JULY 15–19, 2018
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO, USA

On behalf of the International Scientific Committee and the Local Organizing Committee, we cordially invite you to participate in the

18th International Conference on the Strength of Materials (ICSMA 18)

July 15–19, 2018 • The Ohio State University • Columbus, Ohio, USA

Online and advanced registration is now closed.

Onsite registration is available beginning at 3:00 p.m. on Sunday, July 15, at the Ohio Union (2nd level, Archie Griffin East Ballroom Foyer). To expedite the registration process, you may complete and print the PDF registration form and bring it with you. TMS staff will be available to assist you with your registration

Abstract Book

Book Housing

Campus Map

Final Program Now Available, click here to view.

IMPORTANT DATES

Abstract Deadline:
January 15, 2018

Discount Registration Deadline:
June 15, 2018

On-Campus Housing Deadline:
July 6, 2018

Conference Dates:
July 15–19, 2018

RESOURCES

- Final Program
- Calendar of Events
- Exhibit-Sponsor Form

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Funding support provided by Los Alamos National Laboratory.

ICSMA 18 builds on a 50-year tradition of providing an international venue for the latest advances in the strength of materials. Scientific topics provide comprehensive coverage of the field, from basic concepts of deformation to advanced engineering materials, and across composites, alloys, biomedical and bio-inspired materials, and emerging materials. The meeting will advance fundamental understanding of the processes that govern the strength of materials at different length and time scales, and it will forge links between basic studies and investigations of technologically important engineering materials. Thus, ICSMA 18 will offer a broad forum for the presentation and discussion of all aspects related to the strength and deformation of a wide range of materials. The conference will be held at The Ohio State University (USA), providing an open campus setting in which to meet.

Photo Credit: The Ohio State University Communication's Photo Gallery

ICSMA 18 will take place at the Ohio Union (above) on the campus of The Ohio State University in Columbus, Ohio, USA.

ICSMA 18 will begin on the evening of Sunday, July 15 with a an opening reception and conclude on the evening of Thursday, July 19 with a closing banquet. Each weekday morning will begin with a plenary session and transition to six concurrent sessions, all held in the convenience of the Ohio Union, a state-of-the-art meeting space integrated with restaurants and shopping along the High St. commercial district. Please see Special Events for information on networking and special events throughout the week.

Topic areas include:

- Advanced (including in situ) characterization of deformation processes
- Elementary deformation mechanisms in engineering materials
- Fracture and fatigue
- Friction and wear
- Glasses and non-crystalline solids
- High temperature deformation and creep
- Materials under extreme conditions
- Mechanical behavior associated with phase transformations

- Mechanistic foundations for multiscale modeling and ICME
- Micro-and nano-scale mechanical testing
- Effects of grain boundaries and interfaces
- Reinforcements at the sub-nanometer scale
- Strength of biomedical and bio-inspired materials
- John P. Hirth Honorary Symposia
- Hael Mughrabi Honorary Symposia
- Emerging topics

Confirmed Plenary Speakers Include:

Easo George, USA
Oak Ridge National Laboratory
Mechanical Properties of High-Entropy Alloys – Review of Recent Developments

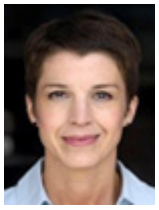
View Abstract

Dierk Raabe, EU
Max-Planck-Institut
Advancing Alloys by Segregation Engineering

View Abstract

Ke Lu, China
Institute of Metal Research, CAS
Hardening and Softening in Nano-grained Metals

View Abstract



Erica Lilleodden, EU
Helmholtz-Zentrum Geesthacht
Achieving Extraordinary Strengths by Varying Length Scales and Boundary Conditions

View Abstract

Laurence Brassart, Australia
Monash University
Micromechanics of Highly Cross-linked Thermosets

View Abstract

Kaneaki Tsuzaki, Japan
Kyushu University

Metallurgical Aspects of Fatigue Crack Growth Resistance in Steel: How Can We Improve it through Microstructure Control?

Dorte Juul-Jensen, EU
Technical University of Denmark
Metal Microstructures and Properties in 3D and 4D

View Abstract

Carolin Koerner, EU
University of Erlangen
Evolution of Microstructure and Material Properties during Additive Manufacturing

View Abstract

See Full List of Invited Speakers

Local Organizing Committee:

- Peter Anderson, The Ohio State University
- Irene Beyerlein, University of California, Santa Barbara
- James Earthman, University of California, Irvine
- Michael Mills, The Ohio State University
- Timothy Rupert, University of California, Irvine
- Izabela Szlufarska, University of Wisconsin

International Scientific Committee:

- Helena Van Swygenhoven, Switzerland - CHAIR
- Angus Wilkinson, UK - VICE CHAIR
- Irene Beyerlein, USA
- Cate Brinson, USA
- Atul Chokshi, India
- Antonin Dlouhy, Czech Republic
- Chris Hutchinson, Australia
- Yuichi Ikuhara, Japan
- Martin Heilmeier, Germany
- Marc Legros, France
- Michael Mills, USA
- Wolfgang Pantleon, Denmark

- Maria-Teresa Perez-Prado, Spain
- Reinhard Pippan, Austria
- Tresa Pollock, USA
- Alexei Romanov, Russia
- Chad Sinclair, Canada
- Werner Skrotzki, Germany
- Zhefang Zhang, China

Ohio Union


View of Oval

OSU Emblem

William Oxley Thompson Library

Campus Map

Send Me More Information

Receive Updates

Click the button above and fill out the form if you are interested in receiving e-mail updates on ICSMA 18.

