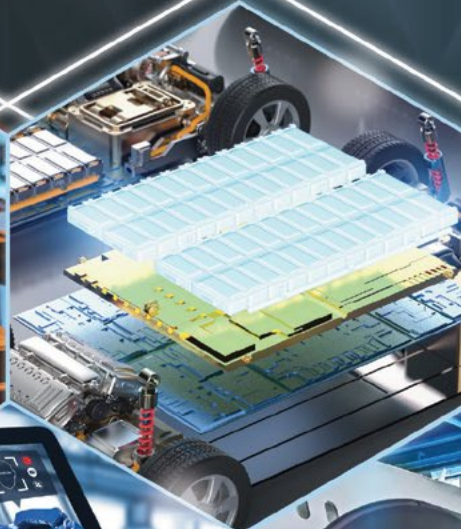


# JOM

MAY 2024

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An official publication of The Minerals, Metals & Materials Society



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### May 2024 Guest Editors

#### Advanced Functional and Structural Thin Films and Coatings

*Thin Films and Interfaces Committee*

Gerald Ferblantier, University of Strasbourg; Adele Carrado, University of Strasbourg;  
 Karine Mougín, Mulhouse Materials Science Institute;  
 Nuggehalli Ravindra, New Jersey Institute of Technology; and  
 Heinz Palkowski, Clausthal University of Technology

#### Deformation-influenced Microstructural Evolution of High-Temperature Alloys

*High Temperature Alloys Committee*

Stoichko Antonov, National Energy Technology Laboratory

#### EUROMAT23: Micro- and Nano-mechanics—Characterization and Modelling

Verena Maier-Kiener, Montanuniversität Leoben; André Clausner, Fraunhofer IKTS; and  
 Johan Hoefnagels, Eindhoven University of Technology

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The five cover images represent the five technical divisions of The Minerals, Metals & Materials Society: Extraction & Processing, Functional Materials, Light Metals, Materials Processing & Manufacturing, and Structural Materials. In representing the five technical divisions, *JOM: The Journal* balances the interests of its members and authors in the monthly topics and articles it publishes.

#### About JOM:

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

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# IN THE FINAL ANALYSIS

*"[Artificial intelligence] will impact every industry on Earth, including manufacturing, agriculture, health care, and more."*

—Fei-Fei Li

Last year, the world's introduction to ChatGPT was a thunderclap. It quickly became a kitchen-table, workplace, hallway, and session-room topic. Many of us dabbled. Others adopted it quickly and lauded its transformative potential. Some dismissed it as a novelty or issued existential cautions. I appreciate the admonitions of those who see a virtual Pandora's Box, but the lid is open and generative AI feels very "different" from those technologies that were hype monsters rather than game changers. I'm more persuaded by this every time that I boot my laptop or swipe my phone. Recently, Microsoft rolled out Copilot as a ChatGPT-powered productivity enhancement tool for its ubiquitous Office 365 products. It also made available a free version of Copilot in its less-than-ubiquitous Edge web browser. Meanwhile, Google now uses generative AI to amplify search results, and Adobe Acrobat offers AI Assistant to engage you in conversation about any PDF. Still newer helpful tools are sure to follow.

In June, we will see the latest on the materials manifestations of the AI revolution as TMS conducts the 2<sup>nd</sup> World Congress on Artificial Intelligence in Materials and Manufacturing. It will be held at the new TMS Specialty Congress (June 16-20 in Cleveland, Ohio). AIM, as we call it, will be co-located with two very companionable conferences: Symposium on Digital and Robotic Forming 2024 and Accelerating Discovery for Mechanical Behavior of Materials 2024.

The Specialty Congress is a new event, but it is designed to house multiple meetings that would otherwise be held at separate locations at separate times—three meetings in one venue at one time for one fee. Nice! The initiative reduces event proliferation while increasing the impact and value for those communities that we convene. The congress also focuses on expanding networks and facilitating the cross-pollination of ideas and perspectives.

For this June's Specialty Congress, AI and machine learning will be the cross-cutting element of all three meetings housed within it. While the events hosted within the Specialty Congress will vary from year to year, the AIM event will be a constant, reflecting the extensive infusion of AI into the materials field's activities—be it as an enabling tool or as an actual materials technology.

