

JOM THE MAGAZINE

DECEMBER 2024
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News and insights about TMS, its members, and the professions it serves

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ON A
SUCCESSFUL
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IN LAS VEGAS



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5700 Corporate Drive
Suite 750
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Publisher for TMS
James J. Robinson,
Executive Director

Operations Management
Matt Baker,
Department Head, Content

JOM: The Magazine
Ashley-Anne Bohnert,
Department Head,
Marketing and
Communications

Kelly Zappas,
JOM: The Magazine Editor

Cheryl M. Geier,
Senior Graphic Designer

Contributing Writers
Megan Enright,
Marketing Administrator

Jillian Schultz,
Digital Engagement
Specialist

Graphics Support
David Rasel,
Senior Manager,
Brand and Digital Assets

Bob Demmler,
Visual Communications
Coordinator

Advertising
TMS Sales Team
Phone: 1-724-814-3174
Email: sales@tms.org

ABOUT THE COVER



For the first time in more than 30 years, the TMS Annual Meeting & Exhibition will be held in Las Vegas, Nevada, in 2025. This month's Las Vegas-inspired cover ties in with our preview of the TMS 2025 Annual Meeting & Exhibition (TMS2025), offering an advance look at the technical program, the all-conference plenary speaker, free professional development events, and more. The story begins on page 9. This month's cover was designed by Bob Demmler, TMS Visual Communications Coordinator.



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 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.

About TMS:

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

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IN THE FINAL ANALYSIS

"If you count E-mail, I'm on the Internet all day, every day."

—Bill Gates

Sing me the song of my people, Bill. . . . I wonder if Bill Gates uses Outlook for all of that email. Could he be a secret Apple Mail aficionado instead? Doubt it. As for me, I'm in Outlook all of the time via an app or a web browser on my laptop, on my desktop, on my smart phone, on my tablet, on my smart watch, . . . if it has a screen, I'm probably reading and sending email on it. Fold in my Teams-integrated calendar, and Outlook is my tool of choice for connecting with the world, managing various aspects of the Society, and triaging my projects.

One of my favorite email maneuvers is the stalwart "forward" function. If I receive an interesting email that could be helpful or interesting to a colleague, I share it along with a few covering thoughts. These forwards run the gamut from news of the materials community to suggestions from members. Earlier today, I forwarded an association e-newsletter article on a recent survey of conference event planners conducted by Global DMC Partners. A big takeaway: The events management community is seeing expense increases from 10-30% over the last two years. The faster-than-inflation increases are particularly noticeable in the cost of travel and accommodations, food and beverage served to event attendees, and audio/visual services.

As TMS Programming Manager Jeff Gnacinski astutely commented in response to my forwarded email, "It's good to know that it's not just us (because sometimes it can feel that way) that is noticing these higher pricing trends. Also, that we are and have already utilized some of the cost management strategies others recommend." Indeed.

The survey does not discuss experiences with realizing offsetting upturns in revenue. Certainly, attracting more revenue is the classical cure for handling increased expenses. It is not the only one, however, and it is not always the preferred one. That is why managing increased expenses is an exhausting exercise in budgeting. In events management, the options generally come down to increasing prices, selling more registrations, selling more exhibits and sponsorships, reducing the level of attendee service, renegotiating contracts to surrender some considerations so as to gain others, or having the sponsoring organization absorb a larger portion of the expense and shrink already shrunken margins. Many of these tactics are unappealing, and none are easy to execute.

Within TMS, the best solution often comes down to finding a balance among all of the factors along with others that may present themselves situationally. For TMS, our North Star is ensuring the value of the event and the quality of the experience being offered to those who register. It is critical that the event-goer be satisfied and have a most memorable experience for all of the right reasons. Your next chance to test our success at delivering value and excellence will be TMS2025 in Las Vegas during March—the deadline to secure discounted registration is coming up at the end of January. I believe that you will find much to treasure there.

I write this editorial as I prepare for an event budgeting meeting where I will remind the team, as I remind myself, of our guiding principle to pursue attendee satisfaction and excellence in our deliverables. Before I do that, I just received an email from *JOM: The Magazine* Editor Kelly Zappas. It concerns my missed deadline for this month's editorial. Kelly is kind, talented, and patient. Let me try to reward that patience by attaching this editorial to a "reply" email and clicking "send."



James J. Robinson
Executive Director



"The events management community is seeing expense increases from 10-30% over the last two years."

Find peer-reviewed technical articles covering the full range of minerals, metals, and materials science and engineering in the December issue of *JOM: The Journal*. Each issue features several technical topics presenting a series of related articles compiled by guest editors. A preview of December technical topics and articles are listed below. TMS members can log in to www.tms.org/Journals for full access to technical articles from *JOM: The Journal* and additional TMS journals.

Below is a sample of articles that will appear in the December issue, based on information available at press time. For the most up-to-date article listing, visit www.tms.org/JOM.

// DECEMBER 2024

Advanced Characterization on Thermodynamic and Kinetics of Complex Alloys

Editors: Bin Ouyang, Florida State University; Bo Shen, Northwestern University

Sponsor: Alloy Phases Committee

"Preliminary Investigation on the Thermodynamic Evaluation and Phase Evolution of Soda Ash-Assisted Roast Treatment of Alluvial Columbite for Recovery of Niobium and Tantalum," **Nnaemeka Stanislaus Nzeh**, et al.

"Effect of Electropulsing on the Microstructure and Mechanical Properties of AZ31 Alloys Manufactured by Cold Drawing," **Zhaohui Shan**, et al.

"Multi-Overlap-Passed Friction Stir Additive Alloying for Enhanced Wear Characteristics, Mechanical and Metallurgical Attributes," **Prakash Kumar Sahu**, et al.

"Research on Hot Deformation Behavior of Ti-5Al-5Mo-5V-1Cr-1Fe Titanium Alloy with Basket-Weave Microstructure," **Yingying Liu**, et al.

"In Situ Investigation of Structural Evolution in $Zr_{46}Cu_{46}Al_8$ and $Zr_{56}Cu_{36}Al_8$ Bulk Metallic Glasses During Isothermal Annealing," **Xuelian Wu**, et al.

Melt Refining, Solidification, and Downstream Processing to Mitigate Casting Defects

Editor: Dmitry Eskin, Brunel University London

Sponsor: Aluminum Committee

"Simulation Analysis of Influence of Argon Gas Injection Hole Position on Flow Field in Steel Ladle," **Zhu Tan**, et al.

"Effect of Orifice Position on Bubble Aggregation and Coalescence in Dynamic Rotating Flow," **Lianyu Wang**, et al.

"Modeling of Casting Deformation Prediction During Investment Casting Based on Geometry Dependence," **Yali Zhang**, et al.

"Modeling of the Sump Profile During DC and MC-DC Casting Based on a Functional Packing Fraction," **Kangcai Yu**, et al.

"Grain Refining Efficiency of Al-V-B Master Alloy in A356.2 Alloy Under Different Inoculated Temperatures and Holding Times," **Yulan Zhou**, et al.

"Comparison of the Flow Field in the Slab Continuous Casting Mold Between the Two- and Three-Hole Nozzles with High Temperature Quantitative Velocity Measurement and Numerical Simulation," **Yuntong Li**, et al.

"Evolution and Multidimensional Characterization of Non-metallic Inclusions in Steel: An Industrial Study," **Jin Wang**, et al.

"Hybrid Modification of Microstructure and Tensile Properties of A319 Alloy by Heat Treatment and Be Addition," **Mostafa Karamouz**, et al.

"Research Status of High-Manganese High-Aluminum Steel and Key Points of Continuous Casting," **Guo-Xing Qiu**, et al.

Sustainable Recovery of Refractory and Photovoltaic Metals

Editors: Athanasios Karamalidis, Pennsylvania State University;

Richard Olsson, KTH Royal Institute of Technology; **Alafara Baba**, University of Ilorin

Sponsor: Hydrometallurgy and Electrometallurgy Committee

"Leaching Kinetics of Cu from Low-Grade Oxidized Copper Ore with High Alkalinity Gangue Using Edta-2na Solution," **Faxin Xiao**, et al.

