

# JOM



APRIL 2021  
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**2021 TMS PRESIDENT ELLEN CERRETA: Implementing a Vision for TMS**

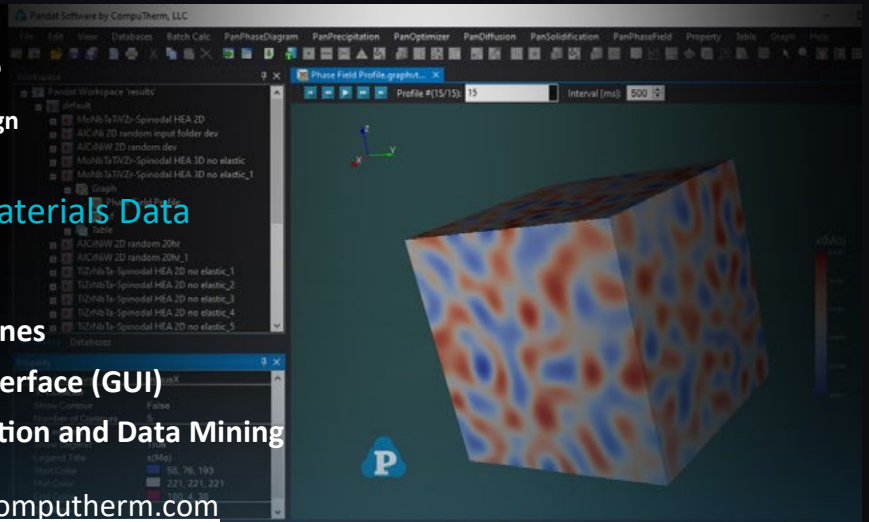
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## About the Cover

Ellen Cerreta, Division Leader, Materials Science and Technology, Los Alamos National Laboratory, was officially installed as the 2021 TMS President at the TMS 2021 Virtual Annual Meeting & Exhibition in March. She shared her plans for implementing the Society's strategic plans over the next year in her first TMS Presidential Perspective in the April JOM Magazine.



## April 2021 Guest Editors

### Advances in Process Metallurgy

*Hydrometallurgy and Electrometallurgy Committee*  
Hong (Marco) Peng, University of Queensland  
Kerstin Forsberg, KTH Royal Institute of Technology

### Materials Recovery Considerations for Design of Next-generation Functional Materials

*Energy Conversion and Storage Committee*  
Surojit Gupta, University of North Dakota  
Lan (Samantha) Li, Boise State University  
Manoj Kumar Mahapatra, University of Alabama-Birmingham

### Pyrometallurgical Processing of Secondary Resources

*Pyrometallurgy Committee*  
M Akbar Rhamdhani, Swinburne University of Technology  
Stuart Nicol, Glencore Technology

## About JOM:

The scope of JOM (ISSN 1047-4838) encompasses publicizing news about TMS and its members and stakeholder communities while publishing meaningful peer-reviewed materials science and engineering content. That content includes groundbreaking laboratory discoveries, the effective transition of science into technology, innovative industrial and manufacturing developments, resource and supply chain issues, improvement and innovation in processing and fabrication, and life-cycle and sustainability practices. In fulfilling this scope, JOM strives to balance the interests of the laboratory and the marketplace by reporting academic, industrial, and government-sponsored work from around the world.

## 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.

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## MISSED TMS2021 VIRTUAL?

The TMS 2021 Virtual Annual Meeting & Exhibition (TMS2021 Virtual) was held live, March 15-18, 2021, but you can still register for the conference for access to the following resources through May 31:

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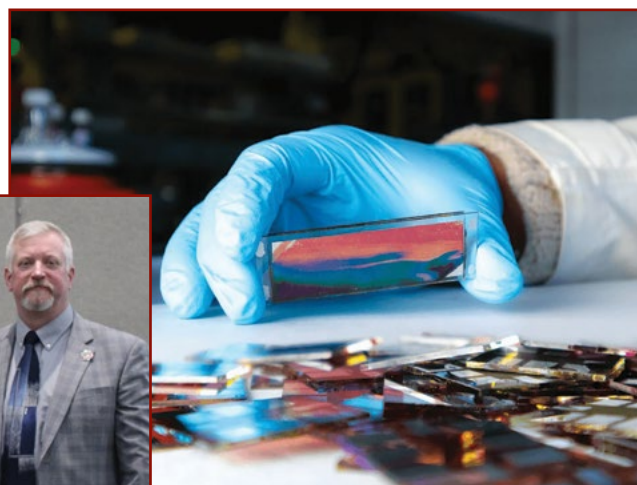
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# in the final analysis

*"In most cases being a good boss means hiring talented people and then getting out of their way."*

—Tina Fey

Annually, the TMS Board of Directors provides me with a set of "Executive Director Goals." These goals are generally in addition to—or amplifications of—my day-to-day responsibilities. The goals range from 10 to 12 items focused on advancing the Society's strategic plan, developing our operations, probing opportunities, addressing challenges, etc. In response, I annually produce an Executive Director's Report to track progress against the goals and other accomplishments. My 2020 report comments on 31 individual initiatives. More than a third were not under consideration when the goals were issued. Why? Because pandemic, naturally. Does responding to a pandemic mean that there's not a good story to tell? Just the opposite! Did I do all the work by myself? Of course not. I got out of the way!

We spent immeasurable time postponing, canceling, and/or virtualizing events. Since TMS2020, we recast 17 of our 2020 and 2021 events, not just because of practicality, but because the Board of Directors has made it clear that safety is the Society's top priority. We engaged in seemingly endless negotiations with hotels and convention facilities to reschedule, cancel, and seek mutually tolerable settlements. These discussions saved the Society millions of dollars of potential risk in contractual penalties and litigation. With negotiation and bending on all sides, the financial burden to TMS was drastically minimized from worst-case scenarios. To date, the penalties to the Society are less than 10% of what might otherwise have been owed. The challenge is not just in contractual negotiations. Staff has pulled the double duty of preparing to present a live event and then unwinding those plans and inventing alternative plans such as pivots toward virtual. These time-compressed pivots created new sets of logistical, programming, sales, sponsorship, proceedings, and messaging and marketing challenges that required staff and volunteers to recalibrate plan after plan and learn new skill sets. We have asked volunteers, staff, and registrants for ceaseless patience and tolerance as we worked through countless ambiguities.

Beyond the pandemic, two other events focused the Society's advocacy attention in new ways. One was the killing of George Floyd by police and the nationwide protests that followed; the second was the issuance of President Trump's Executive Order 13950 with the confusion and anxiety that it sowed within TMS as to whether and how this order would impact the Society's ability to conduct training on diversity, equity, and inclusion. Both situations led to emergency meetings of the Board of Directors, collaborations among the Public and Government Affairs Committee and the Diversity, Equity, and Inclusion Committee, and the issuance of official position statements by TMS. There was also a resolve by the Board of Directors to eschew federal dollars that would require changes to TMS content. Thanks to our passionate volunteers, social justice will feature in our future advocacy efforts.

Through it all, staff has been teleworking. They are performing extraordinarily well under disrupted circumstances, converting their homes into workspaces, learning the intricacies of GoToMeeting and Zoom, endeavoring to replicate in-person workplace experiences remotely, juggling endless uncertainties, keeping up with work obligations, and performing seemingly infinite rework as projects were reprioritized or pivoted into new formats. Like everyone else, staff are also dealing with our era's intellectual, emotional, psychological, physical, interpersonal, and economic challenges and uncertainties in their personal and professional lives. They have my deep appreciation.

