CONFERENCE GUIDE

General Meeting Information, Maps, Programming Highlights, and Exhibit Directory Inside

NEED A COPY OF THE TECHNICAL PROGRAM?
Download the TMS2019 Mobile App (see page 15 for details) or pick up a print copy at the TMS Member Welcome Center.

www.tms.org/TMS2019
Software packages:

- **Thermo-Calc** for thermodynamics and phase equilibria in multicomponent systems
- **Diffusion module (DICTRA)** for modelling diffusion controlled transformations
- **Precipitation module (TC-PRISMA)** for modelling precipitation kinetics
- **Software development kits** for linking Thermo-Calc to your own software codes
- **Over 40 Databases** for thermodynamic and mobility applications

Highlights for 2019a:

- **New Martensite + Pearlite Models** - calculate Ms and Mf temperatures and predict pearlite growth kinetics
- **New TC-Python API** - link Thermo-Calc, DICTRA, and TC-PRISMA to other packages using easy to learn Python language
- **New Databases TCTI2, TCNI9, TCAL6** - Major updates to the Titanium, Nickel, and Aluminum thermodynamic and their corresponding mobility databases

Thermo-Calc 2019a now available:
Visit www.thermocalc.com/release to learn about the new features and databases or stop by Booth 312 at the TMS 2019 Annual Meeting and Exhibition (March 11-13, 2019)

www.thermocalc.com  info@thermocalc.com
Thank you for joining us for the highlight of the TMS year: the TMS 2019 Annual Meeting & Exhibition (TMS2019). For one week, TMS brings together minerals, metals, and materials scientists and engineers from around the world to present research, exchange ideas, and engage in face-to-face conversation with peers, mentors, clients, and friends. The world of our profession truly does come together here, and I’m so glad you’ve decided to be a part of it.

Before you dive into an action-packed schedule of events, allow me to briefly share a few highlights of this year’s conference, as well as a few practical tips for making the most of your time here.

MONDAY ALL-CONFERENCE PLENARY FEATURES LUANA IORIO
From noon to 1:00 p.m. on Monday, Luana Iorio of GE Aviation will deliver an all-conference plenary talk on the topic “The Next Materials Frontier for Flight.” Join your fellow TMS2019 attendees for this broad-interest presentation that will bring together attendees from all technical disciplines for a shared experience.

Afterwards, you are invited to browse the GE additive technologies related to Iorio’s talk on display in the lobby and to join your fellow conference attendees for lunch in the Exhibit Hall. (Check the tickets attached to your badge for your complimentary lunch tickets.)

TMS2019 WELCOMES REWAS 2019
The REWAS 2019 symposium, the sixth installment in this conference series, will be held in conjunction with TMS2019 and will focus on the topic Manufacturing the Circular Materials Economy. All TMS2019 attendees are welcome to attend the five symposia that make up REWAS, as well as Tuesday morning’s REWAS plenary session featuring seven invited speakers and the International Round Table on Materials Criticality to be held on Thursday.

DGM TEAMS WITH TMS ON LIGHT METALS
TMS welcomes The German Materials Society (DGM) as a programming partner for 2019. The TMS-DGM Symposium on Lightweight Metals: A Joint U.S.-European Symposium on Challenges in Light Weighting the Transportation Industry will be held on Tuesday, with a session devoted to aluminum in the morning and one devoted to magnesium in the afternoon.

PLAN YOUR WEEK WITH SCHEDULING TOOLS
With more than 3,500 presentations planned for TMS2019, determining what to attend and how to find your next location can be daunting. Here are some steps to make getting around easier: First, download the TMS2019 App for your mobile device. It includes maps and a scheduling tool that may prove a valuable and convenient way to structure your week. Second, make use of the TMS2019 maps strategically placed throughout the convention center.

WHERE DO I FIND THE TECHNICAL PROGRAM?
Those of you who are frequent TMS annual meeting attendees may have noticed that the conference guide in your hands is significantly slimmer than in past years. This is because it does not include the full technical program with its listing of more than 3,500 presentations. If you would like a print version of the complete technical program, you can pick one up at the TMS Member Welcome Center, located near registration. The program is also available electronically through the TMS2019 app and as a downloadable, interactive PDF at www.tms.org/TMS2019.

VISIT THE TMS MEMBER WELCOME CENTER
Please take a few minutes to meet some of the TMS staff at the TMS Member Welcome Center, which is located near Registration. If you are a first-time attendee or someone who has attended ten or more consecutive TMS annual meetings, please stop by to pick up your free gift. All other attendees should visit to pick up their 2019 commemorative pin. Staff will also be happy to assist you with any questions that you might have about TMS2019, including downloading and using the TMS2019 app, as well as questions regarding your membership.

MAKE THE MOST OF YOUR WEEK!
In the session rooms each day, you’re guaranteed to gain new insights on your work. Learn about different approaches to common problems, and generally expand your knowledge in a wide variety of areas. I hope you use this newfound knowledge to advance your own work and that you return from your week with us energized and ready to take on new challenges.

I wish you a productive and exciting week at TMS2019!

Sincerely,

Kevin J. Hemker
2018 TMS President
MEETING INFORMATION

TMS2019 CONFERENCE GUIDE

For complete details on technical symposia and presentations:
• Search the “Schedule” section of the TMS2019 app
• Download an interactive PDF of the technical program at www.tms.org/TMS2019
• Pick up a copy of the complete printed technical program at the TMS Member Welcome Center

VIEW THE FULL TECHNICAL PROGRAM

DAYLIGHT SAVINGS TIME

Daylight savings time begins at 2:00 a.m. on Sunday, March 10.

San Antonio, TX, USA
12:00 p.m.
(UTC-5)
March 10, 2019

New York, USA
1:00 p.m.
(UTC-4)
March 10, 2019

Beijing, China
1:00 a.m.
(UTC+8)
March 11, 2019

Brussels, Belgium
6:00 p.m.
(UTC+1)
March 10, 2019

Greenwich Mean Time
5:00 p.m.
(UTC+0)
March 10, 2019
For the convenience of attendees, programming is generally grouped and color-coded by topic areas. Find the zones with your topic area to easily locate your session rooms on the map.
TMS2019 LOCATION MAPS

Programming Level 200 (Main Room Level)

Cross over on third level for Zones 4 and 5

Escalator down to Presenters' Coffee, Zones 1 and 6

Poster Sessions (Hall 3) Below

Exhibition (Hall 3) Below

Main Lobby Below

ZONE 2

ZONE 4

ZONE 5

Restrooms
Mother’s Room
Elevator
Escalator
Stairs

www.tms.org/TMS2019
Programming Level 300 (Ballroom Level)
Grand Hyatt San Antonio

GET TO KNOW OUR HOST CITY!
Stop by the Visit San Antonio information desk for additional maps, dining guides, and visitor information. Representatives from Visit San Antonio will be on hand to answer your questions about the city.

@visitsanantonio
In the event of an emergency, being prepared to react effectively is the most critical step in ensuring the health and safety of yourself and those around you.

KNOW YOUR SURROUNDINGS
Please take a few moments to review the maps of the TMS2019 facilities available on pages 4-10 of this guide and on the TMS2019 App. When you enter these buildings, familiarize yourself with the exits and the stairs leading to those exits. When you arrive at your session or event location, look for the emergency exits that are in proximity to you.

HOSPITALS AND PHARMACIES
A listing of local hospitals and pharmacies can be found in the Attendee Toolbox section of the TMS2019 website and on the TMS2019 App.

TAKING NOTE OF LOCATIONS FOR SPECIAL SERVICES

NURSING MOTHER’S ROOMS
The Henry B. González Convention Center offers two dedicated, private rooms for nursing mothers. One is located in the East Wing of the Convention Center in Room 1212 (in the lobby corridor between Halls 3 & 4). The other is located in the West Wing in Room 2137, next to Room 215 in Parkview. The rooms are equipped with comfortable furniture, power outlets, wastebasket, table, and paper towels.

At the Grand Hyatt San Antonio, the Bonham A meeting room on the third floor of the hotel will serve as the nursing mother’s room for TMS2019 attendees and can accommodate two individuals at a time. A chair, table, and outlet access is available for each occupant. The room also has a water station and refrigerator.

Look for the Nursing Mother’s Room icon on the map.

GENDER-NEUTRAL RESTROOMS
Gender-neutral restrooms are available at the Henry B. González Convention Center and at the Grand Hyatt San Antonio. Look for this icon on the map.

EXITS AND ELEVATORS FOR ATTENDEES WITH DISABILITIES
Exits and elevators designated for attendees with disabilities are indicated on the map with this icon.

AT THE HENRY B. GONZÁLEZ CONVENTION CENTER

HOW TO REPORT AN EMERGENCY
Courtesey phones are located within the convention center. Instructions with phone numbers are provided near each phone.

If an emergency is a life-threatening situation:
1. Please call 911 immediately and give as many details as possible. Notify the operator that you are a guest at the Henry B. González Convention Center, 900 E. Market St.
2. Notify in-house security at (210) 207-7773 and relay the information so that they can direct emergency personnel to the appropriate location quickly.

If it is not a life-threatening situation, please notify the in-house Security Division at (210) 207-7773.

ALARMS
Should the general alarm sound, all attendees should evacuate the building immediately. A public address system will announce instructions in English and Spanish during the alarm. For those who are hearing impaired, the alarms are fitted with strobe lights to indicate that the alarm was activated.

EMERGENCY EVACUATIONS
In the event of an emergency evacuation, attendees should leave the convention center through the nearest exit and remain outside until instructed to re-enter. Assistance will be provided to guests with disabilities. Exits and elevators designated for attendees with disabilities are indicated on the maps in this conference guide and on the TMS2019 App.

AT THE GRAND HYATT SAN ANTONIO

HOW TO REPORT AN EMERGENCY
From any house phone, dial extension 55 for the hotel emergency team. For hotel security, dial extension 6222 or 210-451-6222.

ALARMS
If an alarm is activated, follow the announcement from the public address system instructing you what action should be taken.

EMERGENCY EVACUATIONS
In the case of an emergency evacuation, follow the instructions of the hotel staff and proceed to the nearest emergency exit/stairwell. Follow the evacuation route out of the building to a designated assembly area. At the assembly area, please inform a hotel staff member of your room number and whether you require medical attention. Guests with disabilities should dial extension 55 if they need assistance. At check-in, inform the front office host if you will need assistance evacuating so that the hotel can keep record of it.
REGISTRATION & TICKETS

REGISTRATION BADGES
The TMS2019 name badge you received at registration must be worn for admission to technical sessions, the exhibit hall, social functions, and other events. Your full-meeting registration badge provides you access to:

- More than 80 symposia in 15 technical tracks
- Technical sessions of REWAS 2019
- A three-day pass to the TMS2019 Exhibition:
  - Exhibit Hall Opening Reception and Poster Session
  - Exhibit Hall Happy Hour and Poster Session
- President’s Welcoming Reception
- All-conference plenary session, featuring Luana Iorio, GE Aviation
- 2019 TMS-AIME Awards Ceremony
- Online access to the complete collection of TMS2019 proceedings publications

Attached to your name badge, you will find tickets that allow you to access select functions at TMS2019.

BADGE REPLACEMENT
Please keep your badge with you at all times during the meeting. If you misplace your badge, replacement badges can be printed at the TMS2019 registration desk for a fee of $25.

TICKETED EVENTS
Certain receptions, luncheons, and other activities at TMS2019 require purchase of a ticket in order to attend. If you purchased tickets in advance for one of these events, your ticket will be attached to your name badge. If you would like to add a ticketed event to your registration, please inquire at the registration area.

Most ticket sales will be closed by 10:00 a.m. the day before the event. For example, tickets for the awards banquet on Wednesday evening should be purchased by 10:00 a.m. on Tuesday. An exception is the Fresh Coffee, Fresh Ideas: Diversity and Inclusion Breakfast on Wednesday morning. Ticket sales for this event will close at 5:00 p.m. on Monday.

Registration Desk - Hours of Operation:
Sunday: 7:00 a.m. to 7:00 p.m.
Monday: 7:00 a.m. to 6:00 p.m.
Tuesday: 7:00 a.m. to 5:30 p.m.
Wednesday: 7:00 a.m. to 5:00 p.m.
Thursday: 7:00 a.m. to 2:00 p.m.

www.goodfellowusa.com / info@goodfellowusa.com / 1-800-821-2870
Where MATERIALS KNOWLEDGE & INNOVATION meet

MEETING INFORMATION

TMS2019 CONFERENCE GUIDE
FREE PROCEEDINGS ACCESS
TMS2019 attendees in most registration classes receive free online access to the complete collection of proceedings publications. For details on how to download the proceedings publications, see the instructions attached to your name badge.

Please note that complimentary proceedings content must be downloaded by April 30, 2019, at which time standard pricing will take effect.

INDIVIDUAL VOLUMES FOR PURCHASE
TMS members receive a 40% discount off hard copies of the TMS2019 proceedings volumes presented on this page. These books will be available for purchase at the Springer booth, located near the TMS2019 registration area at the Henry B. González Convention Center.

Visit the online TMS Bookstore to search the complete inventory of available TMS publications, including past proceedings volumes at www.tms.org/Bookstore.

TMS2019 PROCEEDINGS VOLUMES
The following volumes will be included in the online proceedings content access for most registrants, and hard copies will be available for purchase at TMS2019:
Wi-Fi, FOOD & BUSINESS SERVICES

**Wi-Fi ACCESS**
For your convenience, free wireless internet access will be available in all areas of the Henry B. González Convention Center. To access free Wi-Fi:

Choose Network: TMS2019
Enter Password: materials

**LUNCHES**
Tickets for lunches in the TMS2019 Exhibit Hall (included as part of the conference registration fee) are attached to each full-conference attendee’s name badge. Please take advantage of these complimentary lunches as a convenient option during busy days. Lunch will be available in the exhibit hall at the following days and times:

- **Monday, March 11**
  1:00 p.m. to 2:30 p.m.

- **Tuesday, March 12**
  11:30 a.m. to 1:30 p.m.

- **Wednesday, March 13**
  11:30 a.m. to 1:30 p.m.

**COFFEE AND QUICK BITES**
On Thursday, when lunch is not available in the exhibit hall, attendees can visit Market Café (in the Main Lobby) or El Puente (in the West Lobby) for a convenient lunch without leaving the convention center. These are also good food service options for attendees looking for a drink, a snack, or a quick meal.

**Market Café** (located in Main Lobby)
Hours: 7:00 a.m. to 4:00 p.m. daily
Market Café has a selection of Starbucks coffees, chilled beverages, snacks, salads, cold sandwiches, hot sandwiches, pizzas, as well as Barbosa (a bar that opens around noon).

**El Puente** (located in West Lobby)
Hours: 7:00 a.m. to 4:00 p.m. daily
El Puente has a selection of Starbucks coffees, chilled beverages, snacks, salads, and cold sandwiches.

**BUSINESS SERVICES**
A UPS store is located in the lobby of the Henry B. González Convention Center, Street Level, at the main entrance. Attendees and exhibitors can use the UPS Store to ship, mail, fax, photocopy, or create a last-minute presentation. The store is closed on Sunday, but open Monday through Friday, 8:00 a.m. to 6:30 p.m.

