

ADVANCE PROGRAM

REGISTER BEFORE AUGUST 30, 2019 TO SAVE!

Technical Meeting and Exhibition

MST & T19 #MST19

MATERIALS SCIENCE & TECHNOLOGY

SEPTEMBER 29 – OCTOBER 3, 2019



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WHERE MATERIALS INNOVATION HAPPENS

Organizers:



Sponsored by:



MST & T 19

MATSCITECH.ORG/MST19

PLENARY
SPEAKERS

OCTOBER 1, 2019 | 8–10:40 A.M.

ASM/TMS DISTINGUISHED LECTURESHIP IN MATERIALS AND SOCIETY



Carolyn Hansson, Professor of Materials Engineering, University of Waterloo, Canada

The Challenge of 100 Year Service-life Requirement

The highway authorities in Canada and the U.S. are considering raising the service-life specification for reinforced concrete highway infrastructure from the current 75 years to 100 years or more. The goals are to reduce the financial and environmental costs and improve the sustainability of the system by limiting the need for maintenance, remediation, and replacement of the structures. In coastal areas and in the northern parts of North America and Europe, the major culprit in limiting the durability of reinforced concrete is salt from seawater and de-icing agents. The chlorides destroy the natural passivity of reinforcing steel in concrete and allow active corrosion, which eventually causes cracking and spalling of the concrete. De-icing agents containing calcium- or magnesium-chloride, can attack the concrete directly. This presentation will describe the research at Waterloo on identifying the most appropriate stainless steels to combat the chloride attack over the long term.

ACerS EDWARD ORTON JR. MEMORIAL LECTURE



Minoru Tomozawa, Professor, Department of Materials Science and Engineering, Rensselaer Polytechnic Institute, USA

Glass and Water: Fast Surface Relaxation

Water has large influence on various glass properties such as mechanical, optical, and chemical properties. Mechanical strength of glasses decreases in water or water vapor; the strength decreases with increasing loading time and crack growth rate increases in increasing water vapor. Structure and properties of glass can change with time near the glass transition temperature. This time dependence is a unique characteristic of glasses, called "relaxation," and its speed increases with increasing temperature. In the presence of water vapor, it was discovered that the relaxation of surface layer of glasses becomes much faster than that of the bulk relaxation. Correspondingly, the surface relaxation was observed at a temperature much lower than the glass transition temperature. In the present talk, this newly discovered phenomena will be discussed: the method of the measurement of surface relaxation method, its structural origin, its application to make

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stronger glass fibers, and its use to explain long standing mysteries related to mechanical properties of glasses, such as degradation of strengthened glasses, glass toughening, and fatigue limit.

AIST ADOLF MARTENS MEMORIAL STEEL LECTURE



Wolfgang Bleck, Chair, Department of Ferrous Metallurgy, IEHK Steel Institute, RWTH Aachen University, Germany

The Fascinating Variety of New Manganese Alloyed Steels

The alloying element manganese is used in virtually all steels for enabling hot formability, to increase hardenability or for solid solution strengthening. Optimizing the balance of conflictive mechanical properties like strength, toughness, and fatigue, formability is the key issue of current steel and process development. Therefore, new steel design concepts use manganese for stabilizing the fcc phase and for adjusting the stacking fault energy. By this, phenomena such as the TRIP, TWIP, or MBIP effects are triggered. This interest in stress-controlled or strain-induced low temperature transformations of the austenite provides the basis for new steel groups like the advanced high strength steels (AHSS), which are of prime interest for sheet metal forming but also for new forging steel concepts.

In medium and high manganese alloyed steels, new alloying concepts and new complex temperature-time-cycles during annealing have been combined for developing nanostructured matrices. A specific feature of these new materials, is that by element partitioning on the nm-scale, local enrichments of carbon and manganese can lead to a complex interplay of phases and crystal defects, providing a new promising field for future materials and process development. The strong interaction of alloying elements among themselves as well as with various crystal defects are regarded as major parameters for the control of mechanical properties. Thus, developing these new steels requires the use of the latest analytical techniques, modern microstructural description methods, advanced simulation techniques, and thorough evaluation of the local and global mechanical behavior. The talk will provide examples of recent steel and process design with a focus on automotive car body and drive train applications.

ADVANCE PROGRAM

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SHORT COURSES

Train your workforce while at MS&T! In addition to MS&T programming, sponsoring societies have organized educational courses for deeper exploration of key topics in materials science.

Complete program and registration information are available at matscitech.org/mst19.