"Fundamental Research on Selective Pre-enrichment of Low-Grade Niobium Concentrate from Bayan Obo Mine Via Super Gravity," **Jintao Gao**, et al.

"Recovery of Vanadium from Rapid-Cooling Converter Vanadium Slag by Sodium Roasting and Water Leaching," **Jin Ma**, et al.

"Recovery of Crude Silver and Valuable Metals from Tin Anode Slime," **Hanman Kou**, et al.

"An Ammonia Leaching Process for the Recovery of Value Metals from Nickel and Cobalt Slag," **XinQiong Dai**, et al.

"Recycling Cu-Sn-Pb Alloy with Enhanced Properties from Waste Photovoltaic Welding Strip by Induction Melting," **Ming Sun**, et al.

"Hot Deformation Behaviors and Microstructural Evolution of Mo-42Re Alloy Prepared by Electron Beam Melting," **Yichao Yang**, et al.

Thermo-mechanical Processing of Steels for Sustainable Energy Utilization

Editors: Kasturi Narasimha Sasidhar, University of Wisconsin-Madison;

Adriana Eres-Castellanos, Los Alamos National Laboratory; **Amrita Lall**, Pacific Northwest National Laboratory

Sponsor: Steels Committee

"Refinement of Large Primary Carbides by Adjusting Annealing Parameters in 45Cr9Si3 Valve Steel," **Zeyou Li**, et al.

"Grain Refinement Mechanism in the CGHAZ of Ultra-High-Strength Structural Steel: A Critical Analysis of the Impacts of Prior Austenite Grain and Cooling Rates," **Libo Wang**, et al.

"Optimizing Microstructure and Mechanical Properties of Cold-Rolled Medium-Mn Steel Through Intercritical Annealing and Warm Rolling," **Ranjit Kumar**, et al.

"Combined Application of Mechanical Deformation and Nitriding to Realize Optimal Mechanical and Anticorrosion Properties for 316 Stainless Steel," **Jagadeesh Neduri**, et al.



Contribute Your Work

View the *JOM* Editorial Calendar to see upcoming topics and learn how to submit your own article for *JOM: The Journal*. Visit www.tms.org/EditorialCalendar.

View More Technical Articles

JOM regularly publishes additional articles that fit within the scope of the journal, but not within the scope of a particular technical topic. Read these in the "Technical Articles" section of *JOM* on Springer.

TMS MEMBER NEWS

Share the Good News!

Contact Kelly Zappas, *JOM: The Magazine* editor, at kzappas@tms.org to share your professional accomplishments. Please note that only news submitted by current TMS members will be considered.

David Bourell Knighted at CIRP Conference

David Bourell's contributions to the field of additive manufacturing and laser sintering have earned him a new title: "Knight of Laser Technology." Bourell, professor emeritus at The University of Texas at Austin, was honored at the 13th CIRP Conference on Photonic Technologies, held in September 2024 in Fürth, Germany. The award was established in 1997 to recognize international career accomplishments in areas related to laser technology. He is only the eleventh Knight in the award's 27-year history.

As a longtime TMS member, Bourell has held many roles, including as the founding chair of the TMS Additive Manufacturing Committee and as instructor for a TMS workshop focused on additive manufacturing. Most recently, he served on the Board of Directors as Professional Development Director. He has received the TMS Materials Processing & Manufacturing Division Distinguished Scientist/Engineer Award and is a 2011 TMS Fellow.

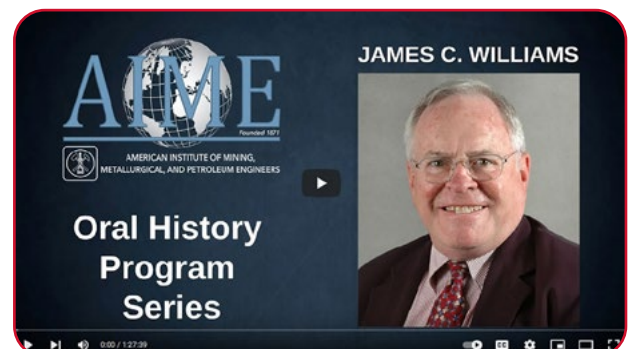


TMS member David Bourell accepted the "Knight of Laser Technology" Award at the 13th CIRP Conference on Photonic Technologies. (Photo Credit: David Bourell)

AIME Adds New Oral Histories from Two TMS Members



In 2024, the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) released two new videos featuring TMS members for its Oral History Project: **Fiona Doyle** and **James C. Williams**. The AIME Oral History Project supports the Institute's mission by preserving and promoting achievements in the fields and sharing prominent member stories with future generations.



In her video, "Following Dreams and Curiosity," **Fiona Doyle** talks about discovering her love of science, overcoming challenges in her career, finding creative solutions to technical problems, and so much more. Doyle joined the University of California, Berkeley, in 1983, around the same time she joined TMS, and was one of the first female faculty members in the College of Engineering. She is currently the Donald H.

McLaughlin Professor Emerita of Mineral Engineering, Distinguished Professor Emerita of Materials Science and Engineering, and Special Advisor to the Dean of Engineering on Academic Matters, at UC Berkeley. Over the course of her career, she has taught, advised, and advocated for thousands of students in a variety of positions.

Doyle's technical work and dedication to her students have earned her many accolades, including the SME Milton E. Wadsworth Award, the TMS Alexander Scott Distinguished Service Award, TMS Extraction & Processing Division Distinguished Lecturer Award (of which she was the first female recipient), and TMS Fellow Award. In 2016 she was elected to the National Academy of Engineering, where she chairs the Earth Resources Engineering Section.

James C. Williams reminisces on his extensive career—from how he became interested in metallurgical engineering through a camping trip with the Boy Scouts to his experiences in industry, academia, and government—in his video, "Advancing Aerospace Through Material Design." Williams is currently a professor of materials science and engineering and Honda Chair Emeritus at The Ohio State University (OSU), where he previously served as dean of the College of Engineering. On the academic side of his career, he has been a visiting professor at the Technical University of Hamburg-Harburg in Germany, a distinguished research professor at

the University of North Texas, and dean of Carnegie Institute of Technology at Carnegie Mellon University (CMU). Blending his industry experience with the academic, Williams was president of Mellon Institute, an industrial research subsidiary of CMU. He previously held a variety of positions at The Boeing Company, Rockwell International Science Center, and GE Aircraft Engines. Additionally, Williams has been on advisory committees and participated in review panels for industry, government labs, research councils, and universities.

Williams joined AIME in 1960 and has been actively involved in TMS since then, notably serving as chair of the Titanium Committee. He is a 1998 TMS Fellow and has received the TMS Leadership Award, TMS/ASM Joint Distinguished Lectureship in Materials and Society Award, TMS Research to Industrial Practice Award, Institute of Metals/Robert Franklin Mehl Award, TMS/SME/AIME James Douglas Gold Medal, and AIME Champion H. Matthewson Award. In 1987, he was elected to the National Academy of Engineering and in 2003, he was inducted into GE's Aircraft Engines Propulsion Hall of Fame.

Visit the AIME Oral Histories web page at aimehq.org to learn the story of your profession in the words of those who have lived it. Here, you can also access the candidate submission form if you would like to nominate a friend or colleague for a future oral history capture and help honor the legacy and traditions of AIME.

Call for Nominations: 2026 Acta Materialia Awards

Did you know you can nominate a friend or colleague for an Acta Materialia Award? Because TMS is a sponsoring society of Acta Materialia Inc., any



Kazuhiro Hono (right), of the National Institute for Materials Science in Japan, accepts the Acta Materialia Gold Medal award from **George "Rusty" Gray III**, Acta Materialia Chair & Treasurer, at the 2024 TMS-AIME Awards Ceremony, held at the TMS 2024 Annual Meeting & Exhibition. Hono and other Acta award recipients were also honored at a special symposium at TMS2024.