Sponsors

Thank you to the sponsors of ICSMA 18:

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INSTITUTE FOR MATERIALS RESEARCH

The Institute for Materials Research is Ohio State's gateway to materials research innovation.

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Funding support provided by Los Alamos National Laboratory.

For More Information

For more information about this meeting, please contact:

TMS Meeting Services
5700 Corporate Drive Suite 750
Pittsburgh, PA 15237
Telephone:
U.S. and Canada Only: 1-800-759-4867
Other Countries: 1-724-776-9000, ext. 241
Fax: 1-724-776-3770
E-mail: mtgserv@tms.org

JULY 15–19, 2018
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO, USA

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

About the Conference

Calendar of Events

Important Dates

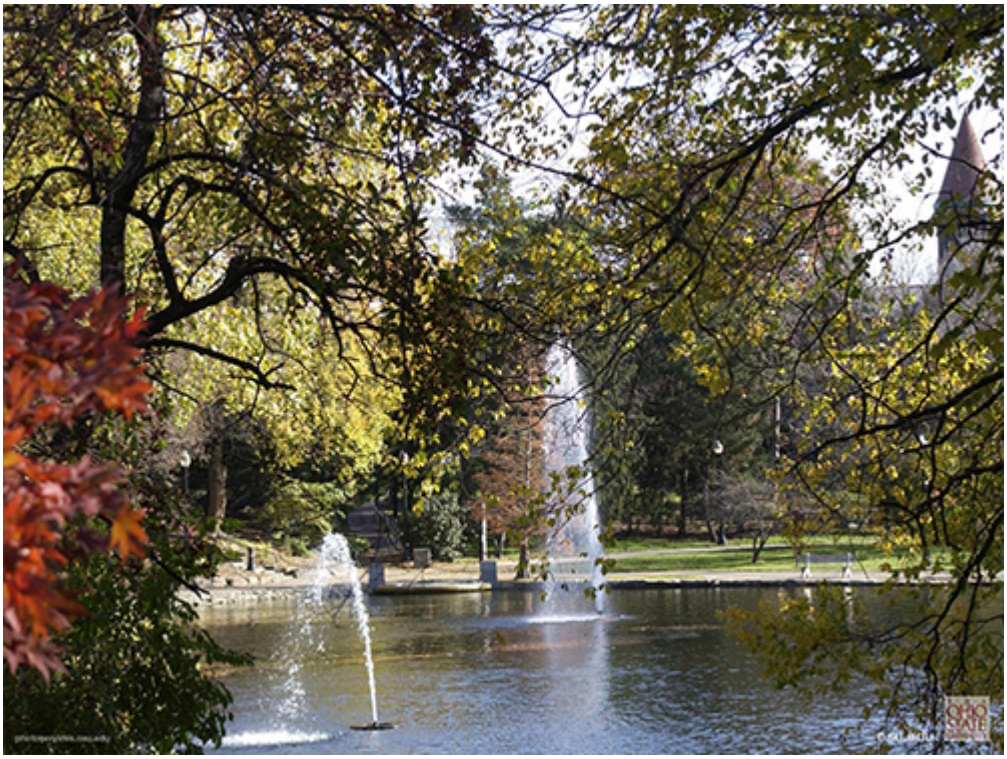
Description	Date
Abstract Submission Deadline	November 30, 2017
Preliminary Program Posted Online	April 30, 2018
Early Bird Registration Discount Rate Ends	April 30, 2018
On-Campus Housing Deadline	July 6, 2018
Conference Opens	July 15, 2018
Conference Closes	July 19, 2018

About the Location

The Ohio State University is one of the largest universities in the US, with a main campus extending over 7 sq. km (1700 acres), nearly 60,000 students, 6000 academic staff and 22,000 administrative staff. Founded in 1870 as the Ohio Agricultural and Mechanical College, The Ohio State University offers more than 12,000 courses, has 18 colleges and schools, more than 200 academic centers and institutes, and is home to the first ceramic engineering program in the US (1894, Edward Orton, Jr) and the only ABET-accredited undergraduate program in welding engineering in North America.

The Oval

Orton Hall



Mirror Lake

Campus Map

Registration

Registration is required for all presenting authors, attendees, accompanying persons, and sponsors/exhibitors. For more information on registering for this conference or on meeting policies, please view the Registration page.

Attire

"Business casual" attire is appropriate for this event. Shorts are permitted. Buildings are air conditioned, so a light jacket, sweater, or scarf is recommended. Special situations:

- Presenters may want to wear "business dress" attire on the day of their presentation, but it is not required.
- The Sunday social tour and Welcome Reception are casual.
- The conference social at The Ohio State University Faculty Club and the conference closing banquet are not formal events. Business casual attire is encouraged.

Language

The official language of the conference is English.

Currency

All fees are expressed in U.S. dollars (USD).

Electricity

The United States uses a 120V/60Hz American grounded socket, with two or three prongs.

Time Zone

Unless otherwise noted, all times for this conference series and related events will take place in the local time, Eastern Time Zone (UTC -5:00).

Weather

The average temperature in Columbus, Ohio in July is around 84°F (29°C) with lows around 65°F (18°C). Average rainfall for the month of July is slightly around inches and average humidity is between 42% and 50%. More information on July weather in Columbus can be found here.