**2019 MATERIALS BOWL COMPETITORS**
Stop by the Lila Cockrell Theatre between 2:00 p.m. and 6:00 p.m. on Sunday afternoon to cheer on your favorite school at the TMS Materials Bowl. The teams competing in this year’s event are:

- University of North Texas, “Aluminati”
- University of Florida, “The Bowl Gators”
- Illinois Institute of Technology, “Aye-Aye Team”
- University of Illinois at Urbana-Champaign, “University of Illinois”
- Georgia Institute of Technology, “The Georgia Tech Buzzers”
- Colorado School of Mines, “Orediggers”
- Missouri University of Science & Technology, “The Miller Indices”
- University of Tennessee Knoxville, “The VOL-ymer Blends”
- Arizona State University, “Sun Devils”
- University of Michigan, Ann Arbor, “University of Michigan Wolverines”
- North Carolina State University, “NC State”
- Florida International University, “Alchemists 2.0”

Find out which team is the champion in the Monday edition of *TMS News*.
TMS2019 MOBILE APP

Build a personalized schedule, view the latest technical program information, access venue maps, and more with the TMS2019 mobile application. To download, search “TMS Annual Meeting” in the App Store or the Google Play™ Store.

The App’s features include:

- Latest programming schedule
- Complete abstracts
- Ability to build a personalized schedule
- Speaker information
- Exhibit map
- Exhibitors and sponsors
- Venue information
- Access to TMS2019 News

If you need assistance downloading or using the TMS2019 App, please visit the Member Welcome Center.

TMS2019 NEWS:
YOUR DAILY MEETING NEWSLETTER

Want to stay informed of everything that’s happening at the TMS 2019 Annual Meeting & Exhibition? TMS2019 News, a daily newsletter reporting on conference activities and events, will be published each morning, Sunday through Thursday, during the conference. You can access the newsletter through the TMS2019 app at any time, through the TMS2019 website, or by clicking on the link in the notification e-mail we’ll send each morning.

Each issue will provide a reminder of the big events planned for the day, as well as recaps and photos from events happening around the meeting. So before you start your day at TMS2019, sit down with a cup of coffee and skim TMS2019 News so that you don’t miss a thing.

TWEET YOUR OWN UPDATES

Keep each other updated on meeting activities, interesting talks, and tips on the best local restaurants. Use #TMSAnnualMeeting to tweet your observations to @TMSSociety.

PLEASE NOTE: LOG IN REQUIRED FOR TMS2019 APP

The first time you open the TMS2019 App, you will be asked to log in using your TMS2019 registration confirmation number. This number will be in your e-mailed registration confirmation and is conveniently printed on the front of your badge. Please remember to use the hyphen when entering your unique confirmation code (19-xxxxx).
VISIT THE TMS MEMBER WELCOME CENTER

**Location:** Henry B. González Convention Center, Hall 3 Pre-Function

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<th>Hours of Operation:</th>
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<td>Sunday: 7:00 a.m. to 7:00 p.m.</td>
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<tr>
<td>Thursday: 7:00 a.m. to 5:00 p.m.</td>
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**LOOKING FOR INFORMATION ON YOUR TECHNICAL SYMPOSIUM OR PRESENTATION?**

Visit the TMS Programming Support desk, located in the Hall 4A Pre-Function area of the Henry B. González Convention Center.

**WHAT CAN YOU DO AT THE TMS MEMBER WELCOME CENTER?**

**FIND TECHNICAL PROGRAM INFORMATION**
Learn how to access technical program information through the TMS2019 App or pick up a print copy of the TMS2019 technical program.

**PICK UP YOUR 2019 COMMEMORATIVE PIN**
All TMS2019 attendees are invited to pick up their commemorative pin honoring the 70th anniversary of *JOM*, the TMS member journal, which was established in 1949. Bring the ticket attached to your registration badge to the Member Welcome Center to claim your pin.

**PICK UP YOUR FREE COPY OF NEW TMS STUDIES**
- **Metamorphic Manufacturing: Shaping the Future of On-Demand Components**
  Organized by TMS on behalf of the Office of Naval Research and the Lightweight Innovations for Tomorrow Manufacturing Institute
  Download for free at: www.tms.org/MetamorphicManufacturing

- **Verification and Validation of Computational Models Associated with the Mechanics of Materials**
  Organized by TMS on behalf of the National Science Foundation
  Download for free at: www.tms.org/VerificationandValidation

**LEARN ABOUT MATERIALS EXPLORERS™**
TMS’s *Materials Explorers™* educational outreach initiative offers members the opportunity to share their interest in science and engineering with students. At the TMS Member Welcome Center, you can watch videos, talk to volunteers who have used the program at local schools, and sign up to bring the program to schools in your area.

**VIEW THE TMS FOUNDATION HONOR ROLL**
Take a moment to view the TMS Foundation Honor Roll, which thanks all of the individuals and organizations who donated to the TMS Foundation in 2018.

**ASK QUESTIONS**
Please visit the TMS Member Welcome Center with any questions you may have about your membership or simply stop by to introduce yourself to TMS staff.

**FIRST-TIME ATTENDEES: PICK UP YOUR WELCOME GIFT**
If this is your first time attending a TMS annual meeting, visit the TMS Member Welcome Center to pick up a guide to making the most of your new TMS membership and use the ticket attached to your registration badge to claim a small gift to thank you for joining us at TMS2019.

**REPEAT ATTENDEES: CLAIM YOUR THANK YOU GIFT**
If you have attended ten or more consecutive TMS annual meetings, stop by the TMS Member Welcome Center for your gift—our small way of saying thank you for your loyalty to us and our conference. Eligible attendees received an e-mail in advance of the meeting and can use the ticket attached to their name badge to claim their gift.
MEETING BADGES
All attendees must wear registration badges at all times during the meeting to ensure admission to events included in the paid registration fee, such as technical sessions, exhibition, and receptions. "Exhibit Only" badges only provide admittance to the show floor for events in the exhibit hall. "Exhibit Only" attendees may not attend technical sessions.

BADGE REPLACEMENT FEE
There is a $25 fee to reprint lost badges. Visit the registration area to request a replacement badge.

GUEST SESSION ACCESS
Each full-conference attendee is permitted up to two guests for one session at which they are presenting. This does not include colleagues or exhibitors. This access is intended for family members who wish to listen to one talk presented by their relative. No one under 18 permitted. Please provide the names of the guests who will be attending your presentations when picking up your badge.

GUEST FUNCTION TICKETS
You may purchase additional tickets to social functions for your guests at the registration desk.

REFUND POLICY
The deadline for all refunds was February 1, 2019. No refunds will be issued at the meeting. Fees and tickets are nonrefundable. TMS is not responsible for “no-show” presenters. Presenters are scheduled and advertised in good faith based on the presenter’s proposal to be included in the program.

PHOTOGRAPHY AND AUDIO/VIDEO RECORDING POLICY
TMS reserves the right to all audio and video reproductions of presentations at TMS-sponsored meetings. By registering for this meeting, all attendees acknowledge that they may be photographed by TMS personnel while at events, and that those photos may be used for promotional purposes, in TMS publications and websites, and on social media sites. Any recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication, or copyright without the express written consent of TMS and the individual authors is strictly prohibited. Attendees violating this policy may be asked to leave the session or the meeting without refund.

ANTI-HARASSMENT POLICY
TMS policy prohibits conduct that is disrespectful, unprofessional, or harassing as related to any number of factors including, but not limited to, religion, ethnicity, gender, national origin or ancestry, physical or mental disability, physical appearance, medical condition, partner status, age, sexual orientation, military and veteran status, or any other characteristic protected by relevant federal, state, or local law or ordinance or regulation. Failure to comply with this policy could lead to censure from the TMS Board of Directors, potential legal action, or other actions. Anyone who witnesses prohibited conduct should notify a TMS staff member as soon as possible following the incident so that the issue can be addressed in a timely manner.

TMS DIVERSITY AND INCLUSION STATEMENT
The Minerals, Metals & Materials Society (TMS) is committed to advancing diversity in the minerals, metals, and materials professions, and to promoting an inclusive professional culture that welcomes and engages all who seek to contribute to the field. TMS recognizes that a diverse minerals, metals, and materials workforce is critical to ensuring that all viewpoints, perspectives, and talents are brought to bear in addressing complex science and engineering challenges. To build and nurture this diverse professional community, TMS welcomes and actively engages the participation of underrepresented groups in all of its initiatives and endeavors.

ANTITRUST COMPLIANCE POLICY
TMS complies with the antitrust laws of the United States. Attendees are encouraged to consult with their own corporate counsel for further guidance in complying with U.S. and foreign antitrust laws and regulations.

AMERICANS WITH DISABILITIES ACT
TMS strongly supports the federal Americans with Disabilities Act (ADA) which prohibits discrimination against, and promotes public accessibility for, those with disabilities. In support of, and in compliance with ADA, we ask those requiring specific equipment or services to contact TMS Meeting Services in advance at 1-724-776-9000 or on-site at the TMS Member Welcome Center.

CELL PHONE USE
In consideration of attendees and presenters, TMS kindly requests that you minimize disturbances by setting all cell phones and other devices on “silent” while in meeting rooms.
Creation of Nano-Powders with the FRITSCH Planetary Micro Mill
PULVERISETTE 7 premium line

Revolutionary comminution concept for small samples into the nano-range (1nm = 10\(^{-9}\) m).

Materials science, engineering, & chemistry professionals make use of the Pulverisette 7 premium line in their work with mechanical activation, mechano-chemistry, mechanical alloying, catalysts, oxides, and more. Inert milling options along with GTM (Gas and Temperature Measurement) System, and Mill Control Software allows more insight to your process, efficiency, and programmable control of your mill and process- in the right environment.

Principle of the planetary mills
In a planetary mill, the sample is placed inside a grinding bowl along with the grinding balls. The grinding bowls are fastened to a sun disk where they counter rotate around the center at high speeds creating impact forces, shearing, and grinding of particles inside. The maximum rotational speed of premium line is 1100 rpm and therefore there is increase of the kinetic energy of the grinding bodies by 150% over classic planetary ball mills. The grinding duration into the nano scale is drastically reduced. The increased energy makes the comminution of nano particles for certain materials possible.

Nano grinding of aluminium oxide
As a testing system we here present the comminution of aluminium oxide (Al\(_2\)O\(_3\)). The \(d_{50}\) value of the base material is 20µm. 5ml Al\(_2\)O\(_3\) and along with water and 0.5 mm zirconium oxide balls are in 60 minutes ground down to approximately 300 nm. In order to reach the range of <100 nm, it is necessary to utilize even smaller grinding balls. We use ZrO\(_2\) balls with a diameter of 0.1mm. After an additional 180 minutes we obtain the following result:

| \(d_{10}\) | 17  |
| \(d_{50}\) | 32  |
| \(d_{90}\) | 80  |

Analysis and Method Information
The depicted size distribution was measured using FRITSCH Laser Particle Sizer ANALYSETTE 22, in consideration of the corresponding Mie parameters. With a ball mill comminution, a certain abrasion on the grinding bodies cannot be avoided. This occurring abrasion was in the above measuring deducted from the original.

Comparable results can also be achieved with other, hard fibrous metal oxides. The comminution is in a suspension. Dry comminution is not possible for particle size reduction applications. Nano particles have a very large specific surface. Therefore the suspension is not stable during the end of the comminution, i.e. the particles re-agglomerate very fast. For the stabilization special additives have to be used. Corresponding tests are performed in our application laboratory.
<table>
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<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
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<td><strong>Saturday, March 9</strong></td>
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<td><strong>Committee &amp; Business Meetings</strong></td>
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<td>Professional Registration Item Writers Workshop and Committee Meeting</td>
<td>9-Mar</td>
<td>9:00 AM</td>
<td>5:00 PM</td>
<td>Hyatt</td>
<td>Travis CD</td>
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<td>Professional Registration Committee Dinner</td>
<td>9-Mar</td>
<td>6:00 PM</td>
<td>8:00 PM</td>
<td>Little Rhein Steak House</td>
<td>TBD</td>
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<td><strong>Sunday, March 10</strong></td>
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<td><strong>All-Conference Events</strong></td>
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<td>Registration</td>
<td>10-Mar</td>
<td>7:00 AM</td>
<td>7:00 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
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<tr>
<td>TMS Member Welcome Center</td>
<td>10-Mar</td>
<td>7:00 AM</td>
<td>7:00 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
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<tr>
<td>Programming Support Desk</td>
<td>10-Mar</td>
<td>2:00 PM</td>
<td>6:00 PM</td>
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<td>Bladesmithing Competition Check-In</td>
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<tr>
<td>Additive Manufacturing Standards, Qualification, and Certification Workshop</td>
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<td>Student Networking Mixer</td>
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<td>TMS Fellows and Invited Guests Reception</td>
<td>10-Mar</td>
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<td>New Board Member Orientation</td>
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<td>Travis AB</td>
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<td>Technical Division Chairs Meeting</td>
<td>10-Mar</td>
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**Event/Function Dates**

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<th>Event/Function</th>
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</table>
## Calendar of Events

**as of February 7, 2019**

<table>
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<tr>
<th>Event/Function</th>
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<td>Magnesium Committee Meeting</td>
<td>10-Mar</td>
<td>1:30 PM</td>
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<td>Recycling and Environmental Technologies Committee Meeting</td>
<td>10-Mar</td>
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<td>Mission A</td>
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<tr>
<td>Metallurgical and Materials Transactions Board of Review</td>
<td>10-Mar</td>
<td>2:00 PM</td>
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<td>Aluminum Committee Meeting</td>
<td>10-Mar</td>
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<tr>
<td>Materials Characterization Committee Meeting</td>
<td>10-Mar</td>
<td>2:30 PM</td>
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<td>Pyrometallurgy Committee Meeting</td>
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<td>Travis AB</td>
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<tr>
<td>Public &amp; Governmental Affairs Committee</td>
<td>10-Mar</td>
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<td>TMS Program Committee Meeting</td>
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<td>JOM Advisor Briefing</td>
<td>10-Mar</td>
<td>4:30 PM</td>
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<td>Diversity Committee Meeting</td>
<td>10-Mar</td>
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<td>6:00 PM</td>
<td>Hyatt</td>
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<td>Process Technology and Modeling Committee Meeting</td>
<td>10-Mar</td>
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<td>Thin Films and Interfaces Committee Meeting</td>
<td>10-Mar</td>
<td>5:00 PM</td>
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<td>Bonham B</td>
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<td>Integrating Materials and Manufacturing Innovation Editorial Board</td>
<td>10-Mar</td>
<td>5:00 PM</td>
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<td>Goliad</td>
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<td>HBGCC</td>
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<td>10-Mar</td>
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<td>Bonham B</td>
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**ANNOUNCING THE 2019 TMS MEETING OF THE MEMBERSHIP AND OPEN BOARD OF DIRECTORS MEETING**

The Minerals, Metals & Materials Society, Inc. (TMS), in accordance with its bylaws (Article II, Section 2.6, and Article III, Section 3.7) will hold its 2019 Annual Meeting of the Membership with an open Board of Directors Meeting, on Thursday, March 14, 2019, from 8:00 a.m. to 8:30 a.m. (CT) in the Mission B Room at the Grand Hyatt San Antonio during the TMS 2019 Annual Meeting & Exhibition. All TMS members are welcome to attend this meeting.
### CALENDAR OF EVENTS
as of February 7, 2019