I asked Adobe Acrobat's AI Assistant how it would ask my supervisor for permission to attend the AIM program in Cleveland. I did this by feeding it a copy of the AIM technical program (paper titles, abstracts, authors, etc.). Some of what AI Assistant proposed:

*AIM 2024 is a highly regarded conference that brings together experts and researchers in the field of artificial intelligence and materials science. The conference will cover a wide range of topics, including high-throughput synthesis and characterization, machine learning in materials and manufacturing, and advanced modeling and simulation techniques. Attending this conference would provide me with valuable insights into the latest advancements in artificial intelligence and its applications in materials and manufacturing. I believe that the knowledge and networking opportunities gained from this conference will greatly benefit our team and contribute to our ongoing projects. I have reviewed the conference program and have identified several sessions and presentations that are directly relevant to my current work. These sessions include topics such as high-throughput protocols, machine learning-assisted discovery, and predictive modeling of material properties.*

Not perfect, but not dreadful either. If I received this proposal, I'd "approve" without hesitation. Give it a try. Perhaps your supervisor will have the same reaction!



James J. Robinson  
Executive Director



*"In June, we will see the latest on the materials manifestations of the AI revolution as TMS conducts the 2<sup>nd</sup> World Congress on Artificial Intelligence in Materials and Manufacturing."*

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

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

## // MAY 2024

### Advanced Functional and Structural Thin Films and Coatings

**Editors:** Gerald Ferblantier, University of Strasbourg; Adele Carrado, University of Strasbourg; Karine Mougín, Mulhouse Materials Science Institute; Nuggehalli Ravindra, New Jersey Institute of Technology; and Heinz Palkowski, Clausthal University of Technology

**Sponsor:** Thin Films and Interfaces Committee

"Comparative Study of the Microstructure and Mechanical Properties of WC/High-Speed Steel Composite Materials Prepared with Co, Ni, and Fe Binders," **Hongnan Li**, et al.

"Tuning the Physical Properties of Ag and ZnO Nanoparticles to be Applied in Various Applications," **Asmaa A. H. El-Bassuony**, et al.

"Effect Of Rare Earth Y Addition on the Microstructure and Properties of Stellite6/WC Coating by Laser Cladding," **Hao Liu**, et al.

"Effect Of Preparation Process on Microstructure and Mechanical Properties of Metal Hollow Sphere Composites (MHSCs)," **Chunhe Wang**, et al.

"From Powder Manufacturing to Perovskite/*p*-type TCO Thin Film Deposition," **Youssef Doumbia**, et al.

"Investigation of Wear Behavior of 34CrNiMo6 Low Alloy Steel Coated by PACVD Method," **Yaser Mahdavi**, et al.

"Electrodeposition of Ni from Choline Chloride/Ethylene Glycol Deep Eutectic Solvent and Pure Ethylene Glycol," **Jianing Cui**, et al.

"Novel Nano-Core-Shell Structure SiO<sub>2</sub>@Ni-Reinforced Ni-P-Based Amorphous Composite Coating," **Zhihao Zhao**, et al.

"Microstructural Characterization of Plasma Sprayed Ni-5wt.%Al Coatings Using Rietveld Refinement," **Fairouz Chouit**, et al.

### Deformation-influenced Microstructural Evolution of High-Temperature Alloys

**Editor:** Stoichko Antonov, National Energy Technology Laboratory

**Sponsor:** High Temperature Alloys Committee

"Responses of Nano-sized Oxides and Damage Behaviors of Microstructure in ODS FeCrAl Alloy During Deformation," **Xi Wang**, et al.

"Effects of the Extrusion Ratio on the Microstructure and Mechanical Properties of the Columnar Network Structure TiBw/TA15 Composites," **Yangju Feng**, et al.

"Plane Strain Deformation Behavior and Evolution of Grain Boundary Characteristics of Inconel 625 Alloy," **Zhanjie Jing**, et al.

"Variant Selection and Coarsening During Stress Aging and Creep Deformation of HAYNES® 244® Alloy," **Thomas Mann**, et al.

"Role of Austenite Stability in Elevated Temperature Mechanical Properties of Gas Metal Arc-Directed Energy Deposition Austenitic Stainless Steels," **Olivia DeNonno**, et al.