SATURDAY, SEPTEMBER 28

SINTERING OF CERAMICS

Ricardo Castro, University of California, Davis
9 a.m. – 4:30 p.m.
 Sponsored by ACerS

DESIGN FOR ADVANCED MANUFACTURING FOR LIGHT-WEIGHTING CERTIFICATE

Sunniva Collins, Ph.D., FASM, Case Western Reserve University
1–5 p.m.
 Sponsored by ASM

SUNDAY, SEPTEMBER 29

INTRODUCTION TO MACHINE LEARNING FOR MATERIALS SCIENCE

Joshua Tappan, Bryce Meredig, Citrine Informatics;
John Mauro, Pennsylvania State University
8 a.m.–Noon
 Sponsored by ACerS

THURSDAY, OCTOBER 3

ELECTROCERAMICS IN MODERN TECHNOLOGY: APPLICATIONS AND IMPACT

R.K. Pandey, Texas State University
8 a.m.–4:30 p.m.
 Sponsored by ACerS

METALLOGRAPHY FOR FAILURE ANALYSIS

Frauke Hogue, FASM, Hogue Metallography
8:30 a.m.–4:30 p.m.
 Sponsored by ASM

FRIDAY, OCTOBER 4

ELECTROCERAMICS IN MODERN TECHNOLOGY: APPLICATIONS AND IMPACT

R.K. Pandey, Texas State University
8 a.m.–Noon
 Sponsored by ACerS

NET SHAPE FORMING-CONVENTIONAL PROCESSES OR ADDITIVE MANUFACTURING?

Howard A. Kuhn, FASM, University of Pittsburgh, America Makes
8:30 a.m.–4:30 p.m.
 Sponsored by ASM

SINTERING OF CERAMICS

Ricardo Castro, University of California, Davis
9 a.m.–2:30 p.m.
 Sponsored by ACerS

ADDITIVE MANUFACTURING MATERIALS AND PROCESSES WORKSHOP

David L. Bourell, University of Texas at Austin;
Sudarsanam Suresh Babu, University of Tennessee-Knoxville; **Kirk Rogers**, The Barnes Group Advisors
1–5 p.m.
 Sponsored by TMS

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PROGRAM AT-A-GLANCE

ADDITIVE MANUFACTURING

- Additive Manufacturing Education
- Additive Manufacturing of Glass, Ceramics and Composites
- Additive Manufacturing of Metals: Microstructure and Material Properties of Nickel-based Alloys
- Additive Manufacturing of Metals: Microstructure, Properties and Alloy Development
- Additive Manufacturing of Metals: Post Processing
- Additive Manufacturing: Effective Production, Characterization, and Recycling of Powder Materials
- Additive Manufacturing: In-situ Process Monitoring and Control
- Additive Manufacturing: Microstructure and Material Properties of Titanium-based Alloys
- Additive Manufacturing: Solid-state and Other Non-beam-based Technologies for the Manufacturing of Metallic Parts
- Corrosion of Additively Manufactured Metals

BIOMATERIALS

- Advanced Biomaterials for Biomedical Implants and Biosensing Devices
- Next Generation Biomaterials
- Surface Properties of Biomaterials

CERAMIC AND GLASS MATERIALS

- ACerS Robert B. Sosman Award Symposium: From Carbides to Carbons - from Bulk to Nano
- Alumina at the Forefront of Technology III
- Ceramic and Crystal Materials for Optics and Photonics
- Ceramics and Glasses Simulations and Machine Learning
- Glasses, Optical Materials, and Devices: Current Issues in Science & Technology
- International Symposium on Ceramic Matrix Composites
- Phase Transformations in Ceramics: Science and Applications

ELECTRONIC AND MAGNETIC MATERIALS

- Advanced Microelectronic Packaging, Emerging Interconnection Technology, and Pb-free Solder
- Advances in Dielectric Materials and Electronic Devices
- Semiconductor Heterostructures: Theory, Growth, Characterization, and Device Applications

ENERGY

- Hybrid Organic-Inorganic Materials for Alternative Energy
- Hydrogen Effects on Materials Performance
- Materials for Nuclear Applications
- Materials Issues in Nuclear Waste Management

FAILURE ANALYSIS

- Failure Analysis & Characterization
- Failure Analysis: Industry Specific Failures
- Failure Prevention and Unconventional Failures

