVIII)

- Brazing and Ceramics Joining
- Dissimilar Metal Welds and Overlays
- Friction Stir Welding
- Micro and Nano Joining
- Welding Metallurgy
- Welding Processes and Weld Properties

Light Metal Technology

- Aluminum Technology
- Magnesium Technology
- Titanium Technology

Mechanochemical Synthesis and Reactions in Materials Science

- Applications
- Highly Energetic Materials and Reactions
- Inorganic Compounds
- Materials for Hydrogen Production and Storage
- Nanocrystalline Alloys and Composites
- Organic Compounds and 2D Nanomaterials

Panel Discussion on Advanced Manufacturing

Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium

S2P: Semi-Solid Processing of Alloys and Composites

Scaling-up from the Laboratory: Strategies, Examples, Challenges, and/or Solutions for Advanced Metal Manufacturing

Technology Scale-up

Shaping and Forming of Composite Materials

Sintering and Related Powder Processing Science & Technologies

- Field Assisted Sintering
- High Temperature Materials
- Sintering and Grain Growth
- Sintering & Powder Processing

Solid State Processing

 Solid State Processing: Friction Stir Processing Related Techniques and Other Solid State Processes

The 8th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing

- Green Manufacturing
- Green Materials Processing

The Role of Manufacturing and Identification of Data Requirements for Enabling Digital Thread/Digital Twin Modeling and Analysis

Ultra High Performance Metals, Metal Alloys, Intermetallics, and Metal Matrix Composites for Aerospace, Defense, and Automotive Applications

- Bulk Metallic Glass / Shape Memory Alloys
- Composites / Hybrid / Graded Materials
- High Temperature Materials I
- Ultrafine Grained / Nanostructured Materials

SPECIAL TOPICS

Accelerated Insertion of Materials (AIM) Qualification

Art and Cultural Heritage: Discoveries and Education

- Art and Cultural Heritage: Discoveries
- Art and Cultural Heritage: Education

Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET Along the Way): The Elizabeth Judson Memorial Symposium

- Continuous Improvement of MSE Programs
- Curricular Innovations and Computational Materials Science
 and Engineering

International Standards for Properties and Performance of Advanced Ceramics – 30 Years of Excellence

Materials Genome Initiative/Materials Today – Data Grand Challenge

Perspectives for Emerging Materials Professionals

Respons Respons Respons Respons Respons PROCESS Advanced Advance Advances Advances Advances Advances Advances Boron, Boro materials: S



LECTURES AND SPECIAL EVENTS

Monday, October 24

9:00 – 10:00 a.m.

ACerS/NICE Arthur L. Friedberg Ceramic Engineering Tutorial and Lecture

 – Aldo R. Boccaccini, Institute of Biomaterials, University of Erlangen-Nuremberg, Erlangen, Germany

Bioactive Glasses in Soft Tissue Repair. What Do We Know So Far?

2:00 – 5:00 p.m.

ACerS Alfred R. Cooper Award Session

Cooper Distinguished Lecture

 – G. Neville Greaves, Cambridge University, Cambridge, UK, and Wuhan University of Technology, Wuhan, China

Where Inorganic Meets Organic in the Glassy State: Hybrid Glasses and Dental Cements

2016 Alfred R. Cooper Young Scholar Award Presentation (TBD)

2:00 – 4:20 p.m.

ACerS Richard M. Fulrath Award Session

– **Tadachika Nakayama**, Nagaoka University of Technology, Japan Ceramics/Polymer Hybrids and its Processing with Nano Pulsed Power Technology

– Yoshiki Iwazaki, TAIYO YUDEN CO., LTD., Gunma, Japan Material Design of Dielectric and Piezoelectric Materials With First-Principles Calculation

- James G. Hemrick, Reno Refractories, Inc.

A Future for Refractory Ceramic Technology Based on a Rich Past – Tomoyuki Nakamura, Murata Manufacturing Co., Ltd., Japan Development of dielectrics for monolithic ceramic capacitor – Bryan D. Huey, University of Connecticut High Speed and Tomographic AFM of Functional Materials

2:30 – 4:00 p.m.

Alpha Sigma Mu Lecture

– Alton D. Romig, Jr., FASM, Executive Officer, National Academy of Engineering

National Academy of Engineering Grand Challenges for Engineering

Sunday, October 23

MS&T Women in Materials Science Reception

Enjoy the chance to network with professionals and peers in a relaxed environment.

Monday, October 24

Experience Salt Lake City

Join us 9:00 –10:00 a.m. to meet with local tour organizers who will provide information on local activities, sites, and self-guided tours in Salt Lake City. The knowledgeable local staff will assist in getting your day planned and started. You will be surprised by all of the activities and sight-seeing available to you during your stay! Advance registration is not required.

Welcome Reception and Exhibit Opening

Network with your colleagues, meet new people, and learn about the exciting membership offerings of the organizing societies.

ACerS 118th Annual Meeting

Newly elected officers take their positions during the annual membership meeting. All ACerS members and guests are welcome.

