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

In Our Members' Words:

Celebrating the TMS Experience

tackled challengesmy professional homeI found friends and mentorsSUPErnew, innovative ideaskind

tremendous point of pride

always felt welcome and valued

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JOM THE MAGAZINE News and insights about TMS, its members, and the professions it serves

Volume 74 Number 3 March 2022

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ABOUT THE COVER



In the final article in our series celebrating the legacy that the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) began in 1871 and passed down to TMS today, JOM: The Magazine looks at the most crucial aspect of the Society: its members. We invited a diversity of members to share their own experiences of what TMS means to them-and included perspectives of TMS leaders who are no longer with us. Snippets of those reminiscences grace this month's cover. Turn to the article on page 6, "A Member-Driven Society: Celebrating the TMS Experience," to read and enjoy this collection of memories. Access the full series of JOM: The Magazine historical articles, along with an interactive timeline and other information on the shared legacy of AIME and TMS at www.tms.org/OurHistory.



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 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

"Just because you made a good plan, doesn't mean that's what's gonna happen." —Taylor Swift

Taylor Swift has conquered the popular musical world several times over. As a performer and cultural influence, she has proven an unstoppable force that, upon meeting an immoveable object, persuaded the immoveable object to willingly yield to her talent, insight, and business savvy. Did Ms. Swift set out to conquer the world in 2004 when she first performed as a 14-year-old at Nashville's Bluebird Cafe? I don't know, but I would not be the least bit surprised if she did. She's smart, and many in the smart set are avid planners. While the TMS Board of Directors once visited the Bluebird Cafe, albeit without Ms. Swift being on stage, our Board is very much among the planning set as well.

As I write, I have been in planning conversations with our new TMS President, Jud Ready of the Georgia Institute of Technology. The focus of the dialog is setting the groundwork for the TMS Board of Directors retreat that is to be held during July at TMS headquarters in Pittsburgh, Pennsylvania. The working plan is ambitious:

First, the Board will consider the TMS Vision and Mission Statements, which were originally adopted in 1997. The former is, "The vision of TMS is to be the professional society of choice for the worldwide minerals, metals, and materials community." The latter is, "The mission of TMS is to promote the global science and engineering professions concerned with minerals, metals, and materials." Much has changed technically, socially, and globally over the intervening 25 years, and the silver jubilee of the vision and mission statements seems an apt time for reflection and either reaffirmation or revision of both.

Second, the Board will consider an update to the TMS Aspires Strategic Plan, which is much more youthful at four years of age. A good strategic plan provides a guide star for an organization's navigation, and TMS Aspires has done just that for our Society. Recall that the plan comprises three goals:

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

It is an engaging plan, and the Board updates it frequently. The summer retreat provides another chance to continue this refinement.

Third, the Board will consider the question, "How do we prepare TMS for the postpandemic era when our meetings portfolio will have to include in-person only, virtual only, and combination in-person and virtual event options?" Presently, we are still in the reactive position of pivoting in-person meetings into either all virtual or blended in-person and virtual events. Eventually, we will be able to stop recasting meetings and once again develop and hold meetings according to plans as originally conceived. We now know that there are many advantages to a well-planned and well-executed virtual experience, not the least of which is the ability to engage participants who might not otherwise be able to attend in the conventional fashion. The Board will explore that and related emergent opportunities that are re-inventing the events field.

For an organization having roots that stretch back to 1871, TMS is not too old to take another lesson from Taylor Swift, who sang in the song "Innocent" from the album *Speak Now,* "Today is never too late to be brand new." Every time that TMS undertakes strategic planning, it makes the Society brand new. How very exciting for all of us! Volume 74 Number 3 March 2022



James J. Robinson Executive Director

<u>@JJRofTMS</u>

"Eventually, we will be able to stop recasting meetings and once again develop and execute meetings according to plans as originally conceived."



JOM TECHNICAL TOPICS



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

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

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Additive Manufacturing with Light Alloys

Scope: Additive manufacturing (AM) with light alloys, especially Al-based alloys, is both desirable and challenging. This is a rapidly growing research field with a clear impact on future manufacturing. Papers are presented on the development and adaptation of AM Al-based alloys, development of an AM process for mitigating technological issues such as hot and cold cracking, porosity, grain growth texture and compositional segregation, post-processing of AM parts, and advanced characterization and testing of AM parts.

Editors: Dmitry Eskin, Brunel University London Sponsor: Aluminum Committee

Advanced Functional and Structural Thin Films and Coatings

Scope: This special topic encompasses all aspects of advanced thin films and nanomaterials for modern optical, photonic, and electronic devices with applications in photovoltaics, sensing, and display technologies. It also addresses coating technologies and surface structuring for tools, as well as multifunctional biomaterials, innovative approaches to new concepts, and applications.

Editors: Ramana Chintalapalle, University of Texas at El Paso; Adele Carrado, Strasbourg University; Gerald Ferblantier, Strasbourg University; Karine Mougin, CNRS – IS2M; Heinz Palkowski, Clausthal University of Technology; and Nuggehalli M. Ravindra, New Jersey Institute of Technology

Sponsor: Thin Films and Interfaces Committee

Decarbonization of Pyrometallurgical Processes

Scope: Pyrometallurgical processes require energy to heat the feed material up to the temperature required for reactions and phase separation to occur. Additionally, pyrometallurgical processes can also require reductants for the desired reactions to proceed. This energy and reductant can be derived from a variety of sources, with hydrocarbons commonly used. This topic focuses on techniques and technology to prevent or significantly reduce CO₂ emissions.

Editors: Stuart Nicol, Glencore Technology, and Akbar Rhamdhani, Swinburne University of Technology Sponsor: Pyrometallurgy Committee

Powder Metallurgy of Non-Ferrous Metals: Striving Toward Technology Advancement

Scope: Papers are presented exploring topics such as: (i) powder processing of light and reactive metals, high entropy alloys, and functionally graded materials and composites, (ii) recent advances in powder consolidation processes, e.g., spark plasma and microwave sintering, powder forging and extrusion, and cold spray forming, (iii) manufacturability investigations, novel process development and robustness, and (iv) modelling and simulation. Editors: David Yan, San Jose State University, and Kathy Lu, Virginia Polytechnic Institute and State University

Sponsor: Powder Materials Committee

Recovery of Rare Earth and Critical Metals from Unconventional Sources

Scope: This topic presents submissions on science discoveries and emerging technologies that enable sustainable extraction, processing, and separation of rare earths and other co-product metals from unconventional sources, including but not limited to mine tailings, acid drainage, coal ash, and oil field brines.

Editors: Chukwunwike Iloeje, Argonne National Laboratory; Joseph Hamuyuni, Metso Outotec; Fiseha Tesfaye, Åbo Akademi University; and Alexandra Anderson, Gopher Resource

Sponsor: Process Technology and Modeling Committee, Energy Committee, and Recycling and Environmental Technologies Committee

Solid Freeform Fabrication 2021

Scope: The Solid Freeform Fabrication Symposium is a leading research conference dealing with all aspects of additive manufacturing. Selected papers from the conference will be invited and published on this topic. **Editors: David Bourell**, University of Texas at Austin **Sponsor:** Invited

TMS MEMBER NEWS



Share the Good News!

Contact Kaitlin Calva, *JOM: The Magazine* Principal Editor, at kcalva@tms.org to share your professional accomplishments. Please note that only news submitted by current TMS members will be considered.

TMS/ASM Joint Distinguished Lectureship in Materials and Society Award Recipient Announced



Iver Anderson, a TMS member since 1982, has been announced as the 2022 recipient of the TMS/ ASM Joint Distinguished Lectureship in Materials and Society Award for providing a broad range of leadership in mentoring and outreach spanning academia, transferring fundamental knowledge to applications, and encouraging

Iver Anderson

engagement in public policy. Anderson is a senior metallurgist at Ames Laboratory and an adjunct professor at Iowa State University.

This award recognizes an individual experienced in a policy-making role in the field of materials engineering for our nation and its industries—an eminent individual who has a perspective of how technology and society are affected by development in materials science and engineering. This award was established in 1971 and is considered a pinnacle award.

As the award recipient, Anderson will present a lecture during the All-Conference Plenary at the Materials Science & Technology 2022 (MS&T22) conference, scheduled for October 9–13, 2022, in Pittsburgh, Pennsylvania. Check the MS&T22 website at www.matscitech.org for future updates on Anderson's presentation and other program details.

Anderson is a recipient of the 1996 Alexander Scott Distinguished Service Award, the 2008 FMD Distinguished Scientist/Engineer Award, the 2014 Research to Industrial Practice Award, and is a 2015 TMS Fellow. He is an active TMS volunteer, having served on a variety of technical and functional committees and on the TMS Board of Directors.

TMS Members Honored by APS, S&P Global, and the Canadian Mining Hall of Fame

Eric Brown, executive advisor at Los Alamos National Laboratory, was selected for the 2021 American Physical Society (APS) class of Fellows. Brown received this award for his technical leadership, technical advances, and leadership and service to APS and the shock physics community. Brown is a 2017 Brimacombe Medalist and a recipient of the 2007 Structural Materials Division Young Leaders Professional Development Award. He currently serves as the director/chair of Public &



Eric Brown



David DeYoung

Governmental Affairs on the TMS Board of Directors.

David DeYoung, director of research & development (retired), Alcoa, received the Lifetime Achievement Award from S&P Global at the 2021 Platts Global Metals Awards for his outstanding contributions to the metals sector during his tenure at Alcoa. DeYoung is a long-standing TMS member, joining in 1981. He is a 2021 TMS Fellow and served as the 2017 TMS President.

Philip Mackey, president of P.J. Mackey



Philip Mackey

Technology Inc. and a TMS member since 1966, will be welcomed into the Canadian Mining Hall of Fame as a member of the 2022 class. Mackey is a recipient of the 2007 EPD Distinguished Service Award, the 2020 EPD Distinguished Lecturer Award, and is a 2010 TMS Fellow.