While I did my best to stay out of the way of productive people, I did occasionally help staff and volunteers alike with an occasional nudge, a good listening session, and some advice. The credit for the heavy lifting, however, goes to the team members. Be it the Before Times or the New Normal, the teams of TMS continue to do great things day in and day out.

# JOM

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James J. Robinson  
Executive Director

@JJRoTMS

*"Since TMS2020, we recast 17 of our 2020 and 2021 events, not just because of practicality, but because the Board of Directors has made it clear that safety is the Society's top priority."*



## member news

Share the good news about your professional accomplishments! Contact Kaitlin Calva, JOM Magazine Managing Editor, at [kcalva@tms.org](mailto:kcalva@tms.org). Please note that only news submitted by current TMS members will be considered.



David McDowell



Dan Thoma

# Congratulations to TMS Award Recipients; New TMS Meeting on AI Seeks Abstracts

## Additional TMS Awards Announced

TMS would like to congratulate the following TMS members on receiving awards from the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) in addition to two TMS Division Awards, honoring work appearing in two of TMS's journals: *JOM* and the *Journal of Electronic Materials (JEM)*. The honors were conferred at various events held during the TMS 2021 Virtual Annual Meeting & Exhibition on March 17, 2021. Recordings of the TMS-AIME Awards Ceremony as well as the TMS Technical Division Award Ceremonies are freely available to view at [awards.tms.org](http://awards.tms.org).

### AIME Honorary Membership Award

#### David McDowell

*Georgia Institute of Technology*  
**Citation:** "For contributions to multiscale modeling and design of structural materials, microstructure-sensitive simulation of fatigue property variability, and leadership in materials innovation."

#### Dan Thoma

*University of Wisconsin-Madison*  
**Citation:** "For sustained technical contributions, distinguished service, and continued leadership for the engineering profession, in multiple efforts affiliated and associated with AIME."

### Functional Materials Division JEM Best Paper Award

**Lisa M. Porter, Luke A.M. Lyle, and Robert F. Davis, Carnegie Mellon University; Serdal Okur and Gary S. Tompa, Structured Materials Industries Inc.; and Venkata S.N. Chava, Matthew L. Kelley, M.V.S. Chandrashekhar, and Andrew B. Greytak, University of South Carolina**  
**Paper:** "Characterization of Epitaxial b-(Al,Ga,In)<sub>2</sub>O<sub>3</sub>-Based Films and Applications as UV Photodetectors," *Journal of Electronic Materials*, November 2020.

### Light Metals Division JOM Best Paper Award

**James Matthew, Guillaume Remy, Mark A. Williams, Fengzai Tang, and Prakash Srirangam, Warwick Manufacturing Group, Warwick University**  
**Paper:** "Effect of Fe Intermetallics on Microstructure and Properties of Al-7Si Alloys," *JOM*, December 2019.

### Structural Materials Division JOM Best Paper Award

**Zachary D. Brunson, Colorado School of Mines; Adam L. Pilchak and Eric J. Payton, U.S. Air Force Laboratory; Satish Rao, UES Inc.; and Aaron P. Stebner, Georgia Institute of Technology**  
**Paper:** "An Expanded Martensite Variant Selection Theory Accounting for Transformation Rotations and Applied Stress Fields: Predictions of Variant Clusters in Titanium," *JOM*, October 2020.

## TMS2021 Virtual Recordings Available



If you missed the TMS 2021 Virtual Annual Meeting & Exhibition (TMS2021 Virtual), held live March 15–18, 2021, you still have a chance to view recordings. Registration for TMS2021 Virtual is still open and provides access to recorded technical presentations from more than 85 symposia in 13 topic areas, such as additive technologies, light metals, advanced materials, energy & environment, and more. Technical programming and the plenary session presentations from the fifth International Symposium on Nickel and Cobalt (Ni-Co 2021) will also be included. Additionally, all registrants will gain electronic access to the TMS2021 Virtual published conference proceedings, which includes 11 titles.

Registration and presentations will be available through May 31, 2021. Learn how to register and begin accessing these resources at [www.tms.org/TMS2021](http://www.tms.org/TMS2021).



## New Artificial Intelligence Meeting Opens Call for Abstract

The TMS World Congress on Artificial Intelligence in Materials and Manufacturing (AIM 2022) is the first event of its kind to focus on the role of artificial intelligence (AI) in materials science and engineering and related manufacturing processes. AIM 2022 will convene stakeholders from academia, industry, and government to address key issues and identify future pathways.

“TMS has been a long-time and early supporter of the Materials Genome Initiative. The role that artificial intelligence can play in materials research has been explored previously by TMS committees including the Materials Innovation Committee, Artificial Intelligence Subcommittee, and Integrated Computational Materials Engineering Committee,” said Taylor Sparks, chair, AIM 2022 organizing committee and associate professor and associate chair, Materials Science and Engineering Department, University of Utah. “The time is now right for a dedicated conference to bring together the broader community of researchers focusing on these exciting new techniques.”

Authors are encouraged to submit their work for consideration by the deadline of

**September 3, 2021.** Abstracts are invited on the following topics: intelligent/robotic manufacturing; artificial intelligence in specific manufacturing process (e.g., forming, casting, additive manufacturing); machine learning/deep learning in materials and manufacturing; computer vision for materials and manufacturing R&D; autonomous materials research; AI-assisted development of new materials/alloys; human-AI collaboration for materials and manufacturing problems; and organizational impacts of artificial intelligence in materials and manufacturing.

The event is set for April 3–6, 2022, at the Pittsburgh Marriott City Center in Pittsburgh, Pennsylvania. For details and to submit an abstract, visit the congress website at [www.tms.org/AIM2022](http://www.tms.org/AIM2022).

To learn more about this topic before the congress, view the four-part webinar series, Artificial Intelligence in Materials: Research, Design, and Manufacturing. Recorded live in February 2021, this program is still available in the TMS Webinar Library at [www.tms.org/WebinarLibrary](http://www.tms.org/WebinarLibrary). TMS members can view the entire series for free, while non-members can purchase the series for \$100.



## In Memoriam

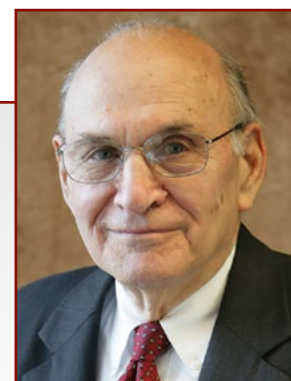
TMS extends its condolences to the family, friends, and colleagues of the following members:

**George Dieter**, a TMS member since 1951, passed away in December 2020 at the age of 92. Dieter was professor emeritus of mechanical engineering, Glenn L. Martin Institute Professor of Engineering, at the University of Maryland (UMD). As dean of the A. James Clark School of Engineering at UMD from 1977–1994, Dieter worked to grow the university's programming and prestige. The University of Maryland recently named its materials teaching lab the George E. Dieter Jr. Materials Instructional Laboratory to honor his legacy. Additionally, Dieter authored *Mechanical Metallurgy* and co-authored *Engineering Design*, both of which are considered essential textbooks for the field.

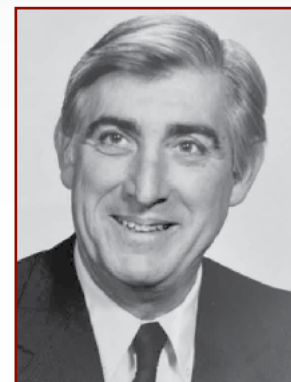
Dieter is a 1993 TMS Fellow and received the 1994 TMS Educator Award (now the Julia & Johannes Weertman Educator Award). He was elected to the National Academy of Engineering in 1993 “for contributions to engineering education in the areas of materials design and processing.”