FUNDAMENTALS AND CHARACTERIZATION

- Actinide and Lanthanide Materials III
- Alloy Design for Additive Manufacturing: Developing New Feedstock Materials
- Bulk Metallic Glasses and their Composites – Progresses, Outcomes, and Prospects
- Characterization and Modeling of Metal Whisker Formation
- Characterization of Materials and Properties through Metallography, Mechanical Testing and Analysis—From Fundamentals to the Cutting Edge
- Data Science for Material Property Interpretation
- Emergent Materials under Extremes and Decisive In-situ Characterizations
- Grain Boundaries, Interfaces, and Surfaces in Functional Materials: Fundamental Structure-Property-Performance Relationships
- PSDK XIV: Phase Stability and Diffusion Kinetics
- Sandphobic Thermal/Environmental Barrier Coatings



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IRON AND STEEL (FERROUS ALLOYS)

- Advanced High Strength Steels / From Design to End Users
- Advances in Understanding of Martensite in Steels
- Advances in Zinc-coated Sheet Steel Processing and Properties
- Applications of Modern Characterization Techniques to Ferrous Alloys and Steel Products
- Formability and Fracture of Metal Sheets
- Gas/Metal Reactions, Diffusion, and Phase Transformation during Heat Treatment of Steel
- Retained Austenite for High and Ultrahigh Strength Steels
- Thermomechanical Processing in Shaping and Forming of Steels

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
- Crosscutting Issues in Corrosion of Materials: Control, Monitoring, Mitigation and Material Selection
- Materials vs Minerals: Bridging the Gap between Materials Science and Earth and Planetary Science
- Substrate Protection for Corrosion Prevention
- Thermal Protection Materials and Systems
- Thermodynamics of Materials in Extreme Environments

MODELING

- Integration between Modeling and Experiments for Crystalline Metals: From Atomistic to Macroscopic Scales
- Modeling Variability of Mechanical Behavior through ICME Techniques with Emphasis on Verification, Validation & Uncertainty Quantification
- Multi Scale Modeling of Microstructure Deformation in Material Processing

NANOMATERIALS

- Controlled Synthesis, Processing, and Applications of Structural and Functional Nanomaterials
- Nanostructured Materials under Extreme Environments
- Nanotechnology for Energy, Environment, Electronics, Healthcare and Industry

PROCESSING AND MANUFACTURING

- 11th International Symposium on Green and Sustainable Technologies for Materials Manufacturing and Processing
- Advanced Manufacturing, Processing, Characterization, and Modeling of Functional Materials
- Advances in Surface Engineering
- Boron Based Materials and Coatings: Structure, Properties, Processing, and Applications
- Joining of Advanced and Specialty Materials XXI
- Light Metal Technology
- Mechanochemical Synthesis and Reactions in Materials Science IV
- Metal and Polymer Matrix Composites IV
- Metamorphic Manufacturing – Incremental Deformation Processing for Agile, High-quality Metallic Component Production
- Multifunctional Ceramic- and Metal-matrix Composites: Processing, Microstructure, Properties, and Performance
- Powder Metallurgy of Light, Reactive, and Other Non-ferrous Metals
- Processing and Performance of Materials Using Microwaves, Electric and Magnetic Fields, Ultrasound, Lasers, and Mechanical Work – Rustum Roy Symposium
- Sintering and Related Powder Processing Science and Technologies
- Surface Protection for Enhanced Materials Performance: Science, Technology, and Application
- Synthesis, Characterization, Modeling, and Applications of Functional Porous Materials
- Ultra High Performance Metallic Systems for Aerospace, Defense, and Automotive Applications

SPECIAL TOPICS

- Activating Allies: Navigating the Intersectional Landscape of Diversity and Inclusion
- Curricular Innovations and Continuous Improvement of Academic Programs (and Satisfying ABET along the way): The Elizabeth Judson Memorial Symposium
- Global Young Investigators Forum
- *Journal of the American Ceramic Society* Awards Symposium
- Perspectives for Emerging Materials Professionals
- Undergraduate Global University

LATE NEWS POSTER SESSION

Want to share your latest research at MS&T? Submit an abstract for the Late News Poster Session! Topics can include any of those listed in the program at a glance. Questions? Contact programming@programmester.org. Abstracts due: **August 1, 2019**



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LECTURES
AND AWARDS

MONDAY, SEPTEMBER 30

ACERs NAVROTSKY AWARD FOR EXPERIMENTAL THERMODYNAMICS OF SOLIDS

8:10–8:55 a.m.

