



TMS2014

143rd Annual Meeting & Exhibition

*February 16-20, 2014 • San Diego Convention Center
San Diego, California, USA*



FINAL PROGRAM

*Linking Science and Technology
for Global Solutions*



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**DEAR FRIENDS
AND COLLEAGUES,**

With great pleasure, I welcome you to the 143rd TMS Annual Meeting & Exhibition, a premier event in the minerals, metals, and materials community.

TMS2014 is filled with so many great options; it can be difficult to determine how best to spend your time. Might I suggest that you plan for at least a little of each of the following activities – learn, meet, get involved, and have fun.

LEARN

Technical Sessions: Over 3,000 technical presentations and dozens of symposia are listed in this book, and you can put together a personalized electronic schedule when you download the TMS2014 mobile application for your smartphone. (See page 3 for more information on the app.)

Spotlight Sessions: Several plenary and keynote sessions explore exciting topics. All sessions occur in the San Diego Convention Center – Room 6A. (See page 20 for descriptions.)

Continuing Education: Workshops and Short Courses are available on Sunday, February 16, to all who register for them. (See page 33 for information.)

MEET

Networking Events: The best part of on-site meetings is the “meet” part. No matter what career stage you are in, at TMS2014 you can reunite with or make new friends and colleagues. (See page 32.)

Exhibition Hall: Exhibitors from around the globe help you make the most of your time here, too, and connect you with industry. Special lunches and receptions take place in the exhibit hall throughout the week. (See the Exhibitor’s List beginning on page 42.)

GET INVOLVED

Committee Meetings: Attend a technical committee meeting in your area of interest. (See the Schedule of Events beginning on page 5 for a listing of times and locations.)

Meeting of the Membership: Find out what TMS is planning in 2014 and beyond. (See page 32.)

TMS Foundation: Give generously to secure the future of our professions. (Booth #118 or page 15 in this book.)

HAVE FUN

COMIC-tanium: This museum-quality exhibit is on display as a fun way to promote the material sciences. Children of attendees are also invited during special hours. (See page 13 for more information.)

Awards & Entertainment: The Annual Awards Ceremony is open to all attendees. For those with dinner tickets, Scottish fiddle legend Alasdair Fraser and cellist Natalie Haas provide live entertainment. (See page 34.)

Learn, meet, get involved, and have fun at TMS2014 in beautiful San Diego!

Sincerely,

Elizabeth Holm





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MEETING HIGHLIGHTS

- **COMIC-tanium:** The Super Materials of the Superheroes (page 13)
- **Quantum Design Manufacturing Facility Tour** (page 26)
- **TMS-AIME Awards Banquet** with live entertainment (page 34)
- **Student Poster Contest** (page 33)
- **Meeting of the Membership** (page 32)
- **Speed Networking Luncheon** (page 32)
- **Young Professionals Luncheon** (page 30)
- **Women in Science Breakfast** (page 32)
- **TMS Foundation Prize Drawings** (page 15)
- **Azorian: The Raising of K-129** Documentary Film Screening (page 12)



Time to Tweet. Follow the **@TMSociety** Twitter account or post using **#TMS14**. Stay current on all of the meetings' updates via the live Twitter feed accessible on the TMS Mobile Application, the large screens around TMS2014, on the TMS2014 website, and on Twitter.

TMS Charging Stations sponsored by **Hatch and Harbison Walker Refractories Co.** are available in the main aisle of the Exhibit Hall for powering up iPhones, Nextel and Sprint mobile phones.





REGISTRATION

Your full-meeting registration badge provides you access to:

- Technical and Poster Sessions
- Three-Day Pass to the TMS2014 Exhibition
- President's Welcoming Reception and Happy Hour Reception (located in the Exhibit Hall)
- Admission to the Awards Ceremony of the TMS-AIME 2014 Awards Banquet
- General Poster Session and Reception
- TMS Materials Bowl Competition
- Technical Division Student Poster Displays
- Admission to select social and networking events
- Online access to the complete collected proceedings

All attendees and meeting participants (authors, exhibitors, etc.) must register for the meeting. Badges must be worn for admission to technical sessions, the exhibition hall, social functions, and other events.

TMS2014 MEETING NEWS OPTIONS

Now you have three options for receiving the most up-to-date, real-time news for TMS2014.

1. The TMS2014 mobile application serves as your hand-held guide to the meeting. Download this free tool from the Apple iTunes Store for your iPhone or iPad or through Google Play for Android devices by searching for "TMS Annual Meeting." Features include:
 - Latest programming schedule
 - View complete abstracts
 - Build your personal schedule and download to your device
 - Speaker information
 - Exhibit map
 - Exhibitors and sponsors
 - Venue information
 - Monitor the *@TMSociety* real-time Twitter feed and the TMS Facebook page*.
2. The *@TMSociety* Twitter handle and #TMS14 let you see meeting news in real-time and let you join the conversation. Follow *@TMSociety* and post to #TMS14 to discuss the meeting and engage with colleagues near and far.
3. The TMS2014 website provides the option for accessing the latest news about the meeting from any internet-connected device or computer. You can monitor the news feed as well.
Please visit www.tms.org/TMS2014

**The TMS Mobile App lets you monitor the Twitter feed and Facebook page without logging into your social media account; however, to comment or post, you will need to log into your social media account and address #TMS14.*

INTERNET ACCESS

Free wireless internet is available at the San Diego Convention Center in the public areas outside of Halls A to G on the ground level. Please select the "Free Internet" network for access.

Complimentary wireless internet access is also available in the Connect Zone located in the Sails Pavilion on the Upper Level. Access to this hall is restricted from 7:00 a.m. to 8:30 a.m. for Presenters' Coffee but will be open to all attendees from 8:30 a.m. to 4:00 p.m. daily. Please select the "TMS2014" network for access.



FOOD AND BEVERAGES

There is a Starbucks Coffee located outside of Hall A in the San Diego Convention Center open daily to visitors and meeting attendees. There is also a Starbucks Coffee located in the South Tower of the Marriott Marquis and Marina Hotel. Additional dining options are available at the Marriott including the Marina Kitchen Café (open in the mornings only) and the Marina Kitchen Restaurant.

There are many dining options within easy walking distance of the San Diego Convention Center and the TMS hotels. For suggestions and information on dining visit the Convention Center Restaurant & Concierge Booth located in lobby B2 of the Convention Center. You can also visit www.visitsandiego.com.

BUSINESS CENTERS

There is a full-service FedEx Kinkos in the San Diego Convention Center on the ground level outside of Halls C & D. FedEx is open on Sunday from 9:00 a.m. to 5:00 p.m. and Monday through Friday from 8:00 a.m. to 5:00 p.m. For more information on available services, please visit local.fedex.com/ca/san-diego/office-1324/.

There is a full-service UPS Store in the San Diego Marriott Marquis and Marina in the south tower. The UPS Store is open on Sunday from 7:00 a.m. to 5:00 p.m. and Monday through Friday from 7:00 a.m. to 7:00 p.m. For more information on available services, please visit theupsstore.com and specify store number 6200.

NOTE ABOUT TIME

All times in this program refer to Pacific Standard Time.

NOTICE REGARDING TECHNICAL PROGRAM CANCELLATIONS

Changing the times of presentations is disruptive to the program and may cause delegates to miss valuable presentations. So, we have asked symposium organizers and session chairs not to adjust presentation times in the event that a speaker is unable to deliver his or her talk due to international travel and/or visa issues resulting in late cancellation or "no show."





MEETING POLICIES

BADGES

All attendees must wear registration badges at all times during the meeting to ensure admission to events included in the paid fee such as technical sessions, exhibition, and receptions. "Exhibit Only" badges only provide admittance to the show floor for events in the exhibit hall. "Guest" badges are for spouses or companions of registered attendees and are used as identification only. "Guest" and "Exhibit Only" attendees may not attend technical sessions.

REFUND POLICY

The deadline for all refunds was January 17, 2014. No refunds will be issued at the meeting. Fees and tickets are nonrefundable.

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.

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 724-776-9000 or on-site at the TMS Information Center (Booth #118).

CELL PHONE USE

In consideration of attendees and presenters, TMS kindly requests that you minimize disturbances by setting all cell phones or PDAs on "silent" while in meeting rooms.

RECYCLING

Discard badges and programs after the meeting in the bins located in the Registration area.

Be materials-minded. Join TMS in reducing, reusing and recycling.

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TMS INFORMATION CENTER (NEW!)

The TMS Information Center is located at Booth #118 in the Exhibit Hall. The center consolidates all things TMS in a convenient location. Stop by for information about:

- TMS Membership
- TMS Technical Initiatives
- TMS Events
- The TMS Foundation
- TMS Volunteer Opportunities

TMS FOUNDATION BOOTH

The TMS Foundation Booth is located near the Technical Programming Support Desk. Here you can learn more about The TMS Foundation initiatives. Full-conference attendees can also drop off the ticket included with their registration badge for a chance to win a prize. Tickets may also be dropped off at the TMS Information Center or TMS2014 Help Desk.

TMS2014 HELP DESK

The TMS2014 Help Desk is located near Registration and it is the place to go for any questions about the meeting, as well as for all questions about online access to the Collected Proceedings and the @TMSociety / #TMS14 Twitter feed. You can also learn more about and the TMS Foundation here.

LOCATION DETAILS (SAN DIEGO & CONVENTION CENTER)

The Convention Center Restaurant & Concierge Booth, located in lobby B2, will be open from Sunday,

February 16 to Thursday, February 20 from 9:00 a.m. to 5:30 p.m. The knowledgeable booth staff can assist in making restaurant reservations, securing attraction and tour tickets, providing city information, and finding transportation, as well as providing information on local shopping and restaurant discounts and coupons.

For more information about San Diego visit www.visitsandiego.com or follow on Twitter @visitsandiego.

WEBSITE USER TESTING INVITATION

Help TMS Make a Better Website

We're rebuilding the TMS Website and we need your help. Provide us with your input in a 20-minute session and you can help us make sure the new TMS.org meets your needs and those of your colleagues. Please stop by the TMS Information Center (**Booth #118**) to learn more and to sign up for a session during one of the following time slots:

Monday, February 17 • 1:00 p.m. to 2:00 p.m.

Tuesday, February 18 • 11:00 a.m. to noon

Wednesday, February 19 • 10:00 a.m. to 11:00 a.m.

The user session takes place at the TMS Information Learning Center, only takes 20 minutes, and you will receive a token of our appreciation for your time! Limited sessions available.

