

# JOM THE MAGAZINE

MARCH 2023  
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News and insights about TMS, its members, and the professions it serves

## THE 2023 AWARDS ISSUE

HONORING  
OUTSTANDING  
ACHIEVEMENTS AND  
RECOGNIZING EXCELLENCE



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# TMS FALL 2023

@ MATERIALS SCIENCE & TECHNOLOGY

October 1-5, 2023 | Columbus, Ohio | #TMSFallMeeting

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## ABOUT THE COVER



Celebrating professional excellence at the TMS-AIME Awards Ceremony and an array of technical division events is a highlight of every TMS annual meeting. This month's cover features a few of the award pieces that have been conferred over time. Read the two March 2023 feature articles, "Honoring Outstanding Achievements: The 2023 TMS Society Award Recipients" and "Recognizing Excellence: The 2023 TMS Division Award Recipients" to find out who is being recognized at the TMS 2023 Annual Meeting & Exhibition, March 19-23, in San Diego, California.



### Access Technical Journal Articles

TMS members receive free electronic access to the full library of TMS journals, including *JOM*. Technical articles published in *JOM: The Journal* are available on the Springer website. TMS members should log in at [www.tms.org/Journals](http://www.tms.org/Journals) to ensure free access.

#### About *JOM: The Magazine*:

This print publication is excerpted from the publication of record, *JOM*, which includes both The Magazine and The Journal sections. *JOM: The Magazine* includes news and insights about TMS, its members, and the professions it serves. To access the publication of record, visit [www.tms.org/JOM](http://www.tms.org/JOM).

#### About TMS:

The Minerals, Metals & Materials Society (TMS) is a professional organization that encompasses the entire range of materials and engineering, from minerals processing and primary metals production to basic research and the advanced applications of materials. Learn more at [www.tms.org](http://www.tms.org).

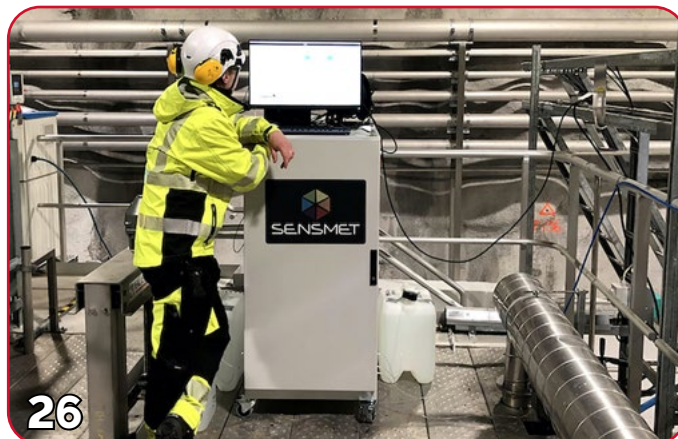
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# IN THE FINAL ANALYSIS

*"It is difficult to think of a major industry that [artificial intelligence] will not transform. This includes healthcare, education, transportation, retail, communications, and agriculture. There are surprisingly clear paths for AI to make a big difference in all of these industries."*

—Andrew Ng

Today, as I engaged in my morning routine of reviewing the battery of newsletters/newspapers to which I subscribe, two headlines caught my attention: The first was from *The New York Times* pointing to its Ezra Kline Show: "A Skeptical Take on the A.I. Revolution—The A.I. expert Gary Marcus asks: What if ChatGPT isn't as intelligent as it seems?" The second appeared in *The Wall Street Journal* as written by Berber Jin and Miles Kruppa: "ChatGPT Creator in Investor Talks at \$29 Billion Valuation. Tender offer at that valuation would make OpenAI one of the most valuable U.S. startups." My attention was piqued as I first heard about ChatGPT only a week earlier when my son, Daniel, referenced it as soon being able to write my monthly *JOM* column and further accelerate my already speedy journey into obsolescence. A feel-good family moment!

So, I decided to give my virtual replacement a quick test. The OpenAI website describes the tool as follows: "We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer follow up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests." Yep, that sounds like my job in a nutshell. So, I asked ChatGPT a TMS question, and it took about five seconds to answer:

**Me:** Tell me about The Minerals, Metals & Materials Society in the area of artificial intelligence.

**ChatGPT:** The Minerals, Metals & Materials Society (TMS) is a professional organization that focuses on the science and technology of materials. It is not specifically focused on artificial intelligence (AI), but it does have a number of technical divisions and committees that cover topics related to materials and AI. For example, the TMS Technical Division on Materials and Mechanics of Smart Structures and Intelligent Systems focuses on the development and application of smart materials and structures that can sense, adapt, and respond to their environment. AI and machine learning techniques may be used in the design and analysis of these materials and systems. Additionally, TMS hosts conferences and workshops on topics related to materials science and technology, including those that cover AI and its applications in the materials field. TMS also publishes a number of journals and magazines, some of which may feature articles on materials and AI. If you are interested in learning more about the intersection of materials science and AI, you may want to consider joining TMS or participating in one of its technical divisions or committees.

That's pretty good; impressive, actually, although the citation of a "TMS Technical Division on Materials and Mechanics of Smart Structures and Intelligent Systems" is cyber-fantasy. If I was artificially intelligent, I likely would have also referenced the virtual course that TMS is offering in April 2023: Artificial Intelligence in Materials Science and Engineering. A naturally intelligent person writing for the TMS website says,

Artificial intelligence (AI) is attracting the interest of scientists and engineers, entrepreneurs and government leaders, and researchers and educators. Within the study of materials science and engineering and related manufacturing processes, in particular, there has been an explosion of new research, publications, and symposia. Through the Artificial Intelligence in Materials Science and Engineering course, participants will benefit from the guidance of experts to gain an overview, learn about important developments in AI, and review the impact of AI on materials science and engineering and related manufacturing processes. Attendees will build upon their understanding of how AI can help to accelerate processes, reduce costs, and innovate products.

I prefer the human touch, but reminiscent of John Henry competing against a steam-powered drill, it seems very likely that AI's integration into our work and leisure activities will continue its encompassing ascend. We don't have to ask ChatGPT to read the writing (or, should I say, "hockey stick curve") on the wall.

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March 2023



James J. Robinson  
Executive Director

 @JJRofTMS

*"I asked ChatGPT a TMS question, and it took about five seconds to answer."*

**JOM:** The Journal includes peer-reviewed technical articles covering the full range of minerals, metals, and materials. TMS members receive free electronic access to the full library of TMS journals, including **JOM**. For the full Editorial Calendar, visit [www.tms.org/EditorialCalendar](http://www.tms.org/EditorialCalendar).

Review the technical topics included in the current issue of **JOM: The Journal** here, and then go to [www.tms.org/JOM](http://www.tms.org/JOM) to log in access technical journal articles on the Springer website.

## MARCH 2023

### 2D Materials – Preparation, Properties & Applications

**Scope:** Since the discovery of graphene, interest in basic and applied research in 2D-materials has been on the rise. Challenges and opportunities continue to grow in the areas of process-property-performance correlations in 2D-materials. This special topic includes coverage of methods of fabrication and material properties; top-down approach – mechanical exfoliation, liquid phase exfoliation, ball-milling based exfoliation; bottom-up approach – chemical vapor deposition, wet chemical synthesis, and hydro/solvothermal synthesis; and device fabrication, properties, and applications.

**Editors:** **Nuggehalli Ravindra**, New Jersey Institute of Technology; **Ramana Chintalapalle**, University of Texas at El Paso; **Gerald Ferblantier**, University of Strasbourg; and **Sufian Abedrabbo**, Khalifa University

**Sponsor:** Thin Films and Interfaces Committee

### Materials for Clean Energy Production and Storage

**Scope:** The invited papers for this topic focus on materials used to produce clean energy and those used for energy storage. This includes recent experimental, theoretical, and computational studies of materials in this field. The topic considers materials used in energy conversion, such as those used for the fabrication of solar cells, solar panels, and solar concentrators.

**Editors:** **Erol Kurt**, Gazi University, and **Shadia Ikhmayies**, University of Jordan

**Sponsor:** Invited

### Powder Materials and Processing for Extreme Environments

**Scope:** Modern demands for functional materials have led to the need for powder synthesis, processing, and consolidation of said materials for the temporary or continued use in extreme environments. This special topic invited papers exploring the response of powder materials to extreme environments (mechanical, thermal, chemical, radiation, magnetic and electric

fields, etc.). Covered research areas include (i) novel powder processing of structural and functional materials; (ii) recent advances in powder consolidation processes, e.g., spark plasma sintering, powder forging and extrusion, cold spray forming, and additive manufacturing; (iii) novel process development, robustness, and monitoring; and (iv) modeling and simulation of these and related topics.

**Editors:** **David Yan**, San Jose State University, and **Timothy Prost**, Uniformity Labs Inc.

**Sponsor:** Powder Materials Committee

## Contribute to JOM: The Journal

Visit [www.tms.org/JOM](http://www.tms.org/JOM) to access author tools that will answer your questions during every step of the manuscript preparation process, from determining the appropriate technical topic for your paper to reading the final product on SpringerLink.



For further information on contributing to **JOM**, contact **JOM Editor Maureen Byko** at [mbyko@tms.org](mailto:mbyko@tms.org).



# TMS MEMBER NEWS

## Share the Good News!

Contact Lynne Robinson, Department Head, Marketing and Communications, at [lrobinson@tms.org](mailto:lrobinson@tms.org), to share your professional accomplishments. Please note that only news submitted by current TMS members will be considered.

## TMS Announces New Study on Hydrogen Technology

To examine the status, impact, and future opportunities of hydrogen technology, TMS launched *The Status and Impact of DOE's Energy Materials Network (EMN) on Hydrogen Technology* science and technology accelerator report in December 2021. While TMS is leading the work of the study, funding comes from the Hydrogen and Fuel Cell Technology Office (DOE-EERE-HFTO) via the Pacific Northwest National Laboratory (PNNL). The focus of this project is hydrogen technology, with an emphasis on the materials development to support a hydrogen energy infrastructure.

The study team is set to accomplish the following milestones by the time the study process concludes in June 2023.

- To scope and prioritize the areas of most promise for each hydrogen-related consortia and the EMN as a whole
- To establish a set of metrics to assess the progress and impact of the EMN consortia to date as well as areas of potential growth
- To identify, in depth, the key gaps, barriers, needs, and enablers to developing the materials necessary for achieving a competitive and robust H<sub>2</sub> energy infrastructure
- To provide concrete recommendations, key milestones, detailed action plans, and implementation pathways needed to help provide a foundation for ultimately transitioning

from fundamental concepts to manufactured components

The final report is scheduled for release at the 2023 Materials Science & Technology (MS&T23) technical meeting and exhibition, slated October 1-5, 2023, in Columbus, Ohio, USA.