Congratulations to these TMS members on their outstanding achievements!

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A Member-Driven Society: Celebrating the TMS Experience

Kaitlin Calva

catalyzed my activity

many fruitful discussions graciously giving credit to others changing with the times one of the conferences I run into p

lagnesium

a funny story

most pleasant memories are the people I have met

exactly 50 years to the day of my first paper

26.982 Aluminium

In its 150-year history, the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) has taken many shapes. There have been Local Sections, Committees, **Divisions, Constituent Societies, and** now, separately incorporated Member Societies supported by AIME. As one of the four Member Societies. TMS has also evolved time and again, adapting not only to world events, but more importantly, to the needs of its members. At every step of the way, changes within TMS have been driven and shaped by the membership predominantly through the work of volunteer committees and board actions informed by member interest and insights.

63.546

Copper

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41



22

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"A Member-Driven Society: Celebrating the TMS Experience," is the eighth and final article in a feature series highlighting the 150th anniversary of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) and TMS. The first article appeared in the March 2021 issue of *JOM*, with additional articles scheduled throughout 2021 and 2022. For more information, contact Kaitlin Calva, *JOM: The Magazine* Principal Editor, at kcalva@tms.org.

Meet the Interviewees



Corbett Battaile Principal Member of Technical Staff, Sandia National Laboratories *TMS Member since 2010; Past Chair, TMS Materials Processing & Manufacturing Division*



Phillip Mackey President, P.J. Mackey Technology Inc. *TMS Member since 1966; 2010 TMS Fellow*



Clinique Brundidge Lead Materials Scientist TMS Member since 2006; Vice Chair, TMS Diversity, Equity, and Inclusion Committee



Judy Schneider Professor, University of Alabama in Huntsville TMS Member since 2003; Current TMS Board Content Director/Chair



Abby Rose Cisko Research Mechanical Engineer, U.S. Army Engineer Research and Development Center *TMS Member since 2018; Chair, TMS Young Professionals Committee*



Blythe G. Clark R&D Department Manager, Sandia National Laboratories *TMS Member since 2014*



8

Fiona Doyle Professor Emerita, University of California, Berkeley TMS Member since 1983; 2021 TMS Fellow



Taylor Sparks

Associate Chair of Materials Science & Engineering, University of Utah TMS Member since 2014; Organizing Committee Chair, First World Congress on Artificial Intelligence in Materials and Manufacturing



Garry Warren

Professor Emeritus, Department of Metallurgical and Materials Engineering, University of Alabama *TMS Member since 1979; 2011 TMS President; 2015 AIME President; Past AIME Trustee; Current Chair, TMS Foundation Board of Trustees*



Janelle P. Wharry Associate Professor, Purdue University

University TMS Member since 2009; 2018 TMS Young Leader; 2021 TMS Young Leaders International Scholar



"TMS members always look forward to annual networking events hosted by alumni. Reconnecting with colleagues is essential during TMS annual meeting week." said Clinique Brundidge, pictured, far left, at a joint event for The Ohio State University and University of Michigan alumni.

In this final article celebrating the legacy that AIME began in 1871 and passed down to TMS today, *JOM: The Magazine* looks at the most crucial aspect of the Society: **its members**. The member-driven nature of our organization is not just how we survive, but how we thrive. As a fitting capstone to our historical article series, we invited a diverse group of members to share their own experiences of what TMS means to them. We have also included perspectives from a few TMS leaders who are no longer with us, who have made a lasting impact on the Society's member-focused culture. Read on for this collection of memories.

JOM: How did you first get involved with TMS?

Corbett Battaile: That's actually a funny story. One of my first TMS meetings was the 2004 Annual Meeting in Charlotte, North Carolina. I'd been at Sandia National Laboratories (and out of graduate school) about five years. In the weeks leading up to the meeting, my mentor, Liz Holm, suggested I "drop in" on the Computational Materials Science and Engineering Committee meeting. So, I did, and several of my senior colleagues were in attendance. Tony Rollett was the outgoing chair of the committee, and his vice chair was no longer active. Most of the other members in attendance had already served as chairs in the past, with the exceptions of Diana Farkas and me. She agreed to serve as vice chair if I would serve as chair. (Pending the official vote, of course!) Mind you, I was new to TMS, and this was my first committee meeting ever. I left the meeting that night as the new chair of the committee, and never looked back! (Though I did bug Tony a lot for help in climbing the learning curve!)

Clinique Brundidge: I was encouraged to join TMS by my research advisor, Tresa Pollock, in 2007. This was during my second year as a doctoral student at the University of Michigan—Ann Arbor.

Abby Rose Cisko: In graduate school, my advisor first introduced me to TMS and encouraged me to submit a poster and attend. This was my first conference, and I was completely in awe of all the interesting research going on that I had no idea about. Since that initial meeting, I have become more involved and continue to be impressed with all the research that is presented at the annual meetings.

Blythe G. Clark: I presented at a TMS conference as a graduate student, on *in situ* TEM results from my thesis research.

Fiona Doyle: Shortly after coming to the United States as an assistant professor in 1983.

Philip Mackey: As graduate students in the 1960s, we were encouraged to join both AIME, as it was called then, as a well as The Australasian Institute of Mining and Metallurgy. I joined AIME-TMS in 1966 and started to receive the *Journal of Metals* and *Transactions of AIME*, which I read cover to cover.

Subsequently, my first employer, Noranda Research Centre of Montreal, Canada encouraged new engineers to attend the AIME annual meetings and supported us in submitting papers. The 99th Annual AIME Meeting, held in Denver, Colorado in 1970, was my first TMS-AIME meeting. Here, I presented a paper on aspects of my recently completed Ph.D.

FIONA DOYLE TMS FELLOW-CLASS OF 2021

Fiona Doyle joined the ranks of TMS Fellows during the TMS-AIME Awards Ceremony held during the TMS2021 Virtual Annual Meeting & Exhibition. On receiving her award, she said, "TMS has been vital to my professional success, both as a source of cutting-edge technical material, and as a professional community where I found friends and mentors and learned indispensable skills. I have always felt welcome and valued—something for which many female engineers of my generation had to struggle."

thesis. I have remained active with TMS ever since—it is an unbelievable organization for members with up-to-date technical information and providing huge networking opportunities—this is extremely important.

Judy Schneider: After beginning my academic career, I looked at various technical societies that captured my research interests and selected TMS as one where I wanted to become active.

Taylor Sparks: I joined TMS as a newly minted assistant professor of Materials Science and Engineering.

Garry Warren: I first got started in TMS by presenting papers at the annual meeting as a graduate student working under Milton Wadsworth at the University of Utah. Milt was elected TMS president while I was his graduate student.

Janelle P. Wharry: Early in my career, I filled out a TMS volunteer survey to indicate my interest in joining a functional committee. I was surprised to get appointed to the Education Committee. That catalyzed my activity on technical committees and symposium organization.

JOM: What is your favorite memory associated with TMS?

Battaile: My first annual meeting in 2004 was certainly memorable, but I think my favorite TMS memories were from my service on the TMS Board of Directors as the Materials Processing & Manufacturing Division Director. Those experiences were invaluable in several ways, ranging from the camaraderie among the board members, to the opportunity to assist the society in such an impactful capacity. I've also really enjoyed the mentoring activities I've participated in, including the Meet a Mentor events and the Leadership Development Initiative.



Corbett Battaile (left, facing camera) offers encouragement and insights to early career professionals at a TMS Meet a Mentor event.



Abby Cisko (far right) meets up with friends and colleagues at the TMS 2019 Annual Meeting & Exhibition in San Antonio, Texas

Brundidge: I especially enjoy the networking events at TMS. I'm very appreciative of the opportunities to engage with TMS leadership.

Cisko: I would have to say that my favorite memory would be the ability to catch up and see old classmates, mentors, and former members of my research group. Although this isn't just one memory, every year TMS seems to be one of the conferences I run into people the most. It's awesome to get to see people I went to undergraduate school with or were in my research group and see what they are working on now and how they have been.

Clark: One of my favorite memories was attending the third TMS Diversity Summit. I learned so much from the speakers and fellow attendees, and it was nice to have the chance to network with other members.



Attending Diversity in the Minerals, Metals, and Materials Professions 3 (DMMM3), pictured above stands as one of Blythe Clarke's favorite TMS experiences. Established in 2014, the Diversity Summit series has been a catalyst for thought and action for TMS and its members on diversity, equity, and inclusion topics.

Doyle: The opportunity to work with incredible leaders in the Extraction & Processing Division (EPD), and see how they tackled challenges, while graciously giving credit to others when things worked out well.

Mackey: I have many fond memories of TMS-AIME; it is difficult to pick a favorite, so here are two. My firstever TMS paper was at the 1970 TMS-AIME Annual Meeting. I was to give the first paper after the morning coffee break. As delegates were settling in minutes before the session opened, I noticed from my front row seat that a well-known professor of extractive metallurgy specializing in process modelling was sitting behind me. I overheard him comment to his colleague beside him, "This next paper should be good-they do high-quality, innovative work at the University of New South Wales." I have to say that on hearing this by accident, it lowered my level of nervousness somewhat. The paper was well-received, I recall, and I think I also met his expectations-and actually had many fruitful discussions with him over the years.

My other favorite memory is from 2020, exactly 50 years to the day of my first paper in 1970. This was at the TMS 2020 Annual Meeting & Exhibition in San Diego, California, where I had the honor to present the EPD Distinguished Lecture that year as the opening lecture at Lead-Zinc 2020-the 9th International Symposium on Lead and Zinc. It was, I felt, well received. At the beginning of the lecture, I mentioned the support I had received over the years from my wife, Angele Blais, who was also in the audience. She received a standing ovation—what a nice memory.



Philip Mackey counts receiving the Extraction & Processing Division's Distinguished Lecture Award as one of his favorite TMS memories. He is pictured above, delivering his presentation as a part of the 9th International Symposium on Lead and Zinc at the TMS 2020 Annual Meeting & Exhibition.