Alexander Beutl, Institute of Inorganic Chemistry–Functional Materials, University of Vienna, Althanstraße, Austria
A novel apparatus for coulometric titrations in lithium containing systems

ACERs/EPDC ARTHUR L. FRIEDBERG CERAMIC ENGINEERING TUTORIAL AND LECTURE

9–10 a.m.

Kathleen Richardson, University of Central Florida, USA
Redefining Material Design Paradigms for Next Generation Optical Materials

ACERs RICHARD M. FULRATH AWARD SESSION

2–4:40 p.m.

Manabu Fukushima, National Institute of Advanced Industrial Science and Technology, Japan
Engineering Cellular Ceramics with Modulated Pore Configurations

Keigo Suzuki, Murata Manufacturing Co. Ltd., Japan
Fabrication and Characterization of Nanoscale Dielectrics for the Design of Advanced Ceramic Capacitors

Ronald Polcawich, U.S. Defense Advanced Research Projects Agency (DARPA), USA
Presentation and title to be announced

Koichiro Morita, Taiyo Yuden Co. Ltd., Japan
Dielectric Material Design and Lifetime Prediction for Highly Reliable MLCCs

Vilas Pol, Purdue University, USA
Engineered Ceramic Materials for Energy Storage

ALPHA SIGMA MU LECTURE

2:30–4 p.m.

Diana Ladoss, FASM, Worcester Polytechnic Institute, USA
A Comparative Study of Ti-6Al-4V Alloys Fabricated by Three Powder-based Additive Manufacturing Technologies: Integrative Design for Fatigue Performance and New Methods for Rapid Material/Part Qualification

For more information on time, location, and additional fees, please visit matscitech.org/mst19

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TUESDAY, OCTOBER 1

ASM EDWARD DEMILLE CAMPBELL MEMORIAL LECTURE

12:45–1:45 p.m.

Katherine Faber, FASM, California Institute of Technology, USA
Breaking Old Barriers: New Opportunities in Brittle Fracture

ACERs FRONTIERS OF SCIENCE AND SOCIETY—RUSTUM ROY LECTURE

1–2 p.m.

Jennifer Lewis, Harvard University, USA
Printing Architected Matter in Three Dimensions

ASM-IMS HENRY CLIFTON SORBY LECTURE

2–3 p.m.

Helmut Clemens, Montanuniversitaet Leoben, Austria
Development and Characterization of High-performance Materials by Means of Cross-scale Metallography and Complementary Methods

ACERs GOMD ALFRED R. COOPER AWARD SESSION

2–4:40 p.m.

Cooper Distinguished Lecture

Kathleen Richardson, University of Central Florida, USA
Function-tailoring Strategies for Broadband Infrared Glasses

2019 Alfred R. Cooper Young Scholar Award Presentation

Winner will be announced after selection by the Cooper Award Committee.

WEDNESDAY, OCTOBER 2

ACERs BASIC SCIENCE DIVISION ROBERT B. SOSMAN LECTURE

1–2 p.m.

Yury Gogotsi, Drexel University, USA
Nanomaterials Born from Ceramics: Transformative Synthesis of Carbons, Carbides and Nitrides



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SPECIAL
EVENTS

SUNDAY, SEPTEMBER 29

**MS&T WOMEN IN MATERIALS
SCIENCE RECEPTION**

5-6 p.m.

**ACERs PCSA & KERAMOS
RECEPTION**

5:30-7:30 p.m.

MONDAY, SEPTEMBER 30

**ASM WOMEN IN MATERIALS
ENGINEERING BREAKFAST**

(ticketed event)

7-9 a.m.

**ACERs BASIC SCIENCE DIVISION
CERAMOGRAPHIC EXHIBIT AND
COMPETITION**

8 a.m.-6 p.m.

**ASM LEADERSHIP AWARDS
LUNCHEON**

(ticketed)

11:30 a.m.-1 p.m.

**ACERs 121ST ANNUAL
MEMBERSHIP MEETING**

1-2 p.m.

**ASM 106TH ANNUAL BUSINESS
MEETING**

4-5 p.m.

**MS&T PARTNERS' WELCOME
RECEPTION**

5-6 p.m.

**AIST STEEL TO STUDENTS
RECEPTION**

6-8 p.m.

**ACERs ANNUAL HONOR AND
AWARDS BANQUET RECEPTION**

6:45-7:30 p.m.

**ACERs ANNUAL HONOR AND
AWARDS BANQUET**

7:30-10 p.m.