SCHEDULE OF EVENTS - SATURDAY



Function	Time	Venue	Room	Access*
Saturday, February 15				
TMS2014 Exhibition				
Exhibit Move-In	8:00 a.m. to 5:00 p.m.	SDCC	Exhibit Hall B1	R
Committee Meetings				
Professional Registration Writers Workshop and Committee Meeting	9:00 a.m. to 5:00 p.m.	MM	Cardiff	R
Financial Planning Committee	2:00 p.m. to 5:00 p.m.	MM	Mission Hills	R
Professional Registration Committee Dinner	6:00 p.m. to 8:00 p.m.	MM	Balboa	R
TMS Board of Directors Dinner	6:00 p.m. to 10:00 p.m.	Offsite		I

■ SDCC - San Diego Convention Center
■ MM - Marriott Marquis Hotel & Marina
 BR - Ballroom

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 T2 - Ticketed Event
 (T2 - Tickets may be purchased onsite up to 24 hours before event)





SCHEDULE OF EVENTS - SUNDAY

Function	Time	Venue	Room	Access*
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Sunday, February 16

All-Conference Events

Registration	7:00 a.m. to 6:00 p.m.	SDCC	Exhibit Hall A	O
TMS Help Desk	7:00 a.m. to 6:00 p.m.	SDCC	Exhibit Hall A	O
Technical Programming Support Desk	noon to 6:00 p.m.	SDCC	BR 6 Lobby	O
Young Professional "Meet the Candidate" Poster Session Set Up	noon to 6:00 p.m.	SDCC	Room 12	
General, Symposium, Student, and Young Professional Poster Session Set-up	2:00 p.m. to 6:00 p.m.	SDCC	Sails Pavilion	O
Young Professional "Meet the Candidate" Poster Session	6:30 p.m. to 7:30 p.m.	SDCC	Room 12	O
TMS Meeting of the Membership	7:00 p.m. to 8:00 p.m.	SDCC	Room 16AB	O

TMS2014 Exhibition

Exhibit Move-In	8:00 a.m. to 5:00 p.m.	SDCC	Exhibit Hall B1	R
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Continuing Education and Special Presentations

Short Course Registration Desk	7:00 a.m. to 10:30 a.m.	MM	Marina BR Desk	O
CANCELLED: Short Course: Proper Anode Baking Furnace Operation- How and Why	8:30 a.m. to 4:30 p.m.	MM	Carlsbad	T
Short Course: Pot Ventilation & Dry Scrubbing Operations for Aluminum Smelters	8:30 a.m. to 4:30 p.m.	MM	Balboa	T
Short Course: Fundamentals of Friction Stir Welding	8:30 a.m. to 4:30 p.m.	MM	Palomar	T
Workshop: Furnace Systems Technology	8:30 a.m. to 4:30 p.m.	MM	Mission Hills	T
Short Course: Grain Refinement of Aluminum and Magnesium Alloys: Theory and Practice	8:30 a.m. to 4:30 p.m.	MM	Laguna	T
CANCELLED: Short Course: Incorporating Life Cycle Assessment in Operational Decision-Making	8:30 a.m. to 4:30 p.m.	MM	Leucadia	T
Tutorial: Neutron and X-rays- Sources, Instrumentation, and Scattering	8:30 a.m. to 4:30 p.m.	MM	Oceanside	T
Workshop: 11th Annual Lead-Free Solders and Interconnect Workshop	8:30 a.m. to 4:30 p.m.	MM	Miramar	T
CANCELLED: Short Course: Radiation Effects on Oxide Ceramics and Novel NWR Fuels	8:30 a.m. to 4:30 p.m.	MM	Vista	T
CANCELLED: Short Course: Sustainability and Minerals Resources	8:30 a.m. to 4:30 p.m.	MM	Malibu	T
Short Course: Theory of Constraints: Tools and Tactics for Creating Business Value in Aluminum Smelters and Other Process Industries	8:30 a.m. to 4:30 p.m.	MM	Newport Beach	T

Student Events

Materials Bowl	noon to 8:30 p.m.	SDCC	Room 14AB	O
Elimination Rounds	noon to 3:00 p.m.			
Championship Round	8:00 p.m. to 4:00 p.m.			

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SCHEDULE OF EVENTS - SUNDAY



Student Technical Division Poster Session Set-Up	2:00 p.m. to 6:00 p.m.	SDCC	Sails Pavilion	O
Student Networking Mixer	8:30 p.m. to 10:30 p.m.	SDCC	Room 15AB	T2

Social Functions

Fellows and Invited Guests Reception	4:30 p.m. to 6:30 p.m.	MM	Marina Kitchen Terrace	I
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Committee Meetings

TMS Board of Directors New Member Orientation	8:30 a.m. to 11:00 a.m.	MM	Point Loma	I
Professional Registration Leadership	8:00 a.m. to 10:00 a.m.	MM	Conference Suite 1	R
TMS Board of Directors Meeting	11:10 a.m. to 1:30 p.m.	MM	Point Loma	I
Recycling & Environmental Technologies Committee	noon to 1:30 p.m.	MM	Del Mar	O
Accreditation Committee	12:30 p.m. to 2:30 p.m.	MM	Coronado	O
Audit Committee	1:00 p.m. to 1:30 p.m.	MM	Conference Suite 2	R
Magnesium Committee	1:30 p.m. to 3:00 p.m.	MM	Del Mar	O
TMS Nominating Committee Meeting	2:00 p.m. to 3:00 p.m.	MM	Conference Suite 1	I
Aluminum Committee	2:00 p.m. to 4:00 p.m.	MM	Cardiff	O
Materials Characterization Committee	2:30 p.m. to 4:00 p.m.	MM	Marina BR D	O
ABET Refresher Training	3:00 p.m. to 5:00 p.m.	MM	Temecula 1	O
Public & Governmental Affairs Committee	3:30 p.m. to 5:00 p.m.	MM	Catalina	O
Thin Films & Interfaces Committee	4:00 p.m. to 5:00 p.m.	MM	Marina BR E	O
Hydrometallurgy & Electrometallurgy Committee	4:00 p.m. to 5:00 p.m.	MM	Marina BR F	O
Nanomaterials Committee	4:00 p.m. to 5:00 p.m.	MM	La Costa	O
PRICM9 International Organizing Committee	4:00 p.m. to 6:00 p.m.	SDCC	Room 18	I
TMS Program Committee Meeting	4:00 p.m. to 6:00 p.m.	MM	Point Loma	R
LMD Council	4:30 p.m. to 6:00 p.m.	MM	Solana	I
Content Development and Dissemination Committee	5:00 p.m. to 7:00 p.m.	MM	Cardiff	I
Materials Innovation Committee	5:30 p.m. to 7:00 p.m.	MM	Del Mar	O
Nanomechanical Materials Behavior Committee	5:45 p.m. to 6:45 p.m.	MM	Newport Beach	O
Pyrometallurgy Committee	6:00 p.m. to 7:30 p.m.	MM	Leucadia	O
Mechanical Behavior of Materials Committee	7:00 p.m. to 8:30 p.m.	MM	Miramar	O
Alloy Phases Committee	7:30 p.m. to 9:30 p.m.	MM	Laguna	O
Phase Transformation Committee	7:30 p.m. to 9:30 p.m.	MM	Del Mar	O

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Want to Get Involved?

Attend one of the many open technical committee meetings being held this week to meet colleagues with similar interests and become a contributing member of the TMS community.





SCHEDULE OF EVENTS - MONDAY

MEETING INFORMATION

Function	Time	Venue	Room	Access*
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Monday, February 17

All-Conference Events

Registration	7:00 a.m. to 6:00 p.m.	SDCC	Exhibit Hall A	O
TMS Help Desk	7:00 a.m. to 6:00 p.m.	SDCC	Exhibit Hall A	O
Technical Programming Support Desk	7:00 a.m. to 6:00 p.m.	SDCC	BR 6 Lobby	O
Presenters' Coffee	7:00 a.m. to 8:00 a.m.	SDCC	Sails Pavilion	R
General and Symposium Poster Session Set-up	8:00 a.m. to 6:00 p.m.	SDCC	Sails Pavilion	O
TMS Foundation Booth	8:00 a.m. to 6:00 p.m.	SDCC	BR 6 Lobby	O
Technical Programming	8:30 a.m. to 5:30 p.m.	See Technical Program for complete schedule and locations		O
Morning Break	9:50 a.m. to 10:30 a.m.	SDCC & MM		O
TMS Information Center	noon to 6:30 p.m.	SDCC	Exhibit Hall B1	O
Afternoon Break	3:30 p.m. to 4:10 p.m.	SDCC & MM		
President's Welcoming Reception	5:00 p.m. to 6:30 p.m.	SDCC	Exhibit Hall B1	O
Poster Session Presentations and Reception	6:30 p.m. to 8:30 p.m.	SDCC	Sails Pavilion	O

TMS2014 Exhibition

TMS2014 Exhibition Hours	noon to 6:30 p.m.	SDCC	Exhibit Hall B1	O
COMIC-tanium! The Super Materials of the Superheroes (brought to you by the TMS Foundation)	noon to 6:30 p.m.	SDCC	Exhibit Hall B1	O
Lunch Concession Stand	noon to 2:00 p.m.	SDCC	Exhibit Hall B1	O

Special Presentations

Innovation in the Aluminum Industry Supply Chain – How Will We Move on to the Next S Curve?	8:30 a.m. to noon	SDCC	Room 6A	O
Materials and Society Keynote Lecture	2:00 p.m. to 5:30 p.m.	SDCC	Room 6A	O
Congressional Fellow Talk	3:30 p.m. to 4:30 p.m.	SDCC	Exhibit Hall B1	O

Student Events

Technical Division Student Poster Contest Presentation & Judging	3:30 p.m. to 5:30 p.m.	SDCC	Sails Pavilion	O
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Social Functions

Women in Science Breakfast	7:00 a.m. to 8:00 a.m.	MM	San Diego BR A	T2
Speed Networking Event	11:30 a.m. to 1:30 p.m.	MM	San Diego BR A	T

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Stay the whole week!

The last day of the meeting is just as packed with sessions as the early days. So, take advantage of 45 concurrent sessions on **Thursday, February 20.**

SCHEDULE OF EVENTS - MONDAY



IOMMMS Reception	4:30 p.m. to 5:30 p.m.	MM	Vista	I
Young Professionals Reception	6:00 p.m. to 7:00 p.m.	MM	Coronado	O
Robertson Symposium Honorary Dinner- Hornblower Cruise	5:45 p.m. to 9:00 p.m.	Offsite	Marriott Marina	
President's Invitational Dinner	6:00 p.m. to 9:00 p.m.	Offsite		I

Committee Meetings

Metallurgical and Materials Transactions A Board of Review	7:00 a.m. to 8:00 a.m.	MM	La Costa	I
Process Technology & Modeling Committee	7:00 a.m. to 8:00 a.m.	MM	Newport Beach	O
Membership & Student Development Committee Meeting	8:45 a.m. to 10:00 a.m.	MM	Leucadia	R
Women In Materials Science & Engineering Committee	9:30 a.m. to 10:30 a.m.	MM	Coronado	O
TMS Executive Committee Meeting	10:00 a.m. to 11:00 a.m.	MM	Encinitas	I
TMS Past Presidents Meeting	11:30 a.m. to 1:00 p.m.	MM	Leucadia	I
EPD Council	noon to 2:00 p.m.	MM	Point Loma	I
ICME Committee	12:15 p.m. to 1:45 p.m.	MM	Solana	O
Powder Materials Committee	12:30 p.m. to 2:00 p.m.	MM	Balboa	O
EMPMD Council	12:30 p.m. to 2:00 p.m.	MM	La Costa	I
Energy Conversion & Storage Committee	5:00 p.m. to 6:00 p.m.	MM	Newport Beach	O
Biomaterials Committee	5:30 p.m. to 6:30 p.m.	MM	Mission Hills	O
Chemistry & Physics of Materials Committee	5:30 p.m. to 6:30 p.m.	MM	Cardiff	O
Nuclear Materials Committee	5:30 p.m. to 7:00 p.m.	MM	Carlsbad	O
Materials & Society Committee	5:30 p.m. to 7:30 p.m.	MM	Del Mar	I
Advanced Characterization, Testing & Simulation Committee	5:45 p.m. to 6:45 p.m.	MM	Balboa	O
Composite Materials Committee	5:45 p.m. to 6:45 p.m.	MM	Marina BR D	O
Magnetic Materials Committee	6:00 p.m. to 7:00 p.m.	MM	Leucadia	O
Solidification Committee	6:00 p.m. to 7:00 p.m.	MM	Point Loma	O
Surface Engineering Committee	6:00 p.m. to 7:00 p.m.	MM	La Costa	O

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New for TMS2014: Interactive session signs!