TMS member can nominate an individual on behalf of the Society. Each sponsoring society may put forth one nomination for each award each year, with nominations remaining in effect for three years. Currently, the organization is seeking nominees for its 2026 award cycle for the following awards:

- **Acta Materialia Gold Medal**
- **Acta Biomaterialia Gold Medal**
- **Acta Materialia Silver Medal**
- **Acta Biomaterialia Silver Medal**
- **Acta Materialia Hollomon Materials and Society Award**
- **Acta Materialia Mary Fortune Global Diversity Medal**

"Those of you who may have attended recent award presentation ceremonies may have witnessed the great appreciation and visibility of the Acta awards in the global materials community," said Carolyn Hansson, TMS member and executive secretary of Acta Materialia, in a call for nominations statement. "I sincerely hope that this may encourage you to make a nomination from your own materials community."

The deadline to submit nominations for a 2026 award is **February 1, 2025**. Visit the Acta Materialia website at www.actamaterialia.org/awards to see specific criteria for each award.

In Memoriam

TMS offers its condolences to the families, friends, and colleagues of the following members and Past TMS Presidents:

Dale F. Stein passed away on October 9, 2023.



He was a member of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) since 1961 and, subsequently, a TMS member since its official incorporation in 1984. During his membership, Stein received the AIME Robert Lansing Hardy

Award and the TMS Fellow Award. In 1980 he served as president of The Metallurgical Society of AIME and, consequently, was a member of the AIME Board of Trustees from 1979 to 1981. Outside of TMS, he was also named a Fellow of ASM International and is a member of the National Academy of Engineering.

Stein's career began mainly in industry, working first at the General Electric Company and teaching at the University of Minnesota for several years before transitioning to full-time academia. In 1971, he joined the faculty at Michigan Technological University (MTU) and eventually became head of the Department of Metallurgical Engineering as well as vice president of academic affairs. In 1979, Stein was made president of MTU, serving the university in this capacity until 1991. After retiring, Stein was elected to the inaugural class of MTU's Academy of Metallurgical and Materials Engineers.

Bruce Wessels passed away on April 7, 2024.



As a TMS member since 1982, Wessels actively participated in several committees, mostly within the Functional Materials Division (then the Electronic, Magnetic & Photonic Materials Division, or EMPMD). Early in his membership, he joined the editorial board

for the *Journal of Electronic Materials*, eventually serving as an associate editor from 1997 until 2008. Wessels made his mark on the Society as 1996 TMS President, simultaneously serving as a member of the AIME Board of Trustees from 1996 to 1997. He also led the TMS Foundation as president in 1997. He was a 2016 TMS Fellow and was also a fellow of the Optical Society of America, American Physical Society, and ASM International.

After completing his doctoral work, Wessels joined the R&D team at General Electric Company. Then in 1977, he joined the faculty at Northwestern University, working his way up with several different positions, including director of the Electronic Materials Program and chair of the Department of Electrical Engineering and Computer Science. In 2005, he was named the Walter P. Murphy Professor of Materials Science and Engineering, a position he held until transitioning to emeritus status in 2020.

Did You Renew Your TMS Membership for 2025?

As the year draws to a close, plan to renew your TMS membership for 2025. Most memberships will expire on December 31. Remember that you must have a current membership to receive the discounted member registration rate for the TMS 2025 Annual Meeting & Exhibition, to retain access to your TMS journal subscriptions (including *JOM*), and to serve on TMS technical committees. Visit www.tms.org/Renew and log in to renew your membership today.



BETTING ON A SUCCESSFUL TMS2025

IN LAS VEGAS

Kelly Zappas



THE WORLD COMES HERE. **TMS2025** 154th Annual Meeting & Exhibition

There's a lot to look forward to at the TMS 2025 Annual Meeting & Exhibition (TMS2025), which will be held March 23–27, 2025. Interest is high in the technical program. (More than 4,600 abstracts have been submitted and 112 symposia organized.) Curiosity is piqued in the meeting's professional development offerings. (For the first time, Sunday workshops and courses are included with most conference registration fees.) And excitement is building for the location. For the first time in more than 30 years, the TMS Annual Meeting & Exhibition will be held in Las Vegas, Nevada. The entire event—programming, networking, and social events—will take place at the MGM Grand Las Vegas Hotel & Casino.

Plans are coming together now for the exhibit, featured speakers, student activities, and networking events that will take place at this global meeting of the minerals, metals, and materials science and engineering communities. With the breadth of topics and events offered, it's a safe bet (perhaps the safest you'll find in Las Vegas) that TMS2025 will offer something for everyone.

Read on for a preview of what you can expect at TMS2025, and visit www.tms.org/TMS2025 to find the most up-to-date information, details on the speakers featured in this article, and information on how to register for the conference and book housing at the MGM Grand.

TMS2025 KEY DATES

January 31: Discounted Registration Deadline
February 24: Housing Reservation Deadline

March 23-27: TMS2025 Conference Dates
March 24-26: TMS2025 Exhibit Dates

AN EXTENSIVE TECHNICAL PROGRAM

TMS2025 received a record number of symposium proposals, and now the five TMS technical divisions are planning more than 100 symposia, grouped into the following broad technical topics:

- Additive Manufacturing
- Advanced Characterization Methods
- Biomaterials
- Data-Driven and Computational Materials Design
- Electronic, Magnetic, and Energy Materials
- Light Metals
- Materials Degradation and Degradation by Design
- Materials Synthesis and Processing
- Mechanics of Materials
- Nuclear Materials

Additional symposia are planned under the heading of Special Topics and include such general-interest topics as the Bladesmithing 2025 symposium and a student-organized symposium on looking outside materials science for lessons on materials discovery. The Elizabeth Judson Memorial Symposium, sponsored by the TMS Education Committee and held at the TMS Fall Meeting in previous years, is planned on the topic of preparing undergraduate and graduate students for materials careers.

TMS2025 is an excellent place to find the people who share your specific interests, while offering you the opportunity to hear (and be inspired by) talks in related areas. Visit the TMS2025 website to find tools that will help you explore the full technical program and begin building a customized schedule tailored to your interests.



TMS will also welcome the co-located conference **REWAS 2025**, a unique, transdisciplinary conference that covers the latest technical and societal developments enabling sustainability within our global economy with a special focus on recycling and waste management. The focus of this year's conference is **Circular Economy for the Energy Transition**, and the conference will consist of five symposia.



This year's meeting will also include **The Fifth Summit on Diversity in the Minerals, Metals, and Materials Professions**. The chairs of the organizing committee discuss this event in the article, "Building on a Decade of Impact: Fifth Diversity Summit Planned at TMS2025," also appearing in the December issue of *JOM*.

The **5th Bauxite Residue Valorization and Best Practices Conference**, which continues the series started in 2015, will also be co-located with TMS2025 for the first time this year.

A UNIFYING ALL-CONFERENCE PLENARY

The wide variety of technical programming is one of the strengths of the TMS Annual Meeting, but for one hour on Tuesday, March 25, programming narrows to offer a single, all-conference plenary session. During that time, all conference attendees share the experience of a broadly focused talk.



This year's plenary speaker is **Emily Molstad**, chief executive officer and co-founder of VALIS Insights. Driven by her passion for sustainability and love of material science, Molstad found her home within the metal recycling industry. She built the foundation of her technical expertise during her

graduate studies at Worcester Polytechnic Institute's Center for Resource Recovery and Recycling (CR3) and

through extensive interviews with industry stakeholders. This deep dive into the industry exposed the power of data to enhance recycling operations. Molstad, along with her co-founder, went on to found VALIS, a software startup dedicated to delivering the solutions needed to optimize the recycling process and create a circular economy. The VALIS team is committed to bringing Industry 4.0 capabilities that increase the profitability of metal recyclers and maximize the recovery of material from the past to meet the demands of the future.