**George R. St. Pierre**, distinguished professor and chair emeritus in The Ohio State University's (OSU) Department of Materials Science and Engineering, passed away at the age of 89 in March 2020. After an active-duty tour in the U.S. Air Force Materials Laboratory, St. Pierre joined OSU faculty in 1957, where he held a variety of positions in addition to his role as professor, including dean of the University Graduate School and chair of the Metallurgical Engineering, Mining Engineering, and Materials Science and Engineering Departments. After his retirement in the 1990s, he worked in the Materials Directorate at the Wright-Patterson Air Force Base and continued to participate in OSU programming until 2019.

St. Pierre was the recipient of the 1976 TMS Fellow Award, 1994 TMS/AIST John F. Elliot Lectureship Award, and the 1996 TMS Educator Award. He was a TMS member since 1953.



George Dieter



George R. St. Pierre



*Do you have business or industry news of interest to the minerals, metals, and materials community? Submit your announcement or press release to Kaitlin Calva, JOM Magazine Managing Editor, at [kcalva@tms.org](mailto:kcalva@tms.org) for consideration.*

## ***In Case You Missed It:*** **Business News from the Field**

### **New Reaction Details Identified for Lithium Metal Batteries**

**Upton, New York, USA:** In a major step to advance electric vehicle batteries, chemists at the U.S. Department of Energy's Brookhaven National Laboratory identified new details of the reaction mechanism that takes place in batteries with lithium metal anodes. Researchers used ultrabright x-rays to identify lithium hydride and a new form of lithium fluoride in the interphase of lithium metal anodes.

### **Novel Technology Converts Coal to Nano-graphite**

**Laramie, Wyoming, USA:** University of Wyoming researchers demonstrated that pulverized coal powder can be converted into nano-graphite, thereby increasing its value. The National Science Foundation-funded experiment placed coal powder on copper foil sealed in glass containers with a gaseous mixture of argon and hydrogen and heated it in a conventional microwave. Nano-graphite is used as a lubricant and offers an alternative use for coal at a time when the demand for coal to generate electricity is declining.

### **Chinese Steel Grew in 2020**

**Brussels, Belgium:** China surpassed one billion metric tons in crude steel production even as global production dropped by 0.9% in 2020, based on data from the World Steel Association. The association reported production at 1.86 billion metric tons worldwide, down from 1.88 billion metric tons in 2019. Following China in the report, India, Japan, and Russia made 99.6, 83.2, and 73.4 million metric tons, respectively. The U.S. produced 72.7 million metric tons, as the fifth-largest producer.

### **U.S. Steel Acquires Big River Pittsburgh, Pennsylvania, USA:**

United States Steel Corp. (U.S. Steel) closed a deal to acquire Big River Steel in January 2021, combining Big River's process technology with U.S. Steel's customer base, capacity, research and development, and product portfolio. Leadership at U.S. Steel expects that the move will give customers "access to a truly sustainable source of the most advanced high-strength steels." U.S. Steel first announced its intentions in late 2019, acquiring a 49.9% share of the business and taking a four-year option on the remaining equity, exercising that option in December 2020 for approximately \$774 million in cash.

### **Biotech Ski Manufacture Gains Momentum**

**Salt Lake City, Utah, USA:** Biotech innovator Checkerspot launched WNDR Alpine, a ski manufacturing subsidiary that will showcase Checkerspot's innovative methodology to derive polyurethanes and textile coatings from oils extracted from microalgae. AlgaTech is a proprietary technique to grow oil-rich microalgae in fermentation tanks. Once harvested, the microalgae oil is mixed with other chemicals to create a wide variety of substances, such as the polyurethane compounds in skis. WNDR skis appeal to both skiers seeking a high-performance product and ski resorts touting sustainable practices.



**Barcelona, Spain:** Universitat Rovira i Virgili and the Institute of Materials Science of Barcelona applied artificial intelligence (AI) algorithms to enable an unprecedented ability to predict the performance of organic solar cells. The researchers generated multiple data sets by using a new, faster experimental method that allows them to look at a large number of samples at once. Then, machine learning models were used to learn from those data sets and predict the performance of even more materials. AI and high-throughput experiments may increasingly be used to predict the optimum conditions of certain materials and devices. (Photo credit: Institute of Materials Science of Barcelona)



# 2021 TMS President Ellen Cerreta: Aspiring Toward What Is Important

Ellen Cerreta



Ellen Cerreta



*“What has transpired since our last in-person TMS Annual Meeting in 2020 shouldn’t be allowed to change **what** we are doing as a Society for the profession—even if it is likely, perhaps more than likely, to change **the how**, the implementation of that vision.”*

A year ago, when I became the Society’s vice president, I would have told anyone who asked that I planned to lean on statements I submitted to the nominating committee for this role back in 2019. More recently, I started to think that was a bad idea, that perhaps statements I made during the nomination process have been overcome by the significant events of 2020, and that I should really rethink my approach. But as I thought more about that, I decided no. I did not want to do that. What has transpired since our last in-person TMS annual meeting in 2020 shouldn’t be allowed to change **what** we are doing as a Society for the profession—even if it is likely, perhaps more than likely, to change **the how**, the implementation of that vision.

So, in these pages, I would like to share with all of you **what** I am hoping to lead as the TMS president. I will not get into **the how**, as I think space doesn’t allow for that, and I think if this year has taught us anything, it is that **how** we do things is fairly dynamic and thus hard to pin down even a few weeks into the future, never mind months into the future.

Instead, I hope to provide a sense of **what** is important to me about TMS and

how that has shaped my thoughts on the Society’s current vision and strategy—TMS Aspires—and how I believe that serves the profession. (**Editor’s note: see the sidebar, “TMS Aspires: The Society’s Strategic Plan,” for more information.**)

I have been a TMS member since 1997. In the last 23 years, I have been an active TMS volunteer. As a student, I met my prospective postdoctoral mentor and was offered a position at Los Alamos National Laboratory at a TMS fall meeting in St. Louis. As an early career scientist, TMS helped me build strong international collaborations through its Young Leaders International Scholar Program in Japan. Finally, positions on the TMS Board of Directors enabled me to both witness and “try out” different leadership styles that have enhanced my career. As I reflect on what TMS has given to me, I know it is time to give back. And it is why I am absolutely honored to serve alongside the TMS staff and the Board of Directors to ensure, maintain, and grow TMS’s high-value membership for materials professionals.

With that said, the part of this presidential role that I am most excited by is the ability to advance the

*“However, through careful attention to the strategy, I believe we can further enhance the TMS experience, inspire new generations of members, and support our thought leaders...”*

implementation of the vision and strategic plan for the Society: TMS Aspires. If you examine the TMS Aspires plan, you see it involves preserving core values of this member-driven society. These values include volunteer-driven programming, robust annual meetings, inclusive membership, and strong partnerships between basic and applied sciences. Simultaneously, this plan embraces change to further improve the TMS experience.

The core TMS values have made us a Society that offers benefits to its members like mentoring, peer review, high-quality content, and networking. However, through careful attention to the strategy, I believe we can further enhance the TMS experience, inspire new generations of members, and support our thought leaders as “they scope the future of materials engineering and technology.” That, said more simply, is the future of our profession.

The TMS Aspires plan identifies three primary goals designed to make TMS the society of choice for all materials

professionals. And as president, I want to leverage this strategy to examine new opportunities for our future meetings—particularly MS&T. As TMS aspires to be “the place where global MSE practitioners come together,” the Society has deep resources to respond to societal issues of materials sustainability and professional grand challenges associated with big data and materials qualification. As part of the Board, I hope we can support and empower the members of committees like Integrated Computational Materials Engineering, Energy, Recycling & Environmental Technologies, Additive Manufacturing, and Computational Materials—just to name a few—to continue to identify programming that addresses our profession’s needs.