<table>
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<tr>
<th>Event/Function</th>
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<td><strong>All-Conference Events</strong></td>
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<td>Presenters’ Coffee</td>
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<td>Morning Break</td>
<td>11-Mar</td>
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<td>11-Mar</td>
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<td>Lunch in the Exhibit Hall</td>
<td>11-Mar</td>
<td>1:00 PM</td>
<td>2:30 PM</td>
<td>HBGCC</td>
<td>Hall 3</td>
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<tr>
<td>Poster Session I Gallery Viewing</td>
<td>11-Mar</td>
<td>2:00 PM</td>
<td>5:30 PM</td>
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<td>11-Mar</td>
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<td>11-Mar</td>
<td>7:00 PM</td>
<td>7:00 PM</td>
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<td>Hall 3</td>
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<tr>
<td><strong>Student &amp; Young Professional Functions</strong></td>
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<td>Meet-a-Mentor Reception</td>
<td>11-Mar</td>
<td>5:00 PM</td>
<td>6:30 PM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom B</td>
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<tr>
<td>Technical Division Student Poster Contest</td>
<td>11-Mar</td>
<td>5:30 PM</td>
<td>7:00 PM</td>
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<td>Hall 3</td>
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<tr>
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<tr>
<td>SMD Luncheon</td>
<td>11-Mar</td>
<td>1:00 PM</td>
<td>2:30 PM</td>
<td>Hyatt</td>
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<tr>
<td>University of Florida Alumni &amp; Friends Social</td>
<td>11-Mar</td>
<td>7:00 PM</td>
<td>9:00 PM</td>
<td>Hyatt</td>
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<td>11-Mar</td>
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<td><strong>Committee &amp; Business Meetings</strong></td>
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<td>Membership &amp; Student Development Committee Meeting</td>
<td>11-Mar</td>
<td>7:30 AM</td>
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<td>11-Mar</td>
<td>9:00 AM</td>
<td>11:00 AM</td>
<td>Hyatt</td>
<td>San Jacinto</td>
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<td>EPD Council Meeting</td>
<td>11-Mar</td>
<td>1:00 PM</td>
<td>3:00 PM</td>
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<td>Powder Materials Committee Meeting</td>
<td>11-Mar</td>
<td>1:15 PM</td>
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<td>11-Mar</td>
<td>1:15 PM</td>
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**Legend:**
- HBGCC = Henry B. González Convention Center
- Hyatt = Grand Hyatt San Antonio
- O = Open to All Attendees
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### CALENDAR OF EVENTS
as of February 7, 2019

<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
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<td>Hyatt</td>
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<td>Steels Committee Meeting</td>
<td>11-Mar</td>
<td>6:00 PM</td>
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<td>Hyatt</td>
<td>Travis CD</td>
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<td>Refractory Metals &amp; Materials Committee Meeting</td>
<td>11-Mar</td>
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<td>7:30 PM</td>
<td>HBGCC</td>
<td>303B</td>
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<td>LMD Council Meeting</td>
<td>11-Mar</td>
<td>6:30 PM</td>
<td>8:30 PM</td>
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<td>Bowie ABC</td>
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<td>Alloy Phases Committee Meeting</td>
<td>11-Mar</td>
<td>7:00 PM</td>
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<td>Computational Materials Science &amp; Engineering Committee Meeting</td>
<td>11-Mar</td>
<td>7:30 PM</td>
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</table>

**Access Options:**
- **O** - Open to All Attendees
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**YOU ARE INVITED TO ATTEND A TECHNICAL COMMITTEE MEETING**

Attend one of our open technical committee meetings this week to meet colleagues with similar interests and to become a contributing member of the TMS community. View a complete listing of technical committee meetings on page 26 for meeting times and locations.

---

**PICK UP YOUR COMMEMORATIVE PIN**

Established in 1949 as the flagship member journal of TMS, *JOM* embodies the Society’s commitment to excellence in its technical publications. As with all aspects of TMS, volunteers serve as the driving force behind the journal by contributing to its development, content, and strategic direction. As a gift of appreciation, all TMS2019 attendees are invited to pick up their commemorative pin honoring the 70th anniversary of *JOM* at the TMS Member Welcome Center. Find the ticket for your pin attached to your registration badge.
<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
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<td><strong>Tuesday, March 12</strong></td>
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<tr>
<td><strong>All-Conference Events</strong></td>
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<tr>
<td>Presenters’ Coffee</td>
<td>12-Mar</td>
<td>7:00 AM</td>
<td>8:00 AM</td>
<td>HBGCC</td>
<td>Hall 4A</td>
<td>O</td>
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<tr>
<td>Registration</td>
<td>12-Mar</td>
<td>7:00 AM</td>
<td>5:30 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
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<tr>
<td>TMS Member Welcome Center</td>
<td>12-Mar</td>
<td>7:00 AM</td>
<td>5:30 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
<td>O</td>
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<tr>
<td>Programming Support Desk</td>
<td>12-Mar</td>
<td>7:00 AM</td>
<td>6:00 PM</td>
<td>HBGCC</td>
<td>Hall 4A Pre-Function</td>
<td>O</td>
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<td>Technical Programming Sessions</td>
<td>12-Mar</td>
<td>8:30 AM</td>
<td>5:30 PM</td>
<td>HBGCC</td>
<td>See Technical Program for complete schedule and locations</td>
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<td>Morning Break</td>
<td>12-Mar</td>
<td>9:50 AM</td>
<td>10:30 AM</td>
<td>HBGCC</td>
<td>Various</td>
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<td>Afternoon Break</td>
<td>12-Mar</td>
<td>3:20 PM</td>
<td>4:00 PM</td>
<td>HBGCC</td>
<td>Various</td>
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<td>Bladsmithing Competition: Awards Presentation</td>
<td>12-Mar</td>
<td>5:00 PM</td>
<td>5:30 PM</td>
<td>HBGCC</td>
<td>Lila Cockrell Theatre</td>
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<tr>
<td><strong>Exhibition</strong></td>
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<td>TMS2019 Exhibition</td>
<td>12-Mar</td>
<td>11:00 AM</td>
<td>7:00 PM</td>
<td>HBGCC</td>
<td>Hall 3</td>
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<td>2019 TMS Bladsmithing Competition Display</td>
<td>12-Mar</td>
<td>11:00 AM</td>
<td>7:00 PM</td>
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<td>Lunch in the Exhibit Hall</td>
<td>12-Mar</td>
<td>11:30 AM</td>
<td>1:30 PM</td>
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<td>Hall 3</td>
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<td>Poster Session II Poster Installation</td>
<td>12-Mar</td>
<td>12:00 PM</td>
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<td>12-Mar</td>
<td>2:00 PM</td>
<td>5:30 PM</td>
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<td>12-Mar</td>
<td>5:30 PM</td>
<td>7:00 PM</td>
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<td>12-Mar</td>
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<td>12-Mar</td>
<td>7:00 PM</td>
<td>7:00 PM</td>
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<td>Hall 3</td>
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<tr>
<td><strong>Student &amp; Young Professional Functions</strong></td>
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<tr>
<td>Young Professional Tutorial Luncheon</td>
<td>12-Mar</td>
<td>12:00 PM</td>
<td>12:45 PM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom C</td>
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<td>Young Professional Tutorial Lecture</td>
<td>12-Mar</td>
<td>12:45 PM</td>
<td>2:00 PM</td>
<td>Hyatt</td>
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<td>Student Career Forum</td>
<td>12-Mar</td>
<td>2:00 PM</td>
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<td>EPD/MPMD Luncheon</td>
<td>12-Mar</td>
<td>12:00 PM</td>
<td>2:00 PM</td>
<td>Hyatt</td>
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<tr>
<td><strong>Committee &amp; Business Meetings</strong></td>
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<tr>
<td>Mobile App Focus Group</td>
<td>12-Mar</td>
<td>7:15 AM</td>
<td>8:30 AM</td>
<td>Hyatt</td>
<td>Mission A</td>
<td>I</td>
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<td>Energy Conversion and Storage Committee Meeting</td>
<td>12-Mar</td>
<td>7:30 AM</td>
<td>8:30 AM</td>
<td>HBGCC</td>
<td>225A</td>
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<td>Fellows Award Subcommittee Meeting</td>
<td>12-Mar</td>
<td>7:30 AM</td>
<td>8:30 AM</td>
<td>Hyatt</td>
<td>San Jacinto</td>
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<td>TMS Foundation Board of Trustees Meeting</td>
<td>12-Mar</td>
<td>7:30 AM</td>
<td>10:00 AM</td>
<td>Hyatt</td>
<td>Bonham B</td>
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<td>Young Professionals Committee Meeting</td>
<td>12-Mar</td>
<td>8:00 AM</td>
<td>9:30 AM</td>
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<tr>
<td>Honors &amp; Professional Recognition Committee Meeting</td>
<td>12-Mar</td>
<td>8:30 AM</td>
<td>9:30 AM</td>
<td>Hyatt</td>
<td>San Jacinto</td>
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<td>Professional Development Committee Meeting</td>
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<td>Hyatt</td>
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<td>12-Mar</td>
<td>10:00 AM</td>
<td>2:00 PM</td>
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<td>TMS Past Presidents Meeting</td>
<td>12-Mar</td>
<td>11:30 AM</td>
<td>1:00 PM</td>
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<td>SMD Council Meeting</td>
<td>12-Mar</td>
<td>12:00 PM</td>
<td>2:00 PM</td>
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<td>Bowie ABC</td>
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<td>Electronic Packaging and Interconnection Materials Committee Meeting</td>
<td>12-Mar</td>
<td>12:30 PM</td>
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<td>Leadership Recruitment Committee Meeting</td>
<td>12-Mar</td>
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<td>5:00 PM</td>
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<td>Solidification Committee Meeting</td>
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<td>7:00 PM</td>
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<td>6:00 PM</td>
<td>7:00 PM</td>
<td>HBGCC</td>
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<td>High Temperature Alloys Committee Meeting</td>
<td>12-Mar</td>
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<td>7:30 PM</td>
<td>Hyatt</td>
<td>Travis AB</td>
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<td>MPMD Council Meeting</td>
<td>12-Mar</td>
<td>6:30 PM</td>
<td>8:30 PM</td>
<td>Hyatt</td>
<td>Bowie ABC</td>
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<td>Magnetic Materials Committee Meeting</td>
<td>12-Mar</td>
<td>7:00 PM</td>
<td>8:00 PM</td>
<td>HBGCC</td>
<td>225B</td>
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### Wednesday, March 13

#### All-Conference Events

- **Presenters’ Coffee**
  - Date: 13-Mar
  - Time: 7:00 AM - 8:00 AM
  - Venue: HBGCC Hall 4A
  - Access: O

- **Registration**
  - Date: 13-Mar
  - Time: 7:00 AM - 5:00 PM
  - Venue: HBGCC Hall 3 Pre-Function
  - Access: O

- **TMS Member Welcome Center**
  - Date: 13-Mar
  - Time: 7:00 AM - 5:00 PM
  - Venue: HBGCC Hall 3 Pre-Function
  - Access: O

- **Programming Support Desk**
  - Date: 13-Mar
  - Time: 7:00 AM - 6:00 PM
  - Venue: HBGCC Hall 4A Pre-Function
  - Access: O

- **Technical Programming Sessions**
  - Date: 13-Mar
  - Time: 8:30 AM - 5:30 PM
  - Venue: HBGCC
  - Access: O

- **Morning Break**
  - Date: 13-Mar
  - Time: 9:50 AM - 10:30 AM
  - Venue: Various
  - Access: O

- **Afternoon Break**
  - Date: 13-Mar
  - Time: 12:30 PM - 4:00 PM
  - Venue: Various
  - Access: O

#### Exhibition

- **TMS2019 Exhibition**
  - Date: 13-Mar
  - Time: 10:00 AM - 2:00 PM
  - Venue: HBGCC Hall 3
  - Access: O

- **2019 TMS Bladesmithing Competition Display**
  - Date: 13-Mar
  - Time: 10:00 AM - 2:00 PM
  - Venue: HBGCC Hall 3
  - Access: O

- **Lunch in the Exhibit Hall**
  - Date: 13-Mar
  - Time: 11:30 AM - 1:30 PM
  - Venue: HBGCC Hall 3
  - Access: T

- **Bladesmithing Competition: Mandatory Blade Check Out**
  - Date: 13-Mar
  - Time: 2:00 PM - 4:00 PM
  - Venue: HBGCC Hall 3
  - Access: R

---

**Legend**

- **HBGCC** - Henry B. González Convention Center
- **Hyatt** - Grand Hyatt San Antonio
- **O** - Open to All Attendees
- **R** - Restrictions Apply
- **I** - Invitation Only
- **T** - Ticketed Event, Pre-registration required
## CALENDAR OF EVENTS

**as of February 7, 2019**

### Exhibitor Move-out
- **Date:** 13-Mar
- **Start Time:** 2:00 PM
- **End Time:** 7:00 PM
- **Venue:** HBGCC
- **Room:** Hall 3
- **Access:** R

### Social Functions

<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fresh Coffee, Fresh Ideas: Diversity and Inclusion Breakfast</td>
<td>13-Mar</td>
<td>7:00 AM</td>
<td>8:00 AM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom A</td>
<td>T</td>
</tr>
<tr>
<td>LMD Luncheon</td>
<td>13-Mar</td>
<td>12:00 PM</td>
<td>2:00 PM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom A</td>
<td>T</td>
</tr>
<tr>
<td>Metamorphic Manufacturing: Shaping the Future of On-Demand Components</td>
<td>13-Mar</td>
<td>12:30 PM</td>
<td>1:30 PM</td>
<td>HBGCC</td>
<td>220</td>
<td>O</td>
</tr>
<tr>
<td>An Information Session with the Experts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JOM Advisor Mixer</td>
<td>13-Mar</td>
<td>4:30 PM</td>
<td>6:00 PM</td>
<td>Hyatt</td>
<td>Mission A</td>
<td>I</td>
</tr>
<tr>
<td>TMS-AIME Awards Reception</td>
<td>13-Mar</td>
<td>5:30 PM</td>
<td>6:00 PM</td>
<td>HBGCC</td>
<td>Lila Cockrell Theatre Pre-Function</td>
<td>O</td>
</tr>
<tr>
<td>TMS-AIME Awards Ceremony</td>
<td>13-Mar</td>
<td>6:00 PM</td>
<td>7:30 PM</td>
<td>HBGCC</td>
<td>Lila Cockrell Theatre</td>
<td>O</td>
</tr>
<tr>
<td>TMS-AIME Awards Banquet</td>
<td>13-Mar</td>
<td>7:30 PM</td>
<td>8:30 PM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom ABC</td>
<td>T</td>
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<tr>
<td>Awards Afterglow Reception</td>
<td>13-Mar</td>
<td>8:30 PM</td>
<td>10:00 PM</td>
<td>Hyatt</td>
<td>Lonestar Ballroom ABC Pre-Function</td>
<td>T</td>
</tr>
</tbody>
</table>

### Committee & Business Meetings

<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>REWAS Organizing Committee Meeting</td>
<td>13-Mar</td>
<td>7:00 AM</td>
<td>8:00 AM</td>
<td>Hyatt</td>
<td>Presidio AB</td>
<td>I</td>
</tr>
<tr>
<td>Light Metals 2020 Subject Chairs</td>
<td>13-Mar</td>
<td>7:00 AM</td>
<td>8:30 AM</td>
<td>Hyatt</td>
<td>San Jacinto</td>
<td>I</td>
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<tr>
<td>Financial Planning Committee Meeting</td>
<td>13-Mar</td>
<td>8:00 AM</td>
<td>10:30 AM</td>
<td>Hyatt</td>
<td>Goliad</td>
<td>R</td>
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<tr>
<td>FMD Council Meeting</td>
<td>13-Mar</td>
<td>12:00 PM</td>
<td>2:00 PM</td>
<td>Hyatt</td>
<td>Bowie ABC</td>
<td>I</td>
</tr>
<tr>
<td>Extraction 20XX Planning Meeting</td>
<td>13-Mar</td>
<td>12:00 PM</td>
<td>2:00 PM</td>
<td>Hyatt</td>
<td>Mission A</td>
<td>I</td>
</tr>
<tr>
<td>International Affairs Committee Meeting</td>
<td>13-Mar</td>
<td>2:00 PM</td>
<td>3:30 PM</td>
<td>Hyatt</td>
<td>San Jacinto</td>
<td>I</td>
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<tr>
<td>TMS2020 Programming Information Session</td>
<td>13-Mar</td>
<td>5:00 PM</td>
<td>6:00 PM</td>
<td>Hyatt</td>
<td>Travis AB</td>
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</table>