SIX HONORARY SYMPOSIA

Six honorary symposia are planned at TMS2025 to recognize individuals who have had a tremendous impact on their fields. These symposia connect individual accomplishments to broader-scale discussions of advances in their respective fields, resulting in sessions that are both personal and insightful. All TMS attendees are invited to hear the talks at the following sessions:



A Career in Powder Processing and Additive Manufacturing

Sponsored by: TMS Materials Processing & Manufacturing Division

Honoring David Bourell



Microstructural Evolution and Material Properties due to Manufacturing Processes

Honoring Anthony Rollett



Atomistic Simulations Linked to Experiments to Understand Mechanical Behavior

Sponsored by: TMS Materials Processing & Manufacturing Division

Honoring Diana Farkas



Recent Advances in Titanium Science and Technology

Sponsored by: Materials Processing & Manufacturing Division/ Structural Materials Division

Honoring Dipankar Banerjee



Innovative Hydrometallurgical Technologies for Environmentally Benign Processing and Remediation

Sponsored by: TMS Extraction & Processing Division

Honoring Fiona Doyle



Thermodynamics and Phase Diagrams Applied to Materials Design and Processing:

Sponsored by: Functional Materials Division/Structural Materials Division

Honoring Rainer Schmid-Fetzer

AN EXHIBIT HALL THAT BRIDGES TECHNOLOGIES

The Exhibit Hall at TMS2025, like the conference itself, brings together a broad range of materials-related individuals. Researchers on the forefront of technology and industry leaders will be there, along with early career professionals and undergraduate and graduate students who could be their next great hires. The TMS2025 exhibit hall provides participants a chance to bridge the gap between fundamental and applied sciences and brings together representatives from around the world in a single location.

Two all-conference events will be held in the Exhibit Hall, offering the chance for exhibitors and attendees to network and socialize in a relaxed setting: the Monday night opening reception and the Tuesday afternoon happy hour. Both events include food and beverages, as well as poster displays.

Space is still available in the exhibit hall; view the Floorplan and reserve your space at www.tms.org/TMS2025/ForExhibitors.

NEW FOR 2025: FREE SUNDAY WORKSHOPS AND SHORT COURSES

Traditionally, Sundays at the TMS Annual Meeting & Exhibition are reserved for specialized short courses and workshops—offering attendees a chance to gain expertise and learn from knowledgeable instructors. For the first time, these events will be open to all TMS2025 full-conference registrants as part of their registration fee—no additional fee is required. At press time, the following events were planned:

- Introduction to Carbon Capture in Primary Aluminum Smelting
- Cathode Lining for Aluminum Production
- Lead-Free Solders and Interconnect Workshop
- Metal Additive Manufacturing Processes Workshop
- Materials for a Global Hydrogen Economy
- Standards in Additive Manufacturing

You may select one course or workshop to attend as part of the registration process for TMS2025. Space will be limited, so register early.

TECHNICAL DIVISION NETWORKING LUNCHEONS

Each year at the TMS Annual Meeting, the five TMS technical divisions gather their members at three luncheon events, where division members can socialize, divisions can honor award recipients, and everyone can hear from an invited speaker.

Zhigang Fang, professor of metallurgical engineering at the University of Utah, will be the featured speaker at the **Extraction & Processing Division/Materials Processing & Manufacturing Division Luncheon**, to be held Tuesday, March 25.

Catrina Rorke, senior vice president for policy and research at the Climate Leadership Council and executive director of the Center for Climate and Trade, will deliver the invited talk at the **Light Metals Division luncheon** on Wednesday, March 26. Her talk will be titled, "Emerging Pressures on Emissions Accounting: Consumer Preferences, Emergent Regulations, and Novel Trade Measures."

The **Structural Materials Division (SMD)/Functional Materials Division (FMD) Luncheon**, which will be held on Monday, March 24, takes a slightly different approach, inviting the recipients of the two divisions' 2024 Young Leaders Professional Development awards to deliver brief talks at the luncheon. This year's speakers will be:

- **Anne Campbell**, Oak Ridge National Laboratory
- **Grace Gu**, University of California Berkeley
- **Zachary Sims**, University of Tennessee
- **Ling Li**, University of Pennsylvania
- **Steven Naleway**, University of Utah
- **Changhong Cao**, McGill University

Reserve your spot at these luncheons by purchasing a ticket through the TMS2025 registration form.

NEW FOR 2025: SUSTAINABLE METALLURGY LUNCHEON

The **Journal of Sustainable Metallurgy Luncheon and Lecture: Celebrating a Decade of Advances in Sustainable Metallurgy** is a new event planned for Wednesday, March 26. This luncheon will be moderated by **Diran Apelian**, University of California, Irvine, and will feature talks from **Claire Davis**, University of Warwick, and **David Dreisinger**, University of British Columbia.



Learn more at
www.tms.org/TMS2025

ACCESS TO A DOZEN PROCEEDINGS VOLUMES

Each full-conference registration includes electronic access to the complete published conference proceedings from TMS2025. Registrants will receive electronic access to the following volumes:

- *Advances in Ceramic Materials and Processing*
- *Advances in Sustainable Composites: Eco-friendly Solutions and Applications*
- *Characterization of Minerals, Metals, and Materials 2025: In-Situ Characterization Techniques*
- *Energy Technology 2025: Carbon Dioxide Management and Other Technologies*
- *Friction Stir Welding and Processing XIII*
- *Light Metals 2025*
- *Magnesium Technology 2025*
- *Materials Processing Fundamentals: Thermodynamics and Rate Phenomena*
- *Natural Fibers and Biocomposites: A Sustainable Solution*
- *Rare Metal Technology 2025*
- *REWAS 2025: Circular Economy for the Energy Transition*
- *TMS 2025 154th Annual Meeting & Exhibition Supplemental Proceedings*

Registrants will receive information on how to access their proceedings in March; individual volumes will also be available for purchase in print.

MAKE YOUR PLANS TO ATTEND

The deadline to register for TMS2025 at the discounted early registration rate is **January 31**. Be sure to make your meeting plans by this date to receive the best rate on conference attendance and to reserve your place at networking and social events.

TMS2025 attendees are strongly encouraged to book hotel accommodations through the TMS2025 website. When you book through TMS's official hotel provider, onPeak, your rate includes a discounted daily resort fee that gives you access to amenities like complimentary resort-wide Wi-Fi, access to the business center, and more. Book your room at the MGM Grand Hotel & Casino through www.tms.org/TMS2025/Housing.

Make your plans today, and join your TMS colleagues, March 23–27, in Las Vegas!

BUILDING ON A DECADE OF IMPACT:

FIFTH DIVERSITY SUMMIT PLANNED AT TMS2025

Eric Brown and Blythe Clark

DIVERSITY (DMMM5)
 IN THE MINERALS, METALS, AND MATERIALS PROFESSIONS

THE WORLD COMES HERE.
TMS2025
 154th Annual Meeting & Exhibition

March 23–27, 2025

MGM Grand Las Vegas Hotel & Casino

Las Vegas, Nevada, USA

#TMSAnnualMeeting | www.tms.org/TMS2025



The Fifth Summit on Diversity in the Minerals, Metals, and Materials Professions (DMMM5) will be held as part of the TMS 2025 Annual Meeting & Exhibition (TMS2025) in Las Vegas, Nevada. TMS2025 registrants can participate in DMMM5 for no additional registration fee.

Attendees of DMMM5 can expect a meaningful celebration and embracing of all members of the TMS community integrated within a comprehensive program focused on advancing diversity, equity, inclusion, and belonging in the field.

The event is co-located with and integrated into TMS2025, to be held March 23–27, enabling people to engage in the full DMMM5 Program starting Tuesday afternoon, March 25. Programming will begin following the TMS2025 All-Conference Plenary session given by Emily Molstad, chief executive officer and co-founder of VALIS Insights, and will continue through lunchtime on Thursday. Participants can attend the full DMMM5 program or come and go for the talks and activities they find most meaningful.

This event rounds out the first decade of TMS's leadership in holding this series of summits to lead the broader minerals, metals, and materials community in advancing diversity, equity, and inclusion (DEI). The summit will include four half-day sessions.