Honoring a TMS Legacy J. Keith Brimacombe 1993 TMS President



"And what about TMS? Where would our Society be without volunteers? Quite simply, it would not exist...The effective operation of TMS, focused on the needs of the materials professional, also relies on a cadre of volunteers around the world who are dedicated to the wellbeing of the profession and the industry it serves. Volunteers work on technical committees of the divisions and on the divisional councils to organize symposia, publications, and continuing education programs. Volunteers serve on the TMS Board of Directors and are concerned with student affairs, professional development, honors and awards, and TMS finances, as well as the areas indicated above. It is these volunteers from the grassroots of the materials profession, working closely with the TMS staff, who are the strength of the Society. TMS is member-focused and member-driven."

> Excerpted from Brimacombe's presidential perspective, "On Volunteers."

Schneider: It is hard to describe a favorite memory, as each meeting always brings new, fresh interactions. I think the feeling was experienced shortly after joining TMS and coming to a technical meeting where I saw many former colleagues from industry. We had all left industry about the same time to pursue graduate studies and here we were all convened as if no time had elapsed!

Honoring a TMS Legacy

Stanley M. Howard 2016 TMS President



"John Hager informed me in 1968, as his graduate student at Colorado School of Mines, that I would be saying 'yes' to TMS service for many years to come. He mentored me during my early career and urged me to participate in a number of the many activities at TMS, and I urge you to do the same for your young charges and notso-young associates; otherwise TMS is just a meeting, or an e-mail, or a website. TMS can only function effectively with a cadre of dedicated and talented volunteers, who we fortunately have in great abundance... Through service, volunteers become better professionals through the opportunities afforded them. I have gained much more than I have given. Thank you for this very much appreciated recognition. However, the greatest honor has been simply to serve our fantastic minerals, metals, and materials society. I love TMS."

-Excerpted from Howard's speech accepting the 2021 Alexander Scott Distinguished Service Award at the TMS 2021 Virtual Annual Meeting & Exhibition TMS-AIME Awards Ceremony.²



University of Michigan graduate students get together at the TMS 2009 Annual Meeting & Exhibition in San Francisco, California. Pictured, left to right, are Janelle Wharry (now at Purdue University), Jessica TerBush (now at the University of Illinois), Anne Campbell (now at Oak Ridge National Laboratory), and Elaine West (now at Naval Nuclear Laboratory).

Sparks: The first TMS meeting I attended was the TMS 2014 Annual Meeting & Exhibition. My department chair and other colleagues had suggested I attend some of the committee meetings in order to get more involved. I was pretty shy back then, but, luckily, I ended up chatting with some kind stranger in the hallway and he offered to come with me as we walked in on one of those meetings. I think we actually joined one of the executive meetings, which are typically not open to the public. But, the folks there— including Chuck Ward, John Allison, Greg Olson, Liz Holm, and others—were super kind and allowed us to stay. It kicked off a long series of interactions with the Society that has come to feel like my professional home.

Warren: I'm in real trouble if I have to pick a single "favorite" memory of TMS. I'm tempted to say that it was my first annual meeting presentation as a graduate student, before 200+ people. But the most pleasant memories are the people I have met, including famous names in metallurgy. I'm grateful to be among those who knew Keith Brimacombe. What a dynamo he was!

Wharry: Seeing my first Ph.D. student present his research for the first time at a TMS annual meeting was a tremendous point of pride. It helped me see how far I had come from when I was a nervous graduate student attending my first TMS conference.

JOM: What do you see as the future direction of TMS?

Battaile: I think one of the key elements—from the Materials Processing & Manufacturing Division's (MPMD) perspective—is the growing presence of computational materials, ICME, machine learning, and other computer-based technologies for materials science. The MPMD is carefully considering how best to coordinate these technical topics and how they can add maximum value for the Society, its programming, and its members.

Honoring a TMS Legacy Julia R. Weertman First Female TMS Fellow (1993)



"In the early days of my professional life I was almost invariably the only woman in the audience of a technical session or serving on a materials-related committee. Now there is an appreciable number of women participating at such events. (Not enough yet, but a great improvement over the situation a few decades ago.) The TMS Ellen Swallow Richards Diversity Award celebrates the achievements of the many who have worked over the years to increase diversity in MSE. My acceptance of this award is on behalf of all those individuals and institutions."

-Excerpted from Weertman's comments accepting the 2015 Ellen Swallow Richards Diversity Award.

Brundidge: TMS has many great programs geared toward making progress in materials science and materials engineering, as well as professional development. TMS is also taking diversity and inclusion very seriously, which will positively grow the underrepresented membership and increase the diversity of thought.

Cisko: I think the future of TMS will continue to be excellent research but also, changing with the times. I think the organization's push for diversity and

inclusion is one of the reasons I enjoy it so much. When I went to graduate school, I was the only girl in my research group. Seeing TMS effort to make sure different genders, ethnicities, and backgrounds are all able to come together in the name of really cool research is awesome.

Clark: I'm excited for how TMS is being a leader in terms of diversity, equity, and inclusion.

Mackey: A huge energy and material transition is now underway as the world begins, in earnest, what I consider will be the lengthy process of decarbonization. The entire metals industry is part of the solution to climate change and our industry will undergo significant technology change in the future as well, while providing the metals required. I believe TMS can pay a bigger role in this transition than we see today. I feel that new, innovative ideas are needed to properly define the best role for TMS in this process.

Doyle: Climate change is necessitating dramatic shifts in energy production, storage, and transportation, to name a few. Many of these shifts will require new materials. I see TMS as being uniquely positioned to make projections about the future needs of essential commodities, such as lithium, while also serving as a leader in securing global supplies of these commodities.

Schneider: I am encouraged by the leadership in TMS in tracking trends in the materials field. This helps me concentrate on research directions I should be exploring.

Wharry: My hope is for an even more inclusive Society that offers equity of opportunities for development, leadership, and visibility for all throughout the materials profession.

Sparks: As somebody working in the field of materials informatics, I'm obviously really excited about the possibilities of artificial intelligence in materials research. At the same time, solutions to global health, energy, water, and other challenges all rely on minerals, metals, and materials. So, I foresee a future where we modernize and bring renewed innovation to the legacy disciplines of extractive metallurgy and mineral processing.

Warren: With confidence, I believe that our AIME forebears have laid a foundation that will help TMS prepare for any eventuality.

References

- 1. "TMS News," JOM, 45, 57 (1993).
- 2. Kaitlin Calva, "Honoring Stanley Howard, a True Friend to TMS," *JOM*, 73, 2268 (2021).

ANNOUNCING THE 2022 TMS AWARD RECIPIENTS

MEGAN ENRIGHT





2023 TMS AWARDS NOMINATIONS DUE APRIL 1

Do you have a colleague who has made a significant impact on their field? Have they been of great service to their community or to TMS? Honor their contributions and recognize their work by nominating them for a 2023 TMS award.

The nomination deadline for most 2023 TMS awards is April 1, 2022.

Visit **awards.tms.org** to explore the many honors and awards available through TMS and to learn more about the nomination process. For additional information, contact Deborah Hixon, TMS Awards Program Manager, at hixon@tms.org.

Providing encouragement and highlighting role models that embody the hard work, dedication, and success of members of the minerals, metals, and materials field is a crucial way that conferring TMS awards advance the profession. These honors span the full gambit of career stages by celebrating everything from outstanding lifetime contributions to the field, to the achievement of those whose careers are just getting started. Publicly honoring award recipients aids in the advancement of the entire community through career growth, methods to share knowledge, and opportunities to inspire others to reach for new heights.

This article highlights the Society-level awards which were conferred during the TMS–AIME Awards Ceremony at the TMS 2022 Annual Meeting & Exhibition (TMS2022) in Anaheim, California held from February 27-March 3, 2022. Visit www.tms.org/TMS2022 for additional information.

SOCIETY AWARDS

2022 TMS FELLOWS

The class of Fellow is TMS's highest honor. To be inducted, a candidate must be recognized as the leading authority and contributor to the practice of metallurgy, materials science, and technology, with strong consideration given for outstanding service to the Society.



Eduard Arzt

Professor, Leibniz Institute for New Materials

Citation: For acting as a bridge between US and European materials research, global leadership, seminal contributions to the field, and leading major materials

research institutes.

"I am thrilled to receive a 2022 TMS Fellow Award and hope very much that in-person proceedings will be possible. It is a great privilege for us scientists to be able to live in a world where ideas flow freely across boundaries and to entertain international ties on a professional and on a personal level. TMS with its international outlook greatly underpins our efforts to promote worldwide science solutions and, in the process, international understanding."



Jiann-Yang (Jim) Hwang Professor, Michigan Technological University

Citation: For pioneering research on microwave-assisted metallurgy, for outstanding innovations on mineral processing, for exceptional leadership

and service to TMS, and for excellent student mentoring.

"TMS for the last 30 years has been the place for me to communicate with colleagues, introduce my students, and serve the community through creating various platforms for new technology developments. This Fellow Award shows my efforts and contributions to the minerals, metals, and materials field has been recognized. I am very grateful to my colleagues and the Society, especially to those who have been working closely with me in the EPD division."



John Lewandowski Distinguished University Professor and Arthur P. Armington Professor of Engineering II, Case Western Reserve University

Citation: For sustained research, teaching, service, and mentoring

activities related to the areas of processing/structure/ mechanical property relationships on conventional and advanced structural materials.

"This award gives me the opportunity to thank my family and the many TMS members and other colleagues that have provided great support and mentorship over the years. Professionally, this includes those at CMU and Cambridge University as well as those at CWRU for more than 35 years. I have appreciated the financial support from various agencies, companies, and benefactors to enable me to work with such great colleagues and students. I look forward to continuing such interactions and will strive to provide guidance to others in a manner that I have been fortunate to have experienced."