Print session signs are a thing of the past at TMS2014!

Use one of several monitors in the technical session areas to access program information, such as speakers, topics, and room locations.

In addition to being leaner and greener, these interactive session signs will be updated in real-time in the event of speaker cancellations or delays.

Find the sessions that are most important to you three ways:

- Traditional Printed Program
- Mobile App
- Personal Conference Scheduler
- And now... Interactive Session Signs!





SCHEDULE OF EVENTS - TUESDAY

MEETING INFORMATION

Function	Time	Venue	Room	Access*
Tuesday, February 18				
All-Conference Events				
Registration	7:00 a.m. to 5:30 p.m.	SDCC	Exhibit Hall A	O
TMS Help Desk	7:00 a.m. to 5:30 p.m.	SDCC	Exhibit Hall A	O
Technical Programming Support Desk	7:00 a.m. to 6:00 p.m.	SDCC	BR 6 Lobby	O
Presenters' Coffee	7:00 a.m. to 8:00 a.m.	SDCC	Sails Pavilion	R
TMS Foundation Booth	8:00 a.m. to 5:30 p.m.	SDCC	BR 6 Lobby	O
Technical Programming	8:30 a.m. to 5:30 p.m.	See Technical Program for complete schedule and locations		O
Poster Gallery	8:30 a.m. to 5:30 p.m.	SDCC	Sails Pavilion	O
Morning Break	9:50 a.m. to 10:30 a.m.	SDCC & MM		O
TMS Information Center	10:00 a.m. to 5:30 p.m.	SDCC	Exhibit Hall B1	O
Afternoon Break	3:30 p.m. to 4:10 p.m.	SDCC & MM		

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■ MM - Marriott Marquis Hotel & Marina
 BR - Ballroom

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 R - Restrictions Apply
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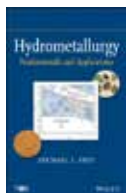
SPECIAL ANNOUNCEMENT - MEET THE AUTHORS

Tuesday, February 18, 2014 • 10:00 a.m. to 11:30 a.m.

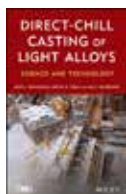
Wiley Booth, San Diego Convention Center, San Diego, California

Join us at the Wiley Booth, located in the registration area of the San Diego Convention Center, on Tuesday morning and meet the authors of four of the latest publications from TMS and Wiley. This informal session will give you the opportunity to discuss these hot topic titles, and have your purchased copy signed by the authors. TMS Members will also be entitled to a 35% discount.

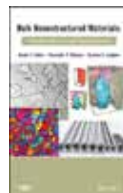
Featured titles:



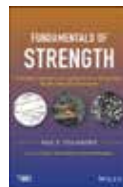
Hydrometallurgy: Fundamentals and Applications, by Michael L. Free
 ISBN 978-1-118-23077-0
 444 pages | November 2013



Direct-Chill Casting of Light Alloys: Science and Technology by John F. Grandfield, Dmitry G. Eskin, and Ian Bainbridge
 ISBN 978-1-118-02265-8
 424 pages | November 2013



Bulk Nanostructured Materials: Fundamentals and Applications, by Ruslan Z. Valiev, Alexander P. Zhilyaev, and Terence G. Langdon
 ISBN 978-1-118-09540-9
 456 pages | December 2013



Fundamentals of Strength: Principles, Experiment, and Applications of an Internal State Variable Constitutive Formulation, by Paul S. Follansbee
 ISBN 978-1-118-41341-8
 518 pages | February 2014

Purchase copies of these and other books published through TMS and Wiley at the Wiley booth, where print proceedings from TMS2014 are also available for purchase. Editor Anita Lekhwani (alekhwan@wiley.com) will be available at the booth to discuss potential book ideas

WILEY

TMS

SCHEDULE OF EVENTS - TUESDAY



TMS2014 Exhibition

TMS 2014 Exhibition Hours	10:00 a.m. to 5:30 p.m.	SDCC	Exhibit Hall B1	O
COMIC-tanium! The Super Materials of the Superheroes (brought to you by the TMS Foundation)	10:00 a.m. to 5:30 p.m.	SDCC	Exhibit Hall B1	O
Lunch Concession Stand	noon to 2:00 p.m.	SDCC	Exhibit Hall B1	O
Happy Hour Reception	4:30 p.m. to 5:30 p.m.	SDCC	Exhibit Hall B1	O

Special Presentations

Manufacturing and Materials Innovation Keynote Session	8:30 a.m. to noon	SDCC	Room 6A	O
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Student Events

Technical Division Student Poster Contest "Best in Show" Judging	10:45 a.m. to 11:45 a.m.	SDCC	Sails Pavilion	O
Student Career Forum	2:30 p.m. to 4:30 p.m.	MM	Catalina	O

Social Functions

EPD/MPMD Luncheon	noon to 1:30 p.m.	MM	San Diego BR A	T2
Young Professional Tutorial Luncheon & Lecture	noon to 2:00 p.m.	MM	Coronado	T2
TMS-AIME Awards Reception	6:00 p.m. to 6:30 p.m.	SDCC	Bayside Lobby	O
TMS-AIME Awards Ceremony	6:30 p.m. to 7:45 p.m.	SDCC	Room 6A	O
TMS-AIME Awards Banquet	7:45 p.m. to 10:00 p.m.	SDCC	West Terrace	T2

Committee Meetings

Metallurgical and Materials Transactions B Board of Review	7:00 a.m. to 8:00 a.m.	MM	La Costa	I
Electronic Packaging & Interconnection Materials Committee	7:00 a.m. to 8:00 a.m.	MM	Leucadia	O
MPMD Council	7:00 a.m. to 9:00 a.m.	MM	Point Loma	I
Honors & Professional Recognition Committee	8:00 a.m. to 9:00 a.m.	MM	Dana Point	R
Young Professional Committee Meeting	8:15 a.m. to 9:45 a.m.	MM	San Diego BR A	O
SMD Council	noon to 2:00 p.m.	MM	Point Loma	I
Education Committee Meeting	12:30 p.m. to 2:00 p.m.	MM	Vista	O
Superalloy 718 & Derivatives Conference Organizing Committee	4:00 p.m. to 5:00 p.m.	MM	La Costa	R
Energy Committee	5:00 p.m. to 6:00 p.m.	MM	Laguna	O
Computational Materials Science & Engineering Committee	5:00 p.m. to 6:00 p.m.	MM	Leucadia	O
Titanium Committee	5:00 p.m. to 6:00 p.m.	MM	Point Loma	O
High Temperature Alloys Committee	5:00 p.m. to 6:30 p.m.	MM	La Costa	O
Shaping & Forming Committee	5:00 p.m. to 7:00 p.m.	MM	Malibu	O
Corrosion & Environmental Effects Committee	5:30 p.m. to 6:30 p.m.	MM	Balboa	O
Refractory Metals Committee	5:30 p.m. to 6:30 p.m.	MM	Carlsbad	O

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SCHEDULE OF EVENTS - WEDNESDAY

MEETING INFORMATION

Function	Time	Venue	Room	Access*
Wednesday, February 19				
All-Conference Events				
Registration	7:00 a.m. to 5:00 p.m.	SDCC	Exhibit Hall A	O
TMS Help Desk	7:00 a.m. to 5:00 p.m.	SDCC	Exhibit Hall A	O
Technical Programming Support Desk	7:00 a.m. to 6:00 p.m.	SDCC	BR 6 Lobby	O
Presenters' Coffee	7:00 a.m. to 8:00 a.m.	SDCC	Sails Pavilion	R
TMS Foundation Booth	8:00 a.m. to noon	SDCC	BR 6 Lobby	O
Technical Programming	8:30 a.m. to 5:30 p.m.	See Technical Program for complete schedule and locations		O
Poster Gallery	8:30 a.m. to noon	SDCC	Sails Pavilion	O
TMS Information Center	9:00 a.m. to 1:00 p.m.	SDCC	Exhibit Hall B1	O
Morning Break	9:50 a.m. to 10:30 a.m.	SDCC & MM		O
General, Symposium, Student, and Young Professional Poster Session - Tear Down	noon to 5:00 p.m.	SDCC	Sails Pavilion	R
Afternoon Break	3:30 p.m. to 4:10 p.m.	SDCC & MM		

TMS2014 Exhibition				
TMS 2014 Exhibition Hours	9:00 a.m. to 1:00 p.m.	SDCC	Exhibit Hall B1	O
COMIC-tanium! The Super Materials of the Superheroes (brought to you by the TMS Foundation)	9:00 a.m. to 1:00 p.m.	SDCC	Exhibit Hall B1	O

Special Presentations				
Project Azorian and Screening of Azorian: The Raising of the K-129	2:00 p.m. to 5:30 p.m.	SDCC	Room 6A	O

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AZORIAN

The Raising of K-129

In 1968 the Soviet ballistic missile submarine K-129 sank in the Central North Pacific. American intelligence located it within weeks of its demise. The CIA crafted a secret program to raise the submarine in 1974. Now, the whole story can be told, by the men who made it happen. This documentary includes never-before-seen footage of the actual salvage attempt and new evidence of the project's successes and failures.

Showing Wednesday, February 19 • 2:00 p.m.
 San Diego Convention Center – 6A

SCHEDULE OF EVENTS - WEDNESDAY



Social Functions

LMD Luncheon	noon to 1:30 p.m.	MM	Temecula	T2
SMD Luncheon: The Project AZORIAN Senior Project – Combining History, Politics and Metallurgy	noon to 1:30 p.m.	SDCC	Room 6A	T2

Committee Meetings

TMS Board of Directors Meeting	8:00 a.m. to 11:30 a.m.	MM	Point Loma	I
Graduate Student Advisory Council	9:00 a.m. to 10:00 a.m.	MM	Leucadia	O
Pan American Materials Conference Committee	1:00 p.m. to 2:00 p.m.	MM	Point Loma	R
TMS Foundation Board of Trustees	2:30 p.m. to 4:30 p.m.	MM	Laguna	R
IOC Meeting of Copper 2016	5:00 p.m. to 7:00 p.m.	MM	Encinitas	R

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Download the TMS2014 Mobile Application

to create a personalized schedule of meeting events. Available through Apple iTunes and Google Play. Just search for "TMS Annual Meeting."