### Thursday, March 14

#### All-Conference Events

<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presenters’ Coffee</td>
<td>14-Mar</td>
<td>7:00 AM</td>
<td>8:00 AM</td>
<td>HBGCC</td>
<td>Hall 4A</td>
<td>O</td>
</tr>
<tr>
<td>Registration</td>
<td>14-Mar</td>
<td>7:00 AM</td>
<td>2:00 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
<td>O</td>
</tr>
<tr>
<td>TMS Member Welcome Center</td>
<td>14-Mar</td>
<td>7:00 AM</td>
<td>5:00 PM</td>
<td>HBGCC</td>
<td>Hall 3 Pre-Function</td>
<td>O</td>
</tr>
<tr>
<td>Programming Support Desk</td>
<td>14-Mar</td>
<td>7:00 AM</td>
<td>6:00 PM</td>
<td>HBGCC</td>
<td>Hall 4A Pre-Function</td>
<td>O</td>
</tr>
<tr>
<td><strong>Technical Programming Sessions</strong></td>
<td>14-Mar</td>
<td>8:30 AM</td>
<td>5:30 PM</td>
<td>HBGCC</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>See Technical Program for complete schedule and locations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning Break</td>
<td>14-Mar</td>
<td>9:50 AM</td>
<td>10:30 AM</td>
<td>HBGCC</td>
<td>Various</td>
<td>O</td>
</tr>
<tr>
<td>Afternoon Break</td>
<td>14-Mar</td>
<td>3:20 PM</td>
<td>4:00 PM</td>
<td>HBGCC</td>
<td>Various</td>
<td>O</td>
</tr>
</tbody>
</table>

#### Committee & Business Meetings

<table>
<thead>
<tr>
<th>Event/Function</th>
<th>Date</th>
<th>Start Time</th>
<th>End Time</th>
<th>Venue</th>
<th>Room</th>
<th>Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Annual Meeting of the Membership and Open Board Meeting</td>
<td>14-Mar</td>
<td>8:00 AM</td>
<td>8:30 AM</td>
<td>Hyatt</td>
<td>Mission B</td>
<td>O</td>
</tr>
<tr>
<td>TMS Board of Directors Meeting</td>
<td>14-Mar</td>
<td>8:30 AM</td>
<td>1:00 PM</td>
<td>Hyatt</td>
<td>Bowie ABC</td>
<td>I</td>
</tr>
</tbody>
</table>

**Note:**
- **HBGCC** - Henry B. González Convention Center
- **Hyatt** - Grand Hyatt San Antonio
- **O** - Open to All Attendees
- **R** - Restrictions Apply
- **I** - Invitation Only
- **T** - Ticketed Event. Pre-registration required

[www.tms.org/TMS2019](www.tms.org/TMS2019)
## TECHNICAL COMMITTEE SCHEDULE

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sunday, March 10, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>1:30 p.m. to 3:00 p.m.</td>
<td>HBGCC - Room 221B</td>
</tr>
<tr>
<td>Recycling &amp; Environmental Technologies</td>
<td>1:30 p.m. to 3:00 p.m.</td>
<td>GHH - Mission A</td>
</tr>
<tr>
<td>Aluminum</td>
<td>2:00 p.m. to 4:00 p.m.</td>
<td>GHH - Lonestar Ballroom A</td>
</tr>
<tr>
<td>Materials Characterization</td>
<td>2:30 p.m. to 4:00 p.m.</td>
<td>GHH - Bowie ABC</td>
</tr>
<tr>
<td>Pyrometallurgy</td>
<td>3:00 p.m. to 4:30 p.m.</td>
<td>GHH - Travis AB</td>
</tr>
<tr>
<td>Hydrometallurgy &amp; Electrometallurgy</td>
<td>4:00 p.m. to 5:00 p.m.</td>
<td>GHH - Mission A</td>
</tr>
<tr>
<td>Process Technology &amp; Modeling</td>
<td>5:00 p.m. to 6:00 p.m.</td>
<td>GHH - Mission A</td>
</tr>
<tr>
<td>Thin Films &amp; Interfaces</td>
<td>5:00 p.m. to 6:00 p.m.</td>
<td>GHH - Bonham B</td>
</tr>
<tr>
<td>Additive Manufacturing</td>
<td>5:30 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 221A</td>
</tr>
<tr>
<td>Nanomechanical Materials Behavior</td>
<td>6:00 p.m. to 7:30 p.m.</td>
<td>HBGCC - Room 221B</td>
</tr>
<tr>
<td>Mechanical Behavior of Materials</td>
<td>7:30 p.m. to 9:00 p.m.</td>
<td>HBGCC - Room 221B</td>
</tr>
<tr>
<td>Phase Transformations</td>
<td>7:30 p.m. to 9:00 p.m.</td>
<td>HGH - Bonham B</td>
</tr>
<tr>
<td><strong>Monday, March 11, 2019</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Integrated Computational Materials Engineering</td>
<td>1:15 p.m. to 2:30 p.m.</td>
<td>HBGCC - Room 305</td>
</tr>
<tr>
<td>Powder Materials</td>
<td>1:15 p.m. to 2:30 p.m.</td>
<td>GHH - Travis CD</td>
</tr>
<tr>
<td>Advanced Characterization, Testing &amp; Simulation</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 302A</td>
</tr>
<tr>
<td>Biomaterials</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 217A</td>
</tr>
<tr>
<td>Chemistry &amp; Physics of Materials</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 303C</td>
</tr>
<tr>
<td>Refractory Metals &amp; Materials</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 205</td>
</tr>
<tr>
<td>Steels</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>GHH - Travis CD</td>
</tr>
<tr>
<td>Surface Engineering</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 210A</td>
</tr>
<tr>
<td>Nuclear Materials</td>
<td>6:00 p.m. to 7:30 p.m.</td>
<td>HBGCC - Room 215</td>
</tr>
<tr>
<td>Shaping &amp; Forming</td>
<td>6:00 p.m. to 7:30 p.m.</td>
<td>HBGCC - Room 006B</td>
</tr>
<tr>
<td>Composite Materials</td>
<td>6:30 p.m. to 7:30 p.m.</td>
<td>HBGCC - Room 303B</td>
</tr>
<tr>
<td>Alloy Phases</td>
<td>7:00 p.m. to 8:30 p.m.</td>
<td>HBGCC - Room 006D</td>
</tr>
<tr>
<td>Computational Materials Science &amp; Engineering</td>
<td>7:30 p.m. to 8:30 p.m.</td>
<td>HBGCC - Room 304C</td>
</tr>
<tr>
<td><strong>Tuesday, March 12, 2019</strong></td>
<td></td>
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<tr>
<td>Energy Conversion &amp; Storage</td>
<td>7:30 a.m. to 8:30 a.m.</td>
<td>HBGCC - Room 225A</td>
</tr>
<tr>
<td>Electronic Packaging &amp; Interconnection Materials</td>
<td>12:30 p.m. to 1:30 p.m.</td>
<td>HBGCC - Room 216A</td>
</tr>
<tr>
<td>Solidification</td>
<td>5:45 p.m. to 6:45 p.m.</td>
<td>HBGCC - Room 006C</td>
</tr>
<tr>
<td>Corrosion &amp; Environmental Effects</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 224</td>
</tr>
<tr>
<td>Energy</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 225A</td>
</tr>
<tr>
<td>Nanomaterials</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 211</td>
</tr>
<tr>
<td>Titanium</td>
<td>6:00 p.m. to 7:00 p.m.</td>
<td>HBGCC - Room 006A</td>
</tr>
<tr>
<td>High Temperature Alloys</td>
<td>6:00 p.m. to 7:30 p.m.</td>
<td>GHH - Travis AB</td>
</tr>
<tr>
<td>Magnetic Materials</td>
<td>7:00 p.m. to 8:00 p.m.</td>
<td>HBGCC - Room 225B</td>
</tr>
</tbody>
</table>

Room Key:  GHH = Grand Hyatt San Antonio; HBGCC = Henry B. González Convention Center
EPM
THE LEADING RUSSIAN MANUFACTURER OF GRAPHITE AND CARBON-BASED PRODUCTS

NOVOCHERKASSK ELECTRODE PLANT
- Started: 1954
- Capacity: 50,000 tonnes of graphite electrodes per annum
- Graphite electrodes

NOVOSIBIRSK ELECTRODE PLANT
- Started: 1974
- Capacity: 130,000 tonnes per annum
- Carbon electrodes, graphite electrodes, cathode blocks, ramming paste, electrode paste and furnace linings

DONCARB GRAPHITE
- Started: 2008
- Specialty carbon graphite products, specialty shapes and heat exchanger equipment

PHONE: +7 (495) 789-96-46
E-MAIL: ENERGOPROM@ENERGOPROM.RU
ADDRESS: 115035, MOSCOW, KOSMODAMIANSKAYA EMBANKMENT, HOUSE 52, BUILDING 5, FLOOR 5
**TMS2019 ALL-CONFERENCE PLENARY**

**“The Next Materials Frontier for Flight”**

**Date:** Monday, March 11  
**Time:** Noon to 1:00 p.m.  
**Location:** Henry B. González Convention Center, Lila Cockrell Theater

The drive for more fuel-efficient, longer range and durable aircraft engines has fueled remarkable progress in materials capability since the beginning of human flight. The TMS 2019 Annual Meeting & Exhibition all-conference plenary session will explore this new phase of materials innovation inspired by both manufacturing and digital technology advances.

**ABOUT THE PRESENTATION**

While Integrated Computational Materials Engineering (ICME) tools are essential for developing more capable material systems, an expanded set of digital tools is playing an increasingly critical role in scaling and industrializing materials. Iorio will discuss how these digital tools offer a new opportunity to escape from the so-called “Valley of Death” of intermediate technology readiness levels by providing insights into key process variables that affect product quality and performance. These same digital capabilities allow for the rapid development of new material systems, tailored to take advantage of the wide-range of processing conditions that can be achieved via additive manufacturing. In addition, analytics, artificial intelligence, and machine learning tools help to rapidly screen options and optimize the many degrees of freedom available in an additive process.

Advances in materials capability will continue to shape the future of flight in the years to come. Iorio’s talk will provide highlights of these new advances at GE, including the introduction of silicon carbide–silicon carbide ceramic-matrix composites and the scaling of additive manufacturing across the engine cross section.

**FEATURED SPEAKER:**

Luana E. Iorio  
General Manager, Engineering Material Systems  
GE Aviation

**ABOUT THE PRESENTER**

Luana Iorio is General Manager, Engineering Material Systems, GE Aviation, where her team has responsibility for the entire life cycle of the materials used in the 60,000+ GE turbine engines that power both commercial and military aircraft. In fulfilling this role, her team develops novel material systems and processing techniques, spanning a range of materials including superalloys, ceramic and polymer matrix composites, and coatings; provides application engineering and material behavior assessments; and develops and applies component life management methods.

Iorio started her career as a materials scientist at GE Global Research in Niskayuna, New York, and had the opportunity to work on a wide range of materials systems and processes. Prior to assuming her current role, she was the Materials Leader for the then newly created GE Additive business.

Iorio received a B.Sc. in Metallurgical Engineering from the University of the Witwatersrand, South Africa, and M.S. and Ph.D. degrees in Materials Science and Engineering from Carnegie Mellon University.

**GET UP CLOSE WITH THE TECHNOLOGY**

Stop by and browse the display of GE Additive technologies related to Iorio’s talk, including an additively produced aircraft engine. The display is located outside of the entrance to the TMS2019 Exhibit Hall.

Explore additional industry innovations inside the Exhibit Hall during TMS2019 Exhibition hours.
The physical and chemical properties of any material change under the influence of temperature. Such changes can be systematically analyzed by applying specified variations in temperature, atmosphere and pressure.

Since 1962, NETZSCH has consistently provided our customers with the latest thermal analysis techniques, the broadest range of highest-quality products, the most complete technical support and the most comprehensive service.

Our instruments and methods allow for material characterization as well as for the study of properties such as specific heat, enthalpy, weight change, Young’s modulus, thermal expansion, conductivity, thermal diffusivity, and evolved gas analysis.

Visit us at Booth 401
Ask about our Trade In program
https://www.netzsch-thermal-analysis.com/us/
REWAS 2019

Manufacturing the Circular Materials Economy

TMS2019 welcomes the 6th installment of the REWAS conference series, which will focus on Manufacturing the Circular Materials Economy. This unique, transdisciplinary conference will feature a plenary session of invited speakers, a special roundtable discussion, and the following five technical symposia:

- Disruptive Material Manufacturing: Scaling and Systems Challenges
- Secondary and Byproduct Sources of Materials, Minerals, and Metals
- Rethinking Production
- Cast Shop Recycling Technologies
- Education and Workforce Development

REWAS 2019 is sponsored by the TMS Extraction & Processing Division, the TMS Light Metals Division, and the TMS Recycling & Environmental Technologies Committee.

REWAS 2019 Reception
Date: Tuesday, March 12
Time: 5:30 p.m. to 7:00 p.m.
Location: Henry B. González Convention Center, Hall 3

All TMS 2019 attendees are welcome to join us in the Exhibit Hall to view REWAS 2019 posters and network with REWAS participants.

REWAS 2019 Plenary Session
Date: Tuesday, March 12
Time: 8:30 a.m. to 12:20 p.m.
Location: Henry B. González Convention Center, Room 007C

PLENARY SPEAKERS:

- "Recycling of Critical Metals"
  Toru Okabe,
  University of Tokyo

- "Supply Chains for Battery Materials"
  Ben Jones,
  CRU International Limited

- "Implications of an Evolving Electronic Waste Stream"
  Callie Babbitt,
  Rochester Institute of Technology

- "Is Sustainability Less Than the Sum of Its Parts?"
  David Wagger,
  Institute of Scrap Recycling Industries, Inc.

- "Mineral Exploration of the Urban Mine: Dynamics of Aluminum Stocks and Flows"
  Chris Bayliss,
  International Aluminum Institute

- "A New Thinking in Metals Recycling"
  Ramana Reddy,
  The University of Alabama

- "Challenges of the Circular Economy"
  Markus Reuter,
  Helmholtz-Institute Freiberg for Resource Technology
This year, the REWAS 2019 symposium will host the International Round Table on Materials Criticality (IRTC), one of a series of events being held at established international conferences around the world. The goal of the roundtable is to gather input that will ultimately result in a Roadmap on Criticality, providing advice for authorities and policy makers world-wide. The topic will be “How Does Industry Manage Criticality in Product Development?”

**FEATURED SPEAKERS:**

- **Roderick Eggert.**
  Colorado School of Mines and the Critical Materials Institute, USA
- **James Goddin.**
  Granta Design Ltd., United Kingdom
- **Atsufumi Hirohata.**
  University of York, United Kingdom
- **Christina Meskers.**
  Umicore, Belgium
- **David Jarvis.**
  HIPTeC AS, Norway
- **Nikolaos Michailidis.**
  Aristotle University of Thessaloniki, Greece
- **Min-Ha Lee.**
  Korea Institute of Industrial Technology, South Korea
- **Armin Reller.**
  ESM Foundation, Switzerland
- **Steven Young.**
  University of Waterloo, Canada

**IRTC Sponsors:**

- **Sponsored by:** ESM Foundation
- **Co-sponsored by:** The Federation of European Materials Societies (FEMS).