Most importantly, the strategic plan also emphasizes another core TMS value: “TMS aspires to be a highly inclusive society.” To provide robust solutions to today’s materials issues, we benefit from diverse backgrounds. This is particularly true in a professional society whose programming, products, and member

## TMS Aspires: The Society’s Strategic Plan

TMS Aspires, adopted in October 2018, is the strategic plan for The Minerals, Metals & Materials Society. TMS Aspires comprises the following three goals, each of which is supported by a suite of objectives and tactics.

**Goal 1. TMS aspires to be a highly inclusive Society** where all materials students and professionals feel welcome and diversity is celebrated.

**Goal 2. TMS aspires to be the place where global materials practitioners come together** and participate in vibrant annual meetings, specialty conferences, courses, student activities, and other events.

**Goal 3. TMS aspires to be the Society that envisions, defines, and enables the future** by gathering and empowering materials experts to scope the future of materials science, engineering, and technology.

For more information, visit [www.tms.org/TMSAspires](http://www.tms.org/TMSAspires).



benefits frequently are driven by the ideas of its members. I am eager to champion the open dialogue required to do this well. I want to seek ways to enhance engagement of all members, which I think can, in part, be done through leveraging our division councils. Furthermore, TMS's portfolio of international activities, including the Young Leaders International Scholar Programs and co-programming at international meetings, are examples of how TMS's reach is becoming more global. I will be looking to involve more members in these international partnerships to ensure their long-term health.

Finally, one way in which to judge the health of the Society may be to examine the way it engages new members and

volunteers. Material Advantage and the Young Leaders Programs have created tremendous opportunity and a tradition for transitions between student and professional membership. I believe our strategic plan directs us to examine these programs and ensure that we are providing valuable service to our student and early career members while also embracing inclusion.

So, I said that I wouldn't talk about **the how**, but as I conclude, I will say that implementing this plan is the hard work that I expect to engage in immediately. The success of this requires your support, and so it is a priority that we identify how to move forward, safely, while we stay true to this vision and in turn serve our profession.

## 2021 TMS Board of Directors

Ellen Cerreta was officially installed as the 2021 TMS President at the TMS 2021 Virtual Annual Meeting & Exhibition (TMS2021 Virtual) in March. The following individuals join her on the TMS Board of Directors to lead the Society in the coming year.

### TMS President

**Ellen Cerreta**

*Division Leader for Materials Science and Technology, Los Alamos National Laboratory*

### Programming Director/Chair

**Timothy Rupert**

*Associate Professor of Materials Science and Engineering, University of California, Irvine*

### Functional Materials

**Division Director/Chair**

**Paul R. Ohodnicki**

*Associate Professor, University of Pittsburgh*

### TMS Past President

**Tom Battle**

*Extractive Metallurgy Consultant*

### Professional Development

**Director/Chair**

**David L. Bourell**

*Temple Foundation Professor of Mechanical Engineering, The University of Texas at Austin*

### Light Metals Division

**Director/Chair**

**Eric Nyberg**

*Technology Development Manager, Tungsten Heavy Powder & Parts*

### TMS Vice President

**Jud Ready**

*Deputy Director, Innovation Initiatives, Georgia Institute of Technology*

### Content Development &

**Dissemination Director/Chair**

**Judith Schneider**

*Professor, University of Alabama at Huntsville*

### Materials Processing &

**Manufacturing Division**

**Director/Chair**

**Mark R. Stoudt**

*Materials Research Engineer, National Institute of Standards and Technology*

### TMS Financial Planning Officer

**Charles Ward**

*Chief, Manufacturing & Industrial Technologies Division, Air Force Research Laboratory*

### Public & Governmental

**Affairs Director/Chair**

**Eric N. Brown**

*Division Leader, Explosive Science and Shock Physics Division, Los Alamos National Laboratory*

### Structural Materials

**Division Director/Chair**

**Daniel Miracle**

*Senior Scientist, Air Force Research Laboratory*

### Membership & Student

**Development Director/Chair**

**Alexis C. Lewis**

*Program Director, National Science Foundation*

### Extraction & Processing

**Division Director/Chair**

**Christina Meskers**

### TMS Secretary/

**Executive Director**

**James J. Robinson**



# Celebrating the 2021 TMS Young Leaders

Megan Enright




# TMS FOUNDATION

## Invest in the Future

Without the TMS Foundation, the opportunities highlighted by the young professionals in this article would not be available. The TMS Foundation is dedicated to the development of the next generation of minerals, metals, and materials scientists and engineers.

Visit [www.TMSFoundation.org](http://www.TMSFoundation.org) to learn more about the Foundation and make a donation. For questions or to talk to TMS Foundation staff, contact [TMSFoundation@tms.org](mailto:TMSFoundation@tms.org) or call 1-724-776-9000.

The TMS Young Leaders Professional Development Awards honor the exceptional futures their recipients will have, both within TMS and as materials science and engineering professionals. These special honors for early career members are conferred by each of the five technical divisions of TMS. This program provides financial assistance to attend the TMS annual meeting, where recipients have access to a variety of leadership development opportunities. Recipients can participate in division council meetings, luncheon lectures, a TMS Board of Directors meeting, and more. At TMS annual meetings, these early career members gain new experiences that offer networking opportunities with professionals at all stages of their careers and prepare them for future leadership roles within the Society.

Each of the 2021 Young Leaders introduced on the following pages received their awards at the TMS 2021 Virtual Annual Meeting & Exhibition (TMS2021 Virtual), March 15–18. Although TMS2021 Virtual has concluded, recordings of the Division Award Ceremonies and the TMS-AIME Awards Ceremony are all available to view at [awards.tms.org](http://awards.tms.org). Be sure to watch the presentations and add these young professionals to your network and your professional community.



## 2021 Young Leaders Professional Development Award Recipients

### EXTRACTION & PROCESSING DIVISION (EPD)

#### Alexandra Anderson

"TMS has played an integral role in my professional development, from my experiences in Material Advantage as an undergraduate to my current roles on EPD technical committees," said Alexandra Anderson, senior research and development engineer at Gopher Resource. "Membership in the Society has helped me grow my network, learn from world-class researchers, and communicate with leaders in my profession." At Gopher Resource, Anderson directs the reverberatory furnace productivity program, encompassing all optimization and expansion projects related to the furnace, as well as burner technology implementation and computational modeling initiatives. She received her Bachelor of Science in mechanical engineering from Gonzaga University in 2013, continuing her education at the Colorado School of Mines where she earned both a Master of Science and a Doctor of Philosophy in metallurgical and materials engineering.

#### Joseph Hamuyuni

"I am thrilled and honored to receive this award," commented Joseph Hamuyuni, a research metallurgist currently working at Metso Outotec Research Centre in Finland. "The TMS Foundation, through the Extraction & Processing Division, has afforded me many opportunities including a platform to network, learn, and exchange ideas with other researchers, for this I am profoundly grateful." Currently, Hamuyuni's primary role is in the research and development of projects that support smelting technology in the metals business area. He holds a Ph.D. in materials science from Aalto University and an M.Sc. Eng. in extractive metallurgy from Stellenbosch University.