COMIC-TANIUM!

THE SUPER MATERIALS OF THE SUPERHEROES



The COMIC-tanium exhibit is in Booth #124.

This museum-quality retrospective was developed as a fun, interactive, educational experience—of interest to anyone who has ever read a comic book, watched a superhero movie, or wondered at the possibilities of materials technology. COMIC-tanium is a traveling exhibit that debuts at TMS2014. Later, it will tour the country, bringing real-life minerals, metals, and materials science and engineering to the public in a fun and interesting way. The exhibit is a major outreach initiative of the TMS Foundation and the Toonseum of Pittsburgh.

Get more information at www.tms.org/foundation/comictanium.aspx.



COMIC-tanium for Kids

Children of attendees are invited to visit the COMIC-tanium exhibit on Wednesday, February 19, from 9:00 a.m. to 1:00 p.m.





SCHEDULE OF EVENTS - THURSDAY

Function	Time	Venue	Room	Access*
Thursday, February 20				
All-Conference Events				
Registration	7:00 a.m. to 5:00 p.m.	SDCC	Exhibit Hall A	O
Technical Programming Support Desk	7:00 a.m. to 5:00 p.m.	SDCC	BR 6 Lobby	O
Presenters' Coffee	7:00 a.m. to 8:00 a.m.	SDCC	Sails Pavilion	R
Technical Programming	8:30 a.m. to 5:30 p.m.	See Technical Program for complete schedule and locations		O
Morning Break	9:50 a.m. to 10:30 a.m.	SDCC & MM		O
Afternoon Break	3:30 p.m. to 4:10 p.m.	SDCC & MM		O
Social Functions				
Quantum Design Manufacturing Facility Tour	10:00 a.m. to noon	Offsite	Departs from SDCC	T1

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**The right partner.
 The right chemical technologies.
 At just the right time.**

The Right Balance of Performance and Possibilities

As the premier advanced chemicals partner for the Alumina industry, Cytec specializes in producing products with the breadth and depth to advance all stages in the Bayer Process. Our MAX HT[®] scale inhibitor, a revolutionary product that eliminates sodalite scale from heat exchangers, recently received the Environmental Protection Agency's Presidential Green Chemistry award. Our rich and time-tested product portfolio includes:

- CYFLOC[™] HX flocculants giving superior red mud clarification
- AERODRI[®] for improved de-liquoring of calciner feed
- CYBREAK[®] defoamers for foam suppression in Bayer liquors
- CYQUEST[®] crystal growth modifiers (CGM) for enhancing agglomeration hydrate particles
- MAX HT[®] sodalite scale inhibitor

Combined with Cytec's unmatched R&D capabilities and world-class application expertise, we continue Delivering Technology Beyond our Customers' Imagination[™] and encourage and enable the right level of performance. To learn more about how the premier supplier of mining specialty chemicals breaks down the barriers of what is possible today and unlocks new possibilities for tomorrow, visit <http://www.cytec.com/businesses/in-process-separation/mining-chemicals>

CYTEC

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JOIN IN THE EXCITEMENT OF THE REVITALIZED

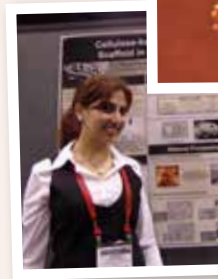
TMS FOUNDATION

TMS Foundation Special Drawing for an iPad Air, Walt Disney World Tickets for TMS2015, and More

Learn about the programs the TMS Foundation funds, make a contribution or pledge, and/or enter a drawing to win an **iPad Air**, a pair of one-day **Walt Disney World passes** for use at the TMS 2015 Annual Meeting and Exhibition, a free **TMS 2015 membership renewal**, or **Walt Disney Lithograph Artwork**. Drop your ticket found in your registration badge in one of our three locations.

The prize drawings will be held Wednesday, February 19, at 12:30 p.m. at the **TMS Information Center (Booth #118)**.

You do not have to be present to win. Also, it is not necessary to donate to enter the raffle, but **a donation or pledge to the TMS Foundation would be very much appreciated** to assist the TMS Foundation as it continues and expands its efforts to nurture students and young professionals. Note that pledges and cash or check donations can be made at the TMS2014 Help Desk, the TMS Information Center, and the TMS Foundation Booth. Credit card donations can only be made at the TMS2014 Help Desk.



About The TMS Foundation

By funding student scholarships, programs for young professionals and education initiatives, the TMS Foundation prepares the future leaders of the global minerals, metals, and materials science and engineering community. When you contribute to the TMS Foundation, you are supporting these future leaders at every step of their education and professional development, ensuring a bright future for the minerals, metals, and materials disciplines.

Foundation-funded programs include:

- Student Scholarships
- Young Professionals Programs
- Awards
- Student Travel Grants
- Special Projects

Visit the TMS Foundation in one of three locations:

- **TMS2014 Help Desk near Registration**
- **TMS Information Center (Booth #118) in the Exhibit Hall**
- **TMS Foundation Booth near the technical programming sessions area.**

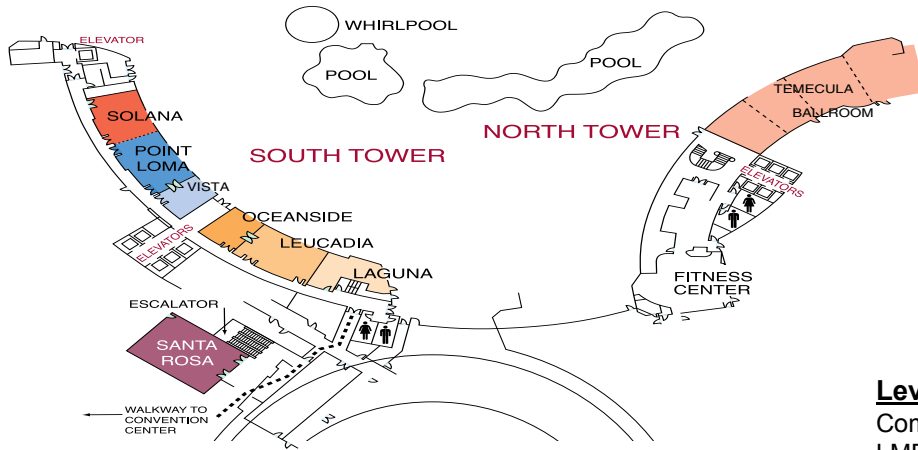


MAP & FLOORPLAN OF MARRIOTT MARQUIS MARINA



**Marriott
MARQUIS
SAN DIEGO MARINA**

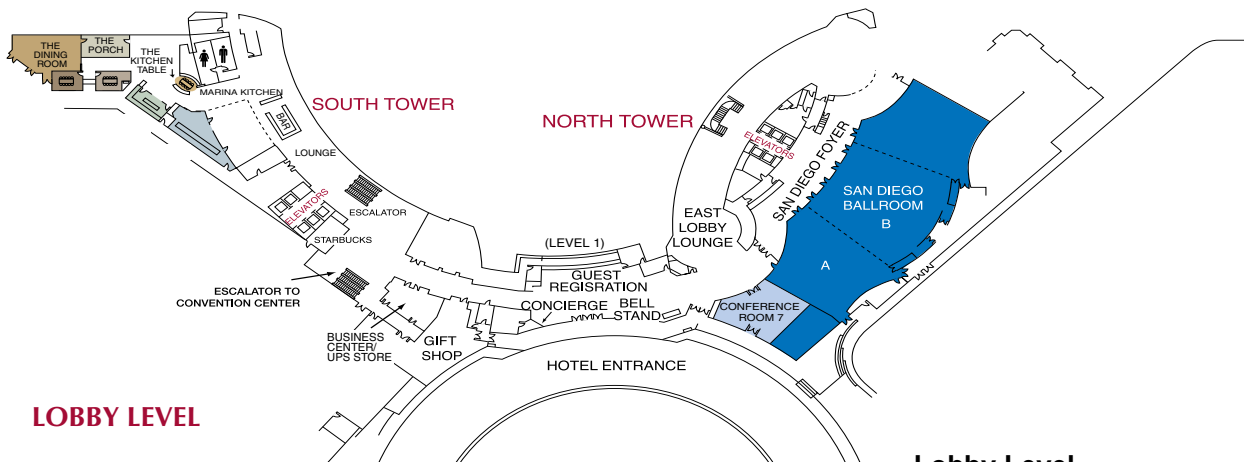
LEVEL 1



Level 1

Committee and Business Meetings
LMD Luncheon

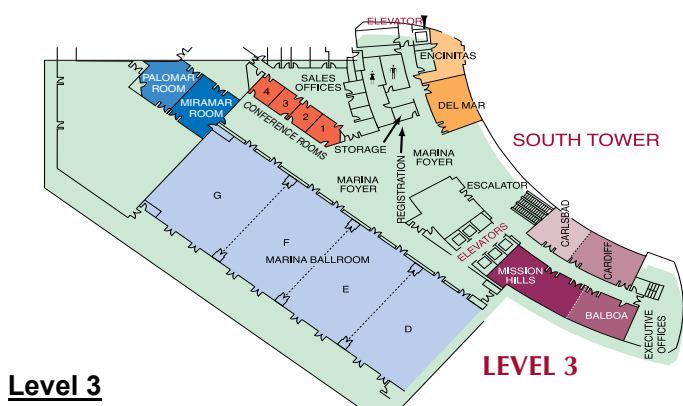
MEETING INFORMATION



LOBBY LEVEL

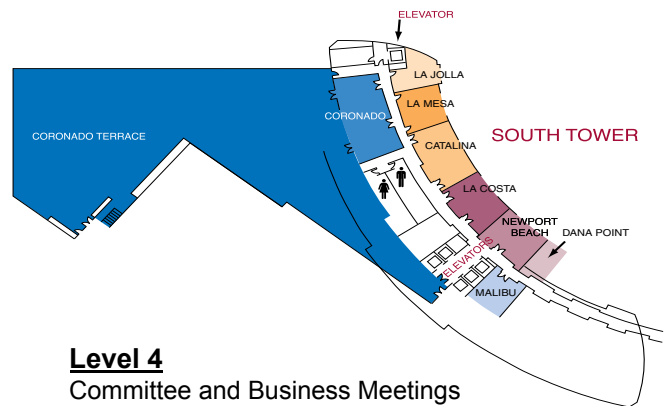
Lobby Level

Fellows and Invited Guests Reception
Women in Science Breakfast
Speed Networking Event
EPD/EMPMD Luncheon