"Improved Thermodynamic Descriptions of Carbides in Ni-based Superalloys," **Richard Buerstmayr**, et al.

## EUROMAT23: Micro- and Nano-mechanics—Characterization and Modelling

**Editors:** Verena Maier-Kiener, Montanuniversität Leoben; André Clausner, Fraunhofer IKTS; and Johan Hoefnagels, Eindhoven University of Technology

"Micro-Mechanical Fracture Investigations on Grain Size Tailored Tungsten-Copper Nanocomposites," **Klemens Schmuck**, et al.

"Comparative Analysis and Error Assessment of Nanoindentation Evaluation Techniques for Nafion™117," **Velislava Yonkova**, et al.

"CeOx Elastic Properties: An In Situ Nanocompression Study in Environmental Transmission Electron Microscopy (ETEM)," **Lucile Joly-Pottuz**, et al.

"Neural Network Supported Microscale In Situ Deformation Tracking: A Comparative Study of Testing Geometries," **Julius F. Keckes**, et al.

### View More Technical Articles

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





# THANK YOU TO OUR 2023 PEER REVIEWERS

*JOM* extends a heartfelt thank you to all volunteers who completed peer reviews in 2023 for articles in *JOM: The Journal*. We know that making time for service to the community can be a challenge. The audience and authors of *JOM* are indebted to these reviewers who so generously shared their knowledge and time to ensure that only the highest quality articles are published.

**The full list of 2023 reviewers follows.**

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Matthew Kasemer	Mateusz Kopec	Jh Lee	Kerli Liivand
Rajendra Kasinath	Yannis Korkolis	Jinwoo Lee	Chang-Jian Lin
Alexander Kauffmann	Ertan Kosedag	Jonghyun Lee	Leqi Lin
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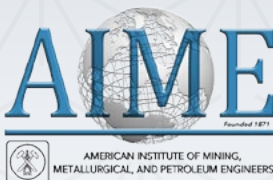
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# HONORING AND GUIDING OUR FUTURE LEADERS: MEET THE 2024 TMS YOUNG LEADERS

**Kaitlin Calva**



How do you identify a young leader? Of course, for leadership awards such as those offered to young professional TMS members, there are criteria such as age or years past receiving a terminal degree; membership and activity requirements; and a clear demonstration of one's accomplishments, to name a few. But what *really* makes a leader?

The TMS Young Leaders Professional Development Awards, International Scholar Awards, Early Career Faculty Fellow Awards, Frontiers of Materials Awards, and Young Innovator in the Materials Science of Additive Manufacturing Awards distinguish these early career TMS members not solely by their impressive technical successes. To receive one of these awards is an endorsement of one's potential to advance their organization or institution, TMS, and society at large. The experiences offered through these awards programs—like attending TMS committee or board meetings, organizing symposia, or traveling to partner society meetings around the world—are meant to guide these

individuals toward leadership roles in the future.

The individuals recognized in the following pages all displayed a growth mindset and have sought opportunities for collaboration and change. They desire to better themselves, through strengthening their non-technical skills or pushing their technical field forward, while also encouraging others to grow alongside them. They face challenges with optimism and enthusiasm and are prepared to work for a better future. They go beyond checking boxes and filling out an application. TMS and the TMS Foundation see the immense value in what these individuals can bring to our minerals, metals, and materials science and engineering community.

Each of the individuals noted in the following pages were presented with their awards at the TMS 2024 Annual Meeting & Exhibition (TMS2024), March 3–7, in Orlando, Florida, USA. Be sure to add these new colleagues to your professional network, and join us in congratulating the following recipients.



## DONATE TO THE TMS FOUNDATION

The TMS Foundation is dedicated to the development of the next generation of minerals, metals, and materials scientists and engineers. Without the generosity of our donors, the opportunities highlighted in this article for early career professionals would not be available.

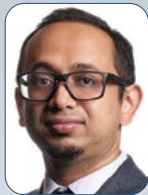
To support this important work, visit [www.TMSFoundation.org](http://www.TMSFoundation.org) to learn more or make a donation. For questions or to discuss your donation personally, contact TMS Foundation staff at [TMSFoundation@tms.org](mailto:TMSFoundation@tms.org) or 1-724-776-9000.