**REWAS 2019 Organizers**

- Gabrielle Gaustad, Alfred University
- Camille Fleuriault, Gopher Resource
- Mertol Gökelma, Norwegian University of Science and Technology
- John Howarter, Purdue University
- Randolph Kirchain, Massachusetts Institute of Technology
- Kaka Ma, Colorado State University
- Christina Meskers, Umicore
- Neale Neelameggham, IND LLC
- Elsa Olivetti, Massachusetts Institute of Technology
- Adam Powell, Worcester Polytechnic Institute
- Fiseha Tesfaye, Åbo Akademi University
- Mingming Zhang, Arcelor Mittal Global R&D
### KEYNOTE & FEATURED SESSIONS

#### MONDAY, MARCH 11

<table>
<thead>
<tr>
<th><strong>2019 Light Metals Keynote Session: Aluminum Industry: Vision for the Next Decade</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Date:</strong> Monday, March 11</td>
</tr>
<tr>
<td><strong>Time:</strong> 8:00 a.m. to 11:30 a.m.</td>
</tr>
<tr>
<td><strong>Location:</strong> Henry B. González Convention Center, Room 004</td>
</tr>
</tbody>
</table>

**Sponsored by:** TMS Light Metals Division; TMS Aluminum Committee  
**Organizer:** Olivier Martin, Rio Tinto

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Title</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris Bayliss</td>
<td>&quot;The Aluminium Story&quot;</td>
<td>International Aluminium Institute</td>
</tr>
<tr>
<td>Mo Xinda</td>
<td>&quot;China Aluminium Industry Picture&quot;</td>
<td>China Nonferrous Metals Industry Association</td>
</tr>
<tr>
<td>Todd Summe</td>
<td>&quot;Products of the Future—Solutions for Shaping a Sustainable World&quot;</td>
<td>Novelis Inc.</td>
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<tr>
<td>Hans Erik Vatne</td>
<td>&quot;Smelter of the Future&quot;</td>
<td>Norsk Hydro ASA</td>
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<tr>
<td>Vincent Christ</td>
<td>&quot;The Aluminium Industry Revolution at the Door Step&quot;</td>
<td>Elysis</td>
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</table>

The session will conclude with a panel discussion.

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### CHECK OUT THE LIGHT METALS DIGITAL LIBRARY

A new online collection of more than 5,200 technical papers from TMS’s signature *Light Metals* proceedings series is now available through the TMS website. The Light Metals Digital Library includes papers published form 1971 to 2010.

View the collection at: [www.tms.org/LightMetalsLibrary](http://www.tms.org/LightMetalsLibrary)
### Diversity in STEM and Best Practices to Improve It

**Date:** Monday, March 11, 2019  
**Time:** 8:20 a.m. to 5:30 p.m.  
**Location:** Henry B. González Convention Center, Room 301B

**Organizers:** Megan J. Cordill, Erich Schmid Institute; Matthew Korey, Purdue University; Jessica A. Krogstad, University of Illinois Urbana-Champaign; Panthea Sepehrband, Santa Clara University

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Title</th>
<th>Institution</th>
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</thead>
<tbody>
<tr>
<td>Angus Wilkinson</td>
<td>&quot;An Approach to Promote Equality and Diversity in a University Materials Department&quot;</td>
<td>University of Oxford, United Kingdom</td>
</tr>
<tr>
<td>Andrea Hodge</td>
<td>&quot;Diversity in STEM: Retention, Graduation and Beyond&quot;</td>
<td>University of Southern California, USA</td>
</tr>
<tr>
<td>Jessica Krogstad</td>
<td>&quot;Best Practices for Promoting Diversity in STEM through Outreach&quot;</td>
<td>University of Illinois, Urbana-Champaign, USA</td>
</tr>
<tr>
<td>Carolyn Hansson</td>
<td>&quot;Half a Century of Diversifying TMS&quot;</td>
<td>University of Waterloo, Canada</td>
</tr>
<tr>
<td>Isabella Van Rooyen</td>
<td>&quot;Navigate an Exciting STEM Career Journey through Diversity&quot;</td>
<td>Idaho National Laboratory, USA</td>
</tr>
<tr>
<td>Ashley Blackford</td>
<td>&quot;The Minority Leaders Research Collaboration Program at the Air Force Research Laboratory Materials and Manufacturing Directorate: Overview, Experiences, and Lessons Learned&quot;</td>
<td>Air Force Research Laboratory, Wright-Patterson Air Force Base, USA</td>
</tr>
<tr>
<td>Jonathan Madison</td>
<td>&quot;TMS Summits on Diversity: What Have We Learned and Where Do We Go From Here?&quot;</td>
<td>Sandia National Laboratories, USA</td>
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<tr>
<td>Roberta Beal</td>
<td>&quot;The Complexities of Being LGBTQ+ In the Workplace&quot;</td>
<td>Los Alamos National Laboratory, USA</td>
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<tr>
<td>K. Cunningham</td>
<td>&quot;T Time: How to Welcome and Support People of All Genders&quot;</td>
<td>ATI Specialty Alloys &amp; Components, USA</td>
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<tr>
<td>Thomas Reeve</td>
<td>&quot;Coming Out in STEM&quot;</td>
<td>Purdue University, USA</td>
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</table>
## Magnesium Technology 2019: Keynote Session

### Date:
Monday, March 11

### Time:
8:00 a.m. to 11:30 a.m.

### Location:
Henry B. González Convention Center, Room 005

### Sponsored by:
TMS Light Metals Division, TMS Magnesium Committee

### Organizers:
Vineet Joshi, Pacific Northwest National Laboratory; J. Brian Jordon, University of Alabama; Dmytro Orlov, Lund University; Neale Neelameggham, IND LLC

<table>
<thead>
<tr>
<th>Title</th>
<th>Speaker</th>
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<tbody>
<tr>
<td>&quot;Magnesium Alloy Sheet for Transportation Applications&quot;</td>
<td>Christopher Romanowski, Danieli FATA Hunter</td>
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<tr>
<td>&quot;Magnesium Process and Alloy Development for Applications in the Automotive Industry&quot;</td>
<td>David Klaumuenzer, Volkswagen AG</td>
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<tr>
<td>&quot;Thermally Activated Slip in Rare Earth Containing Mg-Mn-Ce Alloy, ME10, Compared with Traditional Mg-Al-Zn Alloy, AZ31&quot;</td>
<td>Sean Agnew, University of Virginia</td>
</tr>
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</table>

## Additive Manufacturing Joint Keynote Session

### Date:
Monday, March 11

### Time:
2:30 p.m. to 5:30 p.m.

### Location:
Henry B. González Convention Center, Lila Cockrell Theater

### Sponsored by:
TMS Additive Manufacturing Committee

### Organizer:
Ryan Dehoff, Oak Ridge National Laboratory

<table>
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<tr>
<th>Title</th>
<th>Speaker</th>
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<tr>
<td>&quot;Solidification of Superalloys: From Single Crystals to Additive Manufacturing&quot;</td>
<td>Tresa Pollock, University of California, Santa Barbara</td>
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<td>&quot;Optimizing the Performance of Additively Manufactured Ti Alloy Components&quot;</td>
<td>Hamish Fraser, The Ohio State University</td>
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<td>&quot;Printable Alloys by Design&quot;</td>
<td>Gregory Olson, Northwestern University &amp; QuesTek Innovations LLC</td>
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<tr>
<td>&quot;Opportunities in Machine Learning for Additive Manufacturing&quot;</td>
<td>Elizabeth Holm, Carnegie Mellon University</td>
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<tr>
<td>&quot;Solidification and Solid-state Transformations during Metal Additive Manufacturing under Thermo-mechanical-chemical Transients&quot;</td>
<td>Sudarsanam Babu, The University of Tennessee, Knoxville</td>
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</table>
TUESDAY, MARCH 12

**Materials and Manufacturing Innovation Keynote: Autonomous Materials Research**

**Date:** Tuesday, March 12  
**Time:** 8:30 a.m. to Noon  
**Location:** Henry B. González Convention Center, Room 221D  

**Organizer:** James Warren, National Institute of Standards and Technology

*“Data, Disorder and Materials”*  
**Stefano Curtarolo,**  
Duke University

*“Autonomous Experimentation Applied to Carbon Nanotube Synthesis”*  
**Benji Maruyama,**  
Air Force Research Laboratory

*“SARA: Scientific Autonomous Reasoning Agent to Accelerate Materials Discovery”*  
**Carla Gomes,**  
Cornell University

*“Towards Autonomous Materials Research Systems”*  
**Jason Hattrick-Simpers,**  
National Institute of Standards and Technology

The session will conclude with a panel discussion.

Following the panel discussion, a report on “Frontiers of Materials Research: A Decadal Study” will be held in the same room. See page 38 for details.

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**TMS2019 Acta Materialia Symposium**

**Date:** Tuesday, March 12  
**Time:** 3:15 p.m. to 5:30 p.m.  
**Location:** Henry B. González Convention Center, Room 217C  

**Session Chair:** Carolyn Hansson, University of Waterloo

*Acta Materialia Gold Medal Lecture:*  
**“Stabilizing Nanostructures in Metals”**  
**Ke Lu,**  
Shenyang National Laboratory for Materials Science, Institute of Metal Research, Chinese Academy of Sciences

*Acta Materialia Silver Medal Lecture:*  
**“Generation of Interfacial Dislocations Loops to Overcome the Nucleation Barrier of Tetrahedron Shaped Precipitates”**  
**Xavier Sauvage,**  
Groupe de Physique des Matériaux, CNRS, Université Rouen Normandie

*Acta Materialia Hollomon Award for Materials and Society Lecture:*  
**“When Science Matters”**  
**Alexander King,**  
Iowa State University

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**TMS AND THE GERMAN MATERIALS SOCIETY (DGM) JOINT SYMPOSIUM PLANNED FOR TUESDAY**

On Tuesday, March 12, the one-day TMS-DGM Symposium on Lightweight Metals: A Joint US-European Symposium on Challenges in Lightweighting the Transportation Industry will take place in Room 006A of the Henry B. González Convention Center. Morning sessions will focus on Aluminum topics and afternoon sessions on Magnesium. All TMS2019 attendees are welcome to attend.
## Science Policy within the Materials Research Community

**Date:** Wednesday, March 13  
**Time:** 9:00 a.m. to 5:00 p.m.  
**Location:** Henry B. González Convention Center, Room 008B

**Sponsors:** TMS Education Committee and TMS Public & Governmental Affairs Committee  
**Organizers:** Kathleen Chou, Ashley M. Hilmas, Peter Meisenheimer, Max Powers, and Brian Tobelmann, University of Michigan

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<tr>
<th>Session</th>
<th>Presenter</th>
<th>Sponsor/Affiliation</th>
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<tr>
<td>&quot;Opportunities and Trends in Materials Engineering Research Funding at the National Science Foundation&quot;</td>
<td>Alexis Lewis, National Science Foundation</td>
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<td>&quot;Role of Public-Private Initiatives in Scientific Research&quot;</td>
<td>Alan Taub, Lightweight Innovations for Tomorrow (LIFT) and University of Michigan</td>
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<tr>
<td>&quot;The MGI and Materials Research Policy&quot;</td>
<td>James Warren, National Institute of Standards and Technology</td>
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<td>&quot;Program Management in a Federal Agency&quot;</td>
<td>John Vetrano, Office of Basic Energy Sciences, Department of Energy</td>
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<tr>
<td>&quot;Advocating the Vital Importance of Support for Materials Research and Engineering Education&quot;</td>
<td>Iver Anderson, Iowa State University, Ames Laboratory</td>
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<tr>
<td>&quot;From the Lab to The Hill: How to Get a Job in Policy and What You’ll Do When You Get There&quot;</td>
<td>Edward Herderick, The Ohio State University and 2009-2010 TMS/MRS Congressional Science &amp; Engineering Fellow</td>
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The session will conclude with a panel discussion.
**Effective Business Improvement Methodologies for the Minerals, Metals, and Materials Industries**

**Date:** Wednesday, March 13  
**Time:** 2:00 p.m. to 5:30 p.m.  
**Location:** Henry B. González Convention Center, Room 303B

**Organizers:** Barry A. Sadler, Net Carbon Consulting Pty Ltd; Eric D. Schmidt, Vallourec Star; Robert W. Hyers, University of Massachusetts

*Case Studies of Continuous Improvement Projects in the Metals Industry*  
**Cynthia K. Belt,**  
Metals Energy Management LLC

*The Value of Investigating and Trending Minor Failures to Prevent Major Incidents*  
**Nicholas E. Cherolis,**  
Baker Engineering and Risk Consultants

*Process Stability – the Key to Improvement in Mining, Smelting and Process Industries*  
**Keith A. Sinclair,**  
Sinclair Associates

*Business Development Strategies and Approaches in Minerals, Metals and Materials—an Industrial Gas Supplier’s Perspective*  
**Adrian Deneys,**  
Praxair, Inc.

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**ARE YOU GRADUATING FROM THE MATERIAL ADVANTAGE PROGRAM IN 2019?**

**Become a Recent Graduate Member of TMS for 2020—Free!**

Fill out our recent graduate membership application form at the TMS Member Welcome Center and your first year of membership in TMS following graduation will be free. You’ll retain your Material Advantage membership through the end of 2019; your free year of membership will begin January 2020.

Visit the TMS Member Welcome Center, located outside the TMS2019 Exhibit Hall in the Henry B. González Convention Center (near registration).
This session aims to provide the TMS community with a brief overview of the recently released report by the National Academies of Science, Engineering, and Medicine on the *Frontiers of Materials Research: A Decadal Survey*. Following a summary of the report, several members of the study committee and other leading materials researchers will discuss their vision for the next ten years of the field during a panel discussion.

**EVENT AGENDA**

Welcome and Introductory Remarks
- **James Warren**, National Institute of Standards and Technology

Presentation on the Decadal Survey Outputs
- **Kevin Hemker**, Johns Hopkins University

Panel Discussion
- Moderator: **Steven Zinkle**, University of Tennessee

Panelists include:
- **Linda Horton**, Department of Energy
- **Ian Robertson**, University of Wisconsin
- **Linda Sapochak**, National Science Foundation
- **Susan Sinnott**, Pennsylvania State University
- **Mark Weaver**, University of Alabama

Pick up your lunch in the Exhibit Hall and then sit down with the team of experts responsible for producing *Metamorphic Manufacturing: Shaping the Future of On-Demand Components*, a new TMS study released at TMS2019. Through a brief overview and informal conversation, you will gain first-hand insights into this potentially disruptive technology that combines the incremental deformation of a metalsmith with the precision and control of intelligent machines and robotic systems.

The study is supported by the Office of Naval Research (ONR) and the Lightweight Innovations for Tomorrow (LIFT) Manufacturing Institute.

**FEATURED PRESENTER**

**Glenn Daehn**, Study Team Lead

Mars G. Fontana Professor of Metallurgical Engineering
The Ohio State University

Pick up your free copy of the *Metamorphic Manufacturing* study at the TMS Member Welcome Center this week.

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**PICK UP YOUR FREE COPY OF ANOTHER NEW TMS STUDY**

at the TMS Member Welcome Center

**Verification and Validation of Computational Models Associated with the Mechanics of Materials**

Organized by TMS on behalf of the National Science Foundation

Download for free at: [www.tms.org/VerificationandValidation](http://www.tms.org/VerificationandValidation)
WHAT'S BENEATH THE DRAPE?

A better level of understanding.

Be the first to learn about our new Nano Indenter® in booth 327.

kla.com/nanoindenters
Solidification Processing of Light Metals and Alloys: An MPMD Symposium in Honor of David StJohn

**Dates:** Monday, March 11, to Wednesday, March 13  
**Location:** Henry B. González Convention Center, Room 006C

**Symposium Organizers:** Mark A. Easton, Royal Melbourne Institute of Technology (RMIT) University; Ma Qian, RMIT University; John F. Grandfield, Grandfield Technology Pty Ltd; Norbert Hort, Helmholtz-Zentrum Geesthacht; Mark Roderic Jolly, Cranfield University

The major theme in Professor David StJohn’s career was the study of phase transformations, particularly solidification phenomena. Of particular focus was light metal alloys: aluminum alloys, magnesium alloys and, more recently, titanium alloys. His most recognized and awarded contribution has been in nucleation and grain refinement, but he has made contributions to a wide range of solidification problems including defect formation, melt treatment, and casting alloy design.