The first session will celebrate a decade of DMMM impact, reviewing the lessons learned from previous summits with a focus on intersectionality and providing engaging content for both new and returning attendees. The second session will continue a discussion initiated at DMMM4 towards creating a culture of inclusion for those with physical, cognitive, sensory, and neuro diversity. The third session will focus on taking action toward continued progress, focusing on the current drivers and agents of change necessary for advancing inclusion and diversity within TMS and the broader community into the future. The final session will tackle opportunities for personal and professional development of attendees, aimed at providing tools for them to apply in their own workplaces and fostering a call to action for ongoing progress. Attendees should expect to explore and learn practical solutions and insights for promoting diversity and inclusion in their professional environments.

BUILDING ON A DECADE OF IMPACT

Like each of the previous installments of the DMMM Summit series, this fifth installment will build on the foundation laid by its predecessors. This summit marks a significant milestone by reflecting on the entire decade of the DMMM series, with one of its half-day sessions focusing on a decade of DMMM impact. Attendees will review the progress made since the first DMMM summit in 2014 with a retrospective that will provide a comprehensive overview of the evolution of diversity and inclusion initiatives within the field.

While each DMMM Summit has introduced or had a focus on a new dimension of diversity, this summit will have a central theme of the concept of intersectionality, engaging attendees in understanding how different aspects of identity, such as race, gender, physical abilities, and cognitive function interact in the context of the material science professions. This summit will also continue the tradition of supporting personal and professional development of attendees and will place a strong emphasis on empowerment and sustaining a positive momentum for diversity and inclusion.

TMS COMMITMENT TO DIVERSITY

TMS is committed to advancing diversity in the minerals, metals, and materials professions and promoting an inclusive professional culture that welcomes and engages all who seek to contribute to the field. For more than a decade, the top strategic goal for TMS has been creating an inclusive global community for students and professionals from all walks of life and diverse backgrounds to feel welcome and valued. As part of the TMS diversity statement, the society recognizes that a diverse minerals, metals, and materials workforce is critical to ensuring that all viewpoints, perspectives, and talents are brought to bear in addressing complex science and engineering challenges to build and nurture this diverse professional community.

The society has championed several activities, starting at the Board of Directors, to prioritize creating opportunities for learning and sharing knowledge and experiences in advancing diversity, equity, and inclusion. This includes multiple TMS diversity awards, many activities through the TMS Diversity, Equity, and Inclusion Committee, a DEI Tool Kit, and a variety of meetings, workshops, and webinars of which the TMS DMMM Summit series is just one part. This summit directly advances TMS's goals as underlined in the society's Diversity Statement and underpinned by TMS's advocacy interest in the area of diversity in science and engineering in collaboration with the TMS DEI committee.

EVENT HIGHLIGHTS

In addition to the DMMM5 summit presentations, there are a lot of exciting events at TMS2025, including: the LGBTQ+ and Allies Networking Mixer, the Diversity Breakfast on Wednesday morning that will dovetail directly into the second session of the DMMM5 summit, and more. Check the schedule for additional events. There is also the TMS Award Ceremony with the opportunity to join us in celebrating the many achievements of the broad and diverse membership of TMS.

AN OPEN INVITATION

Over the past decade, we've both been fortunate to participate in the first four installments of the DMMM series. Each one has taught us things about ourselves and broadened our understanding of our colleagues' experiences, which has deeply enriched our engagement in the materials community. It's great if you choose to participate in the entirety of the DMMM5 summit. We would equally like to invite and encourage you to join the summit for even just one talk or panel or activity if you will be attending TMS2025.

Whether this is the first you have heard the term DEI or you've heard it enough to be curious to learn more, whether you've learned from participation in all four previous summits or are a leader of DEI initiatives in your home organization, and even if you don't think this is for you or if you fall anywhere in between, DMMM5 will have something for you.



Eric Brown is LANSCE User Facility Director and Senior Director for Physical Science at Los Alamos National Laboratory and co-chair of the DMMM5 organizing committee.



Blythe Clark is Senior Manager of Materials Engineering and Manufacturing S&T at Sandia National Laboratories and co-chair of the DMMM5 organizing committee.

Learn more at www.tms.org/TMS2025/DMMM5



Getting to Know the Incoming 2025 TMS Board Members

Kelly Zappas



In 2025, five new members will join the TMS Board of Directors for three-year terms. This month, *JOM* talks with our new leaders about their past experiences as TMS members and active volunteers and their hopes for the Society's future. These new board members will begin their terms at the end of the TMS 2025 Annual Meeting & Exhibition (TMS2025) in Las Vegas, Nevada, March 23–27.

Like many TMS volunteer leaders, **Viola Acoff** first joined TMS as a student. At TMS2025, Acoff, who is now the dean of the School of Engineering at the University of Mississippi, will begin her three-year term in the TMS presidential cycle, serving as vice president in 2025, president in 2026, and past president in 2027.



Viola L. Acoff
Presidential Cycle

"In 1996 as a young professional in the field, I started serving TMS in various volunteer activities, which consisted mostly of technical committee memberships," said Acoff. "When I was selected as a recipient of the TMS Young Leader Intern Award (now called the TMS Young Leaders Professional Development Award) in 1998, that was my formal introduction to the functional committees of TMS, and I also had the opportunity to attend the Board of Directors Meeting as an observer. The fact there are so many ways to be involved as a volunteer has kept me so active over the years."

TMS has influenced her career, she said, by providing professional development, networking opportunities, and a platform to explore her research focus. "These experiences—as well as the opportunity to advance and promote the field of metallurgical and

materials engineering from a larger platform—have been the most valuable to me."

Acoff will bring her extensive experience, both with the Society and in the profession, to her new role as president.

"During my 30 years as a faculty member and administrator in academia and as a TMS volunteer, I believe that I have gained the relevant experience and qualifications that have prepared me for the Presidential Cycle Board position," she said. "My current position as TMS Director/Chair of Membership Diversity & Development provides me with additional skills that are directly aligned with those necessary for this position. My experiences across various technical and functional committees of TMS and as a member of the TMS Board of Directors have provided me with a firm foundation of how TMS works and a recognition that TMS is, above all else, a member-driven society."

Her vision for TMS is to continue to successfully execute TMS Aspires, the Society's strategic plan. "TMS has made significant progress in each of the four goals of this strategic plan," she said. "I am looking forward to using my experience as an administrator, educator, team builder, and diversity, equity, and inclusion champion and ally to ensure that the Society continues to execute each of these goals to the fullest. Emphasis will be placed on initiatives which focus on enhancing and ensuring that the Society has a steady membership pipeline from the future generation of volunteers and leaders in our field."

Image courtesy of Kevin Bain, Ole Miss Digital Imaging Services

As Acoff begins the presidential cycle, her current position of Membership Diversity & Development Director/Chair will be filled by **Jenifer Locke**, an



Jenifer Locke
Membership
Diversity &
Development
Director

associate professor in the Department of Materials Science and Engineering and the Fontana Corrosion Center at The Ohio State University.

"My first TMS conference—and first-ever conference—was just after finishing my undergraduate degree while I was working at Wright Patterson Air Force Base in Dan Miracle's group. I was encouraged by him and my direct supervisor to present our research at the TMS 2005 Annual Meeting & Exhibition in

San Francisco," said Locke, who said this experience was a big confidence boost. She wasn't as involved in TMS during graduate school, but returned after finishing her Ph.D. "This return to TMS was largely related to the very positive experience I had at my first TMS conference, where I felt welcomed and supported as a young person with very little materials experience. I found that sense of support, friendship, and mutual respect for all had only increased, and I immediately decided to put my volunteer time into TMS. It was a place that would help me grow and would provide support for both me and my students."

Her work on TMS committees, including the Corrosion & Environmental Effects Committee and the Diversity Committee, has helped to connect

her with materials professionals all over the world. "They help build me up," she said, "by sharing their experiences, advice, and positive affirmations. Progress on the world's leading scientific problems can't happen alone, and it can't happen in a toxic environment. By volunteering with TMS, I have grown my network in ways that allow me to work with and get advice from great technical leaders who are wonderful, supportive people and who make my job more fun and fulfilling."