For More Information

For more information about this meeting, please contact:

TMS Meeting Services
5700 Corporate Drive Suite 750
Pittsburgh, PA 15237
Telephone:
U.S. & Canada Only: 1–800-759-4867
Other Countries: 1–724-776-9000, ext. 241
Fax: 1-724-776-3770
E-mail: mtgserv@tms.org

JULY 15–19, 2018
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO, USA

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Registration

Online and advanced registration is now closed.

Onsite registration is available beginning at 3:00 p.m. on Sunday, July 15, at the Ohio Union (2nd level, Archie Griffin East Ballroom Foyer). To expedite the registration process, you may complete and print the PDF registration form and bring it with you. TMS staff will be available to assist you with your registration

Registration

The conference registration rates for Regular Participants and Junior Researchers includes the following:

a. Sunday welcome reception
b. Monday and Tuesday poster receptions
c. Wednesday networking reception
d. Thursday conference banquet
e. Entrance to plenary and technical sessions
f. Conference vouchers for breakfast and lunch on campus
g. Refreshment breaks during session intermissions

The Accompanying Guest registration package includes only access to social events (items a, b, c, and d above). The guest package does not include entrance to sessions, conference vouchers for breakfast and lunch, or refreshment breaks.

Registration Rates

Registering As	Early Bird By April 30, 2018	Standard By June 15, 2018	Onsite June 16 through Conference
Regular Participant	$750	$825	$895
Junior Researcher	$350	$400	$450

Registering As	Early Bird By April 30, 2018	Standard By June 15, 2018	Onsite June 16 through Conference
Accompanying Guest	$200	$250	$300

Attendees are required to register and badges must be worn for admission to technical and poster sessions, the exhibition, and all conference events.

Visas

Meeting attendees from countries that require a visa to enter the United States are reminded that the process of obtaining a visa takes a minimum of three months. You are strongly encouraged to plan ahead and begin the application process early. The U.S. State Department website includes visa information concerning temporary visitors to the United States that may be helpful to you.

If you require a visa to travel to the ICSMA18 conference in Columbus, Ohio, USA, please contact TMS Meeting Services at mtgserv@tms.org for an official invitation letter that can be added to your visa application materials. Note that the ICSMA conference organizers and TMS Meeting Services can neither guarantee that you will be granted a visa nor contact the embassy or consulate on your behalf. It is the responsibility of the attendee to obtain the necessary paperwork for entry to the United States. It is crucial for the success of the application to apply at least three months in advance.

Conference Policies

Cancellation Policy

Requests for cancellations must be made in writing (by e-mail or mail) to TMS. A $75 processing fee is charged for all cancellations. No refunds will be processed after the registration deadline of June 15, 2018.

Registration

Registration is required for all presenting authors, attendees, accompanying persons, and sponsors/exhibitors.

Photo and Video Recording Devices

The ICSMA conference series reserves the right to all audio and video reproductions of presentations at ICSMA 18. By registering for this conference, all attendee acknowledge that they may be photographed while at events, and that those photos may be used for promotional purposes, in and on ICSMA publications and websites, and on social media sites.

Any recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of the ICSMA 18 organizing committee and the individual authors is strictly prohibited. Attendees violating this policy may be asked to leave the session.

Mobile Phones

In consideration of attendees and presenters, we kindly request that you minimize disturbances by setting all mobile phones and other devices on “silent” while in meeting rooms.

For More Information

For more information about this meeting, please contact:

TMS Meeting Services
5700 Corporate Drive Suite 750
Pittsburgh, PA 15237
Telephone:
U.S. & Canada Only: 1–800-759-4867
Other Countries: 1–724-776-9000, ext. 241
Fax: 1-724-776-3770
E-mail: mtgserv@tms.org

Registration & Travel

Registration

Housing

Travel

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Housing & Travel

Conference technical sessions and poster sessions will be held at the Ohio Union on the campus of The Ohio State University (OSU). A campus map is available here.

Visitors to The Ohio State University campus have a number of housing options, including on- and off-campus venues. The following list is provided by the Local Organizing Committee.

Campus Map

On-Campus Housing

Photo Credit: Ohio Union Photos

The Residences on 10th

This new dormitory facility is an affordable option that is approximately a 5-10 minute walk from the conference venue. Accommodations are in the form of three-bedroom suites with separate shower, sink, and toilet facilities, as well as a common living room with a refrigerator and microwave. Rooms are air conditioned, and free internet access is available through WiFi@osu. Rates are $35/night + 4% credit card fee for a room shared with another individual (you may specify) or $65/night + 4% tax for a single room. Requests fo ADA compliant or other special needs may be made.

Address: 230 W 10th Avenue, Columbus, OH 43210

Click here for reservations at The Residences on 10th .

Photo Credit: Anthony Killian

The Blackwell Inn

The Blackwell is an upscale hotel like none other, featuring the very best in guest service and comfort, and the highest levels of technology and resources. Located on the Fisher College of Business campus of The Ohio State University, The Blackwell offers a restaurant, lounge, and other facilities and is about 0.9 miles (1.5 km) from the Ohio Union conference site. You may walk across the campus or catch an OSU circulator bus between these locations.

Address: 2110 Tuttle Park Place
Columbus, Ohio 43210
Phone: 1–614–247–4000
Toll-Free: 1–866–247–4003
E-mail: blackwellreservations@osu.edu
Click here for reservations at The Blackwell Hotel and Conference Center.