ASM Women in Materials Engineering Breakfast

Join your colleagues for the ASM Women in Materials Engineering Breakfast and listen to a lively discussion of relevant topics with featured speakers. This breakfast sold out last year and is expected to sell out again in 2016. Tickets can be purchased via the registration form. Please join us!

ASM Leadership Awards Luncheon

ASM's organizational unit awards as well as awards and scholarships of the ASM Materials Education Foundation will be presented. ASM's incoming Committee/ Council chairs will also be recognized for their leadership. ASM Committee/ Council members meeting during MS&T, and awardees, will receive an invitation to attend. Others may purchase tickets via the meeting registration form.

Tuesday, October 25

MS&T Plenary Session 8:00 – 10:40 a.m.

ASM/TMS Distinguished Lecture in Materials and Society – Julie A. Christodoulou, FASM, Director, Naval Materials, S&T Division Sea Warfare and Weapons Department, Office of Naval Research Elegant Solutions Exploration and Outcomes that Matter

REGISTER BEFORE SEPTEMBER 23 TO SAVE!

ACerS Edward Orton Jr. Memorial Lecture

Bruce Dunn, University of California, Los Angeles
 Designing Ceramics for Next-Generation Energy Storage Systems

AIST Adolf Martens Memorial Steel Lecture

 – David K. Matlock, University Emeritus Professor, Advanced Steel Processing and Products Research Center, The George S. Ansell Department of Metallurgical and Materials Engineering, Colorado School of Mines

Enhancing the Fatigue Performance of Steel: Have We Learned Anything from the Past?

12:45 – 1:45 p.m.

ASM Edward DeMille Campbell Memorial Lecture – A. Lindsay Greer, University of Cambridge

Extending the Range of the Glassy State: New insights from the Novel Properties of Metallic Glasses

1:00 – 2:00 p.m.

ACerS Frontiers of Science and Society–Rustum Roy Lecture – Cato T. Laurencin, University of Connecticut Regenerative Engineering: A Convergence Approach to Next Generation Grand Challenges

Wednesday, 1:00 – 2:00 p.m.

ACerS Basic Science Division Robert B. Sosman Lecture – Jennifer A. Lewis, Harvard University

Programmable Assembly of Colloidal Suspensions

ASM 103rd Annual Business Meeting

Attend our annual business meeting where officers will be elected for the 2016-2017 term and other ASM business will be transacted. ASM members and guests are welcome.

ASM Canada Council Suite Experience Canadian hospitality!

ACerS 118th Annual Honors and Awards Banquet

Enjoy dinner, conversation and the presentation of Society awards. Purchase tickets for \$90 via meeting registration.

Tuesday, October 25

Salt Lake City Tour

8:30 a.m. – 2:00 p.m.

Price per person: \$65 (includes lunch) | Purchase tickets at matscitech.org A 30-mile adventure, which includes visits to Temple Square; the State Capitol Building; This Is the Place Heritage Park; historic districts, with mansions and cathedrals; University of Utah; Pony Express Station; historic Fort Douglas; Trolley Square; Union Pacific Depot; and more!

MS&T Young Professionals Reception

Attend this reception to meet and network with fellow young professionals.

MS&T16 Exhibit Happy Hour Reception

Network with colleagues and build relationships with qualified attendees, buyers and prospects!

ASM Awards Dinner

Join us in celebrating the wonderful accomplishments of this year's award recipients and the 2016 Class of Fellows. Tickets, which include the President's Reception following the dinner, can be purchased via the registration form.

Accurate as of 6/8/16 (times and locations are subject to change)

Legend: SPCC = Salt Palace Convention Center

MDCC = Salt Lake Marriott Downtown at City Creek Hilton = Hilton Salt Lake City Center