## YOUNG LEADERS PROFESSIONAL DEVELOPMENT AWARDS

This award helps early career professionals participate more actively in TMS. Recipients receive funding to attend the TMS Annual Meeting & Exhibition, where they are invited to join in Society leadership activities.

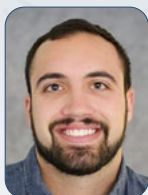
### Extraction & Processing Division (EPD)



**Sougata Roy**  
*Assistant Professor, Iowa State University*

"TMS has played a major role in enhancing my knowledge and professional network in the fields of advanced material and manufacturing. I worked as both lead and co-organizer

for the Agile Additive Manufacturing by Employing Breakthrough Functionalities Symposium. It's great to see the wide range of technical experts from various scientific disciplines connected via the TMS Foundation and their contributions to science and engineering."



**Matthew Zappulla**  
*Scientist, Los Alamos National Laboratory*

"I am grateful to the TMS EPD Nominations & Awards Committee for recognizing my work and for supporting the next generation of scientific leaders.

I am committed to using my leadership skills to inspire and mentor other young scientists. I am thankful for the support of my mentors, colleagues, and family, and I look forward to using this award to further my career and make a meaningful contribution to the materials science community."

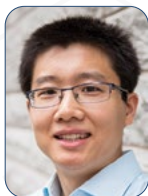
### Functional Materials Division (FMD)



**Changhong Cao**  
*Assistant Professor, McGill University*

"TMS is a fantastic and welcoming community to be part of and it felt like going home every time I attended TMS events. It is a great honor and pleasure to receive this award, which is also a

great encouragement for early career researchers like myself to make continuous contributions to professional societies."



**Ling Li**  
*Associate Professor, Virginia Polytechnic Institute and State University*

"Participating in TMS conferences has consistently been an exciting opportunity for me to delve into new research topics and engage with

experts from all over the world. I feel fortunate and appreciative of the generous support from the TMS community and I also look forward to contributing my efforts to further the ongoing growth of TMS."

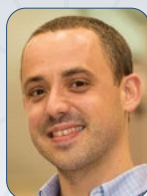


**Steven Naleway**  
*Associate Professor, University of Utah*

"I have been attending TMS Annual Meetings since 2013 and began serving on the Biomaterials Committee in 2016. TMS and the connections that it has

afforded me have been very helpful as I grow my academic career and I am excited about the new opportunities that this award will invite."

### Light Metals Division (LMD)



**Thomas Dorin**  
*Senior Research Fellow, Deakin University*

"This honor not only acknowledges my technical achievements but also provides an unparalleled opportunity for professional growth by facilitating active participation and networking within

the TMS community. I am deeply grateful for this recognition and excited about the prospects it offers for my future engagements in the domain."



**Sridhar Niverty**  
*Materials Scientist, Pacific Northwest National Laboratory*

"TMS provides a fantastic platform for industry leaders, scientists, engineers, and students to discuss the latest R&D and collaboratively tackle materials

science challenges. I am excited to contribute in this role to promote greater inclusivity and participation and work towards the continued success of TMS."



**Brian Zukas**  
*Senior Smelting R&D Engineer, Alcoa Corp.*

"As an engineer in the aluminum industry, TMS and the Light Metals Division have been an invaluable resource in my career. I am looking forward to

the opportunities this award offers to increase my engagement with and contributions to TMS."

## Materials Processing & Manufacturing Division (MPMD)



**Brady Butler**  
Materials Engineer, U.S. Army Research Laboratory, and Visiting Assistant Professor, Texas A&M University

"Over the years, TMS has provided me with resources to pursue my education, a forum to discuss my research, and the opportunity to collaborate and network with the finest professionals in my field. I am deeply honored and grateful to accept this award."



**Arunima K. Singh**  
Assistant Professor, Arizona State University

"The opportunities this award offers to network with accomplished professionals, attend specialized workshops, and gain exposure to cutting-edge research are invaluable for my professional development. With unwavering enthusiasm, I look forward to contributing my skills and passion to the growth and prosperity of the materials science community."