Off Campus Housing

Photo Credit: Marriott Website

SpringHill Suites Columbus OSU

The SpringHill Suites Columbus OSU hotel is located about 1.5 miles from the conference site and provides suite style accommodations:

- Free high speed Internet
- Free breakfast
- Fitness center
- Pool
- Complimentary Hotel Shuttle within a three-mile radius
- On-site parking

For reservations, please use the following contact information:

Address:	1421 Olentangy River Road Columbus, Ohio 43212
Phone:	1–614–297–9912
Toll-Free:	1–877–901–6628

Click here for reservations at the SpringHill Suites Columbus.

Additional Hotels in the Vicinity

There are a variety of hotel options in the vicinity of the OSU campus. Please see https://www.uhdcolumbus.com/map/ for a map.

Travel

Parking

There are several parking garages on campus to choose from. Both the Ohio Union North and the Ohio Union South Garage are a stone's throw away from the Union itself. Should those be full, there are other parking garages available on campus.

To view available parking garages and their rates, click here.

About the campus

There are a variety of facilities and services on campus of The Ohio State University, including cafes and bistros, sporting venues, libraries, special collections, and art and theater venues. For more information, click here.

The edge of OSU's campus is marked by High Street. Choose from a variety of restaurants along it or walk down it to "the art and soul of Columbus"—the Short North.

Transportation

John Glenn Columbus International Airport (CMH) is 9.4 miles away from The Ohio State University's campus. Transportation options to and from the airport include:

- Taxi: approximately $37.21(including a 15% tip)
- Central Ohio Transit Authority (COTA)
    - Fares and routes vary, depending on destination. Use the COTA Trip Planner tool for more information.
- OSU Charter Services:
    - This option is ideal for groups. Prices vary and reservations must be made at least 10 days ahead of time. Use the online reservation form to book a charter bus.

Once on campus, you can make use of CABS, the campus area bus service, to get from one end of the campus to another.

Visas

If you require a visa to travel to the ICSMA18 conference in Columbus, Ohio, USA, please contact TMS Meeting Services at mtgserv@tms.org.

Registration & Travel

- Registration
- **Housing**
- Travel

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Travel

Campus Map

Travel to/from Columbus, OH

John Glenn International Airport services most major domestic and many international carriers.

Travel from the airport to the conference site

John Glenn International Airport (CMH) is approximately 10 miles from the conference site (Ohio Union, 1739 N High St, Columbus, OH 43210). There are several options:

- Public transportation. The Central Ohio Tranport Authority (COTA) offers the Air Connect shuttle, leaving outside the baggage claim area at John Glenn Airport and arriving downtown, where you transfer to the #2 northbound COTA bus. Cost is about $5. Learn more.
- Rental or personal vehicle: John Glenn International Airport offers several rental car options. The drive is approximately 15 minutes in light traffic. Learn more.

Parking

- Parking directions to the Ohio Union Parking garage
- Ohio Union Parking Garage rates
- For more information, call 614-688-0000 or email: mailto:osuinfo@campusparc.com

Getting around the OSU campus

- The OSU campus offers a pedestrian-friendly environment and the commercial High Street District adjacent to the Ohio Union Conference site offers several options for shopping and food. Learn more.
- The Campus Area Bus Service provides transportation across the 7 sq. km (1700 acre) main campus. The service can be used between the conference site and Blackwell Hotel. A map of routes and times is available here. Note that summer service from Blackwell Hotel to/from Ohio Union: Campus Loop North Bus is every 11 min, 7am - 7 pm
- The Ohio State app is free and available for iOS and Android phones and provides convenient access to:
    - Parking Garages

- Campus Area Bus Service
- Dining Locations (including those that you can use with your BuckID conference card)
- Libraries
- Campus Map
- Tour of OSU campus

Registration & Travel

Registration

Housing

Travel

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Technical Program Details

Abstract Book

Final Program Now Available

Technical topics to be covered during this conference include, but are not limited to:

- Advanced (including in situ) characterization of deformation processes
- Elementary deformation mechanisms in engineering materials
- Fracture and fatigue
- Friction and wear
- Glasses and non-crystalline solids
- High temperature deformation and creep
- Materials under extreme conditions
- Mechanical behavior associated with phase transformations
- Mechanistic foundations for multiscale modeling and ICME
- Micro- and nano-scale mechanical testing
- Effects of grain boundaries and interfaces
- Reinforcements at the sub-nanometer scale
- Strength of biomedical and bio-inspired materials
- John P. Hirth and Hael Mughrabi Honorary Symposia
- Emerging topics

Confirmed Plenary Speakers Include:

Easo George, USA
Oak Ridge National Laboratory
Mechanical Properties of High-Entropy Alloys – Review of Recent Developments

View Abstract

the most important mechanical properties and, in this talk, I will review some of their salient features including dependence on temperature, strain rate, and chemical composition. I will show that investigations by a number of different groups of microstructure-property relationships in a few carefully processed model alloys have uncovered some of the fundamental physical mechanisms that govern macroscopic flow and fracture behavior. Certain hypotheses, for example, that greater the number of constituent elements in high-entropy alloys, greater the degree of solid solution strengthening, have been falsified by experiments. Others, for example, that alloying elements that promote phase instabilities can also promote twinning/transformation induced plasticity, appear to hold great promise. After reviewing the progress made to date, I will briefly mention some fruitful areas for future research. Research supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.