are subject to change)			19
SUNDAY, OCTOBER 23		TIME	LOCATION
Conference Activities			
Registration		12:00 p.m. – 5:00 p.m.	SPCC
Programming Support Desk Society Member Lounges		12:00 p.m. – 5:00 p.m.	SPCC
Educational Courses		12:00 p.m. – 5:00 p.m.	SPCC
Additive Manufacturing of Metals - ASM E	ducation short course	8:30 a.m. – 12:00 p.m.	SPCC
Failure Mechanisms and Analysis - ASM Edu		8:30 a.m. – 12:00 p.m.	SPCC
Computational Modeling of Thermal Proces	ses for Metallic Parts - ASM Education short course	8:30 a.m. – 4:30 p.m.	SPCC
A Design Mindset for Additive Manufactur		8:30 a.m. – 4:30 p.m.	SPCC
Essential Microstructure Interpretation - AS		8:30 a.m. – 4:30 p.m. 8:30 a.m. – 4:30 p.m.	SPCC SPCC
Testing and Qualification in Additive Manu Correlative Light and Electron Microscopy		8:30 a.m. – 4:30 p.m. 8:30 a.m. – 4:30 p.m.	SPCC
Material Advantage Student Functions			51 66
Chapter Leadership Workshop (Material Ad	dvantage Chapters Officers Only)	10:00 a.m. – 12:00 p.m.	SPCC
Undergraduate Student Speaking Contest		1:00 p.m. – 3:00 p.m.	SPCC
Undergraduate Student Speaking Contest		1:00 p.m. – 3:00 p.m.	SPCC
Undergraduate Student Speaking Contest Student Networking Mixer	Finals	4:00 pm – 5:00 p.m. 7:00 p.m. – 9:00 p.m.	SPCC SPCC
Social Functions		7.00 p.m. – 9.00 p.m.	SPCC
ASM Annual Meeting and Awards Dinner F	Rehearsal	11:00 a.m. – 2:30 p.m.	Hilton
MS&T Women in Materials Science Recepti		6:00 p.m. – 7:00 p.m.	SPCC
		· · · F · · · F	
MONDAY, OCTOBER 24			
Conference Activities Authors' Coffee		7:00 a.m. – 8:00 a.m.	SPCC
Registration		7:00 a.m. – 6:00 a.m. 7:00 a.m. – 6:00 p.m.	SPCC
Programming Support Desk		7:00 a.m. – 6:00 p.m.	SPCC
Society Member Lounges		7:00 a.m. – 6:00 p.m.	SPCC
ACerS Basic Science Division Ceramographi	c Exhibit and Competition	8:00 a.m. – 6:00 p.m.	SPCC
Exhibition			
Exhibitor Set-Up Welcome Reception & Exhibition Grand Op		8:00 a.m. – 2:00 p.m. 4:30 p.m. – 6:00 p.m.	SPCC SPCC
Poster Installation	lening	4:30 p.m. – 6:00 p.m. 4:30 p.m. – 6:00 p.m.	SPCC
Exhibition Show Hours		4:30 p.m. – 6:00 p.m.	SPCC
Football Feature		4:30 p.m. – 6:00 p.m.	SPCC
Show Office		4:30 p.m. – 6:00 p.m.	SPCC
Exhibitor Lounge		4:30 p.m. – 6:00 p.m. 4:30 p.m. – 6:00 p.m.	SPCC
Career Pavilion		4.50 p.m. – 6.00 p.m.	SPCC
Lectures ACerS/NICE: Arthur L. Friedberg Ceramic Er	ngineering Tutorial and Lecture	9:00 a.m. – 10:00 a.m.	SPCC
ACerS Richard M. Fulrath Award Session		2:00 p.m. – 4:20 p.m.	SPCC
ACerS Alfred R. Cooper Award Session		2:00 p.m. – 5:00 p.m.	SPCC
Alpha Sigma Mu Lecture		2:30 p.m. – 4:00 p.m.	SPCC
Material Advantage Student Functions			
AIST Student Plant Tour ACerS Student Tour		11:30 a.m. – 4:30 p.m.	SPCC SPCC
Undergraduate Student Poster Contest Inst	allation	12:00 p.m. – 5:00 p.m. 4:30 p.m. – 6:00 p.m.	SPCC
Graduate Student Poster Contest Installatio		4:30 p.m. – 6:00 p.m.	SPCC
Social Functions			
ASM Women in Materials Engineering Brea	akfast (Ticketed Event)	7:00 a.m. – 9:00 a.m.	SPCC
Experience Salt Lake City		9:00 a.m. – 10:00 a.m.	SPCC
ASM Leadership Awards Luncheon ASM Tuxedo Pick Up		11:30 a.m. – 1:00 p.m. 4:00 p.m. – 6:00 p.m.	SPCC Hilton
AIST Steel to Students Reception		4.00 p.m. – 8.00 p.m. 6:00 p.m. – 8:00 p.m.	MCC
ACerS Annual Honor and Awards Banquet	Reception	6:45 p.m. – 7:30 p.m.	MDCC
ACerS Annual Honor and Awards Banquet		7:30 p.m. – 10:00 p.m.	MDCC
Annual Meetings			
ACerS 118 th Annual Membership Meeting		1:00 p.m. – 2:00 p.m.	SPCC
ASM 103 rd Annual Business Meeting		4:00 p.m. – 5:00 p.m.	SPCC
TUESDAY, OCTOBER 25			
Conference Activities			
Authors' Coffee		7:00 a.m. – 8:00 a.m.	SPCC
Registration		7:00 a.m. – 6:00 p.m.	SPCC
Programming Support Desk Society Member Lounges		7:00 a.m. – 6:00 p.m. 7:00 a.m. – 6:00 p.m.	SPCC SPCC
ACerS Basic Science Division Ceramographi	c Exhibit & Competition	7:00 a.m. – 6:00 p.m.	SPCC
Poster Installation		10:00 a.m. – 11:00 a.m.	SPCC
General Poster Session with Presenters		11:00 a.m. – 1:00 p.m.	SPCC
General Poster Viewing		1:00 p.m. – 6:00 p.m.	SPCC