Ju Li

Professor, Massachusetts Institute of Technology

Citation: For ground-breaking work on understanding the fundamental properties of ultra-strength materials and development and implementation of

elastic strain engineering.

"I am honored and humbled to be in the TMS Fellow class of 2022. TMS has played a key role in my career development, for which I'm forever grateful."



Zi-Kui Liu

Dorothy Pate Enright Professor of Materials Science and Engineering, Pennsylvania State University Citation: For seminal contributions to fundamentals of thermodynamics and development of computational

approaches and tools for predictions of properties and design of materials.

"I am honored in receiving the TMS Fellow Award. I would like to thank TMS for providing all the terrific professional services to its members and the materials community, which have enabled me to interact with many great scientists, shape my

research programs, and enhance my contributions to our community. I am very grateful for all my current and former students and research fellows for their willingness and dilgence in working with me, so many wonderful collaborators who have been sharing their scientific insights with our group, excellent administrative supports from the Pennsylvania State University at all levels, and the foundational and inspirational education that I received in China and Sweden that drives my curiosity."



Kathy Lu

Professor, Virginia Polytechnic Institute and State University

Citation: For seminal contributions to the fundamental and applied research of materials science and engineering, especially regarding materials synthesis,

processing, and performance in demanding environments. "This award is the highest honor and recognition for my contribution to the fundamental and applied research of materials science and engineering, especially regarding materials synthesis, processing, and performance in demanding environments."



Jan D. Miller

Ivor D. Thomas Distinguished Professor of Metallurgical Engineering, University of Utah

Citation: For seminal contributions to the characterization and understanding of interfacial phenomena in mineral

processing and extractive metallurgy as well as associated mentoring and teaching.

"It is a special pleasure to be selected as a TMS Fellow and to be included with such a distinguished group of individuals. For many years TMS has provided important venues to communicate significant research results, thus facilitating advances in science and technology. The TMS opportunities to publish/present research results are greatly appreciated, and extend to many of our students, representing an important aspect of their education."



Amit Misra

Professor and Department Chair, University of Michigan Citation: For pioneering research in nanomechanics and interface-enabled mechanical behavior and radiation effects in multiphase and multilayered

materials, professional leadership, and mentoring of early career scientists.

"I feel honored to be recognized with the TMS Fellow Award and am grateful for the support from my colleagues, friends, and family, and very thankful of the TMS awards committees and my nominators and letter writers. I thank TMS for being a champion for metallurgy and structural materials research and providing the platform for my continued professional development since I was a graduate student."



Anil Sachdev

Patrice Turchi

Lab Group Manager, General Motors Global Research and Development Citation: For contributions to implementing lightweight products through computational materials

engineering and for efforts to globalize materials research.



Senior Scientist, Lawrence Livermore National Laboratory

Citation: For exceptional and pioneering contributions in electronic structurebased theories of alloys, world-class leadership to promoting materials

science, and tremendous involvement to professional societies.

"I am grateful and humbled by this honor bestowed by my colleagues, and I am honored to have my name included in the list of those who were presented in the past with the TMS Fellow Award. By virtually every measure, it is easy to recognize that TMS remains the society of choice for everything that deals with minerals, metals, and materials, and that spans from extraction to recycling with all the scientific and engineering science in between, like I have said for more than 30 years now. For these reasons, I remain very attached to what this professional scientific society has to offer to us as a community of scientists and will continue to do my best to honor what this award really means."

2022 BRIMACOMBE MEDALISTS

This mid-career award recognizes individuals with sustained excellence and achievement in business, technology, education, public policy, or science related to minerals, metals, or materials science and engineering, and a record of continuing service to the profession.



Megan Cordill

Deputy Director, Erich Schmid Institute for Materials Science, Austrian Academy of Sciences

Citation: For sustained excellence and achievement in the science and technology of mechanical behavior of thin films and an

exceptional and continuing service to the profession. "TMS is my home society and being recognized by my peers for scientific achievement is an honor."



Michael Demkowicz Associate Professor, Texas A&M University

Citation: For atomistic modeling of interface structures and defect interactions for nuclear energy and structural applications, and professional

service to TMS and the materials research community.

"TMS is a vibrant community of scientists and engineers at the frontiers of materials research and development. It is my great honor that this community has chosen me to receive the Brimacombe Medal. I am especially grateful to all those who mentored, supported, and encouraged me throughout my career."



Khalid Hattar

Center for Integrated Nanotechnologies Scientist, Sandia National Laboratories

Citation: For extensive contributions to understand material response under extreme environments through the

development of in-situ microscopy capabilities. And for outstanding mentorship of next-generation materials scientists.

"I am humbled and honored to join the long list of amazing scientists and engineers to be named J. Keith Brimacombe Medalists. I highly value my TMS membership which has provided exceptional professional opportunities, thought provoking and career altering discussions, sparks that ignited several decade-long and extremely fruitful collaborations, and many fond memories of the last amazing conference before the world shutdown. I would be amiss not to thank my mentors, colleagues, friends, post-docs, student interns, and especially my family, as without their patience and support none of my career accomplishments would be possible."



Edward Herderick

Director of Additive Manufacturing, The Ohio State University Center for Design and Manufacturing Excellence Citation: For exemplary leadership and contributions to the industrialization of Additive Manufacturing and service to TMS.

"I am thrilled to join this year's class of Brimacombe Medalists and am grateful and appreciative of TMS and my colleagues, collaborators, and students over the years who have made it so much fun and rewarding to pursue a career in materials science and engineering. I really believe that the TMS community has the tools and knowhow to address societal challenges through collaboration and developing the next generation in our profession. Legendary Ohio State football coach Woody Hayes had a saying: "Pay it Forward" and I think that Keith Brimacombe would have really loved that sentiment. I'm looking forward to doing that with my fellow TMS members for years to come."



Peter Hosemann Professor, University of California, Berkeley

Citation: For contribution to micro and macroscale mechanical testing of irradiated materials and in-situ materials testing and continued dedication to TMS

and education.

"TMS has been my professional home ever since I entered the profession as a material scientist and has been instrumental in my professional development ever since. The inclusive and bottom-up nature of TMS as an organization makes it a very welcoming Society. The Brimacombe Medal reflects this environment very well and as such I am extremely thankful and humbled to receive this award. I thank TMS, my colleagues, friends, and family for their support over the years who enabled me to work in my profession and I am looking forward to many TMS events and engagements in the future."



Jun Lou Professor, Rice University

Citation: For sustained contributions to the development of low-dimensional materials and the understanding of their complex electro-chemical and mechanical behaviors, and for dedication

to service.

"It is a great honor for me to receive the prestigious Brimacombe Medal this year. TMS has played a very important role in my academic career development, including delivering my first ever conference presentation twenty years ago, receiving a young leaders award, organizing several exciting symposia with outstanding speakers and participants, and providing a vibrant professional community I call an intellectual home. I look forward to continuing active engagement with TMS in the years to come."



Akane Suzuki

Principal Engineer, GE Research

Citation: For sustained development of high-temperature alloys for critical components of aircraft engines and power generation gas turbines and advancing understanding of their

operational life-limiting behavior.

"I am truly honored and grateful to receive the TMS Brimacombe Medal. I am fortunate to be a part of TMS and thankful for the tremendous opportunities it provides through conferences and technical committee activities. I wish to thank my colleagues, peers, and mentors for their support, encouragement, and inspiration."



Michael Tonks Professor, University of Florida Citation: For contributions in computational materials science

computational materials science approaches for materials in harsh environments.

"TMS is an excellent professional society and my membership in it has had a large impact on my career. I am honored and humbled to be recognized by them as a Brimacombe Medalist."

ALEXANDER SCOTT DISTINGUISHED SERVICE AWARD

Recognizing a member's outstanding contributions to TMS, this award is typically presented for 10 or more years of TMS service in membership development, student chapters, education, and professional affairs, and/or other Society-level activity.



Carl Cady

Research Engineer, Los Alamos National Laboratory

Citation: For dedicated and sustained service to TMS and its members, particularly to improvements in the quality of programming at TMS annual

meetings and at Materials Science & Technology conferences.

"It continues to be my honor to work with so many colleagues and TMS staff that give their time and energy to make our Society better. The relationships that I have developed with other volunteers have been beneficial in my career development, both in the information and knowledge that is shared by more personal interaction, but also in having a broader network of contacts within our field...I am honored to be given this award because it means that I have contributed to the success of our Society. I hope that I can inspire others to do more. Your efforts will also be rewarded as mine have."

JULIA AND JOHANNES WEERTMAN EDUCATOR AWARD

This award recognizes an individual who has made outstanding contributions to education in metallurgical engineering and/or materials science and engineering.



Gregory Olson

ThermoCalc Professor of the Practice, Massachusetts Institute of Technology Citation: Pioneering contributions and leadership in the integration of materials design into the undergraduate engineering curriculum.

"I will always be grateful for the advice and support of Hans and Julia during my transition from researcher to educator, tackling the prescient challenge of teaching computational materials design to undergraduates some 30 years ago."

LEADERSHIP AWARD

This award recognizes an individual who has demonstrated outstanding leadership in the national and international materials community.



Steven Zinkle

Governor's Chair Professor, University of Tennessee

Citation: For research leadership utilizing microstructure/property relationships that has enabled improved understanding of operational limits and design strategies for

high-performance radiation-resistant materials. "My research career has been integrally connected with TMS, beginning with my first technical presentation at a joint TMS/ASM Fall meeting when I was a 2nd-year graduate student. I have enormously benefited from the personal interactions and technical insights gleaned from TMS meetings. I am, therefore, deeply grateful for being recognized with the TMS Leadership Award."

RESEARCH TO INDUSTRIAL PRACTICE AWARD

This award recognizes an individual who has demonstrated outstanding achievement in transferring research results or findings into commercial production and practical use.



Oden Warren

General Manager, Bruker Nano Surfaces Division

Citation: For the development of advanced commercial nanomechanical testing instrumentation and experimental techniques to determine structure-

mechanical property relationships in materials.