*"Membership in the Society has helped me grow my network, learn from world-class researchers, and communicate with leaders in my profession."*

—Alexandra Anderson



Alexandra Anderson



Joseph Hamuyuni

### FUNCTIONAL MATERIALS DIVISION (FMD)

#### Yong Lin Kong

"I am very grateful for the opportunity and support from TMS," said Yong Lin Kong, assistant professor of the Department of Mechanical Engineering at the University of Utah. "It has been an exciting and fruitful experience working together! I am very much looking forward to the opportunity to contribute back to the wonderful TMS community." Kong's research focuses on the additive manufacturing of nanomaterial-based functional devices and biomedical devices. He received his Ph.D. in mechanical engineering and materials science from Princeton University in 2016 and was a postdoctoral associate at the Massachusetts Institute of Technology from 2016 to 2017.

#### Michael Cai Wang

"Although I was a latecomer to TMS, my first meeting experience (the 2018

annual meeting in San Antonio) felt like a homecoming," reflected Michael Cai Wang, an assistant professor in the Department of Mechanical Engineering at the University of South Florida.

"With this award, I look forward to the broader opportunities and platform it affords and hope to better contribute to the TMS community by assisting with more symposium activities and further engaging in technical committees." Wang received his Ph.D. from the University of Illinois at Urbana-Champaign (2018) and his B.A.Sc. from the University of Toronto (2012), both in mechanical engineering.

*"Although I was a latecomer to TMS, my first meeting experience...felt like a homecoming."*

—Michael Cai Wang



Yong Lin Kong

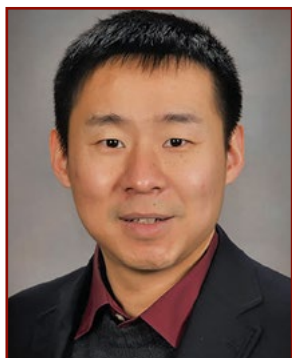


Michael Cai Wang

## LIGHT METALS DIVISION (LMD)



**Richard Otis**



**Kelvin Xie**

### Richard Otis

“My membership in TMS has led to many gratifying professional service opportunities, and the feeling that I am making a real impact, not only on the materials discipline but also on the national research enterprise,” recalled Richard Otis, a materials and manufacturing technologist at NASA’s Jet Propulsion Laboratory. “In my experience, TMS events and committee meetings are excellent for professional networking. I have been the beneficiary of excellent mentorship as a result of my Society involvement, and my priority moving forward is to use this recognition to continue paying it forward to the next generation of scientists and engineers through acts of service and volunteerism.” Otis received a Ph.D. in materials science and engineering from The Pennsylvania State University in 2016. Today, his main research interests include computational metallurgy, CALPHAD-based thermodynamics and kinetics, metal additive manufacturing, Bayesian uncertainty quantification, scientific software engineering, and high-performance numerical computing.

### Kelvin Xie

“TMS is my home society. The TMS annual meeting is my home conference. I am honored to receive this award from TMS,” commented Kelvin Xie, an assistant professor in the Department of Materials Science and Engineering at Texas A&M University. “My experience at TMS was inspiring and fun as a graduate student. Now, as a junior-level faculty, I encourage my students to attend the TMS meetings every year, so they would meet other fellow students who share their passion.” Xie’s research focuses on understanding and designing lightweight structural materials (e.g., Mg alloys) at the nano- and atomic-scales using advanced microstructural characterizations (e.g., TEM and atom probe tomography). He obtained his Ph.D. from the University of Sydney, in the Department of Mechanical Engineering and the Australian Centre for Microscopy and Microanalysis.

*“I have been the beneficiary of excellent mentorship as a result of my Society involvement, and my priority moving forward is to use this recognition to continue paying it forward...”*

—Richard Otis

## Are You A 2022 Young Leader?

TMS Young Leaders Professional Development Award recipients are innovative individuals who represent the future of the minerals, metals, and materials community. A common thread amongst these individuals is their dedication to advancing their professional careers and leadership skills, including being active as TMS volunteers and aiding in the facilitation of TMS’s strategic initiatives.

Do you, or someone you know, fit these criteria? Visit the TMS Honors and Awards website at [awards.tms.org](https://awards.tms.org) to learn more and apply. Applicants must be TMS members in good standing who are age 40 or younger. Awardees must also demonstrate a desire to play an active role in TMS and the potential to advance to volunteer leadership roles with the Society. **The deadline to submit applications for the 2022 Young Leaders Awards is August 15, 2021.**





## MATERIALS PROCESSING & MANUFACTURING DIVISION (MPMD)

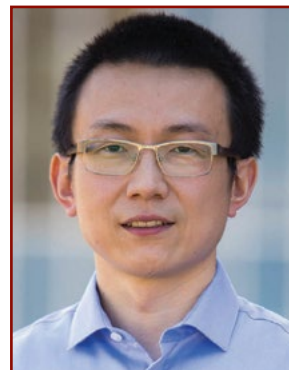
### Liang Qi

“It is a great honor for me to receive this award. TMS membership always provides me tremendous opportunities to interact with top materials scientists and engineers with diverse backgrounds,” noted Liang Qi, an assistant professor in Department of Materials Science and Engineering at the University of Michigan. “During TMS annual meetings, many discussions granted me resources and catalysts for finding research ideas and building new collaborations. As a young faculty member, my professional career has also benefited from various TMS activities, such as serving technical committees, organizing TMS symposia, and being a *JOM* guest editor.” Qi studied materials science and engineering at Tsinghua University in China and earned his bachelor’s degree in 2003. He earned his master’s degree from the Department of Materials Science and Engineering at The Ohio State University in 2007 and his doctoral degree in

materials science and engineering from the University of Pennsylvania in 2009.

### Yu Zou

“Over the past decade, TMS has been my community, where I met international leaders in my research field, attended student mixers and career events, and discussed with peers in poster or oral sessions,” said Yu Zou, an assistant professor and Dean’s Spark Professor in the Department of Materials Science and Engineering at the University of Toronto. “I am truly grateful for this recognition, especially because it comes from my professional society home. I look forward to further engagement in TMS and MPMD activities that are enabled by this award.” Zou received his master’s and bachelor’s degrees in materials science and engineering from McGill University and Beihang University, respectively. He received his Doctor of Science in materials from ETH Zurich in 2016.



Liang Qi



Yu Zou

## STRUCTURAL MATERIALS DIVISION (SMD)

### Joy Gockel

“TMS membership has provided me with a community of colleagues as well as opportunities for growth in both professional development and technical research. I am very honored to receive this award to enable increased participation in society activities,” said Joy Gockel, an assistant professor in mechanical and materials engineering at Wright State University. “I am very thankful for the support from the TMS Foundation and I am looking forward to increased involvement in TMS SMD activities through this professional development award.” Gockel’s research focuses on the understanding of additive manufacturing processing-structure-property-performance relationships through process modeling, in-situ monitoring, materials characterization, and mechanical testing. She earned her Ph.D. in mechanical engineering from Carnegie Mellon University, supported through a National Defense Science and Engineering Graduate Fellowship.

### Chelsey Hargather

“I am honored to be recognized by the SMD at TMS for this award. Participating in the TMS annual meetings over the past five years has given me many opportunities to expand my professional network, share my research, and participate in the advancement of the materials science and engineering community,” stated Chelsey Hargather, an assistant professor of materials and metallurgical engineering at New Mexico Institute of Mining and Technology. “Being involved in the Diversity, Equity, and Inclusion Committee and the ICME Committee has given me the confidence to step into larger leadership roles within the committees and TMS. As a recipient of this award, I hope to serve as a role model to my current students on the benefits of engaging in and giving back to our professional societies.” Hargather received a B.S. in materials science and engineering from Virginia Polytechnic Institute and State University in 2008. She earned her Ph.D. in materials science and engineering from The Pennsylvania State University in 2012.