Dierk Raabe, EU
Max-Planck-Institut
Advancing Alloys by Segregation Engineering

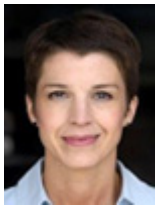
View Abstract

Internal interfaces and dislocations influence mechanical, functional, and kinetic properties of metallic alloys. They can be manipulated via solute decoration, local decomposition and confined transformation phenomena enabling changes in energy, mobility, structure, and cohesion. In an approach referred to as 'segregation engineering' solute decoration is not regarded as an undesired phenomenon but is instead utilized to manipulate specific interface and dislocation structures, compositions and properties that enable useful material behavior.

Ke Lu, China
Institute of Metal Research, CAS
Hardening and Softening in Nano-grained Metals

View Abstract

Conventional metals become harder with decreasing grain sizes, following the classical Hall-Petch relationship. However, this relationship fails and softening occurs at grain sizes in the nanometer regime for some alloys. In this talk, grain size effect on plastic deformation mechanism of nano-grained metals will be analyzed for understanding the hardening and softening behaviors. Nano-grained pure metals and alloys with grain sizes ranging from few nanometers to submicrometers prepared by means of plastic deformation or electro-deposition are investigated. By changing grain boundary (GB) stability with relaxation or segregation of solute atoms, different plastic deformation mechanisms were identified over the grain size range studied, leading to either hardening or softening. The results revealed that GB stability provides an alternative dimension, in addition to grain size, for tailoring strength of nano-grained metals.



Erica Lilleodden, EU
Helmholtz-Zentrum Geesthacht
Achieving Extraordinary Strengths by Varying Length Scales and Boundary Conditions

View Abstract

While implicit size effects in mechanical behavior are well known to materials scientists, as exemplified in the equations relating yield strength to grain size or dislocation spacing, the mechanical response of materials is typically modeled as a continuum, with the inherent microstructural heterogeneities smeared out into an effective homogeneous structure. Yet the strength of metals – a marvelously tailorable “property” – relies on the introduction of microstructural constituents of varying dimensions and spacings, and most importantly the distribution of dislocations as both carriers of and barriers to plastic flow. In this presentation we will draw upon results from micromechanical experiments, where deformation is localized and boundary conditions can be tailored to address both finite size effects as well as the transition to continuum behavior, in order to explore how the fundamental characteristics of metal plasticity can be exploited in small dimensions to achieve extreme strengths, and whether such an approach can be useful in real structures.

Laurence Brassart, Australia
Monash University
Micromechanics of Highly Cross-linked Thermosets

View Abstract

Highly-crosslinked epoxies are widely used as matrix material in high-performance fibre-reinforced composites, governing several aspects of their behaviour. Yet, attempts to model their viscoplastic response have been limited, as compared to thermoplastic polymers. However, the viscoplastic response of highly cross-linked thermosets, in particular under compression, is very similar to glassy thermoplastics below their glass-transition temperature, exhibiting complex features such as strain- and temperature-sensitivity, post-yield softening followed by rehardening, and severe non-linearity upon unloading. These phenomena can in principle be captured by advanced constitutive models for glassy polymers mixing phenomenological and micromechanical elements. However, this often comes at the price of a very large number of parameters (sometimes more than 30), while the physical basis of such models remains limited. In this work, we develop a micromechanical model to describe and predict the viscoplastic behaviour of the RTM6 epoxy resin. The model relies on the concept of STZ's (Shear Transformation Zones) as the elementary carriers of plasticity, whose activation is sensitive to the local stress, temperature and microstructural state. STZ's interact through the (possibly polarized) elastic stress field, resulting in overall viscoplastic flow. This model involves only 5 parameters to identify, all with a physical meaning. It is rich enough to quantitatively capture all the experimental trends, even the complex rate-reversal phenomenon observed during creep tests performed after plastic deformation at intermediate stress levels. While such a model cannot replace closed-form constitutive models for the treatment of large-scale components, it provides physical insights into the small-scale mechanics and is also useful to identify the parameters in macroscopic models.

Kaneaki Tsuzaki, Japan
Kyushu University
Metallurgical Aspects of Fatigue Crack Growth Resistance in Steel: How Can We Improve it through Microstructure Control?

View Abstract

common ductile structural metal. It is important to consider the growth of microstructurally small cracks from three perspectives. First, the fatigue limit does not correspond to the critical stress for crack initiation but rather that for crack propagation. Namely, non-propagating fatigue cracks can exist at the fatigue limit after more than 10 million cycles. Second, the bulk of fatigue life is mostly in the small crack growth stage. Third, the growth of small cracks within steels can be controlled by designing the microstructure and plasticity. Three factors are considered when discussing crack growth behavior in a ductile metal during one loading cycle at a given stress amplitude: (1) crack-tip-deformation mechanisms; (2) plastic deformation around the crack tip; and (3) internal stress evolution in the crack tip and wake. In most metals and alloys, dislocation emission at the crack tip is responsible for crack tip opening and namely crack growth. Thus, we can suppress the crack growth rate by repressing dislocation slip in the region of the crack tip. Regarding internal stress evolution, the formation of compressive stress can suppress crack opening.This presentation introduces some of our recent examples of microstructure control in the vicinity of the crack tip to improve the fatigue crack growth resistance in steels; these include (a) strain-age hardening through dislocations and interstitial carbon atoms interaction in an Fe–C binary steel; (b) nitrogen-enhanced dislocation planarity in a nitrogen-added stainless steel; and (c) martensitic transformation with volume expansion in a TRIP maraging steel.