The members of the study team include:

**Kathy Ayers**, Nel Hydrogen

**Jack Brouwer**, University of California, Irvine

**Nemanja Danilovic**, Electric Hydrogen

**Jay Keller**, Zero Carbon Energy Solutions

**Shanna Knights**, Ballard Power Systems

**Nguyen Minh**, University of California, San Diego

**Norman L. Newhouse**, Newhouse Technology LLC

**Andrew Park**, The Chemours Company

**Petros Sofronis**, University of Illinois Urbana-Champaign

**Brian Somerday**, Somerday Consulting, LLC

**Levi Thompson**, University of Delaware

**Dennis van der Vliet**, Sandia National Laboratories

**Liang Wang**, Toyota Research Institute of North America

**Barr Zulevi**, University of Pennsylvania

Visit [www.tms.org/EMNStudy](http://www.tms.org/EMNStudy) to learn more about each of the team members and to sign up to receive updates about this study, including a notification when the free report is available.

## Ellen Cerreta Appointed Head for Physical Sciences at LANL



In December 2022, Ellen Cerreta was named the new associate laboratory director for Physical Sciences at Los Alamos National Laboratory (LANL). In this role, Cerreta is responsible for managing the development and application of materials science and experimental

physics programs and challenges of national importance. She is also responsible for the stewardship and advancement of the Los Alamos Neutron Science Center. In this directorate, Cerreta oversees five research and development divisions, a facility operations division, two program offices, and three Los Alamos-based national user facilities. Most recently, she

served as the division leader of the Materials Science and Technology Division at LANL.

A TMS member since 1997, Cerreta led the Society as the 2021 TMS President. She has served on a multitude of TMS committees including the Public & Governmental Affairs Committee, the Titanium Committee, the Mechanical Behavior of Materials Committee, and the Member & Student Development Committee. She is currently a member of the TMS Board of Directors as the TMS Past President. Cerreta is a recipient of the 2004 Structural Materials Division (SMD) Young Leaders Professional Development Award, the 2007 Young Leaders International Scholar – 2007 TMS/Japan Institute of Metals and Materials (JIM) Young Leaders International Scholar Award, the 2013 Brimacombe Medal, and the 2020 SMD Distinguished Service Award.

## PRICM11 Seeks Abstract Submissions

The 11<sup>th</sup> Pacific Rim International Conference on Advanced Materials and Processing (PRICM11) is scheduled for November 19–23, 2023, in Jeju, South Korea. This conference is hosted by the Korean Institute of Metals and Materials (KIM) and is sponsored by the Chinese Society for Metals (CSM); the Japan Institute of Metals and Materials (JIM); Materials Australia (MA); and TMS.

Abstracts are now being accepted through the **March 31, 2023** deadline for the following technical topics:

- **Advanced Powder Metallurgy**
- **Advanced Processing of Materials**
- **Advanced Steels and Properties**
- **Battery and Energy Material**
- **Biomaterials and Applications**
- **Composite & Coating Hybrid Hetero-Materials**
- **Data-Driven Material Design**
- **Electronic and Magnetic Materials**
- **Green Steel Production and Recycling**

- **High-Entropy & Metallic Glass Materials**
- **Light Metals and Alloys-Al and Others**
- **Materials Characterization and In-situ/3D/4D**
- **Materials for Additive Manufacturing**
- **Nanocrystalline Materials and Ultra-Fine Grained Materials**
- **Renewable Nuclear Materials.**
- **Simulation of Materials**
- **Structural Materials for High-Temperature**
- **Thin Films and Surface Engineering**

The TMS members involved with organizing this event include:

### *TMS In-Country Representative*

**George "Rusty" Gray**, Los Alamos National Laboratory

### *TMS Organizing Committee Appointees*

**Nikhilesh Chawla**, Purdue University

**Saryu Fensin**, Los Alamos National Laboratory

**Paul R. Ohodnicki, Jr.**, University of Pittsburgh

### *TMS International Advisory Board Appointees*

**Elizabeth A. Holm**, University of Michigan

**W. Jud Ready** (2022 TMS President), Georgia Institute of Technology

**Dan J. Thoma**, University of Wisconsin-Madison

Registration for this conference will open on April 15, 2023. Learn more about this conference and submit your abstract at [www.pricm11.org](http://www.pricm11.org) or contact [info@pricm11.org](mailto:info@pricm11.org).



George "Rusty" Gray



Nikhilesh Chawla



Saryu Fensin



Paul R. Ohodnicki, Jr.



Elizabeth A. Holm

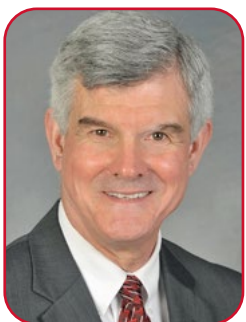


W. Jud Ready



Dan J. Thoma

## George M. Pharr Named University Distinguished Professor



George M. Pharr was recently named a 2022 University Distinguished Professor at Texas A&M University (Texas A&M). The University Distinguished Professor is the highest faculty honor at Texas A&M and, in 2022, Pharr was one of six awardees. This honor is bestowed to faculty members

who are considered pre-eminent in their sector and have made transformational contributions to their fields.

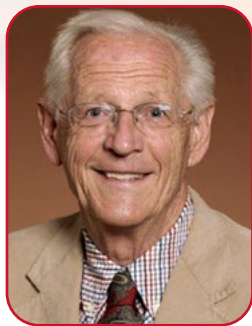
Pharr joined Texas A&M in 2017 and is a professor and the Erle Nye '59 Chair I in the Materials Science and Engineering Department.

A TMS member since 1980, Pharr is a member of the 2016 class of TMS Fellows. He is also the recipient of the 2021 William D. Nix Award. He was elected to the National Academy of Engineering in 2014.



# Remembering Thaddeus (Ted) Massalski

Kelly Zappas



**Thaddeus (Ted)  
Massalski**

TMS recently lost a long-time member of our community and a dedicated contributor to the materials profession. Thaddeus "Ted" Massalski passed away on December 2, 2022, at the age of 96. Massalski was professor emeritus of Materials Science, Engineering, and Physics at Carnegie Mellon University (CMU) in Pittsburgh, Pennsylvania.

Massalski joined TMS in 1955, his membership spanning more than 65 years. He was a long-time editor for the TMS journal, *Metallurgical and Materials Transactions A*. (When he began his work as editor, the journal was operating under its original title: *Metallurgical Transactions*.)

David Laughlin worked with Massalski both as a professor at CMU and as an editor for *Metallurgical and Materials Transactions*. At Massalski's funeral, Laughlin delivered the eulogy.

"He was brilliant," said Laughlin. "He really gave depth to the field."

Tresa Pollock, principal editor for the *Metallurgical and Materials Transactions* journals, also remembered Massalski. "Ted was an inspirational scholar, mentor and distinguished member of the materials community," she said. "His enthusiasm for materials science

spanned almost seven decades, over which there were revolutionary advances in materials. As a junior faculty member at CMU in the 1990s, it was a great privilege for me to be able to discuss phase diagrams, crystal structures, transformations, and the broader issues of materials science with a giant of our field; his legacy will live on."

Massalski received the TMS William Hume-Rothery Award in 1980, was elected a TMS Fellow in 1989, and was named an Honorary Member of TMS's parent organization, the American Institute for Mining, Metallurgical, and Petroleum Engineers (AIME), in 2015.

Massalski participated in the AIME Oral Histories project in recent years. In his interview, he discussed both his early life—which included a daring escape from German-occupied Poland during World War II—and his wide-ranging career, which took him to many places and put him in contact with key figures in the materials community through the years.

"All the good turns in my scientific career were simply that," Massalski said. "I happened to be somewhere where something interesting was going on."

A recording excerpted from his oral history interview, "Ted Massalski: A Recount of His Escape from the Nazis and the Advancing Red Army," can be viewed through the TMS History website at [www.tms.org/History](http://www.tms.org/History). A transcript of the full interview can be viewed by searching the Engineering and Technology History Wiki at [www.ethw.org](http://www.ethw.org).

## Colleagues Remember Ted Massalski

"I met Ted in Denver as a graduate student of Professor Charles Barrett, in the early 1970s. His seminar caused a deep impression on me. I recall this brilliant and handsome gentleman describing the complexities of phase transitions in metals. Indeed, this was a grand problem, and I thought at the time that he would get a Nobel Prize one day. Professor Barrett had confided in me that he had met this brilliant young Polish scholar in the UK and that they had jointly written the third edition of the classic book *Structure of Metals*. Apparently, he had met Ted when he was giving a seminar in England. At that time, Ted had asked him several brilliant questions, which led to their friendship and collaboration.

"Ted visited Brazil about twenty years ago and I was his host. We traveled to Ilha Grande together and I had the rare privilege of learning about his life experiences. We invited him to La Jolla on a couple of occasions and it was always a great pleasure to interact with him. He was and will always be the quintessential European gentleman. We will miss you sorely, Ted."

—**Marc Andre Meyers, Distinguished Professor of Materials Science, University of California, San Diego**

"Dr. Massalski joined the Board of Governors of Acta Materialia Inc. in 1990 and was elected chair of the Board in 1992. He resigned that position in 1995 when his wife became ill and, instead, took on the role of executive secretary, which he held until his retirement from the Board in 2013. Ted was passionate about Acta Materialia and enthusiastic about its outreach to countries around the world through our 38 cooperating and sponsoring materials societies. He took great delight in visiting many of these societies, particularly when he had the opportunity to attend a meeting in his original home of Warsaw in Poland. Ted was a very kind, friendly man, embodying Acta's spirit of welcoming materials scientists from different fields and with an open mind to diverse ideas. He was extraordinarily proud of the continued success of our journals and of our Editorial Board. Ted received many prestigious awards over his long, successful career, including the Acta Materialia Gold Medal, our highest award."

—**Carolyn Hansson, Executive Secretary, Acta Materialia Inc. and Distinguished Professor Emerita, Department of Mechanical and Mechatronics Engineering, University of Waterloo**

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# HONORING OUTSTANDING ACHIEVEMENTS: THE 2023 TMS SOCIETY AWARD RECIPIENTS

MEGAN ENRIGHT



## 2024 TMS AWARDS NOMINATIONS DUE APRIL 1

Do you have a colleague who has made a significant impact on their field? Have they been of great service to their community or to TMS? Honor their contributions and recognize their work by nominating them for a 2024 TMS award.

**The nomination deadline for most 2024 TMS awards is April 1, 2023.**

Visit [awards.tms.org](https://awards.tms.org) to explore the many honors and awards available through TMS and to learn more about the nomination process. For additional information, contact Deborah Hixon, TMS Awards Program Manager, at [hixon@tms.org](mailto:hixon@tms.org).