To cover the main themes of his research career, sessions will cover the following topics:

- Nucleation and grain refinement of light alloys
- Eutectic and peritectic solidification
- Defect formation in castings: porosity and hot tearing
- Solidification under external fields
- Magnesium casting and alloys
- Aluminium casting and alloys
- Solidification during additive manufacturing
- Approaches to collaborative research

Interfaces in Structural Materials: An MPMD Symposium in Honor of Stephen M. Foiles

**Dates:** Monday, March 11, to Thursday, March 14  
**Location:** Henry B. González Convention Center, Room 302C

**Symposium Organizers:** Fadi Abdeljawad, Sandia National Laboratories; Eric R. Homer, Brigham Young University; Elizabeth A. Holm, Carnegie Mellon University; Mark D. Asta, University of California Berkeley

The key to the development of advanced materials with tailored microstructures and architectures is a detailed understanding of interfaces. In particular, the significance of internal (grain and phase) boundaries as well as free surfaces becomes more dominant in applications where a reduction of system size or scale of microstructure is desired to optimize properties. It is to this field that Dr. Stephen M. Foiles made significant contributions over a period of more than 35 years. The goal of this symposium is to bring together researchers across a wide range of disciplines to communicate recent advancements pertaining to the study of materials interfaces (free surfaces, solid-liquid, grain boundaries) both computationally and experimentally. The contributions of Foiles to the development of interatomic potentials for atomistic simulations and study of materials interfaces will be highlighted.

This symposium will cover topics such as:

- Interatomic potential development and its use to model materials behavior
- Thermodynamics of interfaces
- Dynamical behavior of interfaces (crystal surfaces, grain boundaries (GB), phase boundaries, solid-liquid)
- Phase transitions and microstructural evolution
- Interface properties (energy, mobility, etc.)
- Interface segregation/adsorption
- Interface-defect (dislocation/vacancy) interactions (radiation, mechanical, etc.)
Green Materials Engineering: An EPD Symposium in Honor of Sergio Monteiro

Dates: Monday, March 11, to Wednesday, March 13
Location: Henry B. González Convention Center, Room 008A

Symposium Organizers: Shadia Jamil Ikhmayies, Isra University; Jian Li, CanmetMATERIALS; Carlos Mauricio Vieira, State University of the North Fluminense; Jean Margem*, State University of the North Fluminense; Fabio Braga, Military Institute of Engineering

* Passed away March 2018

The main focus of this symposium is green materials, comprising: natural composites, bio-inspired armors, waste added clay ceramics, lignocellulosic fibers, and biodegradable polymers. Also part of the technical scope of this symposium is any type of natural material that could be related to engineering applications. This TMS Extraction & Processing Division (EPD) symposium will be held in honor of Sergio Monteiro, professor at the Military Institute of Engineering, IME, Brazil.

WHAT DO OUR MEMBERS HAVE TO SAY ABOUT US?

When TMS asked its members to describe the Society in one word, we received a variety of responses. The words most frequently used are pictured here. Come to the TMS Member Welcome Center to learn more about your TMS membership!
SPECIAL LECTURES

MONDAY, MARCH 11

Extraction & Processing Division Distinguished Lecturer

Date: Monday, March 11  
Time: 8:00 a.m. to 8:55 a.m.  
Location: Henry B. González Convention Center, Room 213B

Speaker: Sridhar Seetharaman, Colorado School of Mines, USA  
Lecture Title: "The Importance of Transient Phenomena in Metallurgical Processes"

About the Presentation: Metallurgical processes undergo a transient trajectory towards equilibration, and the specifics of this can often have an influence on the outcome on the rate of a reaction, resulting micro-structure, or yield. The transient trajectory can be influenced by factors such as impurities in raw materials, thermal history, and evolving reaction areas. This talk will review examples from slag/metal reactions, precipitations in the melt, and oxidation of cases wherein studies of the details of transient trajectory paths reveal useful information on how metallurgical processes can be affected.

William Hume-Rothery Award

Date: Monday, March 11  
Time: 8:00 a.m. to 8:40 a.m.  
Location: Henry B. González Convention Center, Room 304B

Speaker: Mark D. Asta, University of California, Berkeley, USA  
Lecture Title: "Order within Disordered Materials – Insights into the Nature and Impact of Short-Range Order in Concentrated Solid Solutions"

About the Presentation: Atomistic simulation methods have led to a range of fundamental insights into structure-property relations in configurationally disordered materials, and have become an indispensable tool in computationally accelerated materials design. This talk will provide a brief overview of the general approaches underlying such calculations, highlighting their application in the modeling of properties of concentrated alloy solid solutions. A specific focus will be on the role of short-range order (SRO) - a structural characteristic of solid solutions that has gained renewed attention in the context of multi-principal element alloys, due to its potential impact on stability and mechanical behavior. Insights into the nature of SRO in oxide and metal solid solutions is discussed, as well as its relevance in the context of properties ranging from radiation effects to mechanical deformation. The characteristics of SRO derived from computational simulation are compared to recent experimental observations employing modern characterization tools capable of probing local structure.
**Structural Materials Division Luncheon Lecture**

**Date:** Monday, March 11  
**Time:** 1:00 p.m. to 2:30 p.m.  
**Location:** Grand Hyatt San Antonio, Lonestar Ballroom A

**Speaker:** Stephen M. Foiles, Sandia National Laboratories, USA  
**Lecture Title:** “Molecular Dynamics: With Great Power Comes Great Responsibility”

**About the Presentation:** Molecular dynamics (MD), which follows the classical motion of individual atoms, has become a widely used tool in computational materials science employed to predict a wide range of materials properties and fundamental atomic-scale mechanisms. The great power of MD is that the atoms move in response to their mutual interactions and the external driving forces and the system evolves as the dynamics dictate. No assumptions about underlying mechanisms need to be made; the underlying mechanisms are predicted. Some of the achievements of this approach will be highlighted. However, those wielding this powerful tool have a great responsibility to understand how closely the simulated system actually corresponds to real materials. This uncertainty quantification (UQ) is a very challenging problem because MD is based on a number of underlying approximations including the Born-Oppenheimer approximation, the representation of a material with a mere few million atoms evolving for a few nanoseconds and the uncontrolled approximations inherent in describing the interatomic interactions to name but a few. UQ for MD is a largely ignored field, but one that needs to be addressed if MD is to evolve beyond a qualitative tool to a predictive tool that can impact material design and qualification. Some initial ideas to tackle this problem will be presented along with a discussion of some of the major hurdles ahead.

*This lecture is open to all meeting attendees, but only those who purchased tickets in advance will receive a catered lunch. Luncheon tickets may be purchased at the Registration Desk until 10:00 a.m. on Sunday, March 10.*

**Japan Institute of Metals International Scholar**

**Date:** Tuesday, March 12  
**Time:** 10:30 a.m.  
**Location:** Henry B. González Convention Center, Room 302B

**Speaker:** Sakiko Kawanishi, Tohoku University, Japan  
**Lecture Title:** “An Approach for Solubility Measurement of SiC in Molten Silicon and its Alloy by Real-Time Interference Observation”

**About the Presentation:** Solubility of a component in molten metals and alloys is one of the important materials properties for various applications. In this study, solubility measurement in molten metal at high temperature was performed by dissolving target crystals under a real-time imaging of interference patterns of the crystal. An optical microscope equipped with a heating chamber was used for the observation. The dissolved amount of the crystal was measured in real-time from the evolution of the He-Ne laser interference patterns, used to track the liquid/SiC interface. Temperature dependence of SiC solubility in molten silicon was evaluated up to 1873 K. Solubility of SiC in Fe-36 mol% Si at 1573 K was also assessed. Both measurements, ranging from 0.007 to 0.5 mol% of carbon, reproduced the reported solubilities. The technique can be applied for various systems. Details of observation technique and evaluated results will be presented.
**Extraction & Processing Division/Materials Processing & Manufacturing Division Luncheon**

**Date:** Tuesday, March 12  
**Time:** Noon to 2:00 p.m.  
**Location:** Grand Hyatt San Antonio, Lonestar Ballroom A

**Speaker:** Toru H. Okabe, University of Tokyo, Japan  
**Lecture Title:** “Recycling Precious Metals and Rare Metals from Scraps”

**About the Presentation:** In this talk, the current status of recycling of precious metals and rare metals (or critical metals) will be reviewed, and the related processing technologies will be introduced. Specifically, recent research on the recycling of titanium, rhenium, and some precious metals from scraps will be introduced. The possibility of next-generation recycling technologies of critical metals will also be discussed from a multilateral perspective. Further, recent progress in the refining and recycling processes of titanium and other rare metals will be introduced. If time permits, possible applications of recycling techniques, especially for titanium and precious metal recycling, in practical industrial processes will also be discussed.

*This lecture is open to all meeting attendees, but only those who purchased tickets in advance will receive a catered lunch. Luncheon tickets may be purchased at the Registration Desk until 10:00 a.m. on Monday, March 11.*

**Young Professional Tutorial Luncheon Lecture**

**Date:** Tuesday, March 12  
**Luncheon:** Noon to 12:45 p.m. (Tickets can be purchased at the registration desk until 10:00 a.m. on Monday, March 11)  
**Lectures:** 12:45 p.m. to 2:00 p.m. (No tickets required)  
**Location:** Grand Hyatt San Antonio, Lonestar Ballroom C

**Speaker:** Elsa Olivetti, Massachusetts Institute of Technology  
**Lecture Title:** “Data Mining to Guide Synthesis Towards Resource-Effective Materials, Processes, and Systems”

**About the Presentation:** Thanks to rapidly expanding capabilities in manufacturing, materials characterization, and computational modeling, the materials community has begun to gain unprecedented access to multi-dimensional and multi-resolution data that can, at times, seem unwieldy to manage, process, and analyze. With access to such large and rich data comes a wonderful opportunity to combine materials science with computer and data science. This lecture will present some recent success stories from the community on the use of data-driven approaches to unveil, or even predict, material phenomena through the use of image-processing algorithms, multi-dimensional correlation analyses, machine learning, and more. In the context of these success stories, the lecture will highlight some of the challenges associated with data-driven approaches, as well as opportunities to leverage such approaches to continue to improve our understanding of and ability to predict complex material behavior.
WEDNESDAY, MARCH 13

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<th>Light Metals Division Luncheon*</th>
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<td><strong>Date:</strong> Wednesday, March 13</td>
<td><strong>Date:</strong> Wednesday, March 13</td>
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<tr>
<td><strong>Time:</strong> Noon to 2:00 p.m.</td>
<td><strong>Time:</strong> 12:15 p.m. to 1:15 p.m.</td>
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<tr>
<td><strong>Location:</strong> Grand Hyatt San Antonio, Lonestar Ballroom A</td>
<td><strong>Location:</strong> Henry B. González Convention Center, Room 303C</td>
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**Speaker:** Kevin Anderson, Mercury Marine, USA  
**Lecture Title:** “Technological Advancements in the Secondary Aluminum Industry”

**Speaker:** Hael Mughrabi, University Erlangen-Nürnberg, Germany  
**Lecture Title:** “Revisiting ‘Steady-State’ Monotonic and Cyclic Deformation: Emphasizing the Quasi-Stationary State of Deformation”

**About the Presentation:** Our world will continue to need primary aluminum for years to come. However, particularly in economies that have a long history of aluminum products, secondary aluminum is playing an increasing role. In fact, since 2001, secondary aluminum production in the United States surpassed primary aluminum production with many positive benefits such as lower cost, energy savings, and environmental stewardship. There are numerous high-level and plant-floor themes that drive technological advancement in the secondary aluminum industry. These include, but are not limited to, environmental protection, cost reduction, energy savings, product lifecycle management of aluminum intensive structures, improved mechanical properties, improved metal cleanliness, accurate scrap sortation, scrap stream management, accurate and rapid chemical composition determination, and improved process understanding through data science. During the presentation, Anderson will highlight numerous production relevant technologies that have been either adapted from other industries or developed within the industry to address these themes and continue the advancement of the secondary aluminum industry.

*This lecture is open to all meeting attendees, but only those who purchased tickets in advance will receive a catered lunch. Luncheon tickets may be purchased at the Registration Desk until 10:00 a.m. on Tuesday, March 12.

**About the Presentation:** High-temperature creep, cyclic deformation in saturation, and a number of technologically important processes are typical examples of so-called “steady-state” deformation. In these cases, it is usually assumed that the deformation-induced microstructure undergoes no further changes. However, clear evidence shows that non-negligible microstructural changes occur in steady-state high-temperature creep and in cyclic saturation. Thus, “steady-state” deformation is actually a quasi-stationary deformation. A deeper analysis reveals a persistent slight increase of the dislocation density, due mainly to geometrically necessary dislocations in the subgrain boundaries which transform gradually into sharper boundaries with higher misorientations. The analysis clarifies, as a byproduct, specific effects which arise from the increasing heterogeneity of the dislocation pattern. Thus, a marked decrease of the arrangement factor “alpha” in the Taylor flow-stress is noted, as predicted by the so-called composite model. This effect is compensated partially by the increase of the dislocation density. Thus the flow stress remains rather insensitive to subtle microstructural changes.

HELP US DETERMINE NEXT YEAR’S AWARD LECTURERS

Nominations are now being accepted for a number of TMS society and division awards, including several TMS2020 award lecturers. Submit your nominees by April 1. Visit www.tms.org/awards for more information.
LEADERSHIP & PROFESSIONAL SKILLS

Meet a Mentor

Date: Monday, March 11
Time: 5:00 p.m. to 6:30 p.m.
Location: Grand Hyatt San Antonio, Lonestar Ballroom B

Seasoned professionals representing a combination of academic, government and industry career backgrounds will lead small discussion groups of young professionals and students embarking on their professional materials science careers. Mentors from a variety of technical, career, and social backgrounds will be on hand to answer questions and provide guidance and advice to mentees. Advance reservations required.

Preparing a Winning Application Package Workshop

Date: Tuesday, March 12
Time: 4:00 p.m. to 6:00 p.m.
Location: Grand Hyatt San Antonio, Mission A

Instructors: Mohsen Asle Zaeem, Colorado School of Mines; Janelle P. Wharry, Purdue University; additional instructors to be announced

Sponsored by: TMS Young Professionals Committee

In this workshop, instructors from a national laboratory, university, and industry will share their experiences in obtaining and/or recruiting entry-level positions (postdocs, tenure-track faculty positions, etc.) and help guide the young professional on their journey from recent graduate to career professional. Pre-registration required to participate.

Young Professionals Committee Meeting

Date: Tuesday, March 12
Time: 8:00 a.m. to 9:30 a.m.
Location: Grand Hyatt San Antonio, Bowie ABC

The mission of the Young Professionals Committee is to create opportunities and provide avenues for young professionals to increase their involvement in TMS. This committee meeting is open to all TMS members, age 40 or younger, who have graduated.

ADVANCE YOUR CAREER: APPLY FOR A TMS YOUNG PROFESSIONAL AWARD

TMS offers a number of awards to help early-career professionals gain new experiences and establish a name in the field.

Apply by April 1, 2019:
• NEW! TMS Frontiers of Materials Award
• AIME Robert Lansing Hardy Award
• Early Career Faculty Fellow Award

Apply by June 15, 2019:
• Emerging Leaders Alliance Program

Apply by August 15, 2019:
• TMS Young Leaders International Scholar Award
• TMS Young Leaders Professional Development Award

For more information on award criteria or the application process, visit the “Young Professional Awards” section at awards.tms.org

46 TMS2019 CONFERENCE GUIDE
Learn about more success stories made possible by the TMS Foundation—and how you can be part of future ones.