TUESDAY, OCTOBER 25 (continued) Exhibition	TIME	LOCATION
ASM Mini-Materials Camp	9:00 a.m. – 2:00 p.m.	SPCC
Exhibition Show Hours	9.00 a.m. – 2.00 p.m. 10:00 a.m. – 6:00 p.m.	SPCC
Show Office	10:00 a.m. – 6:00 p.m.	SPCC
Exhibitor Lounge	10:00 a.m. – 6:00 p.m.	SPCC
Football Feature	10:00 a.m. – 6:00 p.m.	SPCC
Career Pavilion	10:00 a.m. – 6:00 p.m.	SPCC
MS&T Food Court	12:00 p.m. – 2:00 p.m.	SPCC
Happy Hour Reception	4:00 p.m. – 6:00 p.m.	SPCC
Lectures	p	5. 66
MS&T Plenary Lectures	8:00 a.m. – 10:40 a.m.	SPCC
TMS Young Professional Tutorial Luncheon (ticketed)	12:00 p.m. – 12:45 p.m.	SPCC
TMS Young Professional Tutorial Lecture (open)	12:45 p.m. – 2:00 p.m.	SPCC
ASM Edward DeMille Campbell Memorial Lecture	12:45 p.m. – 1:45 p.m.	SPCC
ACerS Frontiers of Science and Society - Rustum Roy Lecture	1:00 p.m. – 2:00 p.m.	SPCC
Material Advantage Student Functions	1.00 p.m. 2.00 p.m.	51 66
Undergraduate Student Poster Contest Judging	10:00 a.m. – 12:00 p.m.	SPCC
Graduate Student Poster Contest Judging	10:00 a.m. – 12:00 p.m.	SPCC
ASM DomesDay Competition	10:15 a.m. – 1:30 p.m.	SPCC
Undergraduate Student Poster Contest Display with Presenters	11:00 a.m. – 1:00 p.m.	SPCC
Graduate Student Poster Contest Display with Presenters	11:00 a.m. – 1:00 p.m.	SPCC
Mug Drop Contest	11:15 a.m. – 12:15 p.m.	SPCC
Disc Golf Contest	12:30 p.m. – 1:30 p.m.	SPCC
Undergraduate Student Poster Contest Display	1:00 p.m. – 6:00 p.m.	SPCC
Graduate Student Poster Contest Display	1:00 p.m. – 6:00 p.m.	SPCC
Student Awards Ceremony	2:00 p.m. – 3:00 p.m.	SPCC
Social Functions	2.00 p 2.00 p	5. 66
ACerS Companion Breakfast	8:00 a.m. – 10:00 a.m.	MDCC
Salt Lake City Tour	8:30 a.m. – 2:00 p.m.	SPCC
ASM Tuxedo Pick Up	10:00 a.m. – 5:00 p.m.	Hilton
MS&T Young Professionals Reception	4:30 p.m. – 6:00 p.m.	SPCC
ASM Board of Trustees Portrait	6:00 p.m. – 6:30 p.m.	Hilton
ASM Awards Dinner Reception	6:15 p.m. – 7:00 p.m.	Hilton
ASM Head Table Line Up	6:45 p.m. – 7:15 p.m.	Hilton
ASM Awards Dinner	7:00 p.m. – 9:00 p.m.	Hilton
ASM President's Reception	9:00 p.m. – 11:00 p.m.	Hilton
WEDNESDAY, OCTOBER 26		
Conference Activities		
Authors' Coffee	7:00 a.m. – 8:00 a.m.	SPCC
Registration	7:00 a.m. – 5:00 p.m.	SPCC
Programming Support Desk	7:00 a.m. – 6:00 p.m.	SPCC
Society Member Lounges	7:00 a.m. – 5:00 p.m.	SPCC
ACerS Basic Science Division Ceramographic Exhibit & Competition	7:00 a.m. – 6:00 p.m.	SPCC
Exhibition		
Exhibition Show Hours	9:00 a.m. – 2:00 p.m.	SPCC
ASM Mini-Materials Camp	9:00 a.m. – 2:00 p.m.	SPCC
General Poster Viewing	9:30 a.m. – 2:00 p.m.	SPCC
Football Feature	9:30 a.m. – 2:00 p.m.	SPCC
Show Office	9:30 a.m. – 2:00 p.m.	SPCC
Exhibitor Lounge	9:30 a.m. – 2:00 p.m.	SPCC
MS&T Food Court	12:00 p.m. – 2:00 p.m.	SPCC
Exhibitor Tear-down	2:00 p.m. – 9:00 p.m.	SPCC
General Poster Session - Tear Down	2:00 p.m. – 3:00 p.m.	SPCC
Lectures		
ACerS Basic Science Division Robert B. Sosman Lecture	1:00 p.m. – 2:00 p.m.	SPCC
Material Advantage Student Functions		
Undergraduate Student Poster Contest Display	9:30 a.m. – 2:00 p.m.	SPCC
Graduate Student Poster Contest Display	9:30 a.m. – 2:00 pm.	SPCC
Undergraduate Student Poster Dismantle	2:00 p.m. – 3:00 p.m.	SPCC
Graduate Student Poster Dismantle	2:00 p.m. – 3:00 p.m.	SPCC
Social Functions		
ASM Tuxedo Drop Off	7:00 a.m 12:00 p.m.	Hilton
THURSDAY, OCTOBER 27		
Conference Activities		
Authors' Coffee	7:00 a.m 8:00 a.m.	SPCC
Registration	7:00 a.m. – 12:00 p.m.	SPCC
Society Member Lounges	7:00 a.m. – 12:00 p.m.	SPCC
Programming Support Desk	7:00 a.m 1:00 p.m.	SPCC
ACerS Basic Science Division Ceramographic Exhibit & Competition	7:00 a.m 12:00 p.m.	SPCC
Educational Courses	P	2. 22
Sintering of Ceramics - ACerS Education short course	9:00 a.m. – 4:30 p.m.	MDCC
2	i i i i i i i i i i i i i i i i i i i	
FRIDAY, OCTOBER 28		
Educational Courses		
Sintering of Ceramics - ACerS Education short course	9:00 a.m. – 2:30 p.m.	MDCC