TMS award recipients are among the most accomplished and auspicious members of the minerals, metals, and materials community. Through their many achievements and contributions to the field, the following awardees continue to inspire others to reach for new heights. These recipients represent the full range of career stages – from early career professionals to those at the pinnacle of their careers. These well-deserved recognitions aid the community by encouraging methods of sharing knowledge, providing opportunities for career growth, and honoring lifetime contributions.

This article showcases the Society-level awards which will be conferred during the TMS–AIME Awards Ceremony at the TMS 2023 Annual Meeting & Exhibition (TMS2023) in San Diego, California, USA, from March 19–23, 2023. To learn more about each of the awards listed in this article and their current and past recipients, visit [awards.tms.org](https://awards.tms.org). Join us in congratulating the following awardees on their achievements.

## SOCIETY AWARDS

### TMS FELLOWS



**Irene Beyerlein**  
*Professor, University of California, Santa Barbara*

**Citation:** *For seminal contributions to multi-scale modeling of deformation of polycrystalline metals, severe plastic deformation, and interface-driven plasticity.*

"TMS has played a vital role in my professional career from the very beginning. It is because of the impactful, multiple ways in which TMS promotes excellence across the full professional spectrum, such that anyone may thrive, that I am extremely delighted and honored to be named one of its Fellows."



**Julie Christodoulou**  
*Principal, Materials & Manufacturing Innovations LLC*

**Citation:** *For boldly envisioning, leading, and resourcing the digital transformation of materials science; for executive U.S. Department of Defense leadership in*

*materials integration technologies; and for being a truly inspirational role model.*

"TMS provides a platform for great ideas across our practice to be introduced and strengthened in a rich community of diverse perspectives. It is a source for inspiration and innovation that improves our research and research products, and a space to meet new colleagues and to connect with colleagues who become dear friends. With the greatest respect for the TMS community and the incomparable list of Fellows who have shared this honor, I am deeply humbled."



**David Furrer**  
*Senior Fellow Discipline Lead, Pratt & Whitney*

**Citation:** *For his efforts to champion, develop, and implement data curation, analytics, and computational tools and methods for materials and*

*manufacturing process design and control.*

"I am extremely honored to have been nominated for the award of TMS Fellow and am even more honored and excited to have been selected. To be recognized is a truly humbling experience. I look forward to continued involvement and growth of our technical community."



**Alan Luo**  
*Professor, The Ohio State University*

**Citation:** *For outstanding research and industrial implementation of lightweight alloys and manufacturing processes, innovative teaching, and sustained service in materials*

*processing technologies.*

"I am incredibly honored and humbled by the TMS Fellow Award and very grateful for the support and contributions from my students and post-doctoral researchers at The Ohio State University and my former colleagues at General Motors. I also acknowledge TMS for being my professional home where I have enjoyed many collaborations and friendships with numerous mentors and colleagues from industry and academia. This award also gives me an opportunity to thank my family and especially my wife for the greatest support to my hard work. I will strive to devote my best efforts to educate young engineers and innovate with them in materials science and processing technologies."



**En "Evan" Ma**  
**Professor, Xi'an Jiaotong University**

**Citation:** *For seminal contributions to the understanding of the structure in amorphous and nanostructured alloys that has led to several improved properties of these metastable materials.*

"I am thrilled to be named a TMS Fellow, the pinnacle award of the Society. It is such an honor to be recognized by my peers to join this distinguished group, one of the most selective in the world of materials science. I am deeply and forever thankful to TMS, and I owe this achievement to the talented students and collaborators I have worked with, for their tremendous contributions over the years."



**Ramana G. Reddy**  
**ACIPCO Endowed Professor, University of Alabama**

**Citation:** *For pioneering research contributions in thermodynamics and phase equilibria, the development of new energy efficient technologies for extraction and*

*processing of materials, and his excellent contributions to engineering education and professional development in the field of metallurgical and materials science and engineering.*

"I am honored and humbled to receive this TMS Fellow Award. I am honored to be among those distinguished prior recipients of this award. I love teaching students and collaborating with researchers from all over the world. TMS is one of the most vibrant materials societies in the world. I am very pleased to be a member of it. TMS has played a significant role in my professional growth and providing opportunities to develop contacts with friends and materials and engineering professionals worldwide."



**James Warren**  
**Director, National Institute of Standards and Technology**

**Citation:** *For seminal work in use of phase field models of materials phenomena and exceptional international leadership in materials research policy.*

"I first learned the nature of this extraordinary honor when my mentor and colleague Bill Boettinger became a TMS Fellow, and I am truly humbled to enter these ranks. TMS is my career 'home,' and I cannot imagine any recognition more meaningful. I believe my best days as a TMS member still lie in front of me, and I look forward to engaging with my many colleagues through the diverse forums the Society provides."



**Ji-Cheng "JC" Zhao**  
**Minta Martin Professor and Department Chair, University of Maryland**

**Citation:** *For contributions to high-throughput research and diffusion studies in metals and early implementation of computational alloy design in turbine*

*industry leading to high-impact alloy deployment.*

"TMS Fellows are a group of distinguished scholars who have cemented the foundation for metals science and technology over the decades. I admired them and aspired to join their ranks; and being finally named a TMS Fellow is incredibly humbling and gratifying. I cherish this award and regard it as one of the highest honors of my career. TMS is my 'home' professional society through which I met many wonderful colleagues and mentors who shaped my career. I am wholeheartedly grateful to my students, collaborators, mentors, and colleagues for their contributions to the research that led to this award. Thank you all."

## ALEXANDER SCOTT DISTINGUISHED SERVICE AWARD



**Joy Forsmark**  
**Technical Expert, Ford Motor Company**

**Citation:** *For thoughtful, dedicated, and selfless service and for her leadership on important initiatives that have had pervasive impacts on TMS.*

"It is a great honor to receive the Alexander Scott Distinguished Service Award for my service to TMS. Throughout my career in materials science, TMS membership and service has provided me with opportunities for valuable experiences, professional growth, and amazing interactions with talented students, researchers, and leaders in the field. I truly feel that I have received far more from my activities than the time I have put in and look forward to continuing to serve the Society in its mission to advance and support the field of materials science and engineering."

## BRIMACOMBE MEDALISTS



**Simona Hunyadi Murph**  
**Technical Analyst, Department of Energy and Fellow Scientist, Savannah River National Laboratory**

**Citation:** *For cutting-edge scientific and engineering innovation of anisotropic and shape-selective nanomaterials,*

*extraordinary effort in developing the next generation of leaders and dedicated service to TMS.*

"It is a tremendous honor to be selected as a Brimacombe Medalist and forever join the outstanding past recipients which have set the standard for technical and scientific excellence. TMS has a special place in my heart, as it has offered unparalleled opportunities for professional, technical, and leadership growth. This award will continue to guide and inspire scientists, as we pass it forward and continue to serve."





**Nathan Mara**  
**Professor, University of Minnesota-Twin Cities**

**Citation:** *For excellence in serving the TMS community and scientific advancements in nanomechanical behavior including the link between*

*interfaces and defects.*

"I am grateful that TMS continues to provide me with opportunities to learn from experts in my field and has been instrumental in progressing from university student to national lab staff member to university professor. It is humbling to accept this award and be counted amongst past and present recipients that I consider to be the best of the best. I look forward to continuing to contribute to the ongoing success of the Society and our membership!"



**Emmanuelle Marquis**  
**Professor, University of Michigan**

**Citation:** *For excellence in characterization of high temperature and nuclear materials. Professor Marquis advanced our understanding of microstructure evolution while furthering*

*the development of analytic methods.*

"I am humbled and honored to have been selected to join a long list of truly amazing colleagues as a Brimacombe Medalist. I am grateful to friends, colleagues and students who have mentored and supported me throughout my career so far and from whom I continue to learn. I look forward to continuing my professional journey within the field while promoting, supporting, and advocating for others within TMS and beyond."



**Radhakanta Rana**  
**Principal Researcher, Tata Steel**

**Citation:** *In recognition of significant contributions to the science and technology of high-strength automotive steels and service to the professional community.*

"I am truly honored to receive the Brimacombe Medal Award from TMS. TMS is an excellent professional society that nurtures young talents and prepares a fertile ground for the professional growth of scientists, engineers, and academics by providing with opportunities for exchange of ideas in their conferences, publications, networking, and service to the profession. I am grateful to be a member of TMS which has a vibrant professional community."



**Izabela Szlufarska**  
**Professor, University of Wisconsin-Madison**

**Citation:** *For fundamental breakthroughs bridging the gap between atomistic simulations and nanoscale experiments, as well*

*service leadership in research directions, information dissemination, and materials education.*

"I have a lifetime membership in TMS, and I consider this Society to be my core community. I am deeply honored to receive the TMS Brimacombe Medal Award. I look forward to being part of TMS' far reaching and impactful work for many years to come."



**Kinga Unocic**  
**Senior R&D Staff Scientist, Oak Ridge National Laboratory**

**Citation:** *For her outstanding dedication to ensuring diversity and inclusion within the scientific community and exceptional mentoring of early career scientists.*

"I am very delighted and honored to receive the J. Keith Brimacombe Medal recognition. Being a part of TMS throughout my entire materials research career has provided me unique opportunities for professional growth and has allowed me to help shape the future of TMS through Society leadership opportunities and mentorship of next generation materials scientists and engineers. I would like to thank all my colleagues, mentors, supervisors, students, friends, and particularly, my husband and kids for their understanding and support, for allowing me to develop and progress throughout this amazing journey."



**Jian Wang**  
**Professor, University of Nebraska-Lincoln**

**Citation:** *For outstanding service to TMS and the contributions to fundamental understandings on mechanical behaviors of nanostructured metallic*

*materials and HCP metals.*

"TMS is a vibrant community of scientists and engineers at the frontiers of materials research and development. I am humbled and honored to join the long list of amazing scientists and engineers to be named J. Keith Brimacombe Medalists. I am especially grateful to all those who mentored, supported, and encouraged me throughout my career. I look forward to continuing active engagement with TMS in the years to come."



## BRUCE CHALMERS AWARD



**Narendra Dahotre**  
*Regents Professor and Associate Vice President, The University of North Texas*

**Citation:** *For pioneering contributions to understanding and engineering of laser-materials interactions and implementation of high-power lasers*

*for materials processing/manufacturing, surface engineering, and additive manufacturing.*

"It is a great honor to have been chosen for 2023 Bruce Chalmers Award. Bruce Chalmers' work on fundamental of solidification in general and constitutional supercooling in particular remained important aspects of my research on laser-materials interaction and its implementation in laser-based materials processing and advanced manufacturing throughout my graduate work followed by the academic career. It continues to remain a key element of fundamental understanding of material microstructure (grain and phase) evolution under far from equilibrium thermo-kinetic conditions evolved during laser-based material processing/manufacturing. I thank TMS for recognizing the fundamental contributions of Bruce Chalmers to solidification metallurgy and continued work in the field by others through this award. This honor was made possible by the contributions of my students, research fellows, and collaborators, and therefore this award belongs to all of us."