BRUCE CHALMERS AWARD

Honors outstanding contributions to the science and/ or technology of materials processing by an individual.



Carl Thompson

Stavros Salapatas Professor of Materials Science and Engineering, Massachusetts Institute of Technology Citation: For pioneering scholarly work defining the processing-structureproperty connections in thin-film and

small-scale metallic materials broadly impacting the microelectronics industry.

"I am deeply honored to have been chosen for this award. While Professor Chalmers' own research focused on solidification, his fundamental focus was on linking new insights into the mechanisms of structure evolution, to new ways of making materials that achieved engineering goals. He was an early practitioner and advocate for this approach that now forms the basis of materials science and engineering as we know it today, whether it involves development of the scientific basis for processing of ingots or thin films."

MORRIS COHEN AWARD

This award recognizes an individual who has made outstanding contributions to the science and/ or technology of materials properties. The award includes a life membership to TMS.



Huseyin Sehitoglu Professor, University of Illinois at Urbana-Champaign Citation: For outstanding lifelong

contributions to the understanding of the fatigue of metals.

"It is an honor to receive this TMS award paying tribute to Morris Cohen whose papers I have

studied and learned from, especially on the role of stress state on phase transformations. His papers on the role of transformation dislocations helped me formulate the energetics of transformation in my own work on shape memory alloys. It is especially rewarding to receive this award from TMS considering their very high standards."

CYRIL STANLEY SMITH AWARD

This award recognizes outstanding contributions to the science and/or technology of materials structure.



Gregory Olson

ThermoCalc Professor of the Practice, Massachusetts Institute of Technology Citation: Pioneering contributions in materials design methodologies using a systems-based approach to accelerate materials development.

"This award has a very special meaning to me. Through inspiring interactions with Cyril in the 1980s, his vision of a systems approach to hierarchical microstructure formed the foundation of the materials design methodology on which my career has been based."

OLEG D. SHERBY AWARD

This award recognizes an individual, or small group of collaborators, who has made significant contributions to the understanding of the behavior of materials at high temperatures.



Michael Kassner Professor, University of Southern California

Citation: For outstanding work and contributions to the study of creep and high temperature plasticity including his seminal book "Fundamentals of Creep in

Metals and Alloys".

"I have been a member of TMS for over 40 Years. I love the organization."

WILLIAM HUME-ROTHERY AWARD

Awarded in recognition of exceptional scholarly contributions to the science of alloys.



Anton Van der Ven Professor, University of California, Santa Barbara

Citation: For distinguished contributions to computational materials science and application of first-principles statistical mechanics methods to predict properties

of alloys, oxides, and battery materials. **Presentation:** "Study of Ferroelectricity and Phase Transitions in Hafnia"

INSTITUTE OF METALS LECTURER & ROBERT FRANKLIN MEHL AWARD

This award recognizes an outstanding scientific leader by inviting them to present a lecture at the Society's Annual Meeting on a technical subject of particular interest in the materials science and application of metals program areas.



Ke Lu

Director, Institute of Metal Research Citation: For his seminal contribution to the understanding of the mechanical behaviors of nanostructured metals and his worldclass leadership of materials research. "The TMS 2022 IOM Lecture/Mehl

Award is an extraordinary recognition for me. I am deeply humbled to join the stellar awardee list over the past 100 years, in which many names I learned are from textbooks of materials science and engineering. It is an extra honor for me to follow T.S. Ke, one of key pioneers of materials science in China and a distinguished predecessor of my institute, to receive this prestigious award. I am inspired by this award to deepen explorations in the rich territory of structural materials, especially metals and alloys, and to promote future generations."

Presentation: "Schwarz Crystal Structures in Extremely Fine-Grained Metals"

ELLEN SWALLOW RICHARDS DIVERSITY AWARD

This award recognizes an individual who, in the remarkable pioneering spirit of Ellen Swallow Richards, has helped or inspired others to overcome personal, professional, educational, cultural, or institutional adversity to pursue a career in minerals, metals, and/or materials.



Cammy Abernathy Dean, University of Florida

Citation: For seminal contributions in compound semiconductor processing and efforts to eliminate institutional barriers to achieve the exemplar model for diversity, equity, and inclusion. "It is an incredible honor to receive this award. Ellen Swallow Richards was an inspiration for so many young women at MIT and in the field of materials. Though there is certainly more to be done, it is greatly fulfilling to see how our discipline has grown in importance and diversity over the decades since her trailblazing career. I am very grateful to TMS and to Jeffery and Geraldine McCulley Wadsworth for bringing special attention to the importance of diversity, and I am truly humbled to be considered among those who have helped to advance our discipline in this regard."

WILLIAM D. NIX AWARD

This award is established to honor William D. Nix and the tremendous legacy that he has developed and shared with the minerals, metals, and materials community, and to highlight and promote continued progress and innovation relevant to research into the underlying mechanisms and mechanical behavior of macro-, micro-, and nanoscale materials.



Huajian Gao Distinguished University Professor, Nanyang Technological University Citation: For seminal contributions to the mechanics of engineering and biological materials at multiple length scales, and

for mentoring exceptional members of the next generation of scientists.

"William Nix was my mentor and role model throughout my career. It is with enormous gratitude that I accept this award in his honor." **Presentation:** "Mechano-materials: Engineering Mechanical Properties of Materials with Internal Interfaces and Lightweight Structures"

SADOWAY MATERIALS INNOVATIONS AND ADVOCACY AWARD

This award recognizes a mid-career individual with impactful and broad materials science and engineering achievements and a unique ability to champion their work and the materials science and engineering field through education, public advocacy, or entrepreneurship, particularly in areas related to sustainability.



Elsa Olivetti Associate Professor, Massachusetts Institute of Technology

Citation: For leadership and innovative and pioneering work for sustainability of our material resources in three axes: education, policy, and technical

innovations.

"It is a tremendous privilege to honor the extraordinary and broad impact that Don Sadoway has had on our field...Don Sadoway has been an incredible mentor and intellectual inspiration to me along every dimension of my academic journey from advising my Ph.D. thesis to learning from his teaching and the example he has set in working on problems of great societal importance. I am grateful and honored to be a part of the extraordinary community he catalyzed and fostered through his leadership including students, industrial collaborators, and academic colleagues. Finally, I am thankful to the TMS community, which has been critical in providing opportunities to build strong ties across research and educational initiatives, this award being one impactful way we can continue to build towards a more sustainable materials future."

EARLY CAREER FACULTY FELLOW

This award recognizes an assistant professor for his or her accomplishments that have advanced the academic institution where employed, and for abilities to broaden the technological profile of TMS.



Fadi Abdeljawad

Assistant Professor, Clemson University Presentation: "Interface-driven Phenomena in Materials: From Nanostructuring to Additive Manufacturing" "I am very honored and humbled by

this recognition from TMS. I am also very grateful to the TMS Foundation for their continued support of early career professionals. Thank you to all my students, mentors, colleagues, and collaborators for their support. Ever since my first TMS annual meeting in 2010 as a first-year graduate student, TMS has become a home for all my research, professional development, and networking needs. TMS has been instrumental in advancing my career...I look forward to continuing to contribute to TMS in various activities and to advance the fascinating field of materials science."



Yu Zou

Assistant Professor, University of Toronto Presentation: "Tailoring Defects in Alloy Design and Additive Manufacturing: An Analogy with Professional Development"

"It has been more than ten years since I attended my first TMS meeting, as a student, in San Diego, California in 2011. TMS has been my academic home through my different career stages – as a master's student, Ph.D. student, post-doctoral fellow, and now as an Assistant Professor. In TMS I met international leaders in my research field, attended student mixers and career events, and discussed with peers in poster or oral sessions. I enjoyed every moment from TMS. In 2019, I brought two of my Ph.D. students to the TMS meeting and introduced them to this dynamic atmosphere and I am looking forward to bringing more students and young professionals to this community. I am truly grateful for this recognition!"

TMS BEST PAPER CONTEST

This award recognizes student essays on global or national issues as well as technical research papers relating to any field of metallurgy or materials science

Best Paper Award - First Place Graduate Di Xie



Student, University of Tennessee, Knoxville

Paper: "Plastic anisotropy and twin distributions near the fatigue crack tip of textured Mg alloys from in situ synchrotron x-ray diffraction

measurements and multiscale mechanics modeling" "It is a great honor for me to receive this award. I would like to express sincere gratitude to the TMS Foundation and Material Advantage, which offer me a great opportunity to communicate with many excellent researchers about the state-the-art investigations and progress in my field. This award will boost my confidence in my current academic study and surely inspire me to further progress in my academic and research endeavors."

Best Paper Award - Second Place Graduate



Rakesh Kamath Student, University of Tennessee, Knoxville

Paper: "In-situ, dynamic synchrotron x-ray radiography studies on melt pool evolution and solidification kinetics during laser fusion processing of Ti-6Al-4V"

"It is a huge honor to be recognized by one of the most renowned international professional organizations in the materials science community. I am very much thankful to the TMS Foundation for selecting me as the recipient amongst many of my highly qualified peers. I wish to express my sincere gratitude to my advisor, Hahn Choo, and mentor, Suresh Babu, for their constant guidance and encouragement throughout my dissertation research. I strongly believe this recognition will serve me well, both as a springboard for my future career and a source of inspiration that will enable me to give my best to materials research."

KAUFMAN CALPHAD SCHOLARSHIP

Awarded through CALPHAD Inc. and the TMS Foundation to sophomore or junior undergraduate students majoring in metallurgical engineering, materials science and engineering, or minerals processing/extraction programs.



Michael Bohnet

Student, Louisiana State University "I am honored to receive the Kaufman CALPHAD scholarship and I would like to thank the TMS Foundation for making this opportunity possible. This scholarship will help ease my financial

burden as I pursue my master's degree in Data Science at the University of Texas at Austin."