-

STUDENT ACTIVITIES

(Information subject to change. See Calendar of Events on pages 10-11 for times and location. For more information on student events, visit **matscitech.org/students/**.)

Student Chapter Travel Grants

The Material Advantage Student Program offers \$500 travel grants to student chapters in support of attending MS&T. The grants are restricted to one grant per chapter per academic year. Travel grants will be awarded on a first come, first served basis, so act early! Chapters must be active and in good standing to be eligible. Application deadline is October 17, 2016. Apply today at matscitech.org/students.

Student Monitors

Want to save money while attending MS&T? Students may partially defray expenses by serving as session monitors. Monitors assist session chairs, record session attendance statistics, assist with audio/ visual equipment, etc. Visit matscitech.org/students for more details.

Professional Recruitment & Career Pavilion

Visit booths, talk to company reps, and view job postings in the Career Pavilion while you explore the exhibit hall! This is your chance to make valuable contacts with potential employers. Admission to the Career Pavilion is included in your conference registration fee.

Undergraduate Student Poster Contest

Stop by the convention center exhibit hall to view the submissions to the 2016 undergraduate poster contest. Posters will be displayed on Tuesday, October 25 and Wednesday, October 26, during regular exhibit hall hours. For more information about competing in the poster contest, contact Tricia Freshour at tfreshour@ceramics.org. Deadline for poster abstracts is October 3, 2016.

Graduate Student Poster Contest

The contest, open to current graduate students pursuing M.S. or Ph.D. degrees, recognizes superior research performed during graduate study. Posters must be accepted for the MS&T technical program to be entered into the contest. Entries will be displayed in the general poster session. First, second, and third place prizes are given in the amounts of \$250, \$150, and \$100, respectively. For more information, contact Tricia Freshour at tfreshour@ceramics.org.

SUNDAY, OCTOBER 23, 2016

Chapter Leadership Workshop – FOR CHAPTER OFFICERS ONLY Meet fellow chapter officers, share best practices, and learn about Material Advantage! This workshop is for chapter officers only (Chair, Vice-Chair, Secretary, and Treasurer). Registration is required for this workshop as well as for MS&T. Visit matscitech.org/students/ to register.

Undergraduate Student Speaking Contest

MS&T hosts the semifinal and final rounds of the Material Advantage Undergraduate Student Speaking Contest. This contest encourages undergraduate students to present technical papers and improve their presentation skills. The presentation subject must be technical but can relate to any aspect of materials science and engineering. One contestant from a university is able to compete in this contest. Participants receive a travel grant awarded at the end of the semifinal/final rounds. Winners of the finals receive cash prizes. For contest rules, contact Tricia Freshour at tfreshour@ ceramics.org. MS&T speaking contestants must be reported to Tricia by October 3, 2016.

Student Networking Mixer

Join in this relaxed, casual, and fun atmosphere designed for students, Material Advantage faculty advisors, and society volunteer leaders. Students are encouraged to wear their school colors. Music will be provided.

MONDAY, OCTOBER 24, 2016

ACerS Student Tour

Students have the opportunity to attend a tour, organized by ACerS President's Council of Student Advisors (PCSA), during MS&T16. The tour is subject to change. Stay tuned for more details. Contact Tricia Freshour at tfreshour@ceramics.org with any questions.

AIST Student Plant Tour

AIST will be offering students the opportunity to tour a steel plant while at MS&T16. Nucor Steel - Utah will be hosting the tour. Watch for details!

Emerging Professionals Symposium

Organized by the ASM Emerging Professionals Committee, be sure to participate in this symposium specifically created for those just starting their materials science career!