**Emma White**  
Senior Scientist, DECHEMA Research Institute

"Since my first meeting in 2011, TMS has provided critical, foundational support and opportunities for scientific advancement as I started and established my professional career in materials science. TMS has become my professional home society for inspiring and informative interactions at the leading edge of the materials science field. I am thrilled to have the chance to engage with leaders and be mentored by them as I become even more involved in TMS professional and technical activities and volunteerism through this award."

## Structural Materials Division (SMD)



**Anne Campbell**  
R&D Staff, Oak Ridge National Laboratory

"My involvement with TMS started in 2008 as a graduate student at my first professional conference and has continued to grow since then. I am looking forward to using this opportunity to expand my leadership potential within TMS and its functional and technical committees."



**Grace X. Gu**  
Assistant Professor, University of California, Berkeley

"I am honored to receive this award and look forward to further engagement in TMS and the SMD. TMS has provided me with many opportunities to connect with other researchers in the field, participate in professional development activities, and form new collaborations. I am grateful to be a part of this amazing community."



**Zachary Sims**  
Research Assistant Professor for Advanced Materials, University of Tennessee, Knoxville

"Since joining in 2015, TMS has been a place I could rely on to meet fellow materials professionals with whom I could establish positive relationships and together create world-changing innovation. Whatever comes next for me, I know TMS will continue to be a key factor in my success as a researcher and materials professional."

### ARE YOU A YOUNG LEADER?

Are you an active TMS member who wants to learn more about how the Society works? Do you want to be more involved in planning TMS symposia, events, and other activities? Are you excited about preparing for and shaping the future of the minerals, metals, and materials science and engineering community? You might be a TMS Young Leader.

Recipients of the TMS Young Leaders Professional Development Awards and TMS Young Leader International Scholar Awards are innovative individuals who represent the future of the minerals, metals, and materials community. A common thread among these individuals is their dedication to advancing their professional careers and leadership skills, including being active as TMS volunteers and aiding in the facilitation of TMS strategic initiatives.

If you, or someone you know, fit these criteria, visit [www.tms.org/Awards](http://www.tms.org/Awards) to learn more and apply. Applicants must be TMS members in good standing who are age 40 or younger. Awardees must also demonstrate a desire to play an active role in TMS and the potential to advance volunteer leadership roles within the Society.

**The deadline to submit applications for the 2025 Young Leaders Awards is August 15, 2024.**

## TMS YOUNG LEADERS INTERNATIONAL SCHOLAR AWARDS

This award functions as an exchange program that provides early-career professionals with the opportunity to present their work at international conferences.

### TMS Young Leaders International Scholar to the Japan Institute of Metals and Materials (JIMM)



**Jessica Krogstad**

*Associate Professor of Materials Science and Engineering, University of Illinois Urbana-Champaign*

"Over the years, TMS has been a constant source of inspiration and opportunities to expand my horizons both technically and personally. This is due, in large part, to the amazing people that make TMS the welcoming and intellectually stimulating society that it is. It is for these reasons that I am so humbled and excited to represent TMS at the upcoming JIMM meeting."

### TMS Young Leaders International Scholar to the Korean Institute of Metals and Materials (KIM)



**Anne Campbell**

*R&D Staff, Oak Ridge National Laboratory*

"I am very honored to be selected as the inaugural recipient for the TMS Young Leaders International Scholar Program with the Korean Institute of Metals and Materials. The collaborations between researchers in the U.S. and South Korea will certainly lead to the deployment of advanced nuclear reactors that will help with world-wide reduction in carbon emissions. I will use this opportunity to support the continuation of current, and development of new, collaborations between the U.S. and South Korea for materials needs for future carbon-free energy sources."

### JIMM AND KIM SCHOLARS SPEAK AT TMS2024

The following scholars, selected by JIMM and KIM, delivered presentations at the TMS 2024 Annual Meeting & Exhibition in Orlando as part of the Young Leaders International Scholar Award Program.