Joy Gockel



Chelsey Hargather



Janelle Wharry



Stoichko Antonov



Takayuki Kojima

## International Scholars Announced

The TMS Young Leaders International Scholar program was established in 2006 as a collaboration between TMS and the Japanese Institute of Metals and Materials (JIM). In 2013 the program was expanded to include a second award conferred as a collaboration between TMS and the Federation of European Materials Societies (FEMS). Made possible by funding through the TMS Foundation, the TMS Young Leaders International Scholar Awards enable early career TMS members to travel to the JIM Annual Spring Meeting or EUROMAT meeting where they will present a paper and tour nearby universities, research labs, or industrial facilities. Additionally, JIM and FEMS each sponsor a young professional from their memberships to present a paper at a TMS annual meeting.

The 2021 TMS/FEMS Young Leaders International Scholar Award recipient is **Janelle Wharry**, an associate professor in the School of Materials Engineering at Purdue University and editor of *Materials Today Communications*. “Like many, I began giving technical talks at TMS meetings in graduate school, but the more I have embraced both the scientific and volunteer opportunities within TMS, the more my career has grown,” Wharry noted. “After every TMS meeting, I return to work motivated and reinvigorated—with many fresh ideas to explore, collaborations to initiate, and new opportunities to pursue. It is an honor to represent TMS and present my group’s recent work in irradiation effects on deformation-induced phase transformations at EUROMAT 2021.” Currently, Wharry is involved in projects on a variety of topics including nuclear structural and cladding alloys, structural materials produced by advanced manufacturing and joining methods, metal and oxide nuclear fuels, and electroceramic materials. She also previously served as the general chair of the inaugural TMS/American Nuclear Society Materials in Nuclear Energy Systems (MiNES) conference in 2019.

“I am very honored to receive this award and the opportunity to present my work at the JIM Spring Annual Meeting,” said **Stoichko Antonov**, the 2021 TMS/JIM Young Leaders International Scholar. “Over the years, TMS has provided me with tremendous opportunities to develop professionally, engage with fellow researchers and expand my network of friends and colleagues.” Antonov is currently an Alexander von Humboldt Fellow at the Max-Planck-Institut für Eisenforschung. His research mainly focuses on solving energy sustainability and manufacturing challenges in the air transportation industry by leveraging knowledge on the physical metallurgy of aerospace materials (superalloys, steels, and titanium alloys). He received his Ph.D. from the Illinois Institute of Technology in 2017, working on alloy design and development of Ni-based superalloys.

The JIM Young Leader representing JIM in 2021 is **Takayuki Kojima**, an assistant professor at Shinshu University. Due to travel restrictions from the pandemic, Kojima will attend and give a talk at the TMS2022 in Anaheim, CA.





# Light, Strong, and Resilient: Magnesium Meeting Gathers Researchers Virtually



**Alan Luo and Mihriban Pekguleryuz**



**Alan Luo**



**Mihriban Pekguleryuz**

Magnesium is the lightest structural metal. It is increasingly in demand in a variety of industries, from automotive and energy storage to construction and electronics. The popularity and huge potential of this light metal attracts interests worldwide. The 12th International Conference on Magnesium Alloys and their Applications (Mg 2021) will convene this research community to explore the latest discoveries in magnesium, both fundamental and applied. For the first time, the meeting will be virtual due to the limits of the COVID-19 pandemic on travel and in-person gatherings. Sessions and networking opportunities will be fully available online from June 15–18, 2021.

## Conference History

First held in 1986 in London, this event is the longest-running conference dedicated to the development of

magnesium alloys. This international conference series covers the breadth of magnesium research and development, from primary production to applications to end-of-life management. It is considered the premier technical forum for the global magnesium community.

Past conferences have been well attended by scientists, engineers, and entrepreneurs from academia, government, and industry to discuss new developments in magnesium alloys and share valuable insights in magnesium applications. It is a unique educational arena for researchers starting their research activity or career in the field of magnesium.

## New Developments in Magnesium

Advancements in magnesium have accelerated since the meeting last convened at Mg 2018. New magnesium alloys have been developed with better

# Register Today for Mg 2021



# Mg

12th International Conference on  
**Magnesium Alloys  
and their Applications**

Join us for the first fully virtual iteration of the International Conference on Magnesium Alloys and their Applications. Mg 2021 will be held June 15–18, 2021.  
**Register by April 30, 2021 for the best rate.**

*"First principles calculations and machine learning are starting to revolutionize alloy development routes."*

performance in many applications.

We are also seeing a change in the direction of alloy development activities that the conference will address. Notably, magnesium uses have expanded from traditional die casting alloys and aluminum alloying use to ground-breaking new biomedical and energy applications. Biodegradable and biocompatible implant applications are targeting new alloys and new structures (e.g., scaffolds, foams). In the automotive industry, with the emergence of new engine and alternative fuel technologies, magnesium powertrain casting-alloy research will take a step back while car body alloys will step forward, with a focus on magnesium wrought and casting alloys with higher ductility, and magnesium-based solid fuels.

New understanding in fundamental aspects of magnesium alloys have been made with advanced characterization techniques and modeling methods. These techniques allowed researchers to discover new microstructure-property relationships, such as long-period stacking ordered (LPSO) structures. First principles calculations and machine learning are starting to revolutionize alloy development routes.

Discussions will explore developments in primary and manufacturing processes, including additive manufacturing, and the progress in advanced joining technologies of linear friction welding and friction stir welding. With the encouraging news that the restrictions on the in-cabin use of Mg in aircrafts can be lifted, ignition-proof magnesium alloy research has found new impetus. In corrosion science, steps are being taken towards stainless magnesium. These topics and more promise to illuminate and invigorate the minds gathering virtually at Mg 2021.

### Highlights of Mg 2021

Eleven plenary speakers will headline the technical program, including **John Allison**, University of Michigan, with "Accelerating Predictive Understanding of Microstructural Evolution and Mechanical Behavior of Magnesium Alloys;" **Michele Manuel**, University of Florida, with "Processing Magnesium Metal Matrix Composites Using

Electromagnetic Acoustic Transduction;" and **Anil Sachdev**, General Motors Company, presenting "Advances in Magnesium Alloys for Automotive Applications." Completing the list of plenary speakers will be:

- Irene Beyerlein, University of California, Santa Barbara
- Nick Birbilis, Australian National University
- Hamid Jahed, University of Waterloo
- Fusheng Pan, Chongqing University
- Maria Teresa Perez-Prado, IMDEA Materials Institute
- Kwang Seon Shin, Seoul National University
- Jonathan Weiler, Meridian Lightweight
- Michael Worswick, University of Waterloo

The invited speakers lineup includes 26 presenters from around the world. The four-day schedule features a combination of live and pre-recorded sessions, offering over 140 contributed talks and posters.

### Traditions Continue, Virtually

We are committed to bringing together the magnesium research community, although the pandemic necessitates a break from tradition by delivering the meeting in a digital format.

The magnesium community, with its tight connections, provides a unique environment for highlighting research questions, showcasing materials and processing innovations, and building business savvy. Mg 2021 is an educational platform for all through the wide spectrum of themes it offers. You will leave this conference having gained insight into the strategic direction of your work, be it academic or industrial. If you are just starting R&D in magnesium, this conference is of immense importance.

Registration is open now and includes access to the technical sessions and conference proceedings. To learn more about the technical program and register, visit [www.tms.org/Mg2021](http://www.tms.org/Mg2021).

**Alan Luo** is a professor at The Ohio State University. **Mihriban Pekguleryuz** is a professor at McGill University. They are co-chairs of the Mg 2021 organizing committee.