TUESDAY, OCTOBER 25, 2016

Ceramic Mug Drop Contest

Mugs fabricated by students from ceramic raw materials are judged on aesthetics and breaking thresholds. Mugs are dropped from varying levels until the breaking threshold is reached. The mug with the highest successful drop distance wins! To enter a mug, contact Brian Gilmore at Brian.Gilmore@pxd.com by Monday, October 17, 2016.

Ceramic Disc Golf Contest

This contest is sure to draw a crowd! Students create discs from ceramic or glass materials to meet certain specifications; the discs are then thrown into a regulation disc golf basket. Each disc will be judged in the categories of farthest distance achieved and artistic merit (aesthetics). The disc that is successfully thrown into the disc golf basket from the farthest distance in the fewest number of shots will be named winner of the Ceramic Disc Golf Contest; the most aesthetically pleasing/creative disc will be recorded as "Best Looking" disc. To enter a disc, contact Brian Gilmore at Brian.Gilmore@pxd.com by Monday, October 17, 2016.

ASM Geodesic Dome Design Competition "DomesDay"

Can these domes take the weight? Join us in the Exhibit Hall for the display, judging, and selection of winners at the third ASM Geodesic Dome Design Competition! To register as a contestant and for more information, visit www.asminternational.org/domesday.

Student Awards Ceremony

Congratulate the winners of this year's contests: Material Advantage Chapters of Excellence, Student Speaking Contest, Graduate and Undergraduate Poster Contests, Ceramic Mug Drop Contest, Ceramic Disc Golf Contest, TMS Superalloys Awards, AIST/AISI Scholarships, ACerS Creativity Competition, and Keramos National Awards.

SHORT COURSES



Additive Manufacturing of Metals 8:30 a.m. – 12:00 p.m.

Instructor: Eric Bono, Engineering Solutions at Puris

The basic building block of any powder-based Additive Manufacturing (AM) system is the input metal powder. The quality of the final part directly relates to that starting powder and how it was manipulated during the additive process. Microstructural and chemical changes to that base powder must be tightly controlled and intimately understood in order to produce predictable and acceptable components. Powders can experience a wide range of heat, pressure, humidity, vibration, and other environmental conditions during the processing path. This course will look at some of those conditions and what impact they may have on final components, as well as how to manage and control them to yield the best possible parts. Different AM processes will be compared and contrasted as to how they manipulate the starting powder and what that means to the ultimate material properties.

A Design Mindset for Additive Manufacturing

8:30 a.m. - 4:30 p.m.

Instructor: Howard A. Kuhn, FASM, University of Pittsburgh, America Makes

Additive manufacturing (AM), more commonly known as 3D printing, has captured the attention and fascination of the world of materials and manufacturing. AM provides the opportunity for revolutionary approaches to product development through part integration, tooling for conventional processes, and unique geometries for weight savings. This short course focuses on a formalized approach to design for additive manufacturing by briefly reviewing the materials and characteristics of AM processes, describing various research accomplishments and successful commercial applications, and summarizing these observations into a set of rules, procedures, and mindset for realizing genuine value propositions for AM in metallic and ceramic materials.

Computational Modeling of Thermal Processes for Metallic Parts 8:30 a.m. – 4:30 p.m.

Instructor: **Dr. B. Lynn Ferguson**, FASM, Dante Solutions This course illustrates integrated computational materials engineering concepts. The focus will be on modeling of thermal processing of metallic parts, with emphasis on microstructure control, dimensional change, and stress during, and as a consequence of the process. The focus is on heat treatment processes. Most examples will be on steel components, although aluminum, nickel, and titanium alloys will be discussed. Thermal processing modeling of components involves heat and mass transport, possible surface reactions, solid state transformations, thermal stress, and transformation induced stress. Models include thermal and chemical diffusion, mechanical, and metallurgical models. Material and process data needed for these models will be discussed, including testing methods used to determine the data..

Correlative Light and Electron Microscopy of Metals 12:00 p.m. – 4:30 p.m.

Instructor: John Peppler, ASM International

Light microscopy and electron microscopy each offer specific advantages and limitations when applied to the analysis of metallic materials. Correlating light microscopy images obtained with a variety of illumination and contrast techniques to SEM/EDS images at the same locations provides valuable information for interpretation of results. Finding the exact locations across separate platforms and equipment can be a time consuming barrier to utilization of these techniques without suitable tools for workflow improvement. Examples of applications in failure analysis, interpretation of microstructures, and non-metallic inclusion identification and analysis will be discussed to illustrate power of correlative microscopy in the characterization of metallic materials.

Essential Microstructure Interpretation 8:30 a.m. – 4:30 p.m.