#### JIMM Young Leaders International Scholar to TMS



**Asuka Suzuki**

*Nagoya University, Assistant Professor*

**Presentation:** "Machine-Learning Approaches to Control the Microstructure and Properties of Laser Powder Bed Fused Metallic Components"

#### KIM Young Leaders International Scholar to TMS



**Jahyun Koo**

*Korea University School of Biomedical Engineering, Assistant Professor*

**Presentation:** "Electrochemically Controlled Drug Delivery Valve that Exploits Crevice Corrosion"

## EARLY CAREER FACULTY FELLOW

This award recognizes assistant professors, invites them to make nontechnical presentations at the Emerging Professionals Tutorial Lecture at the TMS Annual Meeting & Exhibition, and asks them to program a symposium at the TMS Annual Meeting & Exhibition the year following the award presentation.

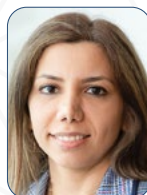


**Diletta Giuntini**

*Assistant Professor, Eindhoven University of Technology*

**Presentation:** "Merging Fields and Perspectives: Multidisciplinarity and Internationalization in Materials Science"

"TMS has been one of my very first professional homes, and I treasure every milestone that I was able to achieve thanks to their support. Being recognized with the Early Career Faculty Fellow Award is an immense honor. I will do my very best to continue contributing to this thriving international community of brilliant materials scientists and engineers."



**Atieh Moridi**

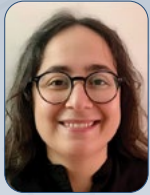
*Assistant Professor, Cornell University*

**Presentation:** "The Power of Instability: Non-Equilibrium Dynamics in Additive Manufacturing and Professional Development"

"I'm deeply grateful to the TMS Honors & Professional Recognition Committee for this remarkable honor. I'm indebted to the bright students I work with every day, as well as the nominators and mentors who have guided me along the way. I look forward to this journey of continued learning and collaboration within TMS."

## FRONTIERS OF MATERIALS AWARD

Recipients of this award are selected to organize symposia on hot or emergent technical topics at the TMS Annual Meeting & Exhibition.



**Pinar Acar**

*Assistant Professor, Virginia Polytechnic Institute and State University*

**Symposium:** Physics-Informed Machine Learning for Modeling and Design of Materials and Manufacturing Processes

**Keynote Presentation:** "Inverse Design for Crystal Plasticity Model Identification via Physics-Informed Neural Networks"

"Thank you very much to TMS for this honor and opportunity of organizing a symposium. I am very much looking forward to the fruitful discussions we will have with the TMS community on this emerging and exciting field of materials research."



**Takaaki Koyanagi**

*R&D Staff, Oak Ridge National Laboratory*

**Symposium:** Novel Ceramics Processes for Nuclear Applications

**Keynote Presentation:** "Development of Next-Generation Silicon Carbide Composites for Nuclear Energy"

"It is a great honor for me to receive the Frontiers of Materials Award. I would like to thank my co-workers and collaborators who helped my career. I am thrilled to organize a special symposium at TMS2024."

## YOUNG INNOVATOR IN THE MATERIALS SCIENCE OF ADDITIVE MANUFACTURING AWARD

Recipients of this award are invited to deliver a talk at the Additive Manufacturing Keynote session held at the TMS Annual Meeting & Exhibition.



**Minh-Son Pham**

*Senior Lecturer, Imperial College London*

**Presentation:** "Meta-Crystals: Synergistic Combination of Materials Science and Additive Manufacturing"

"TMS has been my professional home where I learn and meet many brilliant minds who inspire me in pursuing research in materials science and advanced manufacturing. Being recognized through this award is a great honor. This award is a credit to the excellent works in physical metallurgy and additive manufacturing I have had with Ph.D. students and collaborators with whom I have had the privilege to work."

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



### Emerging Leaders Alliance

#### APPLY FOR THE 2024 EMERGING LEADERS ALLIANCE CONFERENCE

TMS is now accepting applications for the 2024 Emerging Leaders Alliance (ELA) Conference. This program provides interdisciplinary training for future leaders of the science and engineering community. TMS is one of eight partner societies supporting the ELA conference.