# TMS meeting headlines

TMS is committed to your safety during the pandemic. Meeting dates and locations are current as of February 15, 2021. For the most recent updates on TMS-sponsored events, visit [www.tms.org/Meetings](http://www.tms.org/Meetings).

## Other Meetings of Note

### European Metallurgical Conference (EMC 2021)

June 27–30, 2021  
Salzburg, Austria

### 13th International Conference on the Technology of Plasticity (ICTP 2021)

July 25–30, 2021  
Columbus, Ohio, USA

### Materials in Nuclear Energy Systems (MiNES 2021)

September 19–23, 2021  
Pittsburgh, Pennsylvania, USA

### Materials Science & Technology 2021 (MS&T21)

October 17–21, 2021  
Columbus, Ohio, USA

### Congress on Safety in Engineering and Industry 2021

November 1–3, 2021  
Fort Worth, Texas, USA

### 2nd World Congress on High Entropy Alloys (HEA 2021)

December 5–8, 2021  
Charlotte, North Carolina, USA

### World Congress on Artificial Intelligence in Materials and Manufacturing (AIM 2022)

April 3–6, 2022  
Pittsburgh, Pennsylvania, USA



June 15–18, 2021

Virtual Event

**Discount Registration Deadline:**  
**April 30, 2021**

[www.tms.org/Mg2021](http://www.tms.org/Mg2021)

- Plenary speakers for the 12th International Conference on Magnesium Alloys and their Applications will include *John Allison*, University of Michigan; *Michele Manuel*, University of Florida; and *Anil Sachdev*, General Motors Company. The Mg 2021 program also includes a strong lineup of invited speakers and more than 140 contributed talks and posters scheduled during the event.



June 29–July 2, 2021

Washington, D.C., USA

**Discount Registration Deadline:**  
**May 18, 2021**

[www.tms.org/3DMS2021](http://www.tms.org/3DMS2021)

- The 5th International Congress on 3D Materials Science (3DMS 2021) will convene to discuss the three-dimensional characterization, visualization, quantitative analysis, modeling, and development of structure-property relationships of materials, as well as big data and machine learning issues associated with 3D materials science.
- In place of a traditional proceedings publication, the TMS journal *Integrating Materials and Manufacturing Innovation* will be publishing a topical collection dedicated to the congress. Visit the 3DMS 2021 website for more details on the publishing plan.



September 12–16, 2021

Seven Springs Mountain Resort  
Seven Springs, Pennsylvania, USA

**For Best Rates Register by**  
**August 9, 2021**

[www.tms.org/Superalloys2021](http://www.tms.org/Superalloys2021)

- All accepted manuscripts are published in the Superalloys 2020 proceedings publication, available now! The proceedings access will be included in the registration fee.
- Learn about new technologies for lifecycle improvement of superalloys. Explore improvements in the processing and performance of existing materials and the development of new alloys. Register today and join the community for the longest running symposium dedicated to superalloys.



February 27–March 3, 2022  
Anaheim, California, USA

**Save the Date!**

[www.tms.org/TMS2022](http://www.tms.org/TMS2022)

- The TMS Annual Meeting & Exhibition brings together more than 4,000 engineers, scientists, business leaders, and other professionals in the minerals, metals, and materials fields for a comprehensive, cross-disciplinary exchange of technical knowledge.
- The Fourth Summit on Diversity in the Minerals, Metals, and Materials Profession (DMMM4) will be co-located with the TMS 2022 Annual Meeting & Exhibition. Access to this two-day event will be included with your TMS registration.



# call for papers

**JOM is seeking contributions on the following topics for 2021.**  
**For the full Editorial Calendar, along with author instructions,**  
**visit [www.tms.org/EditorialCalendar](http://www.tms.org/EditorialCalendar).**



## October 2021

**Manuscript Deadline: May 1, 2021**

**Topic: Corrosion in Heavy Liquid Metals for Energy Systems**

**Scope:** This topic invites papers on studies related to heavy liquid metal (HLM) such as Pb and lead bismuth eutectic compatibility with structural materials including corrosion and liquid metal embrittlement. In addition, technological aspects of HLM technology including chemistry control methods, filtering, in-situ characterization techniques, forced and natural convection methods, and flow measurements are also included in this topic.

**Editors:** Osman Anderoglu, Alessandro Marino, and Peter Hosemann

**Sponsors:** Corrosion and Environmental Effects Committee and Nuclear Materials Committee

**Topic: Informatics-Enabled Design of Structural Materials**

**Scope:** Informatics-enabled design is a paradigm shift for materials engineering and has led to many breakthroughs within the last decade. For structural materials, an array of challenges persist due to the need for quantitative evaluation of competing performance metrics across many time and length-scales. This special topic aims at capturing the needs and limitations of informatics toolsets for design of structural materials. We invite articles that highlight recent advances and set the scope for future.

**Editors:** Jennifer L.W. Carter and Amit K. Verma

**Sponsor:** Mechanical Behavior of Materials Committee

**Topic: Materials for Small Nuclear Reactors and Micro Reactors, including Space Reactors**

**Scope:** Small nuclear reactors, including micro-reactors, small modular reactors, space reactors, and off-grid reactors rely on different materials and manufacturing processes than those in large-scale power plants: molten salts as coolants and fuels, heat-pipes for heat removal, metal hydrides as high-temperature moderators, fuels

for higher burnup and accident tolerance, etc. They also require novel structural materials and understanding of material interactions. This special topic focuses on materials research and experimental and modeling/simulation for small nuclear reactors.

**Editors:** Sven C. Vogel, Raluca O. Scarlat, Aditya P. Shivprasad, and Marisa Monreal

**Sponsor:** Nuclear Materials Committee

## November 2021

**Manuscript Deadline: June 1, 2021**

**Topic: Advanced High-Strength Steels**

**Scope:** Advanced high-strength steels (AHSS) have been widely used in commercial vehicles for decades. New AHSS are being actively researched in academia and industry. This special topic focuses on the latest developments in AHSS, including high-strength low-alloy (HSLA), dual-phase (DP), transformation-induced plasticity (TRIP), complex phase (CP), martensitic, quenched & partitioned (Q&P), medium manganese, TRIP-assisted bainitic ferrite (TBF), press-hardened steel (PHS), twinning-induced plasticity (TWIP), and low density steels.

**Editors:** M.X. Huang and Ana Araujo

**Sponsor:** Steels Committee

**Topic: Advances in Multi-modal Characterization of Structural Materials**

**Scope:** Progress in the development of instrumentation and workflows that enable the collection of various data modalities have provided novel insights into material behavior. This special topic will focus on the application of varied characterization approaches in both 2D and 3D, across multiple length scales and/or imaging modalities, for structural materials. Papers that focus on the development and application of advanced segmentation and data fusion approaches for quantitative data analysis are also invited.

**Editors:** Andrew T. Polonsky and Amit Pandey

**Sponsor:** Advanced Characterization, Testing, and Simulation Committee



## Topic: Latest Developments in Manufacturing and Recycling of Refractory Materials

**Scope:** Renowned for their unique properties, refractory materials have widespread applications in electronic, nuclear, and defense industries. Although powder metallurgy is still the only route for major commercial production, manufacturing and recycling technologies have made great strides in processing of refractory materials. The focus of this special topic includes recent advances in overcoming process challenges or improving material performances. Manuscripts covering the latest experimental and theoretical studies especially focusing on recycling of refractory metals are invited.