Dorte Juul-Jensen, EU
Technical University of Denmark
Metal Microstructures and Properties in 3D and 4D

View Abstract

Whereas most microstructural characterization techniques reveal the microstructure of prepared sample surface or of thin sample sections – i.e. largely give a 2D description, mechanical properties are mostly measured for bulk 3D samples of various sizes. In this presentation, focus is on the potentials of synchrotron X-ray imaging techniques for mapping metal microstructures non-destructively in 3D and thus also allows the microstructural evolution to be followed over time, when the sample is loaded mechanically or thermally. Several of the synchrotron X-ray techniques furthermore have potentials for non-destructive mapping of local residual strains in 3D, i.e. the strain may be determined in selected local positions and followed during loading. The potentials of the techniques will be illustrated by examples including: -- Grain growth in Si steel showing the effects of grain boundary plane normal and misorientation on successful growth of Goss oriented grains -- Recrystallization of Al showing the effects of the local microstructural variations in the deformed matrix, including ‘hot spots’, for both nucleation and boundary migration -- Residual strain distribution in ductile cast

the home laboratories are discussed.

Carolin Koerner, EU
University of Erlangen
Evolution of Microstructure and Material Properties during Additive Manufacturing

View Abstract

During the last years, digital manufacturing of metallic components directly from electronic data based on layer-by-layer fabrication has developed from rapid prototyping to additive manufacturing (AM). In contrast to conventional fabrication technologies, AM offers much more design freedom. Essential for the now starting success of powder bed based AM of metallic components are the attainable material properties. Nowadays, a variety of metallic alloys and high-performance materials can be successfully processed with material properties comparable to those reached in conventional processes such as casting or forming. Nevertheless, the layer-by-layer AM process leads to specific AM microstructures and properties due to rapid and directed solidification, epitaxial growth, in situ heat treatment or selective evaporation of volatile elements. Thus, knowledge based AM process strategies are essential in order to control the properties of AM materials. In return, this knowledge will allow us to adjust locally material properties within AM components. Based on numerical simulation and experimental results, microstructure evolution during layer-by-layer AM is considered in detail. The focus will be on building defects, grain structure and texture evolution, solidification microstructure and composition variations. These aspects and their effect on the resulting material properties are discussed for two high performance alloys, the nickel base alloy CMSX-4 and Ti-45Al-4Nb-0.4C.

- Peter Anderson, The Ohio State University
- Stephen Antolovich, Georgia Institute of Technology
- Ronald Armstrong, University of Maryland
- Irene Beyerlein, University of California Santa Barbara
- Brad Boyce, Sandia National Laboratories
- Christian Brandl, Karlsruhe Institute of Technology
- Jonathan Cormier, CNRS - The National Center for Scientific Research
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- David Embury, McMaster University
- Michael Falk, Johns Hopkins University
- Katharine Flores, Washington University in St. Louis
- Maryam Ghazisaedi, The Ohio State University
- Nasr Ghoniem, University of California Los Angeles
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- Matthew Miller, Cornell University
- Michael Mills, The Ohio State University
- Andrew Minor, University of California Berkeley
- Hael Mughrabi, U Erlangen-Nurnberg
- Jagdish Narayan, NSCU
- Steffen Neumeier, Friedrich-Alexander-University Erlangen-Nürnberg
- Jian-Feng Nie, Monash University
- Wolfgang Pantleon, Technical University of Denmark
- George Pharr, Texas A&M University
- Adam Pilchak, US Air Force Research Laboratory
- Tresa Pollock, University of California Santa Barbara
- Robert Pond, University of Exeter
- David Rigney, The Ohio State University

- Chad Sinclair, University of British Columbia
- Frans Speapen, Harvard University
- David Srolovitz, University of Pennsylvania
- Aaron P Stebner, Colorado School of Mines
- Charles Stinville, University of California Santa Barbara
- Carlos Tome, Los Alamos National Laboratory
- Patrick Villechaise, CNRS - The National Center for Scientific Research
- Robert Wagoner, The Ohio State University
- Jian Wang, University of Nebraska Lincoln
- Yunzhi Wang, The Ohio State University
- Janelle Wharry, Purdue University
- Hussein Zbib, Washington State University
- Xinghang Zhang, Purdue University
- Yuntian Zhu, North Carolina State University

Photo Credit: The Ohio State University Communication's Photo Gallery

Conference technical sessions and poster sessions will be held at the Ohio Union (above) on the campus of The Ohio State University

Abstract Submissions

To be considered as a presented at ICSMA 18, submit your abstract to ProgramMaster by January 15, 2018.

If you have a question regarding abstract submission, please e-mail TMS Programming Staff.

For examples of technical topics presented during the last iteration of this conference, view the ICSMA 17 final program.

For More Information

For more information about this meeting, please contact:

TMS Meeting Services
5700 Corporate Drive Suite 750
Pittsburgh, PA 15237
Telephone:

Fax: 1 724 776 3770
E-mail: mtgserv@tms.org

Technical Program

Technical Program Details

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Exhibit and Sponsor Opportunities

Join researchers from around the world at ICSMA 18, the home for the latest advances in research on the strength and deformation of materials.

Who attends?