TUESDAY, OCTOBER 1

**ACERs BASIC SCIENCE DIVISION
CERAMOGRAPHIC EXHIBIT
& COMPETITION**

7 a.m.-6 p.m.

ASM MINI-MATERIALS CAMP

9 a.m.-2 p.m.

EXHIBITION SHOW HOURS

10 a.m.-6 p.m.

**GENERAL POSTER SESSION WITH
PRESENTERS**

11 a.m.-1 p.m.

MS&T FOOD COURT

Noon-2 p.m.

GENERAL POSTER VIEWING

1-6 p.m.

**EXHIBITOR NETWORKING
RECEPTION**

4-6 p.m.

**GENERAL POSTER SESSION WITH
PRESENTERS**

4:45-5:45 p.m.

**TMS YOUNG PROFESSIONAL
TUTORIAL LUNCHEON**

(Lunch ticketed)

Lecture open to all attendees

Noon-2 p.m.

**ASM AWARDS DINNER
RECEPTION**

(ticketed)

6-7 p.m.

ASM AWARDS DINNER

7-9:30 p.m.

ASM PRESIDENT'S RECEPTION

9:30-11:30 p.m.

WEDNESDAY, OCTOBER 2

**ACERs BASIC SCIENCE DIVISION
CERAMOGRAPHIC EXHIBIT &
COMPETITION**

7 a.m.-Noon

GENERAL POSTER VIEWING

9:30 a.m.-2 p.m.

EXHIBITION SHOW HOURS

9:30 a.m.-2 p.m.

ASM MINI-MATERIALS CAMP

9:30 a.m.-2 p.m.

MS&T FOOD COURT

Noon-2 p.m.

THURSDAY, OCTOBER 3

**ACERs BASIC SCIENCE DIVISION
CERAMOGRAPHIC EXHIBIT
& COMPETITION**

7 a.m.-Noon

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ADVANCE PROGRAM

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STUDENTS ACTIVITIES

(Information subject to change. For up to date 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. Apply today at matscitech.org/students. **Deadline: September 15, 2019.**

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.

UNDERGRADUATE STUDENT POSTER CONTEST

The contest encourages undergraduate students to present their undergraduate research experiences and to improve their

communication skills. The poster entered must be the work of an undergraduate and completed during the student's undergraduate education. Work presented in the poster does not have to be performed at the student's home institution, but could be, for example, from a project performed as part of a co-op experience, a summer internship, or a Research Experience for Undergraduates (REU) project. To enter the poster contest, submit an abstract of no more than 150 words to the 2019 Undergraduate Student Poster Contest at matscitech.org/students. **Deadline: September 9, 2019.**

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 in the MS&T technical program to be entered into the contest. Entries will be displayed in the general poster session. If you have an accepted poster abstract and would like to enter the contest, contact Yolanda Natividad at ynatividad@ceramics.org.

SUNDAY, SEPTEMBER 29

CHAPTER OFFICER WORKSHOP – FOR CHAPTER OFFICERS ONLY | 9:30 a.m.–Noon

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 before the **September 15, 2019 deadline.**

UNDERGRADUATE STUDENT SPEAKING CONTEST | 1–4 p.m.

MS&T hosts 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 can compete in this contest. MS&T speaking contestants must be reported to Yolanda Natividad at ynatividad@ceramics.org by **September 9, 2019.**

STUDENT NETWORKING MIXER 7–9 p.m.

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, SEPTEMBER 30

EMERGING PROFESSIONALS SYMPOSIUM

Be sure to attend the symposium *Perspectives for Emerging Materials Professionals!* Several sessions have been developed to help students and young professionals navigate their career in the materials science profession.



ACER'S STUDENT TOUR | Noon–4 p.m.

ACerS President's Council of Student Advisors (PCSA) will be offering an opportunity for students to attend a local tour.

AIST STUDENT PLANT TOUR | Noon–4 p.m.

AIST will offer students the opportunity to tour EVRAZ Oregon Steel, a local rolling and spiral pipe mill. Students registered for MS&T19 before August 19, 2019 will be contacted by email to sign up. Advance registration is required.

ACER'S HUMANITARIAN PITCH COMPETITION | 8–11 a.m.

ACerS President's Council of Student Advisors is hosting a competition for students to pitch their ideas to a panel of judges about how you can address a challenge that a community is experiencing. By utilizing their material engineering background, students should aim to show how improved materials/processes will benefit the community that is in need. Both undergraduate and graduate students are eligible to participate. Visit Ceramics.org/pitchcomp for more information. Abstract submission deadline is **September 1, 2019.**

TUESDAY, OCTOBER 1

CERAMIC MUG DROP CONTEST | 11:15 a.m.