## CYRIL STANLEY SMITH AWARD



**Kristin Persson**  
*Professor in Materials Science and Engineering, University of California, Berkeley*

**Citation:** *For pioneering contributions to data production and dissemination, advancing data-driven science of*

*materials structure and its link to properties for materials discovery and design.*

"I am deeply honored to receive the Cyril Stanley Smith Award. I like to imagine that Professor Smith would have appreciated 'at-your-fingertips' access to systematic, quantitative materials data, as he examined archeological artifacts and artwork from all over the world. I am also intensely grateful to the TMS for their tireless support of fundamental materials science and metallurgy."

## ELLEN SWALLOW RICHARDS DIVERSITY AWARD



**Grace Jinliu Wang**  
*Executive Vice President, The Ohio State University*

**Citation:** *For her persistent efforts and leadership to broaden participation in materials science and engineering and beyond.*

"It is my great honor to receive the Ellen Swallow Richards Diversity Award. For decades, TMS has been connecting minerals, metals, and materials scientists and engineers from various backgrounds and walks of life, promoting diversity, inclusion, and paving the ways for many to pursue careers in our fields."

## FRANK CROSSLEY DIVERSITY AWARD



**Jenifer Locke**  
*Associate Professor, The Ohio State University*

**Citation:** *A rising leader and a shining example that tenacity, humility, and hard work can realize extreme success despite economic, social, family, or*

*institutional roadblocks.*

"Being awarded the Frank Crossley Diversity Award serves as a reminder that my resilience, ever present energy and smile, hard work, persistence, and tenacity, even when told I shouldn't, or couldn't, or wouldn't, not only served me well, but has been recognized and appreciated by those around me. I hope this award can help another have the strength to not settle for what is expected or recommended by others based on any facet of their identity, but to push onward towards their own personal goal, even when they don't know if it is achievable for a person like them. One might find, like me, that they can come out the other side achieving what seemed impossibly difficult and still smiling. I'd like to thank TMS and the TMS Foundation for being unique in that they provide and cultivate an environment that continuously strives to improve and always focuses on becoming more inclusive, equitable, and welcoming. There are many societies one can choose to volunteer in, I choose TMS because it has created a space where I feel welcomed, supported, and championed for all facets of myself. TMS not only allows me to share my technical work and thinking, but also bring my whole self and help them work to create a better community for the future."

## INSTITUTE OF METALS LECTURER & ROBERT FRANKLIN MEHL AWARD



**Carl Koch**  
*Professor, North Carolina State University*

**Citation:** *For pioneering and seminal contributions and leadership on the non-equilibrium processing, structure, and properties of amorphous and nanostructured materials.*

*science programs.*

**Presentation:** *"Metallurgical Engineering to Materials Science and Engineering: Evolution of a Profession and TMS"*

## JULIA AND JOHANNES WEERTMAN EDUCATOR AWARD



**Peter Anderson**  
*Professor, The Ohio State University*

**Citation:** *For his authorship of textbook, innovations in education pedagogy, mentoring of academic-track doctoral students, and increasing diversity in academic metallurgy and materials*

*science programs.*

"TMS has been and continues to be a critical enriching part of my professional life. It's an honor to be recognized by this award, in particular because I benefited from many insightful conversations with Julia and Johannes Weertman on the subjects of nano crystalline metals, dislocation theory, and materials education. Their contributions as scholars and educators are inspirational."

## LEADERSHIP AWARD



**Lynnette Madsen**  
*Visiting Professor and Scholar, Cornell University and Program Director, National Science Foundation*

**Citation:** *For visionary and accomplished leadership in advancing fundamental research and promoting*

*research integrity.*

"TMS is a dynamic society, which moves quickly to address exciting and important topics such as equitable and inclusive engagement, and the evolving needs in basic and translational research. I am deeply honored to be selected for this award."

## MORRIS COHEN AWARD



**Oleg N. Senkov**  
*Director of Alloy Development, MRL Materials Resources LLC*

**Citation:** *For pioneering in the discovery and development of refractory high entropy alloys and refractory complex concentrated alloys and fundamental*

*understanding their properties.*

"I am grateful to the Morris Cohen Award nomination committee for recognizing my contributions to the science and technology of materials properties. I am deeply honored and thrilled to receive this prestigious TMS award and to join the company of prior recipients whom I so admire and respect. I am proud to be a member of TMS, a society that has consistently provided me with opportunities for networking, information exchange, and professional growth. I am sharing this award with all my mentors and collaborators."

## SADOWAY MATERIALS INNOVATIONS AND ADVOCACY AWARD



**David Danielson**  
*Managing Director, Breakthrough Energy Ventures*

**Citation:** *For leadership, strategic vision, execution, and championing of solutions to sustainability and decarbonization utilizing materials science and*

*engineering technology via entrepreneurship and government policy.*

"It is a tremendous honor to be selected as the awardee of the Sadoway Materials Innovation and Advocacy Award. Don has been a lifelong mentor and role model for me going back to my days as a Ph.D. student at MIT. He has led the charge in the fight against climate change and inspired a whole generation of materials scientists to follow him...and he has done it in style."



## RESEARCH TO INDUSTRIAL PRACTICE AWARD



**Alan Luo**

**Professor, The Ohio State University**

**Citation:** *For outstanding research and practical contributions to light metals technology and industrial applications.*

"I am deeply honored to receive the Application to Industrial Practice Award from my peers at TMS. As a materials scientist and engineer, I have always believed that the best scientific research should lead to real-world applications. I am thankful for my students, colleagues, and collaborators who helped me achieve these innovations. I also feel fortunate to be associated with TMS during my industrial and academic career. The TMS community has always been a source of scientific knowledge and endless inspiration for innovations."

## WILLIAM D. NIX AWARD



**Eduard Arzt**

**Scientific Director, Leibniz Institute for New Materials**

**Citation:** *For pioneering contributions to our understanding of such diverse phenomena as high temperature creep, size effects, and biological and*

*bio-inspired adhesion, and for communicating these insights through inspirational lectures and publications.*

"TMS is a materials society with a strong international perspective and high visibility that extends to Europe. I am very honored to receive the award named after William D. Nix, an outstanding leader of the field of materials science over many decades, who is renowned for scientific excellence, international cooperation, and friendship, and supportive mentoring of young scientists worldwide."

**Presentation:** *"From Bioinspiration to Machine Learning—a New Concept for Object Manipulation"*

## WILLIAM HUME-ROTHERY AWARD



**Gerbrand Ceder**

**Professor, University of California, Berkeley**

**Citation:** *For seminal contributions to theory and predictive computational methods for complex multicomponent alloys and ceramic solid solutions, and*

*pioneering advances for ab-initio materials design.*

**Presentation:** *"Ab Initio Thermodynamics and Kinetics from Alloys to Complex Oxides"*

# AIME AWARDS

## AIME HONORARY MEMBERSHIP AWARD



**John Allison**

**William F. Hosford Collegiate Professor of Materials Science and Engineering, University of Michigan**

**Citation:** *For his distinguished service to TMS/AIME and outstanding research achievements in Integrated*

*Computational Materials Engineering of structural light-weight metallic alloys.*

"I am deeply honored to become an AIME honorary member. To join the ranks of previous awardees, is humbling indeed."



**Patrice Turchi**

**Retired Senior Physicist, Lawrence Livermore National Laboratory**

**Citation:** *For outstanding and pioneering contributions in alloy theory with applications to stability, ordering, transformations, and for his invaluable*

*service, leadership, and devotion to the Institution.*

"I am humbled by the honor bestowed by AIME and my colleagues at TMS, and grateful to have my name included in the list of those who were presented with the AIME Honorary Membership Award since 1872. By every measure, it is easy to recognize that TMS remains the Society of choice that spans from extraction to recycling with all the scientific and engineering science in between, as I have said for more than 30 years now, I am also proud of being part of the historical AIME society to which TMS belongs and remain very attached to what these professional scientific societies have to offer to us as a community of scientists and engineers and will continue to do my best to honor what this award really means to spearhead and promote the activities the TMS Foundation has to offer to new generations of scientists and engineers."

## AIME CHAMPION H. MATHEWSON AWARD



**Tetsuya Hirade, Japan Atomic Energy Agency, and Kei Saito and Kenichi Takai, Sophia University**

**Paper:** "Hydrogen Desorption Spectra from Excess Vacancy-Type



Defects Enhanced by Hydrogen in Tempered Martensitic Steel Showing Quasi-cleavage Fracture," *Metallurgical and Materials Transactions A*, November 2019.

## AIME ROBERT LANSING HARDY AWARD



**Zhuoran Zeng**  
*Research Fellow, Australian National University*

**Citation:** *For seminal contributions in microstructure-processing-property relationships in magnesium alloys.*

"The AIME Robert Lansing Hardy Award is particularly special on the basis that it is a recognition for younger members of TMS, whilst also having a long history of such important recognition across the broad fields of metallurgy and materials science. I am deeply honored to be receiving the 2023 award. Membership of TMS has always provided me with significant opportunities and played an important role in my career development."

## TMS/SME/AIME JAMES DOUGLAS GOLD MEDAL



**Sevket Acar**  
*Mineral Processing Consultant, Acar Consulting LLC*

**Citation:** *For his unrelenting efforts and dedication in providing practical, world class solutions in the processing of refractory gold ores, which advanced*

*the fundamentals of minerals beneficiation in nonferrous metallurgy.*

# ACTA MATERIALIA AWARDS

## GOLD MEDAL AWARD



**Tresa Pollock**  
*Professor, University of California, Santa Barbara*

## HOLLOMON MATERIALS AND SOCIETY AWARD



**Charles Ward**  
*Retired, U.S. Air Force Research Laboratory*

## SILVER MEDAL AWARD



**Raymundo Arróyave**  
*Professor, Texas A&M University*

## MARY FORTUNE GLOBAL DIVERSITY AWARD



**Ben Britton**  
*Associate Professor, University of British Columbia*

# BRIMACOMBE PRIZE

## BRIMACOMBE PRIZE



**S. Lee Semiatin**  
*Technical Advisor, MRL Materials Resources LLC*



# RECOGNIZING EXCELLENCE: THE 2023 TMS DIVISION AWARD RECIPIENTS

MEGAN ENRIGHT



## 2024 TMS AWARDS NOMINATIONS DUE APRIL 1

Do you have a colleague who has made a significant impact on their field? Have they been of great service to their community or to TMS? Honor their contributions and recognize their work by nominating them for a 2024 TMS award.

**The nomination deadline for most 2024 TMS awards is April 1, 2023.**

Visit [awards.tms.org](https://awards.tms.org) to explore the many honors and awards available through TMS and to learn more about the nomination process. For additional information, contact Deborah Hixon, TMS Awards Program Manager, at [hixon@tms.org](mailto:hixon@tms.org).