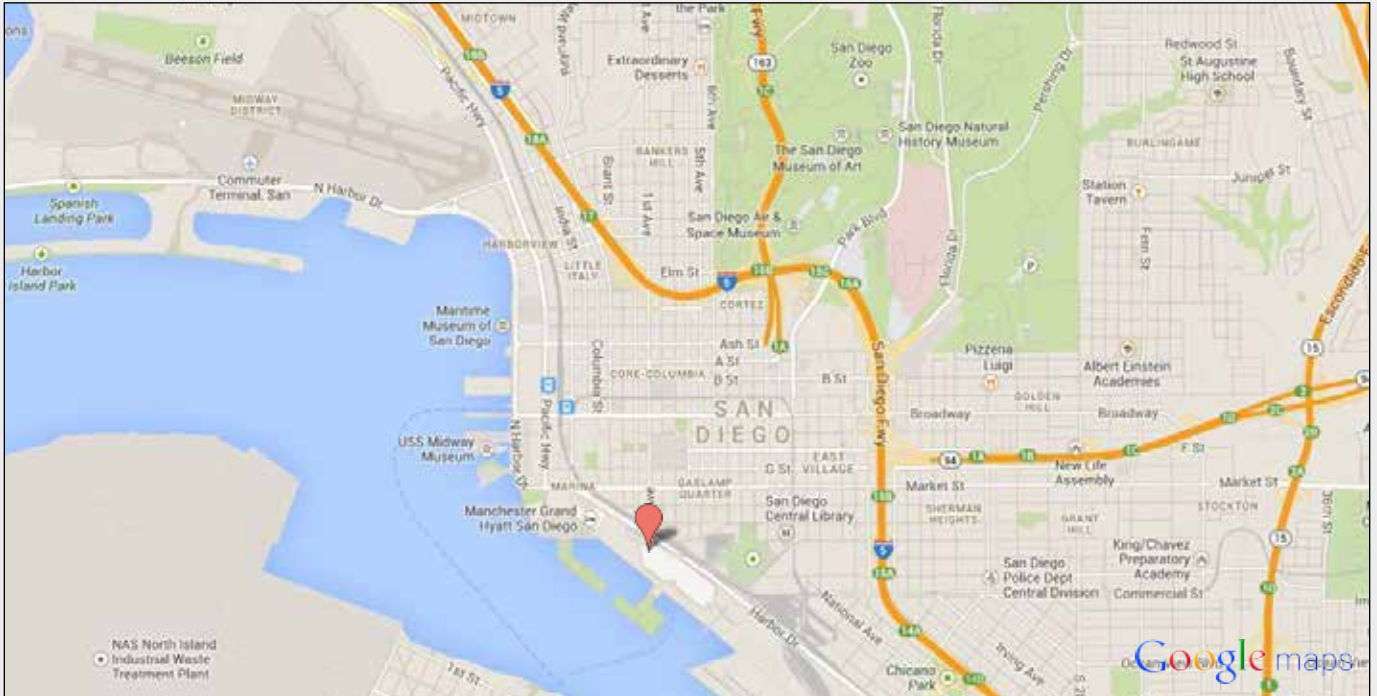
Level 3


LEVEL 3



Level 4

Committee and Business Meetings



 : San Diego Convention Center/ Marriott Marquis, San Diego Marina

ARMORTECH

Aluminum contact technology just got better

Harbison-Walker Refractories Company unveils the next generation in monolithic refractory technology for aluminum contact applications. Check out the ARMORTECH family of products which include:

- ◆ **Ultimate resistance to molten aluminum penetration**
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Harbison-Walker Refractories - A full line supplier of refractory materials for primary and secondary aluminum Brick and monolithic solutions - dense, lightweight, aluminum-resistant, specialty materials

Visit - www.hwr.com

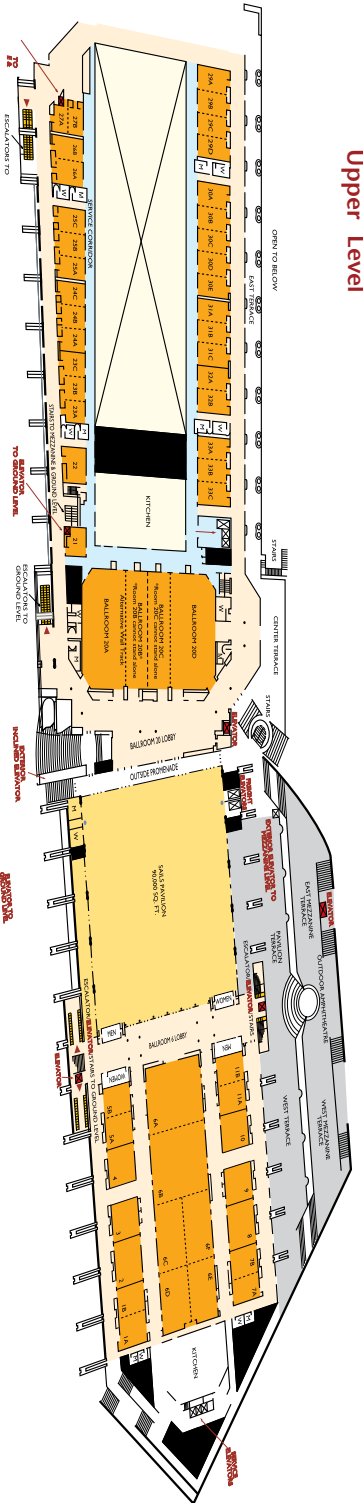
Mail - aluminum@hwr.com

Harbison-Walker Refractories Co.

AP Green, Harbison-Walker and NARCO are part of the ANH Refractories Family of Companies

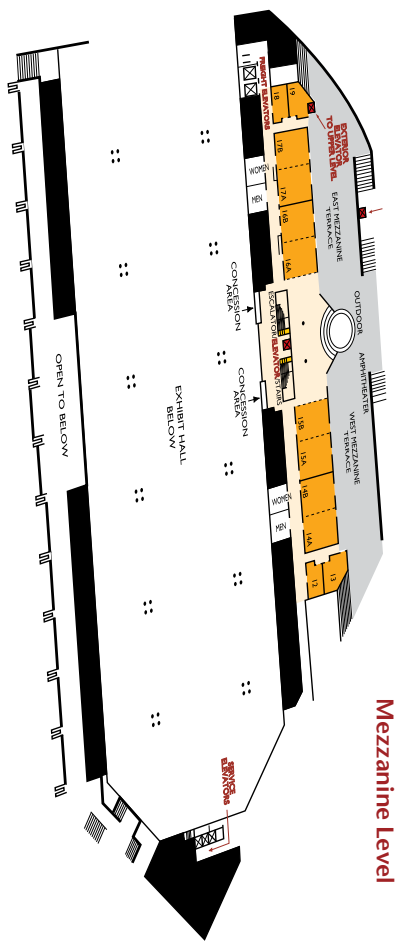


Upper Level



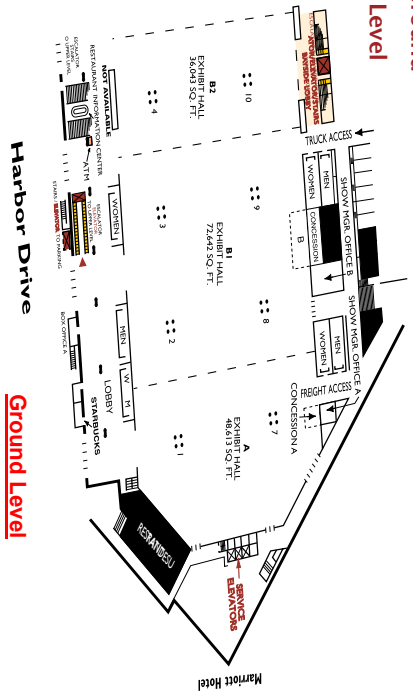
- Upper Level**
- Programming Support Desk
- Foundation Booth
- Presenters' Coffee
- Poster Sessions
- Keynote Presentations & Sessions
- Technical Programming Sessions

Mezzanine Level



- Mezzanine Level**
- Materials Bowl Competition
- Meeting of the Membership
- Student Networking Mixer
- Technical Programming Sessions

Ground Level



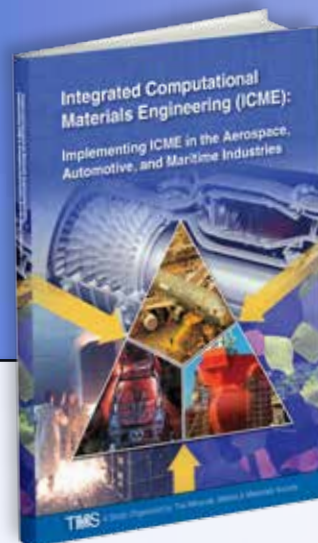
- Ground Level**
- TMS 2014 Registration
- TMS2014 Exhibition
- TMS Information Center
- TMS Help Desk
- Comic-tantium!

MAP & FLOORPLAN OF SAN DIEGO CONVENTION CENTER

MEETING INFORMATION



Find Out How to Accelerate the Development of Advanced Materials



Pick up a FREE hard copy of:

Integrated Computational Materials Engineering (ICME)

Implementing ICME in the Aerospace, Automotive, and Maritime Industries

at the **TMS Information Center (Booth #118)** in the **Exhibit Hall**

Integrated Computational Materials Engineering (ICME): Implementing ICME in the Aerospace, Automotive, and Maritime Industries is the groundbreaking study, organized by TMS, that puts practical guidance at your fingertips for implementing an ICME-Accelerated Product Development Program within three years. This resource compiles the insights, knowledge, and experience of nearly 50 recognized technical experts in ICME and its allied fields, while also building on the broad recommendations of the 2008 U.S. National Academies report that first defined ICME as a new sub-discipline in materials science with enormous power to revolutionize materials-intensive product development cycles.

Report Highlights

- Definition and description of the ***fundamental building blocks needed to implement an ICME-Accelerated Product Development Program within three years*** for the automotive, aerospace, and maritime sectors, but portable to other industries as well.
- ***Frameworks that include flow diagrams and extensive tables*** detailing: necessary actions throughout the product development cycle; entry and exit points of the ICME portions of the cycle; suggestions for computational models and tools to use at various steps; necessary skill sets and personnel; and key decision points.
- ***In-depth recommendations for addressing ICME implementation issues that cut across all industrial sectors.*** These include building a business case for ICME, effectively integrating design into the manufacturing and materials development process, and issues related to verification and validation.
- ***Identification of more than 50 near-term application opportunities*** for implementing ICME in the aerospace, automotive, and maritime industries.

Who Should Read the Report?

The report is useful for a broad variety of stakeholders within and beyond the materials community:

- Professionals and leaders in the aerospace, automotive, and maritime industries.
- Professionals in other materials-intensive industries.
- University professors, researchers, students, and higher-level managers.
- Government scientists and engineers, program officers, and policy makers.

* Sponsored by the U.S. Department of Defense, the U.S. Department of Energy, and the U.S. National Science Foundation, this project also strongly supports the U.S. Materials Genome Initiative's (MGI) goals to accelerate the discovery and deployment of new products and increase global competitiveness.

TMS

For additional information and to download the free report, go to www.tms.org/ICMEstudy

Aluminum Keynote Session

Innovation in the Aluminum Industry
Supply Chain: How Will We Move
On to the Next S Curve?