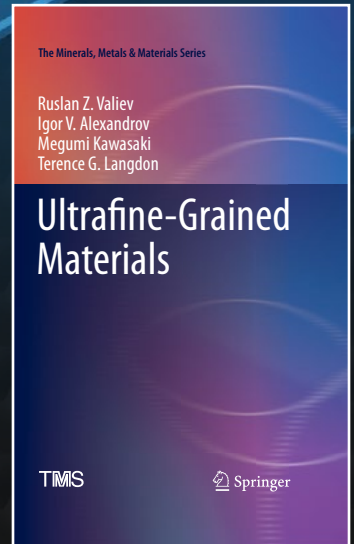
Each year, the TMS Foundation sponsors attendance for up to seven TMS members, typically between ages 24-40, with rising or current leadership positions within their organizations. To apply for one of the seats at the September 2024 conference, please send a letter of interest, one to two letters of recommendation, and a resume or CV of no more than five pages to Deborah Hixon, TMS Awards Program Manager, at [hixon@tms.org](mailto:hixon@tms.org).

**The deadline to apply is May 15, 2024.**

For a first-hand look from TMS members at the skills gained through this experience, read the February 2024 *JOM* article, "Not Your Average Training Program: TMS Members Go Above and Beyond at ELA Conference."

# TMS Members Discuss New Textbook on Ultrafine-Grained Materials

Kaitlin Calva



Three TMS members are expanding libraries with their new textbook, *Ultrafine-Grained Materials*. After working together at various times on a number of projects and scientific papers, **Ruslan Z. Valiev**, **Megumi Kawasaki**, and **Terence G. Langdon** reunited to write this book along with Igor V. Alexandrov.

The book aims to provide an update on the many advances made in the field over the last several decades, hoping to provide equal use and value to both university students and more experienced researchers. By focusing on key terminology and test questions, the authors present the subject in a logical and accessible format to ensure reader understanding.

*Ultrafine-Grained Materials* aims to act as a bridge between the students, researchers, and professionals who are engineering the newest nanomaterials as it summarizes potential applications for these materials in areas including biomedical, electrical, and construction engineering. The book:

- Provides a detailed overview on mechanical and functional properties of bulk nanostructured materials;
- Details applications of bulk nanostructured materials in various industries and engineering disciplines; and
- Describes the application of severe plastic deformation to the formation of hybrid metal systems.

## MEET THE TMS MEMBER AUTHORS



**Ruslan Z. Valiev**, TMS member since 1999 and 2014 TMS Fellow, is a professor at Ufa State Aviation Technical University and at Saint Petersburg State University.



**Megumi Kawasaki**, TMS member since 2003, is an associate professor at Oregon State University. Photo courtesy of Oregon State University.



**Terence G. Langdon**, TMS member since 1966 and 2003 TMS Fellow, is a professor at the University of Southampton and the University of Southern California.

"Ultrafine-grained materials (UFG) obtained via severe plastic deformation (SPD) have been the object of extensive research for the past two decades and hundreds of scientific articles and several books have been published, demonstrating the great prospects of these materials for fundamental studies and applied research," said Valiev.

In this time, Langdon noted, many advances have been made in the production and utilization of UFG materials. "This new book is designed to provide an update on these developments including, for example, the production of UFG implants for medical devices and, by simultaneously processing two different materials, the production of bulk multilayered hybrid materials," he said.

Valiev expanded on this point: "In recent years, a breakthrough has been outlined in this area, associated both with the development of new processing routes for the fabrication of UFG materials and with investigations of the fundamental mechanisms that lead to novel properties for these materials. These subjects are now being lectured for undergraduate and graduate students at many universities worldwide."

"We initiated the writing of this book to fill the knowledge gap between the current advanced research on UFG materials and materials produced through SPD and the fundamental knowledge required for today's students and young scientists," Kawasaki added. "We aim to provide a comprehensive summary of the latest understanding, achievements, and advancements in this field for young researchers, thereby connecting cutting-edge research and foundational knowledge through curated suggested readings, problem sets, and practical tasks."

The three co-authors all acknowledged the role their TMS memberships have played in their own understanding of and work in this field. "Through the TMS community, I have acquired extensive knowledge about UFG materials," Kawasaki reflected, pointing out that her TMS membership has afforded access to numerous works in the field either presented at TMS conferences or published in TMS scientific journals and books.