AIME AWARDS

AIME HONORARY MEMBERSHIP AWARD

Conferred upon an individual for outstanding service to or distinguished scientific or engineering achievement in the fields embracing the activities of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) and its Member Societies. As one of the highest honors that the Institute can bestow, this award is considered a pinnacle award.



Elizabeth Holm

Professor of Materials Science and Engineering, Carnegie Mellon University Citation: For her outstanding service to TMS and distinguished scientific achievements in computational materials science and engineering.

AIME CHAMPION H. MATHEWSON AWARD

Awarded to the author(s) of a paper, or a series of closely related papers, representing the most notable contribution to metallurgical science during the period under review.



Rajendra Bordia, *Clemson University*; Diletta Giuntini, *Eindhoven University of Technology*; Tyler Harrington, *University of California, San Diego*; Alberto Molinari, *University of Trento*; Eugene Olevsky and Elsa Torresani, *San Diego State University*; Kenneth Vecchio, *University of California, San Diego*; and Chaoyi Zhu, *EAG Laboratories*

Paper: "Anisotropy of Mass Transfer During Sintering of Powder Materials with Pore–Particle Structure Orientation," *Metallurgical and Materials Transactions A*, February 2019.

"I am honored that our technical contribution was selected for this significant honor by our peers. I thank Maciej Pietrzyk for nominating our paper and the TMS Honors and Professional Recognition Committee and the TMS Board of Directors for selecting it for this prestigious award," said Bordia. "It is my honor to share this award with our collaborators. Over the past few years, TMS has been a great a platform for me to interact and share my ideas with scientists and researchers around the world. Undoubtedly, it has helped me to develop my career as a scientist with a special focus on materials characterization," Zhu added.

AIME ROBERT LANSING HARDY AWARD

For more than half a century, this award has recognized professionals under the age of 35 in the broad fields of metallurgy and materials science for exceptional promise of a successful career.



Ankit Srivastava Associate Professor, Texas A&M University

Citation: For pioneering contributions to microstructural mechanics and exceptional promise of thought leadership in materials design for

enhanced mechanical performance.

"It is an honor to receive the TMS-AIME Robert Lansing Hardy Award and I sincerely hope to live up to the promise of the award. I am extremely grateful to my principal nominator, mentors, colleagues, and TMS. Participating in the activities of TMS has been a rewarding experience and has immensely impacted my professional development."

AIME HENRY DEWITT SMITH SCHOLARSHIPS

This scholarship is awarded to graduate students majoring in mineral, metals, and/or materials engineering. The award aims to advance the mineral industries by assisting students in the pursuit of graduate education in mining, metallurgical, materials, or petroleum-related disciplines.



Jennifer Bustillos Student, Cornell University

"I am tremendously honored and grateful to have been selected as a Henry deWitt Smith Scholar. As an active Material Advantage member (since my undergraduate studies), I was

eager to participate in TMS student competitions and academic symposia. These opportunities presented by TMS have allowed me to interface with industry partners and students from all around the world to develop the necessary communication and networking skills to excel as a graduate student and professional in the future."



Ho Lun Chan

Graduate Student, University of Virginia "This scholarship award serves not only as a generous financial support to academic studies, but also as a recognition to my continuing efforts to learn and prosper as an emerging

professional in the field of materials science. In 2018, I self-attended the TMS Annual Meeting & Exhibition as an undergraduate student having no clue about what materials science is. TMS and its conferences gave me exposure to the latest of the greatest that I would not be able to learn in school and defined my academic as well as professional goals."

TMS/SME/AIME JAMES DOUGLAS GOLD MEDAL

Honors distinguished achievement in nonferrous metallurgy, including both the beneficiation of ores and the alloying and utilization of nonferrous metals. This award is administered through TMS's Extraction & Processing Division (EPD) and the Society for Mining, Metallurgy & Exploration's (SME) Minerals & Metallurgical Processing Division (MPD).



Deepak Malhotra Director, Magellan Gold Corporation Citation: For a lifetime of dedication to the industry.

ACTA MATERIALIA AWARDS

GOLD MEDAL AWARD

Awarded to a proven leader in materials science and engineering whose research has significantly impacted the development of the discipline.



Dierk Raabe Director, Max-Planck Institute

SILVER MEDAL AWARD

This award honors scientific contributions and leadership from academic, industry, and public sector leaders in the midst of their careers.



David Dye Professor, Imperial College London

HOLLOMON MATERIALS AND SOCIETY AWARD

This recognition honors an individual who promotes understanding of the relationship and interactions between materials technology and societal interest or needs.



Alexander Michaelis President and Professor, Fraunhofer Institute for Ceramic Technologies and Systems IKTS

MARY FORTUNE GLOBAL DIVERSITY AWARD

This award recognizes one or more of the following in the field of materials science and engineering: promotion of, or representation of, women and other under-represented groups in the materials science and engineering field; contributions to the field of materials science and engineering, including teaching, professional service, or research; demonstrated commitment to mentoring students and young professionals; and promotion of materials science and related professional activities in the broader community.



Amber Genau Associate Professor, University of Alabama at Birmingham

ACTA MATERIALIA UNDERGRADUATE SCHOLARSHIP

Supported by the generosity of Acta Materialia Inc. and issued under the TMS Foundation, this scholarship is available to undergraduate students majoring in metallurgical engineering, materials science, and engineering, or to undergraduate students with a significant interest in the materials area.



Andrew Ruba Student, Iowa State University

"I joined the Iowa State University (ISU) Material Advantage chapter during my freshman year of college. This was an excellent place to learn about the larger materials science and engineering

community, as well as the various opportunities and experiences that the field offers. I am deeply grateful to both TMS and Acta Materialia Inc. for providing exposure, aid, and professional growth opportunities to undergraduate students. I will graduate in the fall of 2022 from ISU, and I look forward to working in R&D of advanced polymers or polymer composites."



Gladys Durán Durán Student, Instituto Tecnológico de Morelia

"Being a part of the Material Advantage program gave me the tools to get ready to participate in and solve real problems and this scholarship will support the

next step in my journey of material science research. After graduation, I plan to enroll in a master's program related to materials science and engineering focused on the development of new alloys for aerospace industry and renewable energy. I am grateful to the TMS Foundation for recognizing my effort and passion in this field. This is just the beginning!"

DIVISION AWARDS

In addition to the many Society-level awards administered by TMS, each of the Society's five divisions provide opportunities for recognition specific to the work performed in their areas of technical interest. More information on each of these awards, as well as quotes and photos from recipients, are available at awards.tms.org.

EXTRACTION & PROCESSING DIVISION

EXTRACTION & PROCESSING DIVISION (EPD) DISTINGUISHED LECTURE AWARD



David Dreisinger

Professor and Industrial Research Chair in Hydrometallurgy, University of British Columbia

Citation: In recognition to his international leadership and innovator spirit in research, development, and

teaching of hydrometallurgy, supporting sustainable extraction, and processing of metals. **Presentation:** "Rare Earth and Critical Material

Recovery from Peralkaline Volcanic Ores: Minerals Processing, Hydrometallurgy and Solvent Extraction Separation"

EPD DISTINGUISHED SERVICE AWARD



Corby Anderson Harrison Western Professor, Colorado School of Mines

EPD SCIENCE AWARD





Megumi Akashi, Helmholtz-Zentrum Dresden-Rossendorf (HZDR); Sten Anders, HZDR; Sven Eckert, Head of Department Magnetohydrodynamics, HZDR; Markus Reuter, Senior Expert, SMS Group, Düsseldorf; Natalia Shevchenko, Research Fellow, HZDR; and Olga Keplinger, Senior Engineer Design Enablement, Globalfoundries (not pictured) **Paper:** "X-ray Radioscopic Visualization of Bubbly Flows Injected Through a Top Submerged Lance into a Liquid Metal," *Metallurgical and Materials Transactions B*, February 2020.

EPD PYROMETTALLURY BEST PAPER AWARD



Gerardo Alvear-Flores, *Rio Tinto*; Joe Pease, *Mineralis Consultants*; and Carlos Risopatron, *International Copper Study Group*

Paper: "Processing of Complex Materials in the Copper Industry: Challenges and Opportunities Ahead," *JOM*, July 2020.

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



Christoph Beckermann, University of Iowa, and Vahid Khalajzadeh, MEMC Paper: "Simulation of Shrinkage Porosity Formation During Alloy Solidification,"

Metallurgical and Materials Transactions A, May 2020.

FUNCTIONAL MATERIALS DIVISION

FUNCTIONAL MATERIALS DIVISION (FMD) JOHN BARDEEN AWARD



Long-Qing Chen Hamer Professor of Materials Science & Engineering, Pennsylvania State University

FMD DISTINGUISHED SCIENTIST/ENGINEER AWARD



Roger Narayan Professor of Biomedical Engineering, University of North Carolina

FMD JOURNAL OF ELECTRONIC MATERIALS BEST PAPER AWARD

Hongyan Du, Runhua Fan, Xueyan Fu, Yuliang Jiang, Rui Tian, Shengmei Wei, Guojing Zhao, Wenjin Zhang, and Zidong Zhang, *Shandong University*, and Chuanxin Hou, *Yantai University*

Paper: "Porous Fe@Fe3O4-C Nanocomposite Using Polyvinyl Alcohol Sponge as Template for Microwave Absorption," *Journal of Electronic Materials*, November 2020.

LIGHT METALS DIVISION

LIGHT METALS DIVISION (LMD) DISTINGUISHED SERVICE AWARD



Alan Tomsett Technical Manager, Rio Tinto Pacific Operations

LMD TECHNOLOGY AWARD



Dag Mortensen Principal Research Scientist, Institute for Energy Technology

LMD JOM BEST PAPER AWARD



Geoffrey Sigworth, *GKS Engineering Services* Paper: "Refining of Secondary Aluminum: Important Chemical Factors," *JOM*, September 2021.

NOMINATION PACKET TIPS

It's never too early to start preparing an awards nomination packet. You can start by reviewing award requirements and reading through the Tips for Preparing Nominations page at www.tms.org/Awards. Here, you can learn more about the awards process and access award nomination forms. Completed forms and supporting documents should be submitted to awards@tms.org.