“TMS membership and the TMS Foundation have been instrumental in my success as a materials engineer and materials educator. The Society and the awards provided by the Foundation have allowed me to participate in and direct the technical discussions that impact our community.”

—Jennifer Carter, Case Western Reserve University
2019 TMS/FEMS Young Leaders International Scholar

Stop by the TMS Member Welcome Center, located outside the TMS2019 Exhibit Hall in the Henry B. González Convention Center (near registration), to learn more about the TMS Foundation. Or visit www.TMSFoundation.org/Contribute to offer your support and make an online donation.

www.TMSFoundation.org
NETWORKING & SOCIAL EVENTS

**SUNDAY, MARCH 10**

**President’s Welcoming Reception**

<table>
<thead>
<tr>
<th>Date: Sunday, March 10</th>
<th>Time: 6:00 p.m. to 7:00 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 4A</td>
<td></td>
</tr>
</tbody>
</table>

Kick off the TMS 2019 Annual Meeting & Exhibition with this social networking event open to all attendees. This is a relaxed opportunity to meet with some of your global colleagues before presentations begin on Monday. Refreshments will be provided.

**LGBTQ+ and Allies Networking Mixer**

<table>
<thead>
<tr>
<th>Date: Sunday, March 10</th>
<th>Time: 8:00 p.m. to 11:00 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Grand Hyatt San Antonio, Lonestar Ballroom A</td>
<td></td>
</tr>
</tbody>
</table>

Enjoy an evening of informal networking in a safe space to celebrate shared experiences as TMS LGBTQ+ individuals and allies. Cash bar, with light snacks provided. Organized by the TMS Pride of the TMS Diversity Committee. Champion Level Sponsors: GE Research and the National Institute of Standards & Technology.

**MONDAY, MARCH 11**

**Lunch in the Exhibit Hall**

<table>
<thead>
<tr>
<th>Date: Monday, March 11</th>
<th>Time: 1:00 p.m. to 2:30 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 3</td>
<td></td>
</tr>
</tbody>
</table>

Enjoy a complimentary lunch in the exhibit hall and browse exhibitor displays between the morning and afternoon technical sessions.

**Exhibit Opening Reception and Poster Session**

<table>
<thead>
<tr>
<th>Date: Monday, March 11</th>
<th>Time: 5:30 p.m. to 7:00 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 3</td>
<td></td>
</tr>
</tbody>
</table>

All attendees are invited to meet in the exhibit hall for appetizers, beverages, and networking with exhibitors, poster presenters, and other colleagues on the first day of the TMS2019 Exhibition.

**TUESDAY, MARCH 12**

**Lunch in the Exhibit Hall**

<table>
<thead>
<tr>
<th>Date: Tuesday, March 12</th>
<th>Time: 11:30 a.m. to 1:30 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 3</td>
<td></td>
</tr>
</tbody>
</table>

Enjoy a complimentary lunch in the exhibit hall and browse exhibitor displays between the morning and afternoon technical sessions.

**Exhibit Hall Happy Hour and Poster Session**

<table>
<thead>
<tr>
<th>Date: Tuesday, March 12</th>
<th>Time: 5:30 p.m. to 7:00 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 3</td>
<td></td>
</tr>
</tbody>
</table>

All attendees are invited to gather in the exhibit hall for appetizers, beverages, and networking with exhibitors, poster presenters, and colleagues.

**WEDNESDAY, MARCH 13**

**Fresh Coffee, Fresh Ideas: Diversity and Inclusion Breakfast**

<table>
<thead>
<tr>
<th>Date: Wednesday, March 13</th>
<th>Time: 7:00 a.m. to 8:00 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Grand Hyatt San Antonio, Lonestar Ballroom A</td>
<td></td>
</tr>
</tbody>
</table>

Organized by the TMS Diversity Committee, this event offers an opportunity for TMS members to network and discuss issues related to diversity, inclusion, and engagement in the minerals, metals, and materials professions.

*Tickets required. Tickets must be purchased by Monday at 5:00 p.m. at the Registration Desk.*

**Lunch in the Exhibit Hall**

<table>
<thead>
<tr>
<th>Date: Wednesday, March 13</th>
<th>Time: 11:30 a.m. to 1:30 p.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location: Henry B. González Convention Center, Hall 3</td>
<td></td>
</tr>
</tbody>
</table>

Enjoy a complimentary lunch in the exhibit hall and browse exhibitor displays between the morning and afternoon technical sessions.
STUDENT EVENTS

2019 TMS-AIME Awards Ceremony & Banquet

Date: Wednesday, March 13
Reception Time: 5:30 p.m. to 6:00 p.m.
Awards Ceremony: 6:00 p.m. to 7:30 p.m.
Location for Reception and Awards Ceremony: Henry B. González Convention Center, Lila Cockrell Theatre
Banquet*: 7:30 p.m. to 8:30 p.m.
Afterglow Reception*: 8:30 p.m. to 10:00 p.m.
Location for Banquet and Afterglow Reception: Grand Hyatt San Antonio, Lonestar Ballroom ABC

Show your support for colleagues who will be accepting awards from TMS and the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) at the 2019 TMS-AIME Awards Ceremony & Banquet. There is no cost to attend the awards ceremony to honor those individuals who are being recognized for excellence in their fields. If you would like to attend the banquet following the awards ceremony, however, you must purchase a ticket. The opening reception for this event is sponsored by Zeiss.

* Tickets are required to attend the Banquet and the Afterglow Reception. Tickets must be purchased by Tuesday at 10:00 a.m. at the TMS Registration Desk.

TMS2019 Materials Bowl

Date: Sunday, March 10
Time: 2:00 p.m. to 6:00 p.m.
Location: Henry B. González Convention Center, Lila Cockrell Theatre

Even if you aren’t competing in the materials-themed quiz-show competition, you’re welcome to attend the elimination rounds or the final championship round. Play along to test your materials science and engineering knowledge or cheer on your favorite school. This event is sponsored by Goodfellow.

Student Networking Mixer

Date: Sunday, March 10
Time: 7:00 p.m. to 8:30 p.m.
Location: Grand Hyatt San Antonio, Lonestar Ballroom BC

Take a break and have some fun at this informal social event. Students will have the opportunity to interact with each other and with professionals in a relaxed setting. Refreshments will be provided.

Technical Division Student Poster Contest Session

Date: Monday, March 11
Time: 5:30 p.m. to 7:00 p.m.
Location: Henry B. González Convention Center, Hall 3

Stop by and browse the student poster displays at your leisure or attend the official judging session to ask questions of the participants. If you are participating in the student poster contest, you must be present at the judging session to answer questions about your work.

Student Career Forum

Date: Tuesday, March 12
Time: 2:00 p.m. to 4:00 p.m.
Location: Grand Hyatt San Antonio, Lonestar Ballroom B

“When should I start my job search?” “Should I continue to graduate school or begin my career?” “How important is networking to my career?” If you find yourself asking questions like these about your future, then you should attend the Student Career Forum. Organized by the TMS Young Professional Committee, this session will feature speakers from various stages of their careers and diverse materials science backgrounds to discuss how to navigate a successful career path in the fields of minerals, metals, and materials.
ON DISPLAY NOW IN THE TMS2019 EXHIBIT HALL

TMS2019 is home to the third TMS Bladesmithing Competition, which challenges teams of university students to produce a blade by hand hammering or trip hammer forging. The teams’ entries will be on display in the TMS2019 Exhibit Hall during regular exhibit hours, and all TMS2019 attendees are encouraged to explore the collection.

The winning teams will be announced during a special awards ceremony on Tuesday, March 12, from 5:00 p.m. to 5:30 p.m. in the Lila Cockrell Theatre of the Henry B. Gonzalez Convention Center. The ceremony is open to all TMS2019 attendees.

GOOD LUCK TO EACH OF OUR PARTICIPATING TEAMS:

- Centro de Investigación y de Estudios Avanzados, “CINVESTAV’s Kukri”
- Colorado School of Mines, “Rain Drop Pattern Chef Knife”
- Drexel University, “Occam’s Razor”
- Friederich-Schiller-University Jena, “Hugin”
- Illinois Institute of Technology, Armour College of Engineering, “Kunai”
- Indian Institute of Technology, Bombay, “Talwar”
- Indian Institute of Technology, Madras, “Indian Katar”
- Institut Teknologi Sepuluh Nopember, “The Karembit, Indigenous Martial Arts Weapon of Indonesia”
- McMaster University, “The Mighty Gladius”
- Michigan State University, “An Agricultural Tool, and Then Some”
- Michigan Technological University, “MTU Kukri”
- Missouri University of Science and Technology, “Stahlzahn”
- Montana Technological University, “Renaissance Dagger”
- Montanuniversität Leoben, “Historically Inspired Broken Back Seax”
- New Mexico Institute of Mining and Technology, “Second Heat”
- Norwegian University of Science and Technology, “T13727 Viking Sword Reproduction”
- Oregon Institute of Technology, “Viking’s Little Helper”
- Oregon State University, “Raindrop San Mai Damascus Bowie”
- South Dakota School of Mines & Technology, “Crucible Steel Dagger”
- Universidad Nacional Autónoma de México, “Iztacteopostli”
- Universidad San Francisco de Quito, “Dragon Dagger”
- University of Alberta, “Double-edged Sword”
- University of California, Berkeley, “Ax L. Rose”
- University of California, Irvine, “Utilitarian Kitchen Chopper”
- University of Florida, “DECAPIGATOR”
- University of Idaho, “Fire Creek Forge Bowie Knife”
- University of Minnesota Twin-Cities, “Seax Blade”
- University of North Texas, “Anglo-Saxon Broken-Back Sex”
- University of Pittsburgh, Team #1, “PittSmiths Kukri”
- University of Pittsburgh, Team #2, “It’s a Wonderful Knife”
- University of Tennessee at Knoxville, “Volsung”
- University of Texas at Austin, “Alpha Blade”
- University of Utah, “Damascus Steel Swept Rapier”
- Virginia Polytechnic Institute and State University, “World War 1 Trench Knife Replica”
Are you interested in becoming a STEM Ambassador?

Use *Materials Explorers*™ to inspire students in your community about how scientists and engineers are changing the world.

For more information or to get involved with the program, visit TMS staff at the Member Welcome Center conveniently located near Registration.

[www.materials-explorers.org](http://www.materials-explorers.org)
The reception and ceremony are open to all meeting attendees, but tickets are required for the dinner and afterglow portion of the evening. Tickets must be purchased by Tuesday at 10:00 a.m. at the Registration Desk.

The 2019 TMS-AIME Awards Ceremony and Banquet will be an elegant event, designed to honor the significant professional achievements of members of the minerals, metals, and materials communities. The ceremony includes presentations of awards from both TMS and the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME), of which TMS is a member society. Additional awards, including Acta Materialia awards and the Brimacombe Prize, will also be presented to TMS members.

The evening will consist of four parts. First, award recipients and their guests will be welcomed at a cocktail reception. Following the reception, participants will be seated for the awards ceremony, where individual recipients will be honored for their accomplishments. After the ceremony, those participants who have purchased banquet tickets will proceed to the Grand Hyatt for a formal dinner. Attendees who purchased a banquet ticket will also receive a ticket to the Afterglow Reception which immediately follows dinner. Reception attendees can network while enjoying after-dinner drinks and dessert.

AWARDS CEREMONY PRESENTERS

The ceremony will be hosted by Kevin Hemker, 2018 TMS President, and will include comments by Hemker and James Foley, 2019 TMS President. In addition, the following presenters will announce the awards:

- Roland Moreau, ExxonMobil and 2019 AIME President
- Michele Lawrie-Munro, AIME Executive Director
- Carolyn Hansson, University of Waterloo and Acta Materialia Executive Secretary
- George T. “Rusty” Gray III, Los Alamos National Laboratory and Acta Materialia Chair & Treasurer
- Brian Thomas, University of Illinois and Brimacombe Prize Committee
- Megan Cordill, Erich Schmid Institute and 2015 MPMD Young Leaders Professional Development Award recipient
- Peter Voorhees, Northwestern University, 2011 Bruce Chalmers Award recipient, and 2013 TMS Fellow
- Tresa Pollock, University of California, Santa Barbara, 2005 TMS President, and 2009 TMS Fellow

INSTALLATION OF THE 2019 TMS PRESIDENT:

During the 2019 TMS-AIME Awards Ceremony, TMS will install James Foley as the Society’s 2019 president. Foley is currently Sigma-1 Group Leader at Los Alamos National Laboratory and has been employed there since 2003. He received his B.S. in 1988, M.S. in 1991 and Ph.D. in 1997 in metallurgical engineering from the University of Wisconsin-Madison. He was a postdoctoral fellow at the U.S. Department of Energy’s Ames Laboratory from 1997 through 1998. From 1998 through 2003, he was an associate scientist at Ames Laboratory. His research interests cover amorphous alloys, lead-free solder, aluminum alloys, beryllium, and powder metallurgy. Foley has been a member of TMS since 1987 and served on the Program Committee as Chair from 2006 to 2009. He was the Programming Coordinating Committee Chair for MS&T ’06, and from 2013 to 2016 he served as the Materials Processing & Manufacturing Division (MPMD) Council Chair.
Class of 2019

Brimacombe Medalist – Class of 2019

- Thomas Bieler
  Professor and Director
  Michigan State University

- M. Grace Burke
  Professor and Director
  University of Manchester

- Frank Crossley
  Retired
  Aerojet Propulsion Research Institute

- Dennis Dimiduk
  Chief Technologist
  BlueQuartz Software LLC

- Roderick Guthrie
  Director of McGill Metals Processing Centre
  McGill University

- Elizabeth Holm
  Professor
  Carnegie Mellon University

- Nack Joon Kim
  Professor
  Pohang University of Science and Technology

- Alan Taub
  Professor
  University of Michigan

- Dan Thoma
  Director Grainger Institute for Engineering
  University of Wisconsin – Madison

TMS Fellows – Class of 2019

- Dan Thoma
  Retired
  Aerojet Propulsion Research Institute

- Thomas Bieler
  2019

Society Awards

Franklin Mehl Award Lecturer & Robert Institute of Metals Award

William Hume-Rothery Award

Weertman Educator Fellowship Award

Ellen Swallow Richards Diversity Award

ELLEN SWALLOW RICHARDS DIVERSITY AWARD

• Michelle Buchanan
  Deputy for Science & Technology
  Oak Ridge National Laboratory

Early Career Faculty Fellow Award

• Elsa Olivetti
  Assistant Professor
  Massachusetts Institute of Technology

Julia and John Weertman Educator Award

• David Van Aken
  Professor
  Missouri University of Science and Technology

Julia and Johannes Weertman Educator Award

Julia and Johannes Weertman Educator Award

William Hume-Rothery Award

• Mark Asta
  Professor
  University of California, Berkeley

Institute of Metals Lecturer & Robert Frankline Mehl Award

• Hael Mughrabi
  Professor Emeritus
  University of Erlangen-Nuernberg

Leadership Award

• James Warren
  Director, Materials Genome Program
  National Institute of Standards and Technology