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, contact Geoff Brennecka at geoff.brennecka@mines.edu by **Monday, September 23, 2019.**

CERAMIC DISC GOLF CONTEST | 12:30 p.m.

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, contact Geoff Brennecka at geoff.brennecka@mines.edu by **Monday, September 23, 2019.**

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 annual ASM Geodesic Dome Design Competition! To register as a contestant and for more information, visit Asminternational.org/domesday. Registration deadline: **September 16, 2019.**

STUDENT AWARDS CEREMONY | 2–3 p.m.

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, and Keramos National Awards.



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EXHIBIT AT MS&T

Unique forum ... Offers access to thousands of materials professionals.

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

Keep a pulse on the industry ... Featuring 100 exhibits, 1,850 presenters and **3,200** 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 Expo networking 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.

EXHIBITION

Exhibit Dates:
Tuesday, October 1 | Wednesday, October 2

WHY YOU SHOULD EXHIBIT AT MS&T

This event covers the breadth of materials science addressing the latest advancements in these themes:

- Additive manufacturing
- Biomaterials
- Ceramic and glass materials
- Electronic and magnetic materials
- Energy
- Failure analysis
- Fundamentals and characterization
- Iron and steel (ferrous alloys)
- Materials–environment interactions
- Modeling
- Nanomaterials
- Processing and manufacturing
- Special topics

ATTRACTIONS ON THE SHOW FLOOR

- Poster session
- Mug drop/Ceramic disc
- Football feature
- Materials camp
- DomesDay

RENTAL RATES

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

- (1) Complimentary full conference technical badge
- Post-conference attendees list (emails not included)
- Free digital Expo Only passes for your guests
- Unlimited exhibitor booth personnel badges
- Draped 8' back wall and 3' side rails
- 7" x 44" B&W one-line ID sign
- Company and product listing in printed & online show directories

2019 EXHIBIT HOURS

Tuesday, October 1: 10 a.m.–6 p.m.

Wednesday, October 2: 9:30 a.m.–2 p.m.

Plan to attend the Exhibitor Networking Reception!

Tuesday, October 1: 4–6 p.m.

SPONSORSHIP & ADVERTISING

- Complement your exhibit space and reinforce your brand with a highly visible sponsorship or advertisement in the final program.
- Custom sponsorship, advertising opportunities, and package deals are available!

EXHIBIT SALES & LOGISTICS

Gavin McAuliffe, 312-265-9649, gavin@corcexpo.com

SPONSORSHIP & ADVERTISEMENT SALES & FULFILLMENT

Mary Michalik, 312-265-9650, mary@corcexpo.com



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HOTEL AND REGISTRATION

HOTEL RESERVATION DEADLINE: September 6, 2019

For best availability and immediate confirmation, make your reservation online at matscitech.org/mst19.

DOUBLETREE BY HILTON PORTLAND – (AIST and TMS HQ)

\$201 plus tax/night single or double queen

\$221 plus tax/night single or double premium queen/queen or king

HILTON PORTLAND & EXECUTIVE TOWER – (ASM HQ)

\$211 plus tax/night single or double

PORTLAND MARRIOTT DOWNTOWN WATERFRONT – (ACerS HQ)

\$209 plus tax/night single or double

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 noon of scheduled arrival date will be charged one night's rate and tax.

REGISTRATION RATES

	On or Before 8/30/19	After 8/30/19
Member	\$660	\$785
Nonmember	\$810	\$935
Presenter, Member*	\$610	\$735
Presenter, Nonmember*	\$760	\$885
Student Member	\$135	\$185
Student Nonmember	\$160	\$210
Student Member, Presenter*	\$110	\$160
Student Nonmember, Presenter*	\$135	\$185
One-Day, Member	\$535	\$660
One-Day, Nonmember	\$685	\$810
Exhibit Only	\$25	\$25

*This rate applies to speakers, poster presenters, organizers, and session chairs



Organizers:



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The American Ceramic Society
550 Polaris Parkway, Suite 510
Westerville, OH 43082-7132 USA

Technical Meeting and Exhibition

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MATERIALS SCIENCE & TECHNOLOGY

SEPTEMBER 29 – OCTOBER 3, 2019

PORTLAND CORE GON

WHERE MATERIALS INNOVATION HAPPENS