ICSMA attendees are engaged in cutting-edge research conducted at the world's leading universities and labs specializing in materials science. About 80% of ICSMA18 presenters are faculty or Ph.D. candidates at these key universities, and many make recommendations for equipment and software purchases by their institutions.

ICSMA presenters are international, with over half coming from beyond North America:

- North America: 45.5%
- Europe: 26.2%
- China: 8.5%
- Japan: 6.4%
- Other worldwide: 13.4%

Don't miss the opportunity to reach key influencers in this market segment – reserve your exhibit table or sponsorship today!

Exhibit Table Top: $3,000

Exhibit opportunities include a table top exhibit presence in the heart of conference activities at the Ohio Union. Peak traffic times will be during the daily mid-morning and mid-afternoon refreshment breaks. Each exhibit reservation comes with a valuable full-conference registration, which includes the following access:

- Sunday welcome reception
- Monday and Tuesday poster receptions
- Wednesday networking reception
- Thursday conference banquet
- Entrance to plenary and technical sessions
- Conference vouchers for breakfast and lunch on campus
- Refreshment breaks during session intermissions

Exhibit reservations include the following:

- One 6′ x 30″ table
- Two chairs
- Logo on the conference website
- One full-page advertisement in the final program
- Pre-registration list with names and affiliations
- One full-conference registration

Complete and return the Exhibit Reservation Form to reserve your exhibit table today.

Corporate Sponsorship: Amounts vary

By supporting the ICSMA conference, your company supports the influential scientists and engineers presenting their research here. Corporate sponsorship offers high visibility for your company or organization whether through branding a conference event, such as a reception or break, or through an amenity or takeaway, such as a registrant bag, lanyard, or other logo-branded merchandise. Customized sponsorships are available to fit your company's budget and goals.

Sponsors over $5,000 will receive sponsorship benefits as well as an exhibit table top at the conference and exhibitor benefits.

Reserve your corporate sponsorship today!

To reserve a table top exhibit or corporate sponsorship, contact Peter Anderson, ICSMA18 lead organizer, at anderson.1@osu.edu. *To guarantee all exhibit and sponsor benefits, we suggest acting before June 15, 2018*.

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Exhibitors and Sponsors

The ICSMA Organizing Committee is grateful for the support of the following organizations:

THE OHIO STATE UNIVERSITY
INSTITUTE FOR MATERIALS RESEARCH

The Institute for Materials Research is Ohio State's gateway to materials research innovation.

Nanomechanics, Inc.

ThermoFisher SCIENTIFIC

MTS®

BRUKER

Kammrath Weiss Tech.
Special Developments for Microscopy

Funding support provided by Los Alamos National Laboratory.

Exhibit & Sponsor

Opportunities

Exhibitors and Sponsors

ICSMA18
18TH INTERNATIONAL CONFERENCE ON THE STRENGTH OF MATERIALS

JULY 15–19, 2018
THE OHIO STATE UNIVERSITY
COLUMBUS, OHIO, USA

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

Special Events

Campus Map

The conference setting on the campus of The Ohio State University offers networking and cultural opportunities in an affordable, pedestrian-friendly campus setting. As one of the largest universities in the US, the Ohio State University campus extends over 7 sq. km. (1700 acres) and has nearly 60,000 students, 6000 academic staff and 22,000 administrative staff. It is home to 12,000 courses, 18 colleges and schools, and more than 200 academic centers and institutes, including the first technical program in ceramics (1894, Edward Orton, Jr) and the only ABET-accredited undergraduate program in welding engineering in North America.

Many of the events are designed to leverage the amenities at the university and maximize interaction, convenience, and fun. They include:

Sunday Tour: The National Museum of the US Air Force

Ticket price: $45

This event is optional and is available as an additional ticket purchase on your registration form. Package includes round-trip bus transportation, a boxed lunch at the museum, and admission to the Museum Theater; museum admission is free. Guests of registrants are welcomed to purchase tickets for the tour. Deadline to register for the tour is June 15. A minimum number of registrants is required for this tour to be held.

About the Museum: The National Museum of the United States Air Force is the oldest and largest military aviation museum in the world. The museum is located at Wright-Patterson Air Force Base, near Dayton, Ohio, approximately one hour by bus from The Ohio State University.

The National Museum of the United States Air Force collects, researches, conserves, interprets and presents the Air Force's history, heritage and traditions, as well as today's mission "to fly, fight and win … in Air, Space and Cyberspace" to a global audience through engaging exhibits, educational outreach, special programs, and the stewardship of the national historic collection. Take a virtual tour of the museum.

Sunday Welcome Reception: The Big Bar & Grill

Located just steps from the Ohio Union, The Big Bar & Grill offers an authentic college bar experience for the Sunday Welcome Reception. The ICSMA group will meet on the rooftop patio for drinks and a casual dinner.