Alexander Scott Distinguished Service Award

• Robert Hyers
  Professor
  University of Massachusetts

Oleg D. Sherby Award

• Michael Mills
  Professor
  The Ohio State University

AIME Awards

AIME Honorary Membership

• K. Linga Murty
  Professor
  North Carolina State University

TMS/SME/AIME James Douglas Gold Medal

• Jiann-Yang “Jim” Hwang
  Professor
  Michigan Technological University

AIME Robert Lansing Hardy Award

• Saryu Fensin
  Scientist
  Los Alamos National Laboratory

AIME Champion H. Mathewson Award

• Irene Beyerlein
  Professor
  University of California, Santa Barbara

Acta Materialia Gold Medal Award

• Ke Lu
  Professor and Director
  Institute of Metal Research

Acta Materialia Silver Medal Award

• Xavier Savage
  Deputy Director
  CNRS - GPM - University Rouen Normandy

Other Awards

Aime Henry Dewitt Smith Scholarship

• Brady Dowdell
  Student
  North Carolina State University

Pranjal Nautiyal
  Student
  Florida International University

* Passed away since nominated.
2019 TMS-AIME AWARDS CEREMONY & BANQUET

ACTA MATERIALIA HOLLOMAN MATERIALS & SOCIETY AWARD
- Alexander H. King
  Professor
  Iowa State University

ACTA MATERIALIA UNDERGRADUATE SCHOLARSHIP
- Rafael Rodriguez De Vecchis
  Student
  University of Pittsburgh
- Keith Coffman
  Student
  Georgia Institute of Technology

BRIMACOMBE PRIZE
- John Grandfield
  Director
  Grandfield Technology Pty Ltd

DIVISION AWARDS

EXTRACTION & PROCESSING DIVISION (EPD)

EPD DISTINGUISHED LECTURER AWARD
- Sridhar Seetharaman
  Professor and Associate Vice President for Research
  Colorado School of Mines

EPD DISTINGUISHED SERVICE AWARD
- Jiann-Yang “Jim” Hwang
  Professor
  Michigan Technological University

EPD SCIENCE AWARD
- Ata Fallah-Mehrdjardi
  Senior Manager
  Aurubis AG
- Taufiq Hidayat
  University of Queensland
- Peter Hayes
  Professor and Program Leader
  University of Queensland
- Evgueni Jak
  Professor
  University of Queensland

EPD TECHNOLOGY AWARD
- Adam Gesing
  President
  Gesing Consultants Inc.
- Subodh Das
  CEO & Founder
  Phinity LLC

EPD PYROMETALLURGY BEST PAPER AWARD
- Ata Fallah-Mehrdjardi
  Senior Manager
  Aurubis AG
- Taufiq Hidayat
  University of Queensland
- Peter Hayes
  Professor and Program Leader
  University of Queensland
- Evgueni Jak
  Professor
  University of Queensland

EPD NAGY EL-KADDAH AWARD FOR BEST PAPER IN MHD IN MATERIAL PROCESSING
- Lukas Dion
  Research Scientist
  Rio Tinto
- Laszlo Kiss
  Professor
  University of Quebec at Chicoutimi
- Sandor Poncsak
  Research Professor
  University of Quebec at Chicoutimi
- Charles-Luc Lagace
  Lean Expert
  Masonite International

EPD MATERIALS CHARACTERIZATION AWARDS

Best Paper Award – First Place
- Mingming Zhang
  Lead Research Engineer
  ArcelorMittal Global R&D
- Udaya Bhaskar Kodukula
  Lead Engineer
  ArcelorMittal Global R&D
- Marcelo Andrade
  Ironmaking Manager
  ArcelorMittal Global R&D

Best Paper Award – Second Place
- Zheng Wei
  Chongqing University
- Tao Li
  Chongqing University
- Xueli Cao
  Fujian Institute of Research on the Structure
- Hanying Wen
  Chongqing University

Guodong Shi
Chongqing University
Lei Yu
Chongqing University
Lin Zhu
Chongqing University
Wen-xin Tang
Chongqing University
Meng Li
Chongqing University
Chenguang Bai
Chongqing University

Best Poster Award – First Place
- Mustafacan Kutsal
  Student
  Technical University of Denmark
- Bengisu Yasar
  Research Assistant
  Middle East Technical University
- Yunus Eren Kalay
  Research Assistant
  Middle East Technical University

Best Poster Award – Second Place
- Veeraraghavan Sundar
  Technical Marketing Manager
  UES Inc.
- Satya RNL Ganti
  Research Scientist
  UES Inc.
- Bryan Turner
  Materials Engineer
  Materials Resources LLC

Best Poster Award – Third Place
- Md Ashraful Islam
  Student
  University of South Wales
- Paul Hazell
  Called Friend
  University of South Wales
- Juan Escobedo Diaz
  Lecturer-Assistant Professor
  University of South Wales
- Andrew Brown

FUNCTIONAL MATERIALS DIVISION (FMD)

FMD JOHN BARDEEN AWARD
- Eric Chason
  Professor
  Brown University

FMD DISTINGUISHED SERVICE AWARD
- Tae-Kyu Lee
  Associate Professor
  Portland State University

LIGHT METALS DIVISION (LMD)

LMD DISTINGUISHED SERVICE AWARD
- Barry Sadler
  Managing Director
  Net Carbon Consulting Pty Ltd

LMD LIGHT METALS AWARD
- Jean-Louis Achard
  R&D Technician
  Constellium Technology Center
- Fabio Taina
  Metallurgy and Quality Manager
  Constellium Issoire
- Pierre Le Brun
  Technical Expert
  Constellium Technology Center
- Pierre-Yves Menet
  R&D Group Manager
  Constellium Technology Center

LMD JOM BEST PAPER AWARD
- Gregory Smith
  Researcher
  Naval Research Laboratory
- Sanjay Sampath
  Distinguished Professor and Director
  Stoney Brook University

LIGHT METALS SUBJECT AWARDS

Alumina/Bauxite
- Panagiotis Davris
  Aluminium of Greece
- Efthymios Balomenos
  Senior Researcher/External Associate
  National Technical University of Athens/ Mytilineos S.A.
- Dimitrios Papanias
  Professor
  National Technical University of Athens
- Ioannis Paspalaris
  Professor
  National Technical University of Athens

FMD LIGHT METALS AWARD
- John Grandfield
  President
  Grandfield Technology Pty Ltd

LIGHT METALS SUBJECT AWARDS

Alumina/Bauxite
- Panagiotis Davris
  Aluminium of Greece
- Efthymios Balomenos
  Senior Researcher/External Associate
  National Technical University of Athens/ Mytilineos S.A.
- Dimitrios Papanias
  Professor
  National Technical University of Athens
- Ioannis Paspalaris
  Professor
  National Technical University of Athens
Aluminum Reduction Technology
• Grant J. McIntosh
  Principal Chemist/Research Fellow
  University of Auckland
• Hasini Wijayaratne
  Research Engineer
  University of Auckland
• Gordon E. K. Agbenyegah
  Ph.D. Candidate
  University of Auckland
• Margaret M. Hyland
  Vice-Provost Research
  Victoria University of Wellington
• James B. Metson
  Deputy Vice Chancellor of Research
  University of Auckland

Electrode Technology for Aluminum Production
• Bruno Rausch
  Principal Engineer
  Hydro Aluminium Deutschland GmbH
• Juraj Chmelar
  Area Manager Process Hydro Aluminium AS
• Hogne Linga
  Consultant
• Lorentz Petter Lossius,
  Principal Engineer
  Hydro Aluminium AS
• Rebecca J. Thorne
  Researcher
  Institute of Transport Economics
• Viktorija Tomkute
  Project Engineer
  Hydro Aluminium AS

Aluminum Alloys
• Tao Liu
  Graduate Research Assistant
  University of Alabama
• Sydney Morales
  Student
  University of Alabama
• Mikko Karkkainen
  Student
  University of Alabama
• Luke N. Brewer
  Associate Professor
  University of Alabama
• Laurentiu Nastac
  Professor
  University of Alabama
• Vishweshwar Arvikar
  Senior Process Engineer
  Nemak Alabama
• Ilya Levin
  Site Metallurgist
  Nemak Alabama

LMD MAGNESIUM TECHNOLOGY AWARDS
Application
• Raymond Decker
  Chief Technical Officer
  Thixomat/nanoMAG, LLC
• Stephen LeBeau
  President
  nanoMAG, LLC
• Daniel LaCroix
  Student
  Michigan Technological University

Fundamental Research
• Huimin Lu
  Professor
  Beihang University
• Guangzi Wu
  Chairman
  Inner Mongolia Xintai Construction and Installation Group Co., Ltd

Student Paper
• Charlotte Wong
  Student
  RMIT University
• Mark J. Styles
  Research Scientist
  CSIRO Manufacturing
• Suming Zhu
  Senior Research Fellow
  RMIT University
• Trevor Abbott
  Director - Research & Development
  Magontec Limited
• Kazuhiro Nogita
  Professor
  University of Queensland
• Stuart D. McDonald
  Senior Research Fellow
  University of Queensland
• David StJohn
  Professor Emeritus
  University of Queensland
• Mark A. Gibson
  Honorary Fellow
  CSIRO Manufacturing

Best Poster
• Zhihua Huang
  Student
  University of Michigan
• John Allison
  Professor
  University of Michigan
• Amit Misra
  Professor
  University of Michigan

LMD/EPD SUBJECT AWARD
Recharging
• Jan Steglich
  Project Manager R&D
  TRIMET Aluminium SE
• Christiane Matthies
  TRIMET Aluminium SE
• Marcel Rosefort
  Head of R&D
  TRIMET Aluminium SE
• Bernd Friedrich
  RWTH Aachen University
• Thomas Boundy
  Student
  Colorado School of Mines
• Patrick Taylor
  Professor
  Colorado School of Mines

Energy Best Paper Awards
Professional:
• Xia Lou
  Professor
  Curtin University
• Hossein Dashhi
  Ph.D. Candidate
  Curtin University

Student:
• Mengqi Wei
  Student
  Jiangsu Provincial Academy of Environmental Science
• Qingbo Yu
  Professor
  Northeastern University
• Qiang Guo,
  University of Waterloo
• Zongliang Zuo
  Student
  Northeastern University
• Qin Qin
  Vice-Professor
  Northeastern University

YOUNG PROFESSIONAL AWARDS
EPD Young Leaders Professional Development
• Neslihan Dogan
  Assistant Professor
  McMaster University
2019 TMS-AIME AWARDS CEREMONY & BANQUET

FMD YOUNG LEADERS PROFESSIONAL DEVELOPMENT
- Surojit Gupta
  Associate Professor
  University of North Dakota
- Ning Zhang
  Research Assistant Professor
  Colorado School of Mines

LMD YOUNG LEADERS PROFESSIONAL DEVELOPMENT
- Kristian Etienne Einarsrud
  Associate Professor
  Norwegian University of Science and Technology
- Samuel Wagstaff
  Process Scientist
  Novelis Inc

MPMD YOUNG LEADERS PROFESSIONAL DEVELOPMENT
- Oliver Johnson
  Assistant Professor
  Brigham Young University
- Srikanth Patala
  Assistant Professor
  North Carolina State University

TMS/JIM YOUNG LEADERS INTERNATIONAL SCHOLAR
- Fadi Abdeljawad
  Assistant Professor
  Clemson University

TMS/FEMS YOUNG LEADERS INTERNATIONAL SCHOLAR
- Jennifer Carter
  Assistant Professor
  Case Western Reserve University

JIM YOUNG LEADERS INTERNATIONAL SCHOLAR
- Sakiko Kawanishi
  Assistant Professor
  Tohoku University

STUDENT AWARDS

EPD SCHOLARSHIP
- Brooklyn Carlson
  Student
  University of Wisconsin

FMD GILBERT CHIN SCHOLARSHIP
- Justin Qian
  Student
  University of Pennsylvania

LMD SCHOLARSHIP
- Tanner Livingston
  Student
  University of Utah

MPMD SCHOLARSHIP
- Mackenzie Keefer
  Student
  Michigan Technological University
- Matthew Thomas
  Student
  Michigan Technological University

KAUFMAN CALPHAD SCHOLARSHIP
- Katelyn Adkison
  Student
  Pennsylvania State University

TMS INTERNATIONAL SYMPOSIUM ON SUPERALLOYS SCHOLARSHIP
- Adam Ladd
  Student
  University of Illinois
- Hari Krishnan Rajendran
  Student
  Texas A&M University

TMS BEST PAPER CONTEST GRADUATE
First Place:
- Pranjal Nautiyal
  Student
  Florida International University

Second Place:
- Rui Feng
  Student
  University of Tennessee, Knoxville

IMPORTANT DATES
- Call for Abstracts Opens: MAY 2019
- Registration Opens: OCTOBER 2019
- Exhibition Reservations NOW OPEN!

For information and to sign up for updates, visit: www.tms.org/TMS2020

SAVE THE DATE!
February 23-27, 2020
San Diego, California, USA
#TMSAnnualMeeting

FOUR FULL DAYS OF HIGH-VALUE PROGRAMMING
Don’t miss a minute! TMS2020 officially kicks off on Sunday, March 10 with a full slate of learning and networking opportunities. Programming and events continue through Thursday, March 14.
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TMS 2020
149th Annual Meeting & Exhibition

February 23-27, 2020
San Diego, California, USA
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CO-LOCATED
INTERNATIONAL CONFERENCE
Considered the leading international technical forum for the lead and zinc processing Industries, PbZN 2020 programming is open to all TMS2020 attendees as part of their registration.

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Extractive Metallurgy Consultant

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UPCOMING MEETINGS

For a complete listing of TMS meetings, visit: www.tms.org/Meetings

5th World Congress on Integrated Computational Materials Engineering
July 21-25, 2019 • Indianapolis, Indiana, USA
www.tms.org/ICME2019

11th International Conference on Porous Metals and Metallic Foams
August 20-23, 2019 • Dearborn, Michigan, USA
www.tms.org/MetFoam2019

2019 Liquid Metal Processing & Casting Conference
September 8-11, 2019 • Birmingham, UK
www.tms.org/LMPC2019

Materials Science & Technology 2019 Technical Meeting and Exhibition
September 29-October 3, 2019 • Portland, Oregon, USA
www.matscitech.org

World Congress on High Entropy Alloys
November 17-20, 2019 • Seattle, Washington, USA
www.tms.org/HEA2019

Congress on Safety in Engineering and Industry
June 21-24, 2020 • Philadelphia, Pennsylvania, USA
www.safetycongress.org

The 13th International Conference on the Technology of Plasticity
July 26-31, 2020 • Columbus, Ohio, USA
www.tms.org/ICTP2020

The 14th International Symposium on Superalloys
September 13-17, 2020 • Seven Springs, Pennsylvania, USA
www.tms.org/Superalloys2020

TMS 2020 Annual Meeting & Exhibition
February 23-27, 2020 • San Diego, California, USA
www.tms.org/TMS2020

www.tms.org/Meetings
Pandat™ Software
- PanPhaseDiagram for calculating multi-component multi-phase thermodynamic properties and phase equilibria
- PanPrecipitation for simulating precipitation kinetics of multi-component alloys during heat treatment processes
- PanDiffusion for modeling diffusion-controlled phase transformations in multi-component systems
- PanOptimizer for optimizing thermodynamic model parameters and thermophysical properties

PanEngine API
- Dynamic-linked library of thermodynamic functions and phase equilibria that can be integrated with user’s in-house code

Databases
- Thermodynamic, atomic mobility, and molar volume databases for variety of multi-component alloy systems

Consultation
- Provide materials solutions on multi-component phase equilibria, diffusion, precipitation, weldability, castability etc.
- Develop customized thermodynamic databases, mobility databases and thermophysical property databases and more
- Support software integration with PanEngine API to obtain instant thermodynamic input for custom applications

Calculated thermal conductivities of Al-Cu alloys located in the (Al)+θ region with experimental data

Diffusion simulation between IN100 and Alloy718 at 1150°C for 1000 hours with experimental data

Phase fraction vs. temperature for TNM (Ti-43Al-4Nb-1Mo-0.1B at.%) alloy with experimental data

Precipitation simulation of Fe-1Mn-0.2C (at.%) alloy heat-treated at 600°C