Every year, the five TMS technical divisions award recognition of work performed in their specific technical interest areas. For 2023, the following awardees are commended for their excellence in a particular realm of expertise. Many of these recipients will be presented with their awards at the various division and award lectures held throughout the TMS 2023 Annual Meeting & Exhibition (TMS2023) in San Diego, California, USA, scheduled for March 19–23, 2023.

To discover more about each of these awards and their current and past recipients, visit [awards.tms.org](https://awards.tms.org). Congratulations to all the awardees!

## EXTRACTION & PROCESSING DIVISION (EPD) AWARDS

### EPD DISTINGUISHED LECTURER AWARD



**Corale Brierley**  
*Professor, Brierley Consultancy LLC*  
**Citation:** *For seminal contributions to multi-scale modeling of deformation of polycrystalline metals, severe plastic deformation, and interface-driven plasticity.*

**Presentation:** *"New Directions for Biotechnology Practices in Metals Extraction"*

### EPD DISTINGUISHED SERVICE AWARD



**Mark Schlesinger**  
*Professor Emeritus of Metallurgical Engineering, Missouri University of Science and Technology*  
**Citation:** *Mark has made an outstanding contribution to extractive metallurgy, writing excellent textbooks, making significant contributions in pyrometallurgical research, and organizing TMS conferences and events.*

*significant contributions in pyrometallurgical research, and organizing TMS conferences and events.*

"In a world where extractive metallurgists can often feel like the white rhinos of academia, my membership in TMS has given me the chance to be part of the global extractive community and make life-long friends. My service to the EPD has been a contribution to that community and to the significance of extractive metallurgy within TMS. Recognition by my peers of this service is deeply gratifying."

### NAGY EL-KADDAH AWARD FOR BEST PAPER IN MHD IN MATERIAL PROCESSING

**Sen Luo, Peng Wang, Weiling Wang, Yiming Yang, and Miao-Yong Zhu, Northeastern University**

**Paper:** "Multiphase Field Modeling of Dendritic Solidification of Low-Carbon Steel with Peritectic Phase Transition," *Metallurgical and Materials Transactions B*, December 2021.

### EPD SCIENCE AWARD



**Cong Wang**  
*Professor, Northeastern University*  
**Citation:** *For seminal contributions to advancing the understanding of microstructure, physical properties, and pertinent thermodynamics of welding fluxes subject to high heat input applications.*

"I, together with team members and collaborators, are thrilled upon receiving the prestigious EPD Science Award, a unique distinction lasting for more than 50 years dedicated to the process metallurgy community. We feel immensely honored as our work, published primarily in *Metallurgical and Materials Transactions B*, on structures, physical properties, and fundamental thermodynamics of welding fluxes, is gaining focal recognition among peers. We hope outcomes derived from our work could advance technological development integrating steelmaking and welding metallurgy."

### EPD PYROMETALLURGY BEST PAPER AWARD

**Bernhard Friedrich and Marcus Sommerfeld, Institute of RWTH Aachen University**

**Paper:** "Toward Green Ferroalloys: Replacement of Fossil Reductants in the Pre-reduction Process of Chromite by Bio-Based Alternatives," *REWAS 2022: Developing Tomorrow's Technical Cycles (Volume I)*.

### EPD TECHNOLOGY AWARD

**Yuxiang Peng, Brookhaven National Laboratory, and Ramana G. Reddy and Pravin S. Shinde, University of Alabama**

**Paper:** "Potentiostatic Electrodeposition of Ti-Al Alloy with 40% Titanium from the Lewis Acidic 1-Butyl-3-Methylimidazolium Chloride-Aluminum Chloride Ionic Liquid Electrolyte," *TMS 2022 151st Annual Meeting & Exhibition Supplemental Proceedings*.



**EPD/LMD JOURNAL OF SUSTAINABLE METALLURGY BEST PAPER AWARD**

Mark I. Pownceby and Nathan A.S. Webster, *CSIRO Mineral Resources*; Agung Setiawan, *National Research and Innovation Agency*; Muhammad Akbar Rhamdhani, *Swinburne University of Technology*; and Sri Harjanto, *Universitas Indonesia*

**Paper:** "Kinetics and Mechanisms of Carbothermic Reduction of Weathered Ilmenite Using Palm Kernel Shell Biomass," *Journal of Sustainable Metallurgy*, December 2021.

**LMD/EPD ENERGY BEST PAPER AWARDS**

**Professional**

Soumendra N. Basu, Srikanth Gopalan, Jillian R. Mulligan, and Uday B. Pal, *Boston University*  
**Paper:** "Quantifying the Relationship Between Microstructure and Performance in Gadolinium-Doped Ceria Infiltrated Ni/YSZ Symmetric Cells," *JOM*, October 2022.

**Student**

Joy Morin, *Boise State University*, and Donna Guillen, Kiyoo Fujimoto, and Arin Preston, *Idaho National Laboratory*

**Paper:** "Synthesis Methods for Nanoparticle Morphology Control in Clean Energy Applications," *REWAS 2022: Energy Technologies and CO<sub>2</sub> Management (Volume II)*.

**FUNCTIONAL MATERIALS DIVISION (FMD) AWARDS**

**FMD DISTINGUISHED SCIENTIST/ENGINEER AWARD**



**Candan Tamerler**  
*Spahr Professor, University of Kansas*  
**Citation:** For her outstanding contributions for integrating biological mechanisms into biomimetic design of multifunctional hybrid materials.

"I am deeply honored and humbled to receive this prestigious award. TMS has been my society, so much so that I hardly missed any meetings! I am grateful to the award committee, my colleagues, and especially for my research team and students."

**FMD JOHN BARDEEN AWARD**



**Junqiao Wu**  
*Chancellor's Professor, University of California, Berkeley*  
**Citation:** For his pioneering research in narrow-gap nitride semiconductors, semiconductor alloys, layered semiconductors, and vanadium dioxide.

"I feel extremely humbled to receive the award named after John Bardeen, a giant in science that I have been looking up to since middle school. It is a special honor to be on a list of awardees that includes so many great figures in our fields! I would like to thank my advisors, collaborators, students, and post-docs over the years who have made this possible."

**FMD DISTINGUISHED SERVICE AWARD**



**Kalpana Katti**  
*University Distinguished Professor, North Dakota State University*  
**Citation:** For distinguished service towards TMS FMD through engaging, promoting, and growing the biomaterials and biological materials science areas within TMS.

"Organizing symposia and working for the Biomaterials Committee at TMS has been a great highlight of my career primarily due to the opportunity to work with fabulous researchers in biological materials science. The intellectual interactions and discourses that have always happened at the TMS meeting has been stimulating and invigorating. I hope to continue to engage in more ventures at TMS in the coming years."

**FMD JOURNAL OF ELECTRONIC MATERIALS BEST PAPER AWARD**

Ningzhong Bao, Xianping Fan, Jie Ren, Hui Yang, and Lingjie Zhang, *Zhejiang University*  
**Paper:** "Graphene-Assisted Synthesis of Fe<sub>4</sub>N with Enhanced Microwave," *Journal of Electronic Materials*, 2022.

## LIGHT METALS DIVISION (LMD) AWARDS

### LMD TECHNOLOGY AWARD



**Robert Wagstaff**  
*Founding Partner, Oculatus Consulting*

"I am grateful to the gracious individuals who nominated me for this award. I accept this award with gratitude to the Society, who recognize the work I have been fortunate enough to lead over my career. I am most grateful to my mentors, the innovators, and organizational leaders who have helped pull my life work into commercial reality."

### LIGHT METALS AWARD

**Spencer Toll, Avanti Battery Company, and Antoine Allanore and Caspar Stinn, Massachusetts Institute of Technology**

**Paper:** "Aluminothermic Reduction of Sulfides via Reactive Vacuum Distillation," *Light Metals 2022*.

### LIGHT METALS SUBJECT AWARDS

#### Alumina/Bauxite

**Edgar Gasafi and Alessio A. Scarsella, Metso Outotec GmbH**  
**Paper:** "Green Alumina: A Technological Roadmap," *Light Metals 2022*.

#### Aluminum Alloys

**Randy Beals and Zach Brown, Magna, and Xiaoping Niu, Cosma R&D**  
**Paper:** "Development of Advanced Aluminum Alloy for Structural Castings," *Light Metals 2022*.

#### Aluminum Reduction Technology

**Xiangwen Wang, Alcoa Corporation**  
**Paper:** "Preparation of Aluminum Master Alloys by Electrolytic Co-deposition in Hall-Héroult Cells," *Light Metals 2022*.

#### Electrode Technology for Aluminum Production

**Hogne Linga, Hydro Aluminium AS; Mahyar Farahani, Northvolt; Ann-Mari Svensson, Norwegian University of Science and Technology; and Gøril Jahrsengene, SINTEF Industry**  
**Paper:** "Optical and Electrochemical Characterization of Carbon Anodes with Varying Porosity and Coke Quality," *Light Metals 2022*.

#### Recycling

**Antoine Allanore and Caspar Stinn, Massachusetts Institute of Technology**  
**Paper:** "Shifting the Burden of Selectivity from Chemical to Physical Separation Process via Selective Sulfidation," *REWAS 2022: Developing Tomorrow's Technical Cycles (Volume I)*.

### LMD JOM BEST PAPER AWARD

**Paloma Adeva, Gerardo Garces, Judit Medina Caballero, and Pablo Pérez, CENIM-CSIC; Norbert Schell and Andreas Stark, Helmholtz-Zentrum Geesthacht; and Hyun Kyu Lim and Shae K. Kim, Korea Institute of Industrial Technology**

**Paper:** "Analysis of the Microstructure Role in the Yield Asymmetry of Extruded Mg-LPSO Alloys Using In Situ Diffraction Experiments," *JOM*, July 2022.

### LMD MAGNESIUM TECHNOLOGY AWARDS

#### Application

**Yasumasa Chino, National Institute of Advanced Industrial Science and Technology; Takao Horiya, Innovative Structural Materials Association; Takeshi Ishikawa, Japan Transport Engineering Company; Futoshi Kido, Fuji Light Metal Co. Ltd; Hisashi Mori, UACJ Corporation; Kazunori Shimizu, Sankyo Tateyama, Inc; and Makoto Taguchi, Kawasaki Railcar Manufacturing Co. Ltd**  
**Paper:** "Development of Flame-Retardant Wrought Magnesium Alloys and Application of the Alloys to High-Speed Railway Body," *Magnesium Technology 2022*.

#### Fundamental Research

**Du Cheng, Kang Wang, and Bi-Cheng Zhou, University of Virginia**  
**Paper:** "First-Principles Investigation of the Early-Stage Precipitations in Mg-Sn and Mg-Zn Alloys," *Magnesium Technology 2022*.