MATERIALS PROCESSING & MANUFACTURING DIVISION

MATERIALS PROCESSING & MANUFACTURING DIVISION (MPMD) DISTINGUISHED SERVICE AWARD



Corbett Battaile Principal Member of Technical Staff, Sandia National Laboratories

MPMD DISTINGUISHED SCIENTIST/ENGINEER AWARD



Jian Wang Professor, University of Nebraska-Lincoln

STRUCTURAL MATERIALS DIVISION

STRUCTURAL MATERIALS DIVISION (SMD) DISTINGUISHED SCIENTIST/ENGINEER AWARD



Elizabeth Holm Professor of Materials Science and Engineering, Carnegie Mellon University

SMD DISTINGUISHED SERVICE AWARD



Carl Cady Research Engineer, Los Alamos National Laboratory

SMD JOM BEST PAPER AWARD

Andrew Chuang, Benjamin Gould, and Niranjan Parab, Argonne National Laboratory; Joseph Aroh, Rachel Lim, Seunghee Oh, Anthony Rollett, and Robert Suter, Carnegie Mellon University; Joel Bernier, Lawrence Livermore National Laboratory; and Tao Sun, University of Virginia Paper: "Microscale Observation via High-Speed X-ray Diffraction of Alloy 718 During In Situ Laser Melting," JOM, January 2021.

EPD/LMD JOURNAL OF SUSTAINABLE METALLURY BEST PAPER AWARD

Alejandro Abadias Llamas and Jose Ricardo da Assuncao Godinho, *Helmholtz-Zentrum Dresden-Rossendorf*; Juho Hannula, *AFRY Finland Oy*; Saija Luukkanen, *University of Oulu*; and Markus Reuter, *SMS Group*, *Düsseldorf* **Paper**: "Simulation-Based Exergy and LCA Analysis of Aluminum Recycling: Linking Predictive Physical Separation and Re-melting Process Models with Specific Alloy Production," *Journal of Sustainable Metallurgy*, March 2020.

LMD/EPD BEST PAPER AWARDS

The following awards recognize the author(s) for excellence of a paper published in the preceding year's volume of the Energy proceedings or *JOM* related to an energy topic.

Professional

Yan Chen, Junkai Gao, Qian Shi, Shibin Wu, Qinyao Xu, and Junwei Zhang, *Zhejiang Ocean University* Paper: "Fabrication of a Novel Highly Thermal Conductive Shape-Stabilized Phase-Change Material Using Cheap and Easily Available Cabbage Mustard Biochar," *JOM*, August 2021.

Student

Fang Dong, Xiao-long Li, Gui-Ii Liu, Yan Liu, and Ting-an Zhang, *Northeastern University* Paper: "Hydrodynamics of Gas-Liquid Two-phase Flow in Reverse Spray Washing Process," *Energy Technology 2021*.

LIGHT METALS SUBJECT AWARDS

The following awards recognize individual excellence of papers presented at the previous year's TMS annual meeting in an LMD-sponsored session.

Aluminum Alloys

Jon T. Carter and Louis G. Hector, Jr., *General Motors Warren Tech Center*; Katherine E. Rader, *Pacific Northwest National Laboratory*; and Eric M. Taleff, *University of Texas at Austin*

Paper: "Review of Retrogression Forming and Reaging for AA7075-T6 Sheet," *Light Metals 2021.*

Yeqi Shi and Izabela Szlufarska, University of Wisconsin-Madison

Paper: "Simulations of Wear-Induced Microstructural Evolution in Nanocrystalline Aluminum," *Light Metals* 2021.

Alumina/Bauxite

Andrey Panov, Alexander Senyuta, and Andrey

Smirnov, *RUSAL Engineering and Technological Center* Paper: "Revisiting Alternative Smelter Grade Alumina Production Processes"

Aluminum Reduction Technology

Patricia Gagnon, Marie-Ève Laframboise, and Xiangwen Wang, *Alcoa Aluminum Center of Excellence* Paper: "Experience with Lengthy Pot Hibernation at Alcoa Baie-Comeau," *Light Metals 2021.*

Electrode Technology for Aluminum Production Julien Lauzon-Gauthier and John Secasan, *Alcoa Continuous Improvement Smelting Technology* Paper: "Development and Applications of the Four Points Probe (4PP) Electrical Resistivity Measurements for Anode Process Optimization," *Light Metals 2021*.

Warren Peterson Cast Shop for Aluminum Production Valdis Bojarevics, Georgi Djambazov, Koulis Pericleous, and Catherine E.H. Tonry, *University of Greenwich* Paper: "Contactless Ultrasonic Treatment in Direct Chill Casting," *JOM*, January 2020.

LMD MAGNESIUM TECHNOLOGY AWARDS

The following celebrate individual excellence of papers published in the previous year's volume of Magnesium Technology on specific topics or presented during the TMS annual meeting at the Magnesium Technology Symposium.

Application

MingZhe Bian, National Institute of Advanced Industrial Science and Technology, and Kazuhiro Hono, Zehao Li, and Taisuke Sasaki, National Institute for Materials Science

Paper: "Toward Development of Strong and Formable Magnesium Alloy Sheets with Bake-Hardenability," *JOM*, May 2021.

Fundamental Research

Zongrui Pei, New York University

Paper: "Mechanisms and Machine Learning for Magnesium Alloys Design," *Magnesium Technology* 2021.

Student Paper

Marek Niewczas, *McMaster University*, and Sean Agnew, Jishnu Bhattacharyya, and Mohammed Shabana, *University of Virginia*

Paper: "Thermally Activated Nature of Basal and Prismatic Slip in Mg and Its Alloys," *Magnesium Technology 2021*.

Best Poster

Trevor Abbott, *RMIT University*, and Yahia Ali, Manjin Kim, Stuart McDonald, Kazhuhiro Nogita, and Julio Piraquive, *University of Queensland* Title: "Eutectic Modification of Mg2Si in Mg-Si Alloys for Faster Hydrogen Absorption Kinetics"

EPD MATERIALS CHARACTERIZATION AWARDS

The following awards acknowledge the individual excellence of papers published or posters presented on the topic of materials characterization.

Best Poster Award - First Place

Carolin Fink, Cheng-Han Li, and John Lippold, *The Ohio State University*, and Joerg Jinschek, *Technical University of Denmark*

Title: "S/TEM Characterization of Interdendritic Phases in Ni-30Cr Weld Metal 52XL"

Best Poster Award - Second Place

Wendell Bruno Almeida Bezerra, Luana Crystine da Cruz Demosthenes, Sergio Neves Monteiro, Ulisses Oliveira Costa, Fernanda Santos da Luz, and Michelle Souza Oliveira, *Military Institute of Engineering* Title: "Thermal Stability of Plain Arapaima Scales and Scales-reinforced Epoxy Matrix Composites"

Best Poster Award – Third Place

Bianca Bonomo, Anna Carolina Lucas, Gustavo Lima, Marcia Lopez, Beatryz Mendes, Leonardo Pedroti, and Livia Silva, *Universidade Federale de Vicosa* Title: "Effect of the Incorporation of Bauxite and Iron Ore Tailings on the Properties of Clay Bricks"

JOM: The Magazine Talks with 2021 TMS President Ellen Cerreta

Kelly Zappas





Editor's Note: Ellen Cerreta completed her term as 2021 TMS President at the TMS 2022 Annual Meeting & Exhibition (TMS2022), February 27–March 3, 2022, in Anaheim, California. In this conversation with JOM: The Magazine, Cerreta reflects on her experiences as TMS President and discusses her hopes for the Society's future.



Ellen Cerreta

"[Holding MS&T21 in person] proved that we are all still here and we can adapt to the current challenges of the pandemic." *JOM:* As the world continued to grapple with the COVID-19 pandemic and its ripple effects, what unique challenges did you face during your year as TMS President in 2021?

Cerreta: For me, it seems that a professional society does things better in person. A lot gets lost when you don't have the ability to meet face to face. So I think a special challenge was this: how do we work as a board of directors—and, for me, in a leadership role on the Board of Directors—to ensure that we are still delivering services to members. That was probably the biggest challenge and something that was important to me.

JOM: Your TMS presidential term began with the first fully virtual TMS Annual Meeting & Exhibition in March 2021. What was that experience like for you? How do you think that event benefited our members?

Cerreta: While a virtual event, I think, was not as appealing as an in-person event and there was a sentiment of "we miss being together in person," I think it was important just to *have* an event like TMS2O21 Virtual. There was still a need to be able to share your research, to be able to peer review each other's research, and to have an opportunity to present work. We were missing those opportunities. Even if it wasn't ideal, it was still important to provide that opportunity for our members.

JOM: Later in the year, our Society returned to in-person meetings with MS&T21 in October. How was that experience after such a long time apart? How did our members respond?

Cerreta: Even knowing it was going to be limited attendance and that a lot of things couldn't be like they used to be, it was so worth it. It was worth it to show that we could come back together and keep everybody safe. It proved that we are all still here and we can adapt to the current challenges of the pandemic.

"If TMS2022 ends up moving the needle closer to where we want to be, I will feel like I did my job."

"As far as becoming a more international presence in the materials profession and being that goto Society, I'm really eager to see how we start to leverage the fact that we've learned how to connect in a virtual world." *JOM:* In your inaugural speech at TMS2021 Virtual, you said that the part of this presidential role that you were most excited by is the ability to advance the implementation of the TMS Aspires strategic plan. What are some ways you think we've progressed on those goals as a Society in the past year?

Cerreta: We introduced the TMS Aspires Strategic Plan in late 2018. Of course, we're not making the kind of progress I would have hoped for back when I was sitting on the Board and involved in that strategic planning. With that said, I'm really pleased that the TMS 2022 Annual Meeting & Exhibition (TMS2022) is co-located with the Fourth Summit on Diversity in the Minerals, Metals, and Materials Professions (DMMM4). That directly ties to goal one of our strategic plan with regards to diversity, equity, and inclusion.