Locke took the step of applying for a Board position because she recognized the importance of a Membership Diversity & Development Director who can advocate for others, listen to the historically marginalized members of our community, and bring those perspectives to the larger decision-making process.

Locke is looking forward to learning deeply about how technical societies work and adjust to change. "I also look forward to being in the unique position to learn about the full membership of our Society and how I can build on past directors' progress to continue to improve TMS's position as the home society for current and future materials professionals."

On a more personal level, she hopes to help advance the TMS strategic goal of being a highly inclusive society where all materials students and professionals feel welcome, and diversity is celebrated. When she begins her board position in 2025, it will be exactly 20 years since her initial TMS Annual Meeting. "It was that welcoming experience that led me to stay in materials, pursue a Ph.D., and sit where I am today," she said. "I hope that my experience, abilities, and perspective will help TMS ensure many more people say that in 2045 (and beyond)."

Randy Beals has been attending TMS conferences since his undergraduate days. He gave his first TMS Annual Meeting presentation at a Thursday afternoon



Randy Beals
Light Metals
Division Chair

session, where only the chair was present for his talk, but he stayed with the Society, going on to present at TMS annual meetings and Materials Science & Technology conferences, serving as the TMS Magnesium Committee chair, and as a member of the TMS Aluminum Committee, the Industrial Advisory Committee, and the TMS Awards Committee.

Now, Beals is senior materials engineer at Magna International, and in March, he will become the chair of the TMS Light Metals Division. "My experiences and insights gained from active involvement with TMS over the years offer a unique opportunity to

make a meaningful impact," he said. "I am excited to leverage my industrial background to address key issues and contribute to TMS's success."

Beals values TMS for the opportunities it offers to network with metallurgical experts, who keep him informed and engaged.

"TMS offers a little window into the future. I can keep current on the latest discoveries and advancements," he said. "Overall, I enjoy the access to cutting-edge research. For example, recently there are many interesting papers on experiments involving micro-gravity. They are almost impossible to put down."

As the new chair of the Light Metals Division, he says he is excited to lead technical committees in promoting innovation and collaboration in light metals.

"I aim to showcase technological advancements, support members' professional growth, and enhance industrial involvement, leaving a positive and lasting impact on TMS."

For **Carelyn Campbell**, one of the most valuable aspects of volunteering with TMS has been the opportunity to expand her leadership skills at different



Carelyn Campbell
*Materials Processing
& Manufacturing
Division Chair*

levels, including learning how to organize a symposium, organizing international symposia, chairing a technical committee, and now leading a technical division. "In addition, TMS has provided me with an important community of colleagues with whom I can share ideas, and I can learn," said Campbell, who is the incoming chair of the Materials Processing & Manufacturing Division (MPMD). "Within the TMS community, I have developed

many long-term friendships and professional collaborations that have helped sustain my career."

The diversity of topics covered by TMS and its technical committees have played an important role in **Clarissa Yablinsky's** career. When she decided to change the focus of her materials research, she said she instantly felt welcomed into her new community at TMS.



Clarissa Yablinsky
*Structural Materials
Division Chair*

"I'd never been involved with nuclear materials, but I just showed up to a meeting of TMS's Nuclear Materials Committee. Everyone was extremely inviting and excited to welcome new members," she said. She stayed involved with the committee and eventually ended up as chair, one of the

many leadership positions she has held within TMS. She has also been involved with the Mechanical Behavior of Materials Committee, the Professional Development Committee, the Membership Diversity & Development Committee, and the Financial Planning Committee and has been a member of the TMS Diversity Committee

Campbell is currently the leader of the Thermodynamics and Kinetics group in the Materials Science and Engineering Division in the Material Measurement Laboratory at the National Institute of Standards and Technology. She first joined TMS as an undergraduate in 1988, based on the recommendation of her advisor and the department chair. "I soon got involved in leading the student ASM/TMS Materials Science Club at Northwestern. Having the opportunity to interact and learn from so many different experts in the field kept me involved and excited to attend the meetings and present my own work."

As chair of the MPMD, Campbell looks forward to working with the technical committees to improve program coordination and outreach to industry. "I hope to work with other divisions to strengthen our programming, especially as we tackle new materials challenges, including sustainability, quantum computing, and the integration of digital twins to advance manufacturing and materials design."

since its inception. At TMS2025, she will step into the role of chair of the TMS Structural Materials Division on the TMS Board of Directors.

"I like the breadth of science that is presented at TMS, and I like being part of the strategy of how we continue to build TMS," she said. "I want to help drive the policy and goals of the Society to make sure that we're serving our members appropriately."

Like many members, Yablinsky became involved in TMS as a student. "I started by coming to a TMS meeting, and it was a lot of fun," she said. "After graduation, I started at Los Alamos National Lab, where they were really supportive of TMS and very involved, so I had very good mentors to draw me into the Society and keep me active over the years. The other really valuable thing was receiving the TMS Young Leaders Professional Development Award. That really exposed me to all of those committees that I ended up later sitting on."

Yablinsky is a scientist in the Materials Science and Technology Division and a Project Lead in the Office of Experimental Sciences Dynamic Material Properties Campaign at Los Alamos National Laboratory.

Nominations Now Open for 2026–2029 TMS Board of Directors

TMS is now accepting nominations for five positions on the 2026–2029 TMS Board of Directors. The open positions are:

- **Presidential Rotation (Encompasses three successive one-year positions: Vice President, President, and Past President)**
- **Financial Planning Officer**
- **Content Director/Chair**
- **Professional Development Director**
- **Public & Governmental Affairs Director/Chair**

Nominations will be accepted until January 15, 2025. Additionally, positions for two division chairs (Extraction & Processing and Functional Materials) are open on the 2026–

2029 Board of Directors, but nominations for these positions are developed directly through the technical divisions.

Applicants' packages for the five open positions will be considered by the Society's Nominating Committee, which will then recommend a candidate for each position to the Board of Directors. If approved by the Board of Directors, these endorsed candidates will be presented to the general membership for approval by July 2025.

To access complete job descriptions and qualifications for each office, as well as nomination instructions, visit www.tms.org/BoardNominations. For additional information, contact Deborah Hixon, TMS Awards Program Manager, at hixon@tms.org

INVEST IN PEOPLE WITH THE TMS FOUNDATION

Kaitlin Calva



The TMS Foundation is committed to nurturing the next generation of leaders in the minerals, metals, and materials community through awards and programs geared towards students and early career professionals.

Join the 2024 year-end appeal campaign to make an investment and a difference in careers, lives, and the future of the profession.

TMS members and donors are key to the success of the TMS Foundation. Every donation, small or large, makes an impact on the future of science and innovation. Supporting the TMS Foundation enables it to meet its goals of providing financial assistance and career-building experiences for students and early career professionals through four signature program elements:

- **Expanding the TMS Young Leaders Professional Development Awards Program**
Help offer five more awards for bright, motivated young professionals who are ready to take on the challenges of the field.
- **Increasing the number of Family Care Grants**
Adding ten more grants eases the financial burden for more professionals attending the TMS Annual Meeting & Exhibition.
- **Establishing the International Student Travel Grants for the Americas Program**
Creating this initiative will bring talented students from the Americas to TMS events and all the opportunities they offer.
- **Supporting the TMS Bladesmithing Student Program**
This increased support secures TMS's ability to continue delivering this popular program.

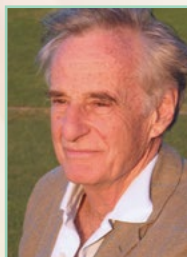
Every contribution to the TMS Foundation goes toward empowering an individual, funding a project, or launching a career. Your support helps build a world that values science, supports education, and rewards innovation. In the coming months, you will see articles announcing the recipients of student and early career professional awards. Pay attention to the



Donate Today

Use the online contribution form at www.TMSFoundation.org/Contribute or scan the QR code. Please send your gift by December 31, 2024.