Instructor: Frauke Hogue, FASM, Hogue Metallography

Do you interpret microstructures on a regular basis, for quality control, failure analysis, or research? Are you just curious about what the structures mean that you have been seeing all these years? Or is metallography a new field for you? In any case, this Sunday class before the MS&T conference is for you! This is a one-day version of the four-day class that has been presented to rave reviews at the ASM Headquarters at Materials Park for the last 20 years. The focus is on practical interpretation, NOT theory, phase diagrams, and thermodynamics. There are no prerequisites. We will look at slides of over 200 structures and find out and discuss what each structure tells us about the type of material, manufacturing methods used, heat treatment, mechanical properties, and sometimes even failure modes.

REGISTER BEFORE SEPTEMBER 23 TO SAVE!

Failure Mechanisms and Analysis

8:30 a.m. – 12:00 p.m.

Instructor: **Ronald J. Parrington**, P.E., FASM, Engineering Systems, Inc. This half-day short course is based on the very popular ASM course: *Principles of Failure Analysis*. Whether made of metallic or nonmetallic materials, components fail by distortion, corrosion, wear, and/or fracture. The primary objective of failure analysis is to accurately identify the failure mechanism, so that appropriate preventive actions can be taken. The important mechanisms for each type of failure (distortion, corrosion, wear, and fracture) will be reviewed in detail, including the key macro- and microscale features used by the failure analyst to identify the various failure mechanisms. Numerous examples and case studies are illustrated with photographs, fractographs, and photomicrographs.

Testing and Qualification in Additive Manufacturing 8:30 a.m. – 4:30 p.m.

Instructor: Dr. Prabir K. Chaudhury, Exova

Additive Manufacturing (AM) of 3D printed metallic parts do not have inspection, testing, and quality assurance guidelines. There isn't a consensus among participants on qualifying parts and inspecting when in production. This course addresses testing and qualification for industrial implementation. Processing related effects on microstructure and property provide guidance on process development and optimization through testing, inspection, and qualification. Mechanical, physical, and microstructural property measurement requirements for part design will be addressed. Material and process selection, machine qualification, product and process development, process optimization, qualification, monitoring, and finally product quality assurance are discussed. Beneficial for machine developers, part manufacturers, product designers, and original equipment manufacturers engaged in AM.



Sintering of Ceramics

9:00 a.m. – 4:30 p.m.; 9:00 a.m. – 2:30 p.m. Instructor: Mohamed N. Rahaman, Missouri University of Science and Technology

This two-day course will follow the key topics in the textbook, *Sintering of Ceramics*, by M. N. Rahaman (book is included with course) and will be supplemented by detailed case studies of the sintering of specific ceramics and systems. Students will develop sufficient background in the principles and practice of sintering to be able to (i) do sintering to achieve specified target microstructures, (ii) understand the difficulties encountered in practical sintering, and (iii) take practical steps to rectify the problems encountered in producing required target microstructures.

EXHIBITION

Exhibit at MS&T

Unique Forum ... Offers you access to thousands of materials professionals!

Powerful Attendees ... More than 50% of attendees have significant purchasing power!

Keep a Pulse on the Industry ... More than 115 exhibitors, 1,755 presenters, and 3,400 attendees!

Learn at Technology Sessions ... Choose from more than 250 sessions! Show Floor Attracts Customers ... 93% of attendees spend more than one hour at the exhibition!

Networking Opportunities ... From the Happy Hour Reception to the Poster Session, MS&T offers a great opportunity to socialize and network with colleagues and friends from the materials science and technology industry.

Rental Rates

\$3,050 USD | \$100 USD per corner charge | 10' x 10' Booth includes:

- (1) Full Technical Conference Badge
- Unlimited Exhibitor Booth Personnel
- Company Listing in Show Directory
- Post-Conference Attendees List

First Time Exhibiting? Discounted booth rate of \$2,200!

Why You Should Exhibit at MS&T

As an exhibitor, benefit from more than 3,400 attendees interested in products related to the structure, properties, processing, and performance of materials. This event covers the breadth of materials science addressing the latest advancements in these themes:

- Biomaterials
- Ceramic and Glass Materials
- Electronic, Optical, and Magnetic Materials
- Energy
- Fundamentals & Characterization
- Green Manufacturing and Sustainability
- Iron and Steel (Ferrous Alloys)
- Materials-Environment Interactions
- Nanomaterials
- Processing and Product Manufacturing
- Surface Modification
- Special Topics

Attractions on the Show Floor

Poster Session **Football Feature** ASM Mini-Materials Camp

Mug Drop/Ceramic Disc Golf Contest DomesDay

Sponsorship & Advertising

- Gain additional brand exposure with sponsorship and advertising. Make sponsorship an integral component of your marketing strategy.
- Custom sponsorship, advertising opportunities, and package deals are available!

MS&T Attendees are Your Customers*

In which type of organization are you currently working?

- Academic/University
- Government Laboratory
- Industry/For-profit Research Laboratory
- Consultant
- Supplier
- Other

Which of the following areas most closely relate to your job function? 37.05%

10.93%

8.55%

28.27%

8.79%

6.41%

39.95%

13.00%

29.55%

3.78%

7.09%

6.62%

- Materials and systems
- Product manufacturing
- Processing
- Fundamentals and
- Characterization Education and professional
- development Other

What job functions best describes your work?