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Valiev agreed with his colleague: "TMS coordinates research efforts among scientists all over the world, especially with its meetings being a platform for the exchange of ideas and information relating to all aspects of materials science. Particularly, the UFG-related symposium series has provided opportunities to bring fundamental investigations from laboratory scale to practical application in various branches of industry, attracted young scientists, and let us share our practices, knowledge, and experiences, which is all summarized in the textbook."

"The conferences have been of major importance both for meeting and having discussions with colleagues and because we have been organizing a series of symposia on UFG metals," said Langdon, also referring to the Ultrafine-Grained Materials Symposium held bi-annually at the TMS Annual Meeting & Exhibition. Langdon, along with Valiev, Kawasaki, and many other TMS members, all have been involved in this symposium over the years as a co-organizer, session chair, or presenter. "I much appreciate the support given to us by TMS in organizing these symposia."

On a final note of reflection, Valiev added, "TMS duly recognizes achievements with its various awards and publication opportunities, and I am proud to be a part of it."

*Ultrafine-Grained Materials* is available now. To obtain your 20% TMS member discount for this non-proceedings title, visit [www.tms.org/Bookstore](http://www.tms.org/Bookstore), log in to see the discount codes in the text above the product listing, and enter the code during checkout on the Springer website.

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

# TMS MEETING HEADLINES

Meeting information is current as of February 27, 2024. For the most recent updates on TMS-sponsored events, visit [www.tms.org/Meetings](http://www.tms.org/Meetings).

## TMS Specialty Congress 2024



June 16–20, 2024  
Cleveland, Ohio,  
USA

### Housing Deadline: May 24, 2024

The TMS Specialty Congress series convenes the Society's recurring specialty meetings under one roof with a single registration fee that includes all programming and access to multidisciplinary networking opportunities. Explore your technical interest in a focused, small event environment, while also having access to cross-disciplinary learning and collaboration opportunities with aligned materials communities.

[www.tms.org/SpecialtyCongress2024](http://www.tms.org/SpecialtyCongress2024)

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



September 8–12, 2024  
Champion, Pennsylvania,  
USA

### Discount Registration Deadline: July 15, 2024

Enhance your Superalloys 2024 experience by attending a short course on Sunday, September 8, 2024. The following two courses will be offered: **Advanced Characterization Methods to Understand Deformation Mechanisms in Superalloys** and **Repair Operations of Engine-Run Turbine Airfoils and Future Challenges in Superalloy Materials**.

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

## TMS Fall Meeting 2024 at Materials Science & Technology (MS&T24)



October 6–9, 2024  
Pittsburgh, Pennsylvania,  
USA

### Make Plans to Attend

A complement to the TMS Annual Meeting held each spring, the TMS Fall Meeting at MS&T offers TMS members a chance to connect each year at a second large-scale, multidisciplinary meeting to explore the intersections of development, synthesis, and application.

[www.tms.org/TMSFall2024](http://www.tms.org/TMSFall2024)

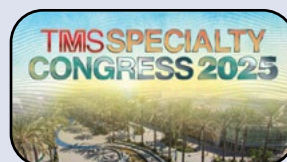
## OTHER MEETINGS OF NOTE



### TMS 2025 Annual Meeting & Exhibition (TMS2025)

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

[www.tms.org/TMS2025](http://www.tms.org/TMS2025)



### TMS Specialty Congress 2025

June 15–19, 2025  
Anaheim, California, USA

[www.tms.org/SpecialtyCongress2025](http://www.tms.org/SpecialtyCongress2025)



### Extraction 2025 Meeting & Exhibition (Extraction 2025)

November 16–20, 2025  
Phoenix, Arizona, USA

[www.extractionmeeting.org/Extraction2025](http://www.extractionmeeting.org/Extraction2025)

## CO-SPONSORED MEETINGS

### 4th International Symposium on Electrometallurgy - part of the 63rd Conference of Metallurgists (COM 2024)

August 19–22, 2024  
Halifax, Nova Scotia, Canada  
*Co-organized by TMS*

### Solidification and Casting of Aluminium Alloys: From Basics to Technology

September 2–6, 2024  
Brunel University, London, United Kingdom  
*Co-sponsored by TMS*



# SUBMIT AN ABSTRACT

ABSTRACTS DUE: NOVEMBER 1, 2024

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