#### Best Poster

**Christopher Hale, Svitlana Fialkova, Jagannathan Sankar, Zhigang Xu, Sergey Yarmolenko, and HongLin Zhang, North Carolina Agricultural and Technical State University**  
**Title:** "Effect of Single-Pass Differential Speed Rolling on the Dynamic Recrystallization, Microstructure, and Mechanical Properties of Mg<sub>5</sub>Zn," *Magnesium Technology 2022*.

#### Student Paper

**Christian Feiler, Daniel Höche, Xuejiao Li, Robert H. Meissner, Tim Würger, and Mikhail L. Zheludkevich, Institute of Surface Science, Helmholtz-Zentrum Hereon**  
**Paper:** "Active Corrosion Protection Surfaces Based on Layered Double Hydroxides Nanocontainers: A Computational Study," *Magnesium Technology 2022*.



## MATERIALS PROCESSING & MANUFACTURING DIVISION (MPMD) AWARDS

### MPMD DISTINGUISHED SCIENTIST/ ENGINEER AWARD



**Somnath Ghosh**  
*Michael G. Callas Chair Professor, Johns Hopkins University*

**Citation:** For pioneering contributions to Materials Engineering through the innovation of spatial and temporal multi-scaling methods like PHCMs and WATMUS, that are game changers for fatigue prediction.

"Receiving the MPMD Distinguished Scientist/Engineer Award from TMS is a tremendous honor for me. It is a highlight of my research career that I will cherish always. I am truly honored to be in the company of the very distinguished colleagues who have received this award before me. Thank you, TMS!"

### MPMD DISTINGUISHED SERVICE AWARD



**Kester Clarke**  
*FIERF Professor, Colorado School of Mines*

**Citation:** For dedicated service to the advancement of TMS and MPMD through exceptional volunteerism and continued support of mentoring new members.

"I feel that I have gained so much professionally and personally from my participation in TMS and MPMD that the experience has been precious in and of itself, but it's really delightful to receive this award on top of it all! Thank you and looking forward to continued service in the future."

## STRUCTURAL MATERIALS DIVISION (SMD) AWARDS

### SMD DISTINGUISHED SCIENTIST/ ENGINEER AWARD



**Javier Llorca**  
*Scientific Director, IMDEA Materials Institute, and Professor, Polytechnic University of Madrid*

**Citation:** For his contributions towards establishing processing-microstructure-property linkages in structural materials by means of multiscale modelling strategies and the transference of these tools to industry.

"I am deeply honored to receive this award from the Structural Materials Division of TMS and I want to share this recognition with all my collaborators along the years."

### SMD DISTINGUISHED SERVICE AWARD



**Elizabeth Holm**  
*Professor, University of Michigan*

**Citation:** For seminal contributions to our understanding of the processing of structural materials via computer simulation and materials learning.

"SMD has been my home division since I became a TMS member. It is a true honor to receive this recognition from my professional family!"

### SMD JOM BEST PAPER AWARD

**Matthew Cherry and John Wertz, Air Force Research Laboratory, WPAFB, and Laura Homa, University of Dayton Research Institute**

**Paper:** "Estimation of Realistic Microtexture Region Orientation Distribution Functions Using Eddy Current Data," *JOM*, October 2022.

# JOM TALKS WITH 2022 TMS PRESIDENT JUD READY

Kelly Zappas

**JOM:** Your term as president began in March of 2022, as the Society was easing into post-pandemic operations. What unique challenges did this pose during your Presidential year?

**Ready:** The ending of pandemic restrictions opened up new opportunities for TMS to integrate practices that we discovered during COVID—for instance, remote conferences and working from home for TMS staff. There are clear benefits to both working from home and the various remote learning options that we've explored. There are downsides, too, but the question is: how do we integrate the positive aspects of what we've learned for the betterment of our members and also our headquarters staff? I think that was one of the key challenges: taking the good parts and getting rid of the bad parts of our pandemic selves in a post-pandemic world.

**JOM:** You began your TMS presidential year at the first in-person TMS Annual Meeting that had been held since 2020.

*Editor's Note: Jud Ready completes his term as 2022 TMS President at the TMS 2023 Annual Meeting & Exhibition, March 19-23, 2023, in San Diego California. In this conversation with JOM: The Magazine, Ready reflects on his experiences as TMS President and discusses his hopes for the Society's future.*

**Then, in October, you were part of the fully in-person Materials Science & Technology conference. How do you feel about the progress that's been made in bringing these events back?**

**Ready:** The quality of both meetings was top notch—just the same as members have come to expect for



decades on end. They had really good content, really good networking opportunities, really good venues. All of that was as good or better than it had been in the before times.

But there were challenges, too. The motto of the TMS Annual Meeting is "The World Comes Here," but the world could not come to us the way it normally would. Certain parts of the world, like Asia, were still on lockdown, and that's a huge segment of our membership. So, as much as we'd like to welcome everybody back with open arms, some are held back by their countries' regulations. Hopefully by the time the TMS 2023 Annual Meeting & Exhibition is here, all of those restrictions will have been removed or at least won't be as onerous.

So, losing some of that international participation from TMS has been a big change. That segment of our Society is one of the strongest technical contributors to all the technical divisions. We miss hearing their voices, both literally and figuratively, at TMS meetings.

**JOM:** In the past few years, the Board has taken a number of actions to streamline the Society's operations and ensure the future viability of the organization. How have these changes collectively positioned TMS for the future?

**Ready:** If we look back over the past, say, five years, the board has come up with a variety of different strategic initiatives, such as TMS Resolves, TMS Connects, and TMS Aspires. All of these have different tactics attached to them.

Now, we have to bring all these ideas and initiatives into fiscal alignment with the reality that we lost a huge segment of our annual meeting participants in 2022,



(Photo Below): Jud Ready addresses the audience at the TMS-AIME Awards Ceremony, held at the TMS 2022 Annual Meeting & Exhibition in Anaheim, California.



Jud Ready (photo below on right) presents Iver Anderson with the 2022 TMS/ASM Joint Distinguished Lectureship in Materials and Society Award at the Materials Science & Technology 2022 (MS&T22) Plenary Session in Pittsburgh, Pennsylvania.



and the annual meeting is the single biggest driver of our budget. We want to make sure that all these different things that we've looked at have a positive impact on the membership, do not have a negative impact on staff, and are fiscally responsible—either revenue neutral or revenue positive.

The Society is operating as a nonprofit, so we're not-for-profit, but we're not-for-loss, either. That's been a key thing that I look at because I'm an academic. I'm not in industry, so I'm also in the same not-for-profit, but also not-for-loss type of world. We have to balance financial considerations with service to our members, and we want to do it in perpetuity. We want TMS to go on forever. We don't want to be out of money in five years. That would be a total disservice. So, we had to make some extremely tough calls.

But as part of this, we're racking and stacking all those different initiatives and different activities, and that's going to be the key emphasis moving forward,

**"WE'LL CONTINUE TO LEVERAGE THAT MEMBERSHIP CONNECTION BECAUSE THAT'S REALLY THE KEY ROLE OF A PROFESSIONAL SOCIETY: CONNECTING THE PROFESSIONAL MEMBERS TO ONE ANOTHER. THAT'S WHY ALL PROFESSIONAL SOCIETIES ARE OUT THERE, BUT PARTICULARLY TMS."**

certainly for 2023, probably for 2024 and 2025, too. We'll just have to see, when all travel restrictions are lifted, does the world continue to come back to us?

We expect they will, because the benefits of TMS membership are the technical content, networking opportunities, business development, and the connections—professionals connecting to a supplier or a buyer or a new student, or a student connecting with a research advisor or future employer. All those things still exist, and they've always existed that way at TMS. We'll continue to leverage that membership connection because that's really the key role of a professional society: connecting the professional members to one another. That's why all professional societies are out there, but particularly TMS.

TMS feels like a very highly networked organization. I think there's probably three degrees of separation among TMS members, if that, from every single member to every other member.

**JOM: Could you say a few words regarding TMS's recent position statement in support of Ukraine?**

**Ready:** In January, TMS issued a statement concerning the ongoing Russian invasion of Ukraine that expresses both concern and support for our members residing in Ukraine. We took this step in response to requests from some of our members to break our traditionally neutral geopolitical stance and ban Russian members from participating in our Society's activities. After considerable deliberation, the TMS Board of

Directors determined that acting upon individual members from Russia would do nothing to stop their government's aggressive practices and would only end up hurting those members and the profession as a whole by eliminating their contributions. We have instead decided that it would benefit our community more to help our Ukrainian members by providing complimentary professional memberships and free registration to attend TMS2023 or TMS2024. You can learn more details and read the full statement at [www.tms.org/PGA](http://www.tms.org/PGA).

**JOM: What do you consider to be your greatest contribution as TMS President?**

**Ready:** I think it's something that actually has not happened yet. It's what we just approved at the last TMS Board of Directors meeting. I'm really excited about a new meeting concept that we're planning that will combine many of our specialty conferences into a broader event. I think this will help to maintain the closeness of these events and also bring the costs down—both for us and for our members. Everything we do needs to always be member-focused, but also good for the Society, so we need to consider the return on revenue for hosting those single events in different cities. Instead, we're going to combine them all into one location. This is a bit of an experiment, and it will start in 2024, but that's really one of the most impactful things that I think we've implemented as a board. Again, this is something that came about as a result of COVID, but I think it's going to be a positive thing.

We welcome input on this concept. We've got a steering committee built with volunteer leaders, but we very much welcome comments from any members, especially the members that attend these various smaller congresses and smaller workshops and events that we host.

**JOM: What have you found most fulfilling about serving as president?**

**Ready:** The members. It all goes back to the members. Meeting new members, of course, has been part of the role, but also hearing from people from my past who I haven't heard from in a decade—or a couple of decades in some cases. I've had messages from a dozen or so different folks contact me to say, "Hey, congratulations on being TMS President." So I've reconnected with them and invited them to join us in San Diego for TMS2023.

If you recognize my name while reading this, please do try to come find me at the conference. I'd love to catch up on old times. If I've never met you before, I still want to meet you. We'll create new memories this year at the annual meeting and hopefully reconnect in future years.

**JOM: What lessons are you taking with you from your presidential experience?**

Certainly fiscal responsibility. I always had that from operating the Ready general fund here, but expanded

to a service-oriented society like TMS. We have to provide these services—that's the whole point. We were really, really focusing on how the Society helps the member and how that network among members helps the whole materials science and engineering community as well. It's a very symbiotic relationship. If our members and the whole materials society world is struggling, we can boost one another up.

**JOM: Is there anything else you'd like to add?**

**Ready:** If you've not already made your plans to attend the TMS 2023 Annual Meeting & Exhibition in San Diego, California, there's still time to do it. It begins March 19. Walk-up registrations are available. We have a nice, robust exhibit planned. You can attend the technical sessions.