Engineer/Scientist 36.69% Student 26.62% Professor/Instructor 20.99% Marketing/Sales 5.63% Management 4.78% Consultant 2.22% Other 2.05% Retiree 1.02%

Concerning how your organization makes significant purchases, which of the following statements best characterizes your role?

- I am the final decision maker
- on significant purchases. 19.76% I am very influential on significant purchase decisions. 29.88%
- I make recommendations on significant purchases. 30.59%
- I am not involved in significant purchase decisions. 19.76%

*Statistical data from 2015 conference survey.

Professional Recruitment & Career Pavilion

Packages starting at only \$1,500!

Reserve your tabletop in the Professional Recruitment & Career Pavilion to gain premier access to seasoned veterans, young professionals, graduate students or post-doc candidates primed for the job market. Now is the time to reserve your space and lock in your tabletop location, sponsorship, and advertising needs. Contact your Sales Representative today!

Be a Sponsor! Visit matscitech.org/exhibits or contact a Sales Representative today.

Contact a representative for more details on exhibiting, sponsorships or advertising:

Mona Thiel (614) 794-5834

mthiel@ceramics.org



Cate Davidson (724) 814-3092 cdavidson@aist.org



Christina Sandoval (440) 338-5151 x 5625 Christina.Sandoval@asminternational.org



Caron Gavrish (724) 814-3140 cgavrish@tms.org







HOTEL & REGISTRATION

Reservation deadline: September 29, 2016

For best availability and immediate confirmation, make your reservation online at matscitech.org.

Hilton Salt Lake City Center (ASM HQ) Rate: \$189 single or double occupancy One-half block from Salt Palace Convention Center

Salt Lake Marriott Downtown City Creek (ACerS HQ) Rate: \$194 single or double occupancy Adjacent from the Salt Palace Convention Center

Salt Lake Marriott City Center (AIST and TMS HQ) Rate: \$189 single or double occupancy Five minute walk from the Salt Palace Convention Center

Holiday Inn Express Salt Lake City (Students) Rate: \$149 single or double occupancy Adjacent from the Salt Palace Convention Center

Radisson Hotel Salt Lake City Rate: \$159 single or double occupancy Adjacent to the Salt Palace Convention Center

U.S. Government rate rooms are extremely limited; proof of federal government employment must be shown at check-in or higher rate will be charged. U.S. Government rate is the prevailing government rate.

Cancellation: Reservations cancelled less than 72 hours prior to 12:00 p.m. of scheduled arrival date will be charged one night rate and tax.

Audio and Visual Recording of Technical Paper Presentations/Sessions

ACerS, AIST, ASM, and TMS reserve the right to any still photography, audio and video reproductions of presentations at every technical session and related conference activities. Recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of MS&T and the individual authors is strictly prohibited. MS&T will take photographs and video during the MS&T Conference and Exposition, and reproduce them in MS&T educational, news or promotional material, whether in print, electronic or other media, including the MS&T website. By participating in the MS&T Conference and Exposition, you grant MS&T the right to use your name, photograph and biography for such purposes. All postings become the property of MS&T. Postings may be displayed, distributed or used by MS&T for any purpose.

Registration Rates

	On or before 9/23/16	After 9/23/16
Member	\$625	\$725
Nonmember	\$775	\$900
Presenter Member	\$575	\$675
Presenter Nonmember	\$725	\$850
Student Member	\$125	\$150
Student Nonmember	\$150	\$175
Student Member Presenter	\$100	\$125
Student Nonmember Presente	er \$125	\$150
One-Day Member	\$500	\$675
One-Day Nonmember	\$650	\$875
Exhibit Only	\$25	\$25

Badge Pick-up and Onsite Conference Registration

The MS&T Conference registration desk will be located at the Convention Center. Advance registrants may pick-up badges at the registration area during the following hours:

Sunday, October 23	12:00 p.m. – 5:00 p.m.
Monday, October 24	7:00 a.m. – 6:00 p.m.
Tuesday, October 25	7:00 a.m. – 6:00 p.m.
Wednesday, October 26	7:00 a.m. – 5:00 p.m.
Thursday, October 27	7:00 a.m. – 12:00 p.m.

For quick and easy onsite registration, remember to bring your registration confirmation with bar code identification!

Special Needs

ACerS, AIST, ASM, TMS, the Salt Palace Convention Center and all conference hotels are striving to accommodate all guests with special needs. If you require access to modified housing, transportation, or other assistance, please provide this information in detail on both your conference registration and housing forms.



Technical Meeting and Exhibition



MATERIALS SCIENCE & TECHNOLOGY

OCTOBER 23 – 27, 2016 SALT PALACE CONVENTION CENTER SALT LAKE CITY, UTAH USA

The American Ceramic Society 600 N. Cleveland Ave., Suite 210 Westerville, Ohio 43082 USA

Plan to attend the leading forum for materials science and engineering.