Monday, February 17 • 8:30 a.m. to Noon
San Diego Convention Center – Room 6A

Over several decades, research and development within the aluminum industry has been constrained by factors such as cost cutting and “rationalization” following company mergers and take-overs. This leads to a question: *How will the industry support the work required to move on to the next innovation S curve? In other words, how do we get to the critical mass of R&D required to achieve breakthroughs that will lift industry environmental and energy-efficiency performance to maximize future growth potential?* Relevant issues include: *What work is needed? Who will do it? What are the possible funding models? What are the roles for international cooperation and government facilitation?*

In this keynote session, senior speakers from industry and academia will:

- explore these topics from the perspective of smelting and alumina production
- look at the role of external research providers
- present a case study from one integrated aluminum company
- look at innovation in the industry from a North American perspective
- examine innovation within the broader mining industry.

The presentations will be followed by a panel discussion. Chair: **Barry Sadler**, Net Carbon Consulting Pty Ltd

SPEAKERS AND TOPICS



Barry Welch, Universities of New South Wales (Australia) & Auckland (New Zealand)

“Focus Areas and Possible Options for Aluminum Smelter Performance Enhancement”

This provocative presentation will highlight how the emphasis on good smelting technology

fundamentals has declined, yet numerous opportunities exist for economic and performance enhancements. Speculative examples will be promoted for addressing the energy and operating inefficiencies that persist in smelting. After 80 years of research, there is no

alternative process for aluminum production other than electrowinning with a carbon anode in a molten fluoride electrolyte, so this is where this presentation will be focused.

Over the last 60 years or so, the aluminum smelting industry has moved from largely fully vertically integrated companies (i.e. bauxite mining to semi-finished products) to the much more stand-alone industry we have today. Due to a number of diverse factors, such as the dependency of independent smelters on purchased technology, this has diminished the “pool” for developing innovative ideas. Progress in technology development became retarded by a “copy and paste” syndrome. This has led to an inward thinking industry that has not looked “over-the-fence” to the advances made in other industries that have the potential for application in large modern smelters.

The scientific understanding of smelting principles has reached such a low that the industry does not even correctly define what an anode effect is. While computer modeling is widely used to refine cell designs, it has significant limitations such as the use of simplified background equations that are based on data developed for quite different electrolytes, cell designs and operating conditions to those now used. Little attempt has been made to bridge the gap between business units especially since short term financial performance carries higher rewards for management as compared with longer-term, process wide improvements. But needs and solutions are there if the industry opens its eyes and appreciates the long-term benefits of further research and development.

Gerald I.D. Roach, Alcoa World Alumina Australia “Further Innovation in the Bayer Process – Is This a Reality or a Pipe Dream?”

Over the last century, the rapid growth in aluminum demand has seen the Bayer process, used to produce smelter-grade alumina, increase in both output and efficiency. Innovation within the Bayer process related to equipment (e.g. fluidized bed calciners), yield, solid/liquor separation techniques, energy reduction, as well as making the process essentially a continuous operation, has resulted in a major reduction in operating costs and often (but not always) capital cost. There have been similar major improvements in safety and the environmental footprint. With such a mature process, the expectation might well be that the top of the S curve has been reached in many of the various unit operations, and the overall process, such that there is not much more room for improvement or innovation.

The presentation will review improvements within the Bayer Industry and look at whether there is potential for really significant innovation to move the Bayer Process on to a new S curve. In particular, a major factor in the cost of alumina production (both capital and operating cost) is the smelting processes' product quality requirements. In order to move forward and identify, and then develop, new innovations it is important that these innovations can be shown to be implementable processes. That requires significant process input and continual close cooperation between industry and academia or the relevant research organization (even between the refinery and their own research group) to ensure the project does not stray from its primary goal. It is important to develop a model for such cooperative work to ensure that there is a win/win scenario for all parties as often views of what constitutes a successful project, and expectations from the project, can be markedly different.



Mark P. Taylor, University of Auckland
“The Role of External Research Groups in Aluminum Industry Innovation”

How can teams in external research labs, removed from production environments, become involved in innovation? The knowledge and skills of specialist teams in a field like aluminum production must be valuable to smelters. But how can these groups participate as and when stimuli for change are experienced at smelters?

This talk addresses these questions with real examples from the last decade, and some thoughts about the innovations needed next, as well as, how they can be accelerated.



Martin Segatz, Hydro Aluminium Deutschland GmbH
“Hydro’s Innovation Engine - From Idea to Business”

This presentation will look at how Hydro’s aspiration to become technology leader in key areas of its vertically integrated aluminum business has been the driving force to establish a durable network of intense cooperative research relationships with preferred academic and industrial partners. A focus on business-critical development needs like energy efficiency in primary metal or new product development opportunities in the Rolled Product sector, have allowed Hydro to maximize the effect of its R&D efforts, creating business value

and opportunities. A systematic approach to innovation management and well-defined internal development processes have resulted in major technology and business achievements. By professionally managing contracts and IP, Hydro has been able to cooperate successfully and efficiently with research and funding partners even in key areas of core technology and thus extend its own capabilities significantly. The potential for the wider application of Hydro’s approach within the industry will also be discussed.



Alton Tabereaux, Alcoa (retired)
“Innovation in the North American Aluminum Industry”

In 2013, Alcoa celebrated its 125-year anniversary of the company started by its innovative legacy of founders Charles Martin Hall and Alfred Hunt. This presentation will look at the innovations and evolution of aluminum smelting technology in North America since that creation with an emphasis of the impact of corporate and government R&D programs on the process. Specific examples of R&D work within the North American aluminum smelting industry will be looked at, including the inert anode, carbothermic reduction, new metal product development, and large-scale cell development.



Geoff Bearn, Rio Tinto Technology and Innovation
“Innovation in Mining – Rio Tinto’s Mine of the Future™ Program”

The mining industry faces growing challenges to meet the increasing demand for metals and minerals, driven largely by industrialization and urbanization in the emerging world. Today, quality mineral deposits are harder to find, are often remotely located and tend to be of lower ore grade. Step change innovation is required to maintain competitive advantage in the face of rising costs and declining productivity. Rio Tinto’s Mine of the Future™ program aims to create value by finding better ways to mine through new technologies. Challenges for the mining industry and Rio Tinto’s innovation initiatives are discussed, while reflecting upon some experiences in the aluminum industry.



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TMS2014

Keynote Session

World Views on Materials and Manufacturing Innovation: Regional Perspectives from Government Organizations

SESSION SPOTLIGHT

The session will close with an interactive, moderated panel discussion immediately following the individual presentations, in which the audience will be provided the opportunity to ask questions of the keynote speaker panel.

Tuesday, February 18 • 8:30 a.m. to 12:50 p.m.
San Diego Convention Center – Room 6A

PROGRAM ORGANIZERS

Charles Ward, Air Force Research Laboratory
Hani Henein, University of Alberta

SPONSORED BY

TMS Materials Innovation Committee

Combining recent emphasis on manufacturing advances and acceleration of materials innovations, this special keynote session will focus on the current state of the art and future international landscape of *integrated materials and manufacturing innovations*. In particular, it will examine regional perspectives from leading government organizations around the world. Esteemed speakers will present overviews of their current activity areas, as well as previews of what is on the horizon for materials science and engineering innovations, especially as they relate to manufacturing.

KEYNOTE SPEAKERS WILL INCLUDE:

- **Cathy Foley**, Chief of CSIRO Materials Science and Engineering Division, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia
- **Han Dong**, Vice Chief Engineer of China Iron & Steel Research Institute Group (CISRI Group), Vice President of Central Iron & Steel Research Institute (CISRI), Director of National Engineering Research Center of Advanced Steel Technology (NERCAST), China
- **G. Sundararajan**, Director, ARCI, Hyderabad & Professor, IIT Madras, India
- **Yoshio Akimune**, General Manager Technical Planning Division Innovative Structural Materials Association, Japan
- **Laurie Locascio**, Director, Material Measurement Laboratory, The National Institute of Standards and Technology (NIST), USA

SAVE THE DATES!

Mark your calendars now for these upcoming annual meetings with TMS:

TMS Annual Meeting & Exhibition

2015	Orlando, Florida	March 15-19	Swan & Dolphin Hotels, Walt Disney World
2016	Nashville, Tennessee	February 14-18	Music City Center
2017	San Diego, California	February 26-March 2	San Diego Convention Center
2018	Phoenix, Arizona	March 11-15	Phoenix Convention Center
2019	San Antonio, Texas	March 10-14	Henry B. Gonzalez Convention Center
2020	San Diego, California	February 23-27	San Diego Convention Center

Materials Science & Technology (MS&T)

2014	Pittsburgh, Pennsylvania	October 12-16	David L. Lawrence Convention Center
2015	Columbus, OH	October 4-8	Greater Columbus Convention Center
2016	Salt Lake City, UT	October 24-27	Salt Palace Convention Center





HONORARY SYMPOSIA

A Lifetime of Experience with Titanium Alloys: A Structural Materials Division Symposium in Honor of Jim Williams, Mike Loretto and Rod Boyer

Monday, February 17 to Thursday, February 20
San Diego Convention Center – Room 1A



The successful and widespread industrial use of titanium alloys may be traced in large part to the significant contributions these three gentlemen have made to the field of titanium metallurgy. Their careers spanned several decades in academia and industry where they served as mentors, organizers, advisors, managers, distinguished fellows, directors, and presidents. The first talk of each morning in this three-day, six-session symposium will feature an invited speaker highlighting the lifetime and achievements of each honoree.

Celebrating the Megascale: An Extraction & Processing Division Symposium in Honor of David G.C. Robertson

Monday, February 17 to Thursday, February 20
San Diego Convention Center – Room 16A

(Room 3 and 16A will be used for Thursday afternoon sessions)



At a time when maintaining metals production is increasingly important to modern society, producers face the challenge of remaining profitable within an unpredictable global economy, while minimizing environmental impact and energy consumption. Economies of scale are becoming increasingly important

in this setting, leading to larger and larger plants – some reaching the megascale – and requiring the support of highly skilled professionals. Professor David G.C. Robertson has devoted his career to the education of highly skilled metallurgical professionals and to the engineering of all types and sizes of metallurgical processes, particularly those involving molten metals. His research has focused on transport phenomena of smelting, refining, and solidification processes, particularly mass transfer, kinetics, and fluid dynamics.

Robertson Honorary Dinner

Monday, February 17, 6:00 p.m. to 9:00 p.m.

Cost: \$130

(tickets will be available for purchase until Monday at noon)

Held in conjunction with the “Celebrating the Megascale: An Extraction & Processing Division Symposium in Honor of David G.C. Robertson,” this event will honor the career and contributions to the field of extraction and processing technology (specifically pyrometallurgy) of David Robertson. Join us for a social, three-hour dinner cruise.

The evening’s itinerary will be as follows:

Boarding at Marriott Marina - 5:45 p.m. to 6:00 p.m.

Social and Dinner - 6:00 p.m. to 8:45 p.m.

Dock and Disembark at Marriott Marina

8:45 p.m. to 9:00 p.m.

Dynamic Behavior of Materials VI – A Structural Materials Division Symposium in Honor of Professor Marc Meyers

Monday, February 17 to Thursday, February 20
San Diego Convention Center – Room 3



The dynamic behavior of materials encompasses a broad range of phenomena associated with extreme environment and with relevance to technological applications in military and civilian sectors. The field of dynamic behavior of materials comprises diverse phenomena such as deformation, fracture,

fragmentation, shear localization, damage dissipation, chemical reactions under extreme conditions, and processing (combustion synthesis; shock compaction; explosive welding and fabrication; shock and shear synthesis of novel materials). It has evolved considerably in the past twenty years and is now at a stage where its significance to all classes of materials including metals, ceramics, polymers, and composites is becoming relevant.