You're also welcome to attend our technical committee meetings at TMS2023.

These are almost all open to new membership. There are very few closed committees in TMS, so find one that suits you.

And remember: we've all been there—very timidly walking into a room, not knowing anybody, grabbing the first chair in a dark corner you can find and being real quiet, you know, because we're all introverts. It's hard at first, but then it just builds from there.

You make friends with the person sitting next to you. They introduce you to somebody across the table, and boom!

Suddenly you're part of the community.

**"EMPLOYERS THINK OF TRAVELING TO AN EVENT LIKE THE TMS ANNUAL MEETING AS AN EXPENSE, BUT THEY SHOULD VIEW IT AS AN INVESTMENT. . . IT PUTS YOU IN TOUCH WITH THE ECOSYSTEM THAT YOUR COMPANY PARTICIPATES IN BECAUSE YOUR SUPPLIERS, YOUR COMPETITORS, YOUR UPSTREAM FOLKS, YOUR DOWNSTREAM FOLKS, YOUR FUTURE EMPLOYEES—EVERYBODY'S THERE."**

We always say about the TMS

Annual Meeting that "The World

Comes Here," and you need to be part of

this materials science and engineering world coming together in San Diego, March 19–23. Your career will improve, and your employer will reap the benefits. Employers think of traveling to an event like the TMS Annual Meeting as an expense, but they should view it as an investment. I know it probably doesn't change where it gets accounted on their books, but it changes your perspective if you look at it as an investment, not just in your workforce, but also in your company in general. It puts you in touch with the ecosystem that your company participates in because your suppliers, your competitors, your upstream folks, your downstream folks, your future employees—everybody's there.

So if you're not there, you're missing out. Be sure to come to the TMS 2023 Annual Meeting & Exhibition.



# COLLABORATION AND CONNECTIONS: A PREVIEW OF ICME 2023

Charles Ward and  
Heather Murdoch



#### About the Authors:

Charles Ward is the chair of the ICME 2023 Organizing Committee and the editor-in-chief of *Integrating Materials and Manufacturing Innovation*. He is the retired chief of the Manufacturing and Industrial Technologies Division of the U.S. Air Force Research Laboratory's Materials and Manufacturing Directorate. Heather Murdoch is the ICME 2023 programming chair and a materials engineer at the U.S. Army Research Laboratory.

The World Congress on Integrated Computational Materials Engineering (ICME 2023) will meet for the 7<sup>th</sup> time this May 21-25, 2023, at the beautiful Caribe Royale Resort in Orlando, Florida. This marks the return to the biannual format, bringing together international participants from across areas of modeling and simulation, experimental specialization, data analytics, and engineering design. Scientists and engineers from academia, industry, and government will gather to address ICME tools and techniques, their integration, and application.

The release of the National Research Council study report on ICME in 2008 launched a paradigm shift in materials science and engineering that is still felt today. The novel concept of providing an integrated means to capture and reuse materials knowledge through computational techniques has spawned numerous research and development initiatives globally—notably the Materials Genome Initiative in the United States. The introduction of data-dependent techniques such as artificial intelligence in materials science and engineering is a natural advancement within the ICME paradigm, keeping ICME just as relevant today as when it was first introduced.

ICME 2023 provides a focused, small setting that facilitates deep discussion and meaningful connections. The limited number of parallel tracks and small venue ensure that participants can easily attend sessions of interest and still have time for

collaborative meetings. Attendees specifically praised the community feeling of the last ICME congress, which included s'mores at a bonfire on the shores of Lake Tahoe and hikes in the snow. Given that the 2023 congress is in Orlando, Florida, it will be a very different climate in terms of the weather, but the community atmosphere will surely be even warmer.

ICME is at its core about collaboration and connections: between models and experiment, between length scales, between discovery, design, manufacturing, and application, and between science and engineering. Planned plenary talks will emphasize this point and set the tone for more than 160 other contributed talks. Plenaries include James Saal of Citrine Informatics, with "Accelerating Development of Materials with Artificial Intelligence", Ida Berglund of QuestTek Europe, with "Advancing ICME Technologies via Strategic Collaboration while Bridging the Gap between Academia and Industry", and Andrew Bobel of General Motors Global Research & Development, presenting their award-winning work on "Multi-scale Approach for Developing a High Silicon Al-Si-Cu Alloy for Additive Manufacturing Supercharger Rotors". (Read sidebar article on next page for further information.) Other plenary speakers will include Adam Kopper of Mercury Marine and Laurent Capolungo of Los Alamos National Laboratory. More than 160 additional invited and contributed talks will round out a very rich technical program.

## ICME 2023 Features Inaugural ICME Industry Implementation Award Plenary

General Motors Global Research & Development, as the recipient of the Materials Processing & Manufacturing Division (MPMD) ICME Industry Implementation Award, will be honored at ICME 2023. This award recognizes the significant achievements that industry has made to implement ICME methods into a manufacturing process and/or design of a new material and is to be awarded every two years in conjunction with the ICME World Congress.

"It is with great humility and gratitude that we accept the MPMD ICME Industry Implementation Award for our work on computational alloy development for additively manufactured superchargers. It was our vision to use state-of-the-art computational tools together with experimental validation to accelerate this ultimate implementation," said Andrew Bobel, Senior Researcher, General Motors Global Research & Development. Bobel will accept this award on behalf of General Motors Global Research & Development and present the plenary talk on the company's work for which they are being recognized.

The technical sessions will highlight the breadth of advances, challenges, and opportunities for ICME and include a diverse range of invited speakers. All conference presenters are encouraged to submit an article describing the work they present to TMS' *Integrating Materials and Manufacturing Innovation* journal. Submitted papers will undergo peer review for a special ICME World Congress topical collection. Topical themes that were incorporated in previous meetings and will be continued this year include:

- **Applications: Advanced Manufacturing:** This topic area has been broadened to capture more diverse advanced manufacturing methods, including the use of ICME in additive, hybrid, and metamorphic manufacturing.
- **Applications: Materials Design and Modification:** Examines using ICME tools to develop and refine materials for targeted applications and properties.
- **Artificial Intelligence and Machine Learning:** This topic focuses on leveraging artificial intelligence tools within an ICME paradigm to accelerate the discovery, development, and application of materials.
- **ICME for Non-Metals, Structural Composites, and Ceramics:** A track specifically devoted to the unique challenges of non-metallic modeling and design.
- **ICME-Based Design Tools - Industrial Integration and Success Stories:** Serves as an introduction of model-based descriptions of materials that can integrate with digital engineering in other disciplines, and examples where ICME has been implemented for product and/or process improvements in industry.
- **Linkage: Process – Microstructure – Properties:** Highlights both modeling and experimental approaches that scale temporal and spatial ranges to provide a quantitative, predictive capability.
- **Material Databases and Platforms:** This topic includes discussion of avenues and best practices for data sharing, uncertainty quantification and propagation, and establishment of tools in these areas.

New topic areas for ICME 2023 include:

- **Scientific Workflows for ICME:** This topic concentrates on the recent concept of automated processes and data capture from experiment and computation.
- **New and Emerging Areas for ICME:** We look forward to seeing the many exciting new ideas to be presented in this topic in addition to the areas of Functional Materials and Energy Storage and Conversion that were specified in the call for abstracts.

## REGISTER FOR ICME 2023



**Discount Deadline: April 7, 2023**

Secure your place at ICME 2023 and register by April 7, 2023, to get the best rate at [www.tms.org/ICME2023](http://www.tms.org/ICME2023). Make sure you also book your room at the ICME 2023 venue, the Caribe Royale Resort in Orlando, Florida, USA. A block of rooms has been reserved at the Caribe Royale at a special rate and reservations can be made in the housing section of the ICME 2023 website. In addition to saving time and money, staying at the congress location will provide the most convenient access to technical session rooms and social functions, allowing for plenty of informal networking opportunities with colleagues. Accommodations must be secured by April 29, 2023.

By the time you are reading this article, abstract submissions will be closed, but please check the ICME 2023 website regularly at [www.tms.org/ICME2023](http://www.tms.org/ICME2023) for updates on the technical program as you plan to attend the conference. We look forward to seeing you in Orlando!



*In Case You Missed It:*

# BUSINESS NEWS FROM THE FIELD



**Oulu, Finland:** Sensmet announced its new Micro-Discharge Optical Emission Spectroscopy technology which improves the production efficiency of lithium. This technology is able to measure multiple metals and their impurities in real time as opposed to batch sampling and laboratory analyses traditionally used by battery metal manufacturers. The technology measures the atomic emission spectrum and derives a quantitative analysis of the metals in the sample. (Photo Credit: Sensmet)

## Sabina Constructs Nunavut Mine

**Vancouver, Canada:** Sabina Gold & Silver Canadian committed to construction at the C\$610 million (\$463m) Goose Gold Mine in Nunavut. Construction at the site, located in the Back River gold district, is planned to fully start in 2023, with first gold production expected in 2025. The Vancouver-based mining company has already completed pre-development activities, while major equipment and materials required for construction have been either procured, delivered or are in transit.

## A Ferroelectric Superconductor

**New York, New York, USA:** Columbia University researchers have discovered evidence that superconductivity and ferroelectricity, two competing phenomena, can occur in the same material. While researching the material  $\text{MoTe}_2$ , evidence of resistance-free transport of electrical currents was found in single layers of the material. Researchers found superconductivity to be easier to control in a two-layer system, after exploring with stacks of the material. This two-layer system was not symmetric, atoms in the layers did not align, which created an internal electric field. Measurements were performed across temperatures, magnetic fields, and electrostatic doping and the research team discovered a manipulatable transition between superconductive and ferroelectric states in  $\text{MoTe}_2$ .

Do you have business or industry news of interest to the minerals, metals, and materials community?

**JOM**  
THE MAGAZINE

Submit your announcement or press release to Lynne Robinson, Department Head, Marketing and Communications, at [lrobinson@tms.org](mailto:lrobinson@tms.org).



**Anglesey, United Kingdom (UK):** Anglesey Mining conducted a recent survey of Mynydd Parys, a copper deposit in the north of the Isle of Anglesey in Wales, to determine the feasibility of reopening the site. The survey revealed large deposits of minerals, encouraging Anglesey to begin securing new permits. The site is one of the largest underdeveloped copper deposits in the UK and the area of consideration was last explored 30 years ago. Deposits of zinc, gold, and silver were also found. (Photo Credit: BBC News)

## AMI to Open R&D Center

**Sparks, Maryland, USA:** Active Minerals International (AMI) will begin construction on the new Research & Development (R&D) Innovation Center in the summer of 2022. Located in Houston, Texas, USA, this center will conduct R&D on new products, processes, and application development of minerals through technical innovation. AMI's Innovation Center will also participate in material and mineral research and application testing, as well as technical support for sales, technical service, and operations. The center will house state-of-the-art equipment such as a scanning electron microscope (SEM), an X-ray diffraction (XRD), and a laser particle size analyzer.