Introducing a New Travel Grant



Science knows no borders, but financial wherewithal can create very rigid borders, indeed. To break down these barriers, the TMS Foundation has a new goal of establishing the **TMS International Student Travel Grants for the Americas.**

With a generous donation from TMS Foundation Trustee and Platinum Society Member **Marc A. Meyers** (pictured), the TMS Foundation has almost met its fundraising target, but donations are still needed. Once fully funded, this program will award up to \$1,000 annually to students from Central America, South America, and the Caribbean to help cover their travel expenses to a TMS conference in the United States. "This will help many students that otherwise could not come to TMS meetings," said Meyers. "There, they can learn, establish connections, and expand their education and training in the U.S."

Thinking back on his own career, Meyers reflected on the value of participating in professional events that allow for technical exchange and valuable networking opportunities. "I attended my first TMS meeting in 1974, fifty years ago. It was a fantastic experience," he said. "Professor Barrett took me around and introduced me to famous scholars whose books and papers I had read. TMS continues to be this unique platform, and I hope that students from the Americas that otherwise would not be able to come will be able to be enriched by this experience."

This program is designed to encourage students to stay engaged in materials science and engineering by nurturing their professional development and networking opportunities while fostering a more diverse and inclusive scientific dialogue. Learn more about this and other TMS Foundation-funded programs at www.TMSFoundation.org.

appreciative words from each of these beneficiaries. These are the individuals your donation will support. These are the lives your contribution will change. And the key element in all of this is *you*. **Make your contribution by December 31 to be part of the year-end appeal.**

Kaitlin Calva is an independent contributor and a former Editor of JOM: The Magazine.

JOM: The Magazine Talks with ALEX GRANT

Kelly Zappas



Alex Grant is the chief executive officer of Magrathea, a company developing innovative technology for the production of carbon neutral light metal from seawater. He was one of the invited keynote speakers at the Magnesium Technology 2024 symposium, held at the TMS 2024 Annual Meeting & Exhibition (TMS2024) in Orlando, Florida, where he gave the talk, "Developing a New Generation of Electrolytic Technology for Making Magnesium Metal."

Pictured above are two 8 kg pure magnesium ingots from Magrathea's pilot foundry.

JOM

JOM: Could you describe your technical background and how it led to your current role?

Grant: My career started at McGill University, where I got my bachelor's degree in chemical engineering and philosophy. When I graduated, I moved to the U.S. to pursue my Ph.D. in chemical engineering at Northwestern University. I left with a master's degree to help start a lithium extraction start-up. I then spent the next seven years working on several lithium extraction resource projects.

During this time, my friend and neighbor, Jacob Brown, a chemical engineer at Tesla working on cathode technology, started discussing with me the promise of magnesium metal, especially in a world of cheap, renewable energy. The more we learned about the process technology and the current supply constraints of electrolytic magnesium metal, the more we became convinced of its potential. In 2022, we

raised our first \$2 million, quit our jobs, and founded Magrathea. Now in 2024, we're 30 people and have raised over \$30 million from private investors and the U.S. federal government with an operating two tonne/year nameplate pilot in California demonstrating innovative new magnesium extractive metallurgy technology that we developed.

JOM

JOM: Magrathea's tagline is "Metal without Mining." Could you explain how that works?

Grant: Most processes to produce metal require a mined ore as feedstock. However, Magrathea's process uses magnesium chloride-rich brines or seawater as feedstock, eliminating the need for open pit or underground mining in the supply chain. These magnesium chloride brines are globally abundant and often waste products of other production processes such as sea salt and potash production.

When brine first enters Magrathea's novel process, it is cleaned of contaminants that may affect the process downstream using simple hydrometallurgical techniques. The clean brine can then be dehydrated to make anhydrous magnesium chloride using novel process technology that we developed. Next, the dry magnesium chloride is melted and electrolyzed in a molten salt electrolyzer, producing magnesium metal and dry chlorine. Finally, the magnesium is tapped from the electrolysis cell and brought to Magrathea's foundry, where it is poured into ingots.



JOM: What are the benefits of Magrathea's process over other methods?

Grant: The majority of magnesium metal made before the year 2000 was produced electrolytically from seawater. However, the dominant magnesium

production process has shifted to the Chinese Pidgeon process over the last few decades. This process takes advantage of the abundant cheap coal and labor available to China in the 90s, but this is done at the cost of emissions and people, producing metal with a global warming potential of over 35 kg CO₂ equivalent/kg magnesium metal. Though the Chinese Pidgeon process is the primary production process used today, customers both old and new have a strong preference for electrolytic-produced magnesium due to its lower carbon footprint, lower labor use, and higher purity product inherent to the process.

Magrathea's electrolytic process was developed based on learnings from legacy processes like Dow's and Norsk Hydro's legacy approaches. These processes have all taken different approaches to dehydrating the magnesium chloride feedstock. This process is challenging because magnesium chloride is incredibly hygroscopic. Electrolytic processes have never converged on a singular effective and



Technician team pouring ingots in Magrathea's pilot foundry. Photos provided by Magrathea.



A technician removing magnesium from Magrathea's pilot electrolyzer.

inexpensive dehydration process. Magrathea's novel process technology introduces a new way to dehydrate magnesium chloride that we think will achieve these goals. Additionally, Magrathea's process advances the electrolyzer design, improving overall efficiency and designing for intermittent renewable energy like wind and solar.

JOM *JOM: How close are you to commercial-scale production?*

Grant: Magrathea has already proven our technology at the mini-pilot and pilot scales, commissioning a two tonne/year pilot facility in Oakland, California, and producing, so far, a couple tens of kilograms of metal including from seawater. We plan to commission our first commercial-scale smelter in the 2028 timeframe.

JOM *JOM: What are the next steps for your company?*

Grant: The next and last stage of scale-up for Magrathea is building a 150 tonne/year nameplate capacity demonstration plant to prove out core smelter technology at commercial scale. We have already begun site selection and procuring long lead time equipment for this facility, which will begin commissioning in the 2026 to 2027 timeframe.

JOM *JOM: How will this technology affect the broader use of magnesium in automotive and other applications?*

Grant: Through discussions across industries, we have seen that many engineers love magnesium as a material of construction, especially for applications where lightweighting is critical, such as automotive and aerospace. However, many uses of magnesium have been constrained due to the unreliability of the supply chain. In 2021, China significantly reduced its magnesium production, causing prices to spike by up to 10 times in Europe. On top of this, magnesium is much more expensive in the United States due to a hefty tariff on Chinese magnesium. Magrathea is solving these problems while eliminating magnesium's carbon footprint, diminishing these barriers to further adoption, and securing supply for the existing North American and European market.

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

Grant: Magrathea's mission is not only to decarbonize and stabilize the magnesium supply chain but also to solve a critical threat to U.S. national security. In the defense sector, magnesium metal is not only used as an alloy to make parts for aerospace and terrain vehicles, but it is also used as a powder for munitions and ration heating, as an alloying element in almost all aluminum alloys, as a desulfurization agent for steel, and as a consumable in the process of producing critical elements like titanium, hafnium, zirconium, boron, and beryllium.

Today there is no reliable primary pure magnesium metal production in all of the North Atlantic Treaty Organization, and the sole friendly nation with primary production capabilities is Israel, which in the past year, has become an increasingly turbulent region. The world is entering an era of great power competition, making this lack of Western supply even more concerning. Magrathea is reshoring magnesium production to ensure supply of this critical material is stable to underpin trillions of dollars of trade and U.S. national security.

This article is part of an occasional feature series in which *JOM: The Magazine* talks with industry leaders about technology developments and current issues. To suggest a candidate for a future issue, contact Kelly Zappas, *JOM: The Magazine* editor, at kzappas@tms.org.

ANNOUNCING EDITORIAL CHANGES FOR TMS JOURNALS

Kaitlin Calva



Significant changes are coming to two TMS journals at the start of 2025. **Tresa M. Pollock** and **Charles Ward** are stepping down from their editorial posts at the *Metallurgical and Materials Transactions* (MMT) family of journals and *Integrating Materials and Manufacturing Innovation* (IMMI), respectively. The December 2024 issues of these publications will be the last for these leaders. *JOM* talked with both outgoing editors for a look back on their work, milestones the journals have achieved, and their hopes for the future.