I am also really pleased that we are continuing to expand programming in newer areas of interest to members regarding advances in the use of artificial intelligence and machine learning in materials science. I'm looking forward to continued growth in areas like advanced manufacturing programming. I think that really speaks to our goals under the strategic plan.

One of the things that happened during COVID is that we showed that we can use some of the tools that enable broader engagement worldwide. As far as becoming a more international presence in the materials profession and being that go-to Society, I'm really eager to see how we start to leverage the fact that we've learned how to connect in a virtual world.

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

Cerreta: I think my job changed almost instantly when the pandemic hit. I viewed my job as keeping the Society operating under these new circumstances. Early in 2020, it was hard to understand what TMS was going to look like on the other side of this pandemic, but we needed to make sure we would still be here when we got to the other side.

I think that Tom Battle [2020 TMS President], Jim Foley [2019 TMS President], and now Jud Ready [2021 TMS Vice President] and I have been able to lead a Board of Directors in lockstep with TMS staff and that allows us to start asking ourselves some new questions. Now that we are starting to come out of the pandemic, what do we want to look like? Who are we going to be? The Society may not look exactly the same way it looked before. But the pandemic has allowed our profession to explore a new art of the possible for networking and also taught us what we really value about the traditional ways in which we engaged as a society. There is value in having experienced that.



Cerreta lead the first in-person TMS Board of Directors meeting in 2021 at the MS&T21 conference in October.

JOM: What have you learned from your presidential experience?

Cerreta: There are several things that got reinforced or validated for me. First, the TMS membership is *really* an impressive group of scientists, engineers, and generally creative thinkers. They provide a lot of terrific ideas—almost too many to act on. It was almost hard to hear so many good ideas and not have the resources to act on all of them.

Another thing that I knew was important but that was reinforced during this year was really making sure that we were doing things that were responsive to the membership. This isn't a board of directors making decisions about what we think should happen in materials science. We're supposed to be offering a product that enhances the profession. In many places, we were able to do that by

offering events virtually during COVID. I think we pushed ourselves to prove that we could actually do something in person by going back to MS&T. I'm very, very hopeful that, at TMS2022, we get to that next level of engagement. If TMS2022 ends up moving the needle closer to where we want to be, I will feel like I did my job.

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

Cerreta: Despite the fact that this wasn't necessarily the presidential year I thought I was going have, I really am completely honored to have been the TMS president and have been able to play a role in making sure that the Society is healthy. I will be so proud forever to look back on that.

<image>

Cerreta presents the TMS Institute of Metals/Robert Franklin Mehl Award for MS&T21 to Tresa Pollock, Alcoa Professor of Materials at the University of California, Santa Barbara, at the MS&T21 plenary session. Pollock served as TMS president in 2005.

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In Case You Missed It: BUSINESS NEWS FROM THE FIELD

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: The Magazine* Principal Editor, at kcalva@tms.org for consideration.



Auburn, Alabama, USA: (Above) SiO2 Materials Science is investing \$123 million to expand a facility in Auburn, Alabama, that manufactures vials for Moderna's COVID-19 vaccine. The facility makes 10 million vials a month. The expansion will equip the firm to meet growing demand, while also investing in the Auburn region and adding jobs. SiO2 invented a patented microscopic, pure glass coating for the inside of plastic containers used for medical vials, syringes, and delivery devices. (Photo credit: Sio2 Materials Science)

Researchers Redesign U.S. Coins

Gaithersburg, Maryland, USA: Researchers at the National Institute of Standards and Technology (NIST), Carelyn Campbell and Mark Stoudt, designed new, cheaper metal alloys for U.S. coins. In addition, they devised an accelerated materials design approach that cut years of research costs, by using new predictive models that incorporated coin specifications and that directed alloy optimization. When the U.S. Mint introduced the project in 2013, the five-cent nickel coin was 75% copper and 25% nickel by mass and cost nine cents to make. The new nickel costs only five and ninetenths cents to make. The pair received the 2020 NIST Bronze Medal Award for their work.

Farsoon Breaks Sales Record

Changsha, China: Farsoon Technologies reported sales of over \$15 million for the month of November 2021, a record for the company. The company sold more than forty 3D printers, as well as material, service, and application contracts. Activity in metal additive manufacturing accounted for over 60% of sales. The company also announced plans to expand its production capacity that will include a dedicated site for increased polymer powder material production.

Pittsburgh, Pennsylvania, USA: (Above) Three of America's leading industrial and transportation companies, United States Steel Corporation, Norfolk Southern Corporation, and The Greenbrier Companies, Inc., jointly announced a new, more sustainable steel gondola railcar. Using an innovative formula for high-strength, lighter-weight steel developed by U.S. Steel, each gondola's unloaded weight is reduced by up to 15,000 pounds. Gondola railcars transport loose bulk material such as metal scraps, coils, wood chips, steel slabs, and ore. Norfolk Southern will initially acquire 800 of the Greenbrier engineered gondolas. (Photo credit: Business Wire)

Partners to Qualify Al Powders

Ottawa, Canada: German technology company TRUMPF GmbH + Co. KG is working with Canada's Equispheres, Inc. to qualify its aluminum additive manufacturing powders on TRUMPF 3D printers. Equispheres offers three lines of AlSiMg10 powders for laser beam powder-bed fusion (PBF-LB) manufacturing systems. TRUMPF's engineering team is determining the optimal parameters for using the powders and reducing costs in the production of 3D printed parts. TRUMPF reports positive initial results and expects to complete the qualification process in early 2022.

Firms Consider Afghan Mining Prospects

Beijing, China: Companies in China are taking initial steps to source valuable resources from Afghanistan. Jiangxi Copper Co. Ltd. and the Metallurgical Corp. of China are hoping to push forward with the Mes Aynak copper mine, for which they signed a 30-year lease in 2008. The mine has an estimated reserve of 11.08 million tons of copper. Other firms are exploring opportunities in lithium. The representatives of five Chinese companies arrived in early November to scout for lithium deposits.

TMS MEETING HEADLINES



Meeting dates and locations are current as of January 21, 2022. For the most recent updates on TMS-sponsored events, visit www.tms.org/Meetings.



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

April 3-6, 2022

Pittsburgh, Pennsylvania, USA

Housing Deadline: March 10, 2022

AIM 2022 is the first event of its kind to focus on the role of artificial intelligence in materials science and engineering and related manufacturing processes. This congress will convene stakeholders from academia, industry, and government to address key issues and identify future pathways.

www.tms.org/AIM2022



6th International Congress on 3D Materials Science (3DMS 2022)

> June 26–29, 2022 Washington, D.C., USA

Discount Registration Deadline: May 13, 2022

3DMS 2022 provides a forum for presentations of current interest and significance to the three-dimensional characterization, visualization, quantitative analysis, modeling, and development of structureproperty relationships of materials, as well as big data and machine learning issues associated with 3D materials science.

www.tms.org/3DMS2022



Additive Manufacturing Benchmarks (AM-Bench) 2022 August 15–18, 2022 Bethesda, Maryland,

USA Housing Deadline:

July 22, 2022

AM-Bench 2022 is the second event in a conference series of controlled benchmark measurements with the primary goal of enabling modelers to test their simulations against rigorous, highly controlled additive manufacturing benchmark test data.

> www.tms.org/ AMBench2022



2022 Liquid Metal Processing & Casting Conference (LMPC 2022)

September 18–21, 2022 Philadelphia, Pennsylvania, USA

Discount Registration Deadline: August 8, 2022

LMPC 2022 convenes experts from both industry and academia to specifically discuss the latest advances in primary and secondary melt processing as it relates to casting large ingots of highly alloyed metals.

> www.tms.org/ LMPC2022

['] Other Meetings of Note



6th World Congress on Integrated Computational Materials Engineering (ICME 2022) April 24–28, 2022 Lake Tahoe, Nevada, USA www.tms.org/ICME2022

Co-Sponsored Meetings

Offshore Technology Conference (OTC) 2022 May 2–5, 2022 Houston, Texas, USA ALTA 2022 Nickel-Cobalt-Copper, Uranium-REE, Gold-PM, In Situ Recovery, Lithium & Battery Technology Conference & Exhibition May 20–27, 2022 Perth, Australia

Materials Science &

Technology 2022

(MS&T22)

October 9–13, 2022

Pittsburgh, Pennsylvania,

USA

www.matscitech.org/MST22



TMS 2023 Annual Meeting & Exhibition March 19–23, 2023 San Diego, California, USA www.tms.org/TMS2023

8th International Conference on Solid - Solid Phase Transformations in Inorganic Materials (PTM2022) June 27–July 1, 2022 Xi'an, China



Superalloy 718 and Derivatives 2023 May 14–17, 2023 Pittsburgh, Pennsylvania, USA www.tms.org/ Superalloy718-2023

The 12th International Conference and Workshop on Numerical Simulation of 3D Sheet Metal Forming Processes (NUMISHEET 2022) July 10–14, 2022 Toronto, Ontario, Canada

Honors for Every Career Stage



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

Most TMS awards have a deadline for April 1. To view individual award pages and more details, visit www.tms.org/Awards.

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SAVE THE DATE March 19–23, 2023 San Diego, California, USA #TMSANNUALMEETING

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- In 2023, we will return to the San Diego Convention Center but use a new headquarters hotel, so prepare to join us at the **Hilton San Diego Bayfront** for TMS2023!

MARK YOUR CALENDAR WITH THESE KEY DATES:

May 2022: Call for Abstracts Opens

October 2022: Registration Opens

March 19-23, 2023: Conference Dates









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70 60 50 40 30 20 10

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Variation in solidus temperature over 1000 compositions within alloy 718 specification

Ti and TiAl Alloys



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

High Entropy Alloys



Calculated phase diagram along the composition line of CoCrFeNi-Al

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