## CrCoNi Has Highest Toughness Recorded

**Berkeley, California, USA:** While researching a metallic alloy of chromium, cobalt, and nickel, Lawrence Berkeley National Laboratory scientists measured the highest toughness ever recorded for any material. CrCoNi is exceptionally strong and ductile as it gets colder and its properties become enhanced, which is the opposite of most other materials. As a high entropy alloy (HEA), CrCoNi contains an equal mix of each element which lends to an extraordinarily high combination of strength and ductility when stressed.

# TMS MEETING HEADLINES

Meeting dates and locations are current as of December 28, 2022. For the most recent updates on TMS-sponsored events, visit [www.tms.org/Meetings](http://www.tms.org/Meetings).



## TMS 2023 Annual Meeting & Exhibition (TMS2023)

March 19–23, 2023  
San Diego, California, USA

**Meeting Dates:**  
**March 19–23, 2023**

TMS2023 will connect minerals, metals, and materials scientists and engineers who work in industry, academia, and government from around the world.

The conference features four full days of technical programming, with more than 95 symposia in 14 topic areas.

[www.tms.org/TMS2023](http://www.tms.org/TMS2023)



## Superalloy 718 & Derivatives 2023

May 14–17, 2023  
Pittsburgh, Pennsylvania, USA

**Discount Registration Deadline: April 3, 2023**

Superalloy 718 & Derivatives 2023 will explore metallurgical processing, materials behavior, and microstructural performance for a distinct class of 718-type superalloy and derivatives. Featured are keynote speakers Melissa Martinez, ATI Metals, and David Furrer, Pratt & Whitney, among other invited presenters.

[www.tms.org/Superalloy718-2023](http://www.tms.org/Superalloy718-2023)



## 7th World Congress on Integrated Computational Materials Engineering (ICME 2023)

May 21–25, 2023  
Orlando, Florida, USA

**Discount Registration Deadline: April 7, 2023**

ICME 2023 will feature plenary presentations from Andrew Bobel, General Motors Global Research & Development, Ida Berglund, Questek Europe AB, Laurent Capolungo, Los Alamos National Laboratory, Adam Kopper, Mercury Marine, and James Saal, Citrine Informatics.

[www.tms.org/ICME2023](http://www.tms.org/ICME2023)



## TMS Fall Meeting 2023 @ Materials Science & Technology (MS&T)

October 1–5, 2023  
Columbus, Ohio, USA

**Abstract Deadline: April 3, 2023**

TMS Fall 2023 at MS&T is a recognized forum for fostering technical innovation at the intersection of materials science, engineering, and application.

[www.tms.org/FallMeeting/TMSFall2023](http://www.tms.org/FallMeeting/TMSFall2023)

## Other Meetings of Note



## 3rd World Congress on High Entropy Alloys (HEA 2023)

November 12–15, 2023  
Pittsburgh, Pennsylvania, USA

[www.tms.org/HEA2023](http://www.tms.org/HEA2023)



## 11th Pacific Rim International Conference on Advanced Materials and Processing (PRICM11)

November 19–23, 2023  
Jeju, South Korea

[www.pricm11.org](http://www.pricm11.org)



## TMS 2024 Annual Meeting & Exhibition (TMS2024)

March 3–7, 2024  
Orlando, Florida, USA

[www.tms.org/TMS2024](http://www.tms.org/TMS2024)



## 15th International Symposium on Superalloys (Superalloys 2024)

September 8–12, 2024  
Champion, Pennsylvania, USA

[www.tms.org/Superalloys2024](http://www.tms.org/Superalloys2024)

## Offshore Technology Conference (OTC) 2023

May 1–4, 2023  
Houston, Texas, USA

**Co-sponsored by TMS**

## European Metallurgical Conference (EMC 2023)

June 11–14, 2023  
Düsseldorf, Germany

**Co-sponsored by TMS**

## OTC Brasil 2023

October 24–26, 2023  
Rio de Janeiro, Brazil

**Co-sponsored by TMS**

## Materials in Nuclear Energy Systems (MiNES 2023)

December 10–14, 2023  
New Orleans, Louisiana, USA

**Co-sponsored by TMS**



# HONORS FOR EVERY CAREER STAGE

Explore the many TMS awards available for established professionals, early career professionals, and students.



## UPCOMING DEADLINES:

**APRIL 1:** Most TMS award nominations due.

**JUNE 1:** AIME James Douglas Gold Medal nominations due.

**AUGUST 15:** Young Leaders Professional Development Award applications due.

**SEPTEMBER 1:** TMS/ASM Joint Distinguished Lectureship in Materials and Society Award nominations due.



View the individual award pages for more details at [www.tms.org/awards](http://www.tms.org/awards)



THE WORLD COMES HERE.

# TMS 2023

152<sup>nd</sup> Annual Meeting & Exhibition



MARCH 19–23, 2023 | SAN DIEGO, CALIFORNIA, USA  
#TMSANNUALMEETING | [www.tms.org/TMS2023](http://www.tms.org/TMS2023)

## DON'T MISS OUT: TMS2023 BEGINS MARCH 19!

Join us at one of our most popular destinations for the TMS Annual Meeting & Exhibition: San Diego, California! Historically, San Diego has hosted the Society's best-attended meetings, and—with more than 4,500 abstracts submitted—we expect strong attendance once again for TMS2023.

### WHY TMS2023

"For me, every TMS meeting is a fresh start to new interactions, a birth place for new collaborations, a check-in for multi-year partnerships and a reunion of sorts, where we celebrate the accomplishments of many and welcome others to the family."

—Jonathan Madison,  
*15-Year TMS Annual Meeting Attendee*



### KEY MEETING ACTIVITIES

Workshops and Courses: **March 19**  
TMS2023 Exhibit Hall: **March 20-22**  
Technical Programming: **March 20-23**



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LEARN MORE AT: [www.tms.org/TMS2023](http://www.tms.org/TMS2023)

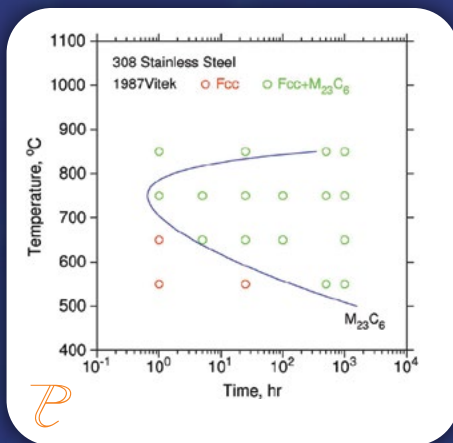
# Thermo-Calc Software

Empowering Metallurgists, Process Engineers and Researchers

## What if the materials data you need doesn't exist?

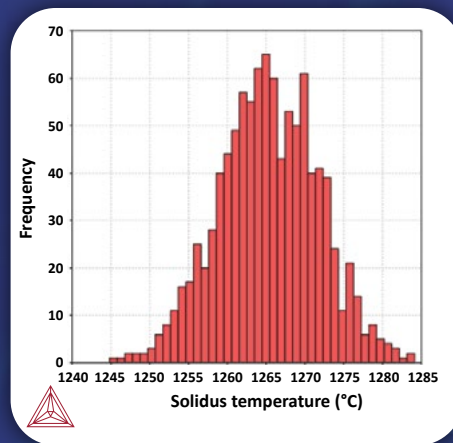
### Gain insight into materials processing

#### Precipitation



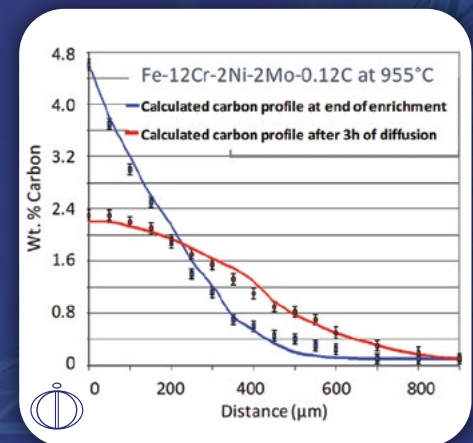
Time temperature precipitation of  $M_{23}C_6$  in 308 stainless steel

#### Solidification



Solidus variation within Alloy 718 specification (Gaussian,  $n=1000$ )

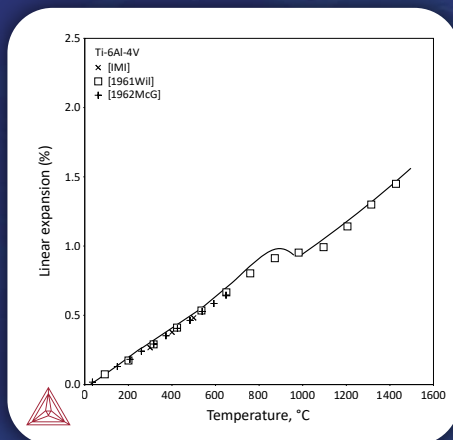
#### Diffusion



Carbon diffusion profile near surface during carburization of a martensitic stainless steel

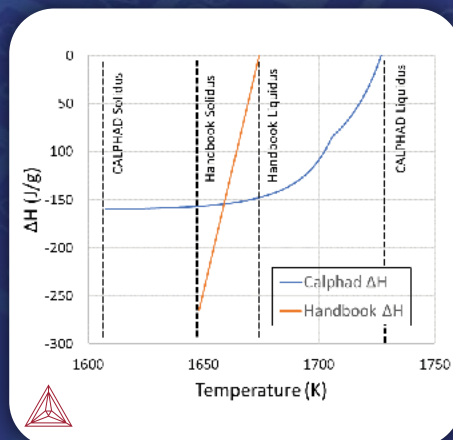
## Predict a wide range of materials property data

#### Thermophysical Data



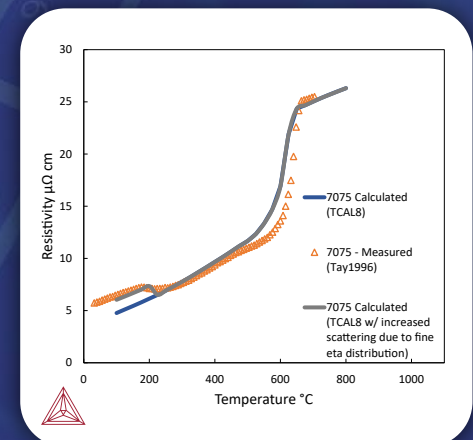
Linear expansion vs temperature for Ti-6Al-4V

#### Thermodynamic Properties



Calculated latent heat compared to handbook values for a specific 316L stainless steel chemistry

#### Electrical Resistivity



Calculated electrical resistivity of aluminum alloy 7075