**Editors:** Chai Ren and Ravi Enneti

**Sponsor:** Refractory Metals and Materials Committee

## Topic: Silicon Technologies

**Scope:** This topic covers silicon production from quartz and carbon to the most important feedstock for crystalline solar cells. Characterization of single-crystalline silicon, silicon defects, and behavior of impurities are included, as well as the use of silicon as a storage material, and use of silicon melt to store and generate energy. Recycling of silicon compounds, solar cells, electronic components, and life-cycle of silicon-related technologies are also covered.

**Editors:** Shadia Ikhmayies

**Sponsors:** Recycling and Environmental Technologies Committee and Materials Characterization Committee

## December 2021

### Manuscript Deadline: July 1, 2021

## Topic: Advanced Casting and Melt Processing Technology for Light Alloys

**Scope:** This topic covers the newly developed or significantly improved casting and melt processing technologies applicable to light alloys. This may include advanced studies on the improvement of structure; optimization of phase composition, mitigation of casting defects as well as advances in casting and melt treatment technology. Also considered is the extension of the technology to recycled alloys. Both experimental and modelling studies will be considered, the latter requiring experimental validation.

**Editor:** Dmitry Eskin

**Sponsor:** Aluminum Committee

## Topic: Advances in Processing, Manufacturing, and Applications of Magnetic Materials

**Scope:** We welcome submission of papers on advances for synthesizing, processing, and characterization of magnetic materials including permanent and soft magnets, energy conversion, and multiferroic materials (such as magnetocaloric, magnetoelastic, magnetoelectric and magnetoresistive materials). Applications of interest include biological applications of magnetism, sensors and actuators, energy harvesting, motor-generators, transformers and inductors, and memory applications. Work on discovery, advanced manufacturing, processing and characterization techniques applied to the relevant magnetic materials and their applications, is strongly encouraged.

**Editors:** Scott McCall and Ikenna Nlebedim

**Sponsors:** Magnetic Materials Committee

## Topic: Corrosion and Protection of Materials at High Temperatures

**Scope:** Papers on all aspects of high-temperature corrosion and protection of materials are invited. Examples of topics include oxidation in different atmospheres, molten salt corrosion, metal dusting, halogen attack, etc. Papers dealing with surface modification for high-temperature corrosion protection are also invited.

**Editors:** Vilupanur Ravi and Ramprashad Prabhakaran

**Sponsor:** Corrosion and Environmental Effects Committee

## Topic: Surface Engineering for Improved Corrosion or Wear Resistance

**Scope:** Corrosion and wear are surface phenomena and therefore, surface engineering has been used to improve both properties. Coatings, surface alloying, gradient structures, nanocrystallization, and inhibitors have been applied to tailor the surfaces for improved corrosion and wear resistance. This special topic focuses on capturing recent advancements in: 1) surface engineering technologies to improve corrosion and/or wear resistance and 2) theoretical understanding of corrosion and/or wear behavior of the surfaces.

**Editors:** Tushar Borkar, Arif Mubarak, and Rajeev Gupta

**Sponsor:** Surface Engineering Committee

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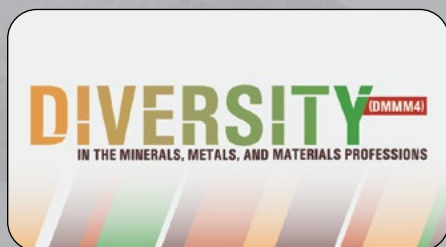
# SAVE THE DATE



**FEBRUARY 27-MARCH 3, 2022**  
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Join us next year in Anaheim, California, for the TMS 2022 Annual Meeting & Exhibition (TMS2022) and continue the celebration of the 150th Anniversary year of TMS and the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME).

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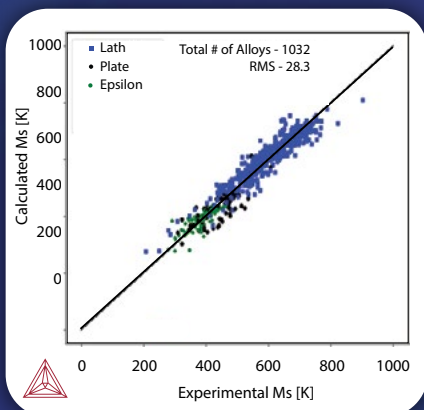
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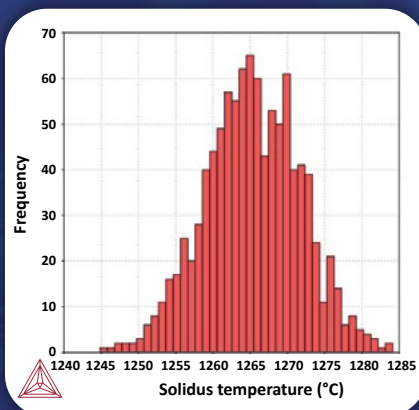
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### Steel and Fe-Alloys



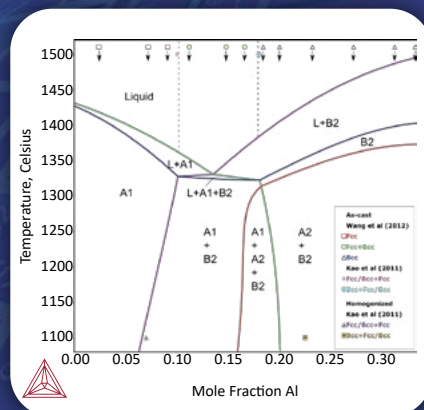
Comparison of calculated and experimental Ms temperatures for a wide range of steels

### Nickel



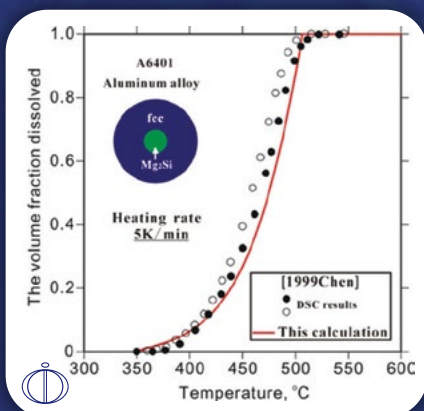
Variation in solidus temperature over 1000 compositions within alloy 718 specification

### High Entropy Alloys



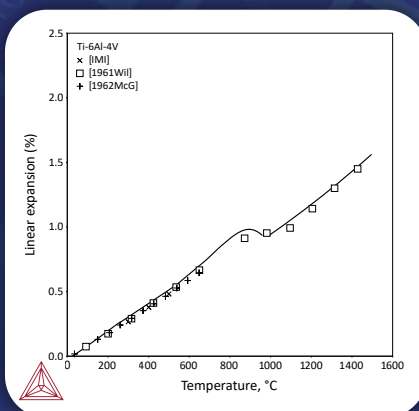
Calculated phase diagram along the composition line of CoCrFeNi-Al

### Al Alloys



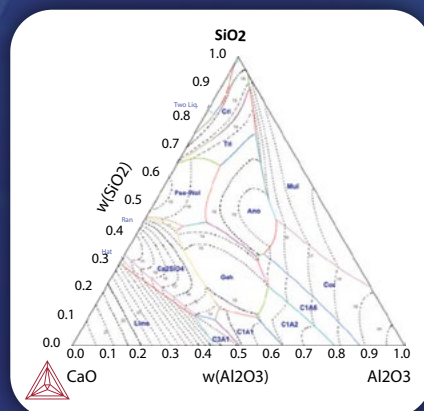
Dissolution of Mg<sub>2</sub>Si precipitate in Alloy A6401

### Ti and TiAl Alloys



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

### Oxides



Ternary liquidus projection in oxide systems