TMS2015

It’s not too soon to plan for next year. The TMS 2015 Annual Meeting & Exhibition will be held March 15–19, 2015 in Orlando, FL. Please visit the Travel Planners Booth in Hall A to book your hotel for 2015.

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HONORARY SYMPOSIA

Progress towards Rational Materials Design in the Three Decades Since the Invention of the Embedded Atom Method: A Materials Processing & Manufacturing Division Symposium in Honor of Michael I. Baskes

Monday, February 17 to Wednesday, February 19
San Diego Convention Center – Room 30E



This symposium will honor the remarkable contributions of Michael I. Baskes to the field of computational materials science. Along his career Baskes has pioneered the theoretical and numerical development of models of materials behavior, with emphasis on the role played by atomistic defects on the anisotropic

behavior of engineering materials. His many contributions have been critical to establishing a strong connection between models and experiments, and to bridging different scales in the pursuit of robust multiscale models with experimental integration.

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TMS membership is a career investment. By attending TMS2014, you are joining a prestigious network of 12,000 scientists and engineers in the minerals, metals, and materials communities.

The Value of TMS Membership

TMS members receive access to more than \$2,000 worth of exclusive, members-only benefits designed to expand your professional horizons.

Stop by the TMS Information Center in the Exhibit Hall to learn how to make the most of your TMS membership in 2014.

MEETING INFORMATION



TECHNICAL TOUR

QUANTUM DESIGN TOUR

Thursday, February 20 • 10:00 a.m. to Noon
Departs from San Diego Convention Center
COST: \$25

During this one-hour tour, visitors will see Quantum Design's manufacturing and testing facilities, applications laboratory, and newly completed, whole-building, high-pressure helium recovery and liquefaction system. Wear closed-toe shoes, please.

ABOUT QUANTUM DESIGN

Founded in 1982, Quantum Design is a privately held corporation that develops and markets automated temperature and magnetic field testing platforms for materials characterization. These systems offer a variety of measurement capabilities and are in widespread use in the fields of physics, chemistry, biotechnology, materials science, and nanotechnology. A broad product line allows Quantum Design to address the scientific and operational requirements of researchers around the world. For more information, visit www.qdusa.com.





MONDAY

2014 William Hume-Rothery Award Lecture

Monday, February 17 • 8:30 a.m. to 9:10 a.m.

San Diego Convention Center – Room 6C



Rainer Schmid-Fetzer, Clausthal University of Technology

Lecture Title: “Phase Diagrams - The Beginning of Wisdom”

About the Topic: “Phase diagrams are the beginning of wisdom - not the end of it”. This famous quotation coined by Sir William Hume-Rothery

has guided the author’s materials research for many years. The main part of this presentation aims at an audience with no prior exposure to phase diagrams and all those interested in “my way” of concisely teaching “How to Read and Apply Phase Diagrams.” Starting from the very basics of phase diagrams and phase equilibria we will go through reading unary, binary and ternary phase diagrams, including liquidus projections, metastable phase diagrams and useful choices of state variables in phase diagrams. Thermodynamic simulation of Equilibrium versus Scheil solidification is also covered and the path from initial off-equilibrium state towards equilibrium is emphasized. Applications demonstrated include alloy solidification, heat treatment and soldering. An example “beyond” phase diagrams is given by the competition between thermodynamic and nucleation barrier for secondary phase selection.

Institute of Metals/Robert Franklin Mehl Award

Monday, February 17 • 8:30 a.m. to 9:10 a.m.

Marriott Marquis and Marina – Marina Ballroom E



Jagdish Narayan, North Carolina State University

Lecture Title: “Frontiers in Thin Film Epitaxy and Novel Nanostructured Materials”

About the Topic: This talk focuses on designing and processing of novel nanostructured materials

of controlled size and orientation, and defects and interfaces. Thin film growth modes can be precisely controlled to produce zero-, one-, two-, and three-dimensional nanostructures. The orientation control requires epitaxy across the misfit scale which is achieved by the paradigm of domain matching epitaxy. The DME paradigm emphasizes the matching integral multiples of lattice planes across the film-substrate interface, where

domains are separated by dislocations and the misfit in between the integral multiples is accommodated by the principle of domain variation. This talk emphasizes on two-dimensional pseudomorphic metamaterials where the chemical composition is controlled by growth parameters and the structure is determined by the structure of the substrate which provides a template for thin film growth. The thickness (1-5 monolayers) can be controlled manipulating strain and internal thermodynamic free energy.

Extraction & Processing Division Distinguished Lecturer

Monday, February 17 • 8:40 a.m. to 9:20 p.m

San Diego Convention Center – Room 16B



Brajendra Mishra, Colorado School of Mines

Lecture Title: “How Critical is Recycling for Critical Materials’ Sustainability?”

About the Topic: Rare earths metals, including yttrium and scandium, are being increasingly

used in clean energy technologies, colored phosphors, lasers and high intensity magnets. There are important defense applications such as fighter jet engines, missile guidance systems and space based satellite and communication systems based on these metals. The commitment to clean energy technologies by governments and the projected growth in power and transportation sectors across the globe ensure that the demand for rare earth metals and compounds would continue to escalate. This demand implies that, to ensure unhindered technological innovation, it is essential to possess secure supply chains for rare earth elements. Therefore, rare earth metals are not rare but critical. The United States continues to be one of the largest consumers and importer of rare earths and the trend is expected to continue as the demand increases. In order to ensure secure rare earth supply and attenuate supply-demand imbalance post 2014, it is not only necessary to encourage and support exploration of newer reserves, build a rare earth stockpile, but it is also of utmost importance to look at opportunities to recycle and reuse Rare Earth Elements from secondary sources, such as post-consumer and manufacturing process wastes. This discourse will describe the technological developments made to convert these valuable resources into functional manufactured materials for lighting industry, automotive and petroleum refining catalysts, and high density permanent magnets.





SPECIAL LECTURES

Why Scientists Are Needed In Policy Making: A Face-to-Face with Congressional Fellows

Monday, February 17 • 3:30 p.m. – 4:30 p.m.

TMS Information Center – Booth #118 Hall B1



Megan Brewster

2013-2014 TMS-MRS Congressional Science and Engineering Fellow
United States Senate Committee on Energy and Natural Resources Fellow



Ed Herderick

Director of R&D
Rapid Prototype + Manufacturing (rp+m)
Chair, Public & Governmental Affairs Committee
2009-2010 TMS-MRS-ACerS Congressional Science and Engineering Fellow

About the Event

Meet with TMS/MRS Congressional Science and Engineering Fellows past and present. This year's fellow, Megan Brewster, and past fellow Edward Herderick will discuss why policy often requires scientific knowledge to be effective. They will share their experiences of being at the interface between technology, policy, and application in Washington, D.C. and discuss why a Congressional Fellowship is an important consideration for your career path. Following their presentations, ample opportunity will be available for discussion, questions, and answers.

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Dr. Ali H A M Al Zarouni

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SPECIAL LECTURES

TUESDAY

Extraction & Processing Division/Materials Processing & Manufacturing Division Joint Luncheon Lecture

Tuesday, February 18 • Noon to 1:30 p.m.
Marriott Marquis and Marina – San Diego Ballroom A



John Allison, University of Michigan

Lecture Title: “MGI and ICME - Here to Stay or Just ‘The Next Big Thing?’”

FOR YOUNG PROFESSIONALS

Young Professional Luncheon Lecture

Tuesday, February 18 * Noon to 2:00 p.m.
Marriott Marquis and Marina – Coronado



Daniel Gianola, Assistant Professor, University of Pennsylvania

Lecture Title: “Fostering International Interactions and Collaborations in Materials Science and Engineering”

About the Topic: Research and education in science and engineering have no boundaries. Despite geopolitical conflict and a diversity of global cultural influences, science and engineering transcends all and speaks a common language – progress that evolves the frontiers of knowledge and technology. A cultural shift is upon us that we would be remiss not to embrace – according to a recent National Academy of Sciences report, as of 2007, China became second only to the U.S. in the estimated number of people engaged in scientific and engineering research and development.

I propose to moderate a discussion on strategies – implemented from the laboratory to governmental policy – to promote rich, engaging, and longstanding global interactions in materials science and engineering. Topics to be discussed include (i) defeating parochial views to research and education, (ii) mechanisms (both present and future) for engagement in international activities, and (iii) opportunities for student exchange and promoting global citizenship in the next generation of scientists and engineers.



Michele Manuel, Assistant Professor, University of Florida

Lecture Title: “Back to Basics: Putting the ‘E’ back in MSE Through the Use of Design and Entrepreneurship”

About the Topic: Engineering has always provided the backbone and motivational driving force to pursue advancements in materials science. However, in the era of reducing credit hours and declining budgets, it has been difficult to maintain a high level of engineering content within the materials science and engineering (MSE) curriculum. Initiatives such as the Materials Genome and Integrated Computational Materials Engineering (ICME) has proven that science content can be tied to engineering skills in an efficient and streamlined manner without sacrificing quality of either ideology. This talk will focus on methods to overcome the gap created when science and engineering must merge together and showcase examples of successful pedagogical practices that illustrate the idea that integrating design and entrepreneurship further enhances and deepens a student’s understanding of scientific concepts and engineering-based critical thinking.

The Young Professional Luncheon Lecture is open to all meeting attendees; however, optional boxed lunches are available only to those who ordered in advance.

JIM SCHOLAR

Tuesday, February 18 • 3:55 p.m. to 4:15 p.m.
San Diego Convention Center - Room 19



Hiromichi T. Fujii, Tohoku University

Lecture Title: “Microstructure and Mechanical Properties in Dissimilar Joint between Al Alloy and Cu by Ultrasonic Welding”

About the Topic: Dissimilar joints between 1050 Al alloy and Cu were prepared by ultrasonic spot welding technique under various welding conditions to understand the characteristics of joints. Tensile shear strength of the joints increased with increasing the welding energy up to 0.3 kJ. The strength was saturated around 1.3 kN when the welding energy was applied more than 0.3 kJ. The joint welded with sufficiently high energy was fractured at base metal of Al alloy during tensile shear strength test. The interface microstructure in Al alloy consists of severely deformed region due to ultrasonic vibration. In addition, the fine and equiaxed



grains were observed near the joint interface in the specimens fractured at base metal. Moreover thin Al₂Cu intermetallic compound layer with the thickness of 40 nm was found to be formed at the joint interface in the specimens fractured at base metal.

WEDNESDAY

Vittorio de Nora Prize for Environmental Improvements in Metallurgical Industries

Wednesday, February 19 • 11:25 a.m. to 11:50 a.m.
San Diego Convention Center - Room 13



Abdalla Ahmed Al Zarouni, Manager, Technology Process Development, Dubai Aluminum Co. Ltd.