Continuing the Legacy of *Metallurgical and Materials Transactions*



To stay at the forefront of a rapidly evolving field, *Metallurgical and Materials Transactions* has undergone several evolutions itself. First known simply as *Metallurgical Transactions*, the journal was created when *Transactions of the Metallurgical Society of AIME* merged with the similarly themed *Transactions Quarterly* from the American

Society for Metals (ASM)—a publishing relationship that continues today. “The journals are managed jointly by TMS and ASM,” explained **Tresa M. Pollock**, University of California, Santa Barbara. “I am proud that they have contributed to the health of our professional societies.”

A few years later the journal entered a new phase when it split into *Metallurgical Transactions A* (focusing on physical metallurgy) and *B* (focusing on process metallurgy). And finally “Materials” was added into the journals’ titles, becoming what we recognize today as *Metallurgical and Materials Transactions A* (MMTA) and *Metallurgical and Materials Transactions B* (MMTB). Each journal has contributed to *MMT*’s legacy in its own way. “The journals have such a fantastic history of high-impact papers in the area of metallic materials. The giants of our field solidified the reputation of the journals with their high-impact publications,” Pollock added: “I have always appreciated the high standards of review at *MMT* along with the flexibility on paper length.”

Reflecting on her personal role with *the MMT* journals—first as an author and progressing to reviewer, associate editor, and finally serving more than eight years as principal editor—Pollock noted the many changes that have kept the journals at the forefront of the community. Early on, all editors were faculty members at Carnegie Mellon University. “During my time we have evolved to an international group of editors, with similar diversification of the origin of the authors who send us manuscripts.”

Despite this evolution, Pollock notes that the journals stay true to their roots and “continue to capture all the emerging topics in the field. Recent topics of high interest have been high entropy alloys, additive manufacturing, artificial intelligence/machine learning methods for materials, friction stir welding, and recycling and sustainability in materials processing.”

As for the future of *MMTA* and *MMTB*, Pollock hopes that they "continue to attract outstanding science and engineering papers that are at the leading edge of our field. I also hope that we publish greater numbers of papers and continue to grow the journals' Impact Factors." She added: "And I *really* hope that the junior professionals in our field engage with and publish in *MMT*!"

Making a New Mark with *Integrating Materials and Manufacturing Innovation*



In 2011, U.S. President Barack Obama launched the Materials Genome Initiative (MGI), and TMS again underscored its position as a leader in the materials science and engineering community with its efforts to support this initiative. Through an ad hoc committee, said **Charles Ward**, Air Force Research Laboratory (retired), TMS determined "that MGI's focus of integrating computation and experiment with a greater reliance on and sharing of digital data lacked a dedicated peer-reviewed journal" TMS filled the need in 2012 with *IMMI*, naming Ward as its first editor-in-chief. "Launching *IMMI* was both exciting in defining a unique set of aims and scope and building a world-class editorial board to guide me in its growth."

Introduced with an exclusively open-access publishing format, the journal initially aimed to support global open science initiatives—an aim that proved ahead of its time. After the journal changed to a hybrid publishing model, Ward observed that, "the tide is finally shifting, and the number of open access articles has increased significantly."

In 2015, *IMMI* proved itself ahead of the curve once more with the introduction of the Data Descriptor article. "We were an early adopter of this approach to provide the community with access to high-quality, well-described materials data. These articles have proven to be exceptionally well-received by the community, with an average lifetime citation total of 20 and a median citation total of 8.5 (per CrossRef)."

Over the next decade, *IMMI* continued to make its mark, proving the value of sharing what Ward calls, "the other tangible products of research, such as software, algorithms, experimental techniques, data, and application of methods," via peer-reviewed articles. "Not only is it important for authors to fully explain and share research tools and methods, but doing so via a peer-reviewed publication also incentivizes authors

to share them with the technical community. This also supports discoverability and research reproducibility, which are critical concepts in today's research environment."

Of his 12 years with *IMMI*, Wards says he is "proudest of my work with the Editorial Board in maturing the journal's scope to fill a need in the materials and manufacturing community by focusing on the tools, methods, and impact of digitally enabled materials engineering."

Looking to the Future of *IMMI*



In January 2025, **Taylor Sparks**, University of Utah, will step into Ward's editorial shoes after being involved with the journal as both an author and a member of the Editorial Board. "I'm confident that Taylor is exactly the right person to bring fresh ideas and energy to the journal, leading it to a new level of excellence and expanding its global reach in both

authorship and readership," said Ward.

"As a member of the Editorial Board, I've been actively involved in shaping the journal's vision, helping to ensure it remains at the forefront of materials informatics research. It's a thrilling time to be involved in digital materials science!" Sparks said, noting his hope to help the journal flourish alongside a rapidly growing and fast-paced field. "I am particularly excited about the growing focus on data-driven materials processing and manufacturing, which are becoming increasingly crucial to society. I am also eager to see the continued refinement and specialization of machine learning techniques across the informatics pipeline—from data collection to representation, algorithm development, and integration with materials science."

Ultimately, Sparks aims to expand the journal's presence while upholding its reputation in a few different ways. In terms of technical content, Sparks hopes "that *IMMI* can broaden its scope to include emerging topics while maintaining the visibility and impact of a high-Impact Factor journal." He also recognizes the importance of promoting articles as a way to deepen the journal's relationship with readers and solidify its standing within the materials science community. "By introducing innovative ways to engage with our content, we can expand our readership and strengthen the journal's influence."

Check future issues of *JOM* for more updates on the *MMT* editorial team and news from all TMS journals. Learn more about these journals, read past issues, and explore additional publishing opportunities at www.tms.org/Journals.

Kaitlin Calva is an independent contractor providing writing support for TMS and *JOM: The Magazine*.

TMS MEETING HEADLINES

Meeting information is current as of September 30, 2024. For the most recent updates on TMS-sponsored events, visit www.tms.org/Meetings.

TMS 2025 Annual Meeting & Exhibition (TMS2025)



March 23–27, 2025
Las Vegas, Nevada,
USA

Discount Registration Deadline: January 31, 2025

TMS offers discounted room rates and special benefits like reduced resort fees for conference attendees. Book through the TMS2025 website to ensure easy access to all on-site activities and to help TMS meet its financial commitments to the hotel.

www.tms.org/TMS2025

TMS Specialty Congress 2025



June 15–19, 2025
Anaheim, California,
USA

Discount Registration Deadline: April 30, 2025

The MDiscovery Challenge is set to take place during the TMS Specialty Congress 2025! This exciting machine learning challenge invites researchers, industry professionals, and students to predict properties such as hardness and electrical resistivity from process and microstructural data.

www.tms.org/SpecialtyCongress2025

TMS Fall Meeting 2025 at Materials Science & Technology (MS&T25)



September 28–
October 1, 2025
Columbus, Ohio,
USA

Abstract Submission Deadline: May 1, 2025

TMS presents robust programming, networking and social activities, and professional development events tailored to its members' interests within the broader structure of the MS&T conference series, giving members an opportunity to experience both their TMS community and the resources of all the MS&T partnering societies.

www.tms.org/TMSFall2025

OTHER MEETINGS OF NOTE



Extraction 2025 Meeting & Exhibition (Extraction 2025)

November 16–22, 2025
Phoenix, Arizona, USA

www.extractionmeeting.org/Extraction2025



TMS 2026 Annual Meeting & Exhibition (TMS2026)

March 15–19, 2026
San Diego, California, USA

www.tms.org/TMS2026



TMS Specialty Congress 2026

June 21–25, 2026
Anaheim, California, USA

www.tms.org/SpecialtyCongress2026

CO-SPONSORED MEETINGS

Offshore Technology Conference (OTC) 2025

May 5–8, 2025
Houston, Texas, USA
Co-sponsored by TMS

OTC Brasil 2025

October 28–30, 2025
Rio de Janeiro, Brazil
Co-sponsored by TMS

PRICM 12

August 9–13, 2026
Gold Coast, Australia
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