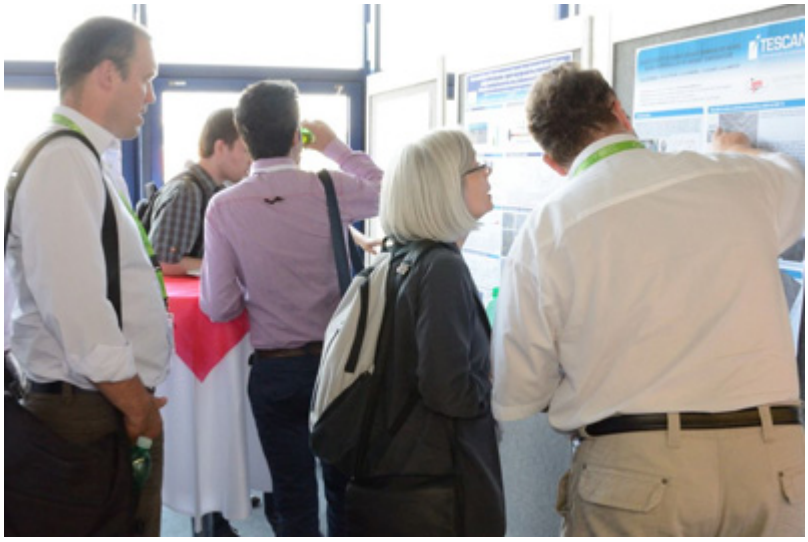
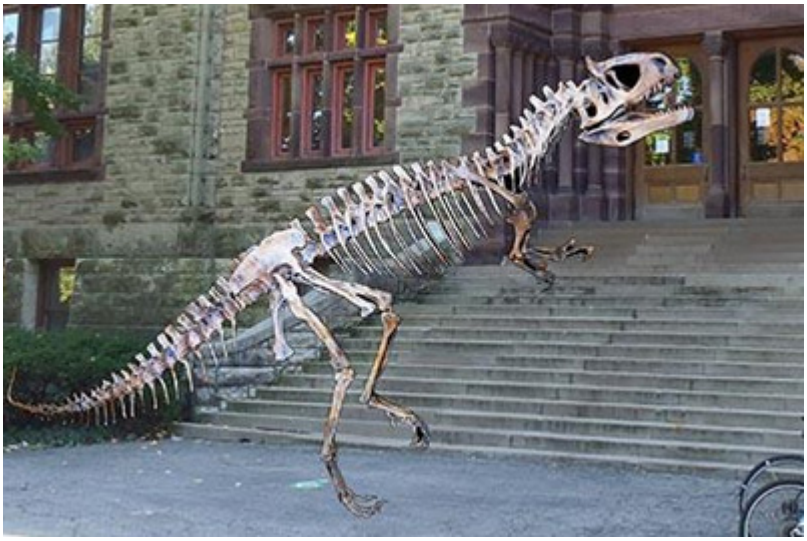


Photo credit: ICSMA 17

Poster Session Receptions
Monday, July 16 and Tuesday, July 17

Join colleagues for two interactive poster sessions and networking receptions at the Ohio Union's Performance Hall and Potter Plaza. Includes complimentary snacks and drinks.



Social Tours
Wednesday, July 18

Explore the University's many landmarks for art, culture, and science through social tours of venues, such as:

- Billy Ireland Cartoon Library and Museum
- Chadwick Arboretum
- Orton Geological Museum
- Wexner Center for the Arts
- Center for Automotive Research
- Center for Electron Microscopy and Analysis
- Center for Design and Manufacturing Excellence

For information about tour availability or to sign up for a tour, visit the registration desk in the Archie Griffin East Ballroom foyer of the Ohio Union during registration hours.

Photo credit: The Faculty Club at The Ohio State University

Networking Reception in Honor of Professor John Hirth and Professor Hael Mughrabi

Join us as we honor these leaders in the field at the historic Faculty Club at The Ohio State University. Includes complimentary appetizers and drinks.

Conference Banquet at the Blackwell Inn and Conference Center
Thursday, July 19

This conference tradition will include complimentary drinks, a full-course banquet, and the announcement by the International Scientific Committee of the site for ICSMA 19 in July 2021.

July 15–19, 2018 | The Ohio State University | Columbus, Ohio, USA

History of ICSMA

International Conference on the Strength of MAterials

Year	Conference	Location
1967	ICSMA 1	Tokyo, Japan
1970	ICSMA 2	Asilomar, USA
1973	ICSMA 3	Cambridge, United Kingdom
1976	ICSMA 4	Nancy, France
1979	ICSMA 5	Aachen, Germany
1982	ICSMA 6	Melbourne, Australia
1985	ICSMA 7	Montreal, Canada

Year	Conference	Location
1988	ICSMA 8	Tampere, Finland
1991	ICSMA 9	Haifa, Israel
1994	ICSMA 10	Sendai, Japan
1997	ICSMA 11	Prague, Czech Republic
2000	ICSMA 12	Asilomar, USA
2003	ICSMA 13	Budapest, Hungary
2006	ICSMA 14	Xi'an, China
2009	ICSMA 15	Dresden, Germany
2012	ICSMA 16	Bangalore, India
2015	ICSMA 17	Brno, Czech Republic

Past Conferences

1967 – ICSMA 1 (Tokyo)

Participants on the International Conference on the Strength of Metals and Alloys, September 4, 1967, Tokyo.

1970– ICSMA 2 (Asilomar)

Group Photograph
Conference Participants, 31 August 1970
Asilomar Conference Grounds, Pacific Grove, California

2000– ICSMA 12 (Asilomar)

2012– ICSMA 16 (Bangalore)

For More Information

For more information about this meeting, please contact:

TMS Meeting Services
5700 Corporate Drive Suite 750
Pittsburgh, PA 15237
Telephone:
U.S. & Canada Only: 1–800-759-4867
Other Countries: 1–724-776-9000, ext. 241
Fax: 1-724-776-3770
E-mail: mtgserv@tms.org

History