Lecture Title: "Reducing Greenhouse Gas Emissions during Aluminium Smelting through Development and Implementation

of Improved Control Strategies and Operational Practices"

About the Topic: It is well known that aluminium smelters are one of the main producers of the PFC emissions during smelting process. The PFC emissions are produced during a known event called anode effect. The aluminium industry has recognized this issue and worked on reducing PFC emissions levels over the past several years. At DUBAL, a lot of work has been done in this regard over the past several years which resulted in achieving low PFC emissions. This paper shows the approach taken to reduce PFC emissions, the work done to translate the fundamental understanding of the root causes into practical applications, and finally the changes made to the various systems and practices to cascade the knowledge and changes in the systems and practices to the potlines.

Light Metals Division Luncheon Lecture

Wednesday, February 19 • Noon to 1:30 p.m.
Marriott Marquis and Marina – Temecula



William Joost, U.S. Department of Energy

Lecture Title: "Connecting the Science and Engineering of Vehicle Weight Reduction"

Structural Materials Division Luncheon Lecture

Wednesday, February 19 • Noon to 5:30 p.m.
San Diego Convention Center – Room 6A



Gerhard Fuchs, University of Florida

Lecture Title: "The Project Azorian Senior Project – Combining History, Politics and Metallurgy"

About the Topic: In his luncheon lecture, Gerhard Fuchs of the University of Florida will expand on the popular August 2013 JOM article, "Cold War Thriller Brings Classroom Theory to Life." The focus of Fuchs's talk is Project Azorian, a real-life espionage tale of a lost Soviet nuclear submarine and one of the most ambitious covert engineering feats of the modern age, made even more complicated by a metallurgical failure. Immediately following the luncheon will be a special showing of the theatrical documentary, *Azorian: The Raising of the K-129*.

Fuchs's lecture and the documentary screening are open to all TMS2014 attendees. Advance tickets are required for a reserved table seating and catered lunch.

TMS is a member-driven society, so your volunteerism is what makes it work. Volunteering with TMS is a great way for you to broaden your technical interests, strengthen your resume, and give back to the profession. But don't take our word for it. Visit the TMS Information Center in Booth #118 in the Exhibit Hall for more information on opportunities to participate and grow the society.





NETWORKING, STUDENT, AND SOCIAL EVENTS

SUNDAY

TMS2014 Materials Bowl

Sunday, February 16

Elimination Rounds: **Noon to 4:00 p.m.**

Championship Round: **8:00 p.m. to 8:30 p.m.**

San Diego Convention Center – Room 14AB



Even if you aren't competing in this 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.

Meet the Candidate

Employment Poster Session

Sunday, February 16 • 6:30 p.m. to 7:45 p.m.

San Diego Convention Center – Room 12

Organized by the TMS Young Leaders Committee, this session allows potential employers to connect with young professionals seeking post-doctoral, full-time, or faculty positions. Candidates present posters on their qualifications and research interests to potential employers from universities, industries, and national labs. All meeting attendees are welcome at this session.

TMS Meeting of the Membership

Sunday, February 16 • 7:00 p.m. to 8:00 p.m.

San Diego Convention Center – Room 16AB

At this informal gathering, 2013 TMS President Elizabeth Holm will provide a brief overview of the society's major initiatives from the past year and a preview of the organization's future. Suveen Mathaudhu, Program Manager, U.S. Army Research Office, and the volunteer curator for COMIC-tanium, will then provide a look at how the scientific subtext underlying comic mythology and comic-inspired movies can be used to excite and educate the public about the impact of minerals, metals, and materials research and development on society. The TMS Foundation will also recognize the "materials superheroes" profiled in the COMIC-tanium exhibit.

Student Mixer

Sunday, February 16 • 8:30 p.m. to 10:30 p.m.

San Diego Convention Center – Room 15AB

This informal social event allows students to interact with each other and with professional members in a relaxed—and fun—setting. Refreshments are provided. Dancing is optional.

MONDAY

Women in Science Breakfast

Monday, February 17 • 7:00 a.m. to 8:00 a.m.

Marriott Marquis and Marina – San Diego Ballroom A

Organized by the TMS Women in Science Committee, this annual event offers an opportunity for TMS members to network and discuss issues specific to women in the science and engineering professions.

Tickets are required for this event.

Connect Zone

**Monday, February 17 to Thursday, February 20
8:30 a.m. to 4:00 p.m.**

San Diego Convention Center – Sails Pavilion

The Connect Zone is open daily to all attendees as a gathering spot where meeting participants can connect both to the Internet—through free wireless access—and to other TMS2014 attendees. This open area will act as an informal networking center, workspace for attendees, a convenient location to meet with colleagues, and as the site of a Job Board for posting resumes and job openings. Access to the area will be reserved from 7:00 a.m. to 8:30 a.m. for Presenters' Coffee, but will open daily to all meeting attendees beginning at 8:30 a.m. and ending at 4:00 p.m.

Speed Networking & Luncheon

Monday, February 17 • 11:30 a.m. to 1:30 p.m.

Marriott Marquis and Marina – San Diego Ballroom A



Significantly enhance your networking opportunities with this exciting, high-impact, and structured networking event that produces exceptional results for participants.

NETWORKING, STUDENT, AND SOCIAL EVENTS



A match-making system pairs innovation with traditional networking methods to identify mutually beneficial and knowledge-building relationships among professionals.

Due to the nature of this event, only those who have registered in advance can participate.

Student Poster Contest Judging

Monday, February 17

3:30 p.m. to 5:30 p.m.

San Diego Convention Center – Sails Pavilion



Browse the student poster displays and ask questions of the contest participants at the Student Poster Contest Judging Session.

President's Welcoming Reception

Monday, February 17 • 5:00 p.m. to 6:30 p.m.

San Diego Convention Center- Hall B1

All attendees are invited to meet in the exhibit hall for appetizers, beverages, and networking with exhibitors and other colleagues.

Young Professional Happy Hour Reception

Monday, February 17 • 6:00 p.m. to 7:00 p.m.

Marriott Marquis and Marina – Coronado

This reception provides young professionals the opportunity to network with more experienced TMS members in a relaxed, social atmosphere.

TUESDAY

Student Career Forum

Tuesday, February 18 • 2:30 p.m. to 4:30 p.m.

Marriott Marquis and Marina – Catalina

Organized by the TMS Young Leader 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 materials.

Exhibit Hall Happy Hour

Tuesday, February 18 • 4:30 p.m. to 5:30 p.m.

San Diego Convention Center- Hall B1

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

WEDNESDAY

Young Professional Technical Division Poster Contest

View Posters During Poster Session and Gallery Hours

San Diego Convention Center – Sails Pavilion

View technical posters submitted by early-career professionals in each of the five TMS technical divisions: Electronic, Magnetic & Photonic Materials; Extraction & Processing; Light Metals; Materials Processing & Manufacturing; and Structural Materials. Posters will be judged, and the winner in each division will be awarded \$500.

CONTINUING EDUCATION



CONTINUING EDUCATION SHORT COURSES & WORKSHOPS

The 2014 meeting has a number of continuing education courses scheduled on February 16. Registrations will be accepted onsite for these courses through 8:30 a.m. on Sunday. For a complete list of offerings please visit www.tms.org/tms2014. Onsite registrations can be completed

in Hall A (TMS2014 Registration). All continuing education courses will take place at the Marriott Marquis and Marina. A continuing education help desk is located in the Marriott's Marina Ballroom Foyer in the South Tower on Sunday from 7:00 a.m. to 10:30 a.m. for those needing assistance finding a classroom or with course questions. Onsite registrations can also be completed at this help desk.





143rd TMS-AIME Annual Awards Banquet

including Dinner, Live Entertainment, Awards Ceremony, and Installation of 2014 President

Tuesday, February 18 • Reception: 6:00 p.m.

San Diego Convention Center – Bayside Lobby

Awards Ceremony Seating Begins: 6:30 p.m.

San Diego Convention Center – Room 6A

Banquet Dinner: 7:45 p.m.

San Diego Convention Center – West Terrace



Featuring live entertainment from Scottish fiddle legend **Alasdair Fraser** and cello ace **Natalie Haas**.

Recognizing Excellence in Minerals, Metals, and Materials

The 2014 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 community. 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.

The evening will consist of three parts.

1. Award winners and their guests will be welcomed at a cocktail reception.
2. Following the reception, participants will be seated for the awards ceremony, where individual winners will be honored for their accomplishments. A professional photographer will be on hand to capture these moments.
3. Following the ceremony, those participants who have purchased banquet tickets will proceed outside to the West Terrace for a nautical-themed dinner and a beautiful view of the San Diego Bay. Dinner guests will be treated to live entertainment from Scottish fiddle legend Alasdair Fraser and cello ace Natalie Haas.

How to Attend

All TMS Annual Meeting attendees are welcome to attend the ceremony portion of the evening to support friends and colleagues receiving awards and to join in honoring their accomplishments.

Advance tickets are required for admission to the dinner portion of the evening. Your ticket includes admission to the cocktail reception, awards presentations, three-course dinner with wine and dessert, and live entertainment. All venues are fully accessible for guests with disabilities.

Installation of the 2014 TMS President



Hani Henein

Hani Henein, researcher and professor at the University of Alberta in Edmonton, Canada, will be installed as the 2014 TMS President during the TMS-AIME Annual Awards Banquet. As Vice President of TMS, Henein worked to foster the development and involvement of young professionals in TMS and hopes to continue that work in his new role as president.

Henein has been a TMS member for 31 years and currently serves as the Society's Vice President. He has been a member of the TMS Financial Planning Committee and served as the TMS Board Director of Programming. As a member of the Society, Henein served on the TMS Board as the Director of Programming from 2009 to 2012 and also has served on numerous technical committees.

The main thrust of Henein's research is in the area of advanced materials processing, developing new near-net shape processing routes. He is the director of the Advanced Materials and Processing Laboratory and a fellow of the Canadian Academy of Engineers and the Canadian Institute of Mining, Metallurgy and Petroleum, as well as a Killam Research Fellow. He carries out research projects in collaboration with colleagues at McMaster University, Ecole des Mines de Nancy (France), Bremen University (Germany) and INSA de Lyon (France).

Henein earned his B.S. and M.S. degrees from McGill University in Montreal, Canada, and his doctorate from the University of British Columbia. He is a registered Professional Engineer in the Province of Alberta. He has one patent, published 250 technical papers, and edited nine books. Additionally, he has received numerous professional awards and honors.

Excellence and Inspiration: TMS Honors the Best of the Best

Recognizing TMS members who have distinguished themselves from a field of excellence is a focal point of every TMS Annual Meeting. To further underscore the significance of its highest professional honors, TMS has opened the TMS-AIME Honors and Awards Ceremony to all TMS2014 attendees. The program will take place on Tuesday, February 18, and offers the rare opportunity to see and hear some of the most influential figures in the field at the pinnacle of their careers.

The ceremony will be hosted by some of TMS's most esteemed members:

- Ray Peterson, 2009 TMS President - presenting the awards celebrating the achievements of TMS's young and mid-career members.
- Tresa Pollock, 2005 TMS President and 2009 TMS Fellow - honoring those receiving TMS's pinnacle awards.
- Carolyn Hansson, 1997 TMS Fellow - presenting the 2014 Class of TMS Fellows.

"For our more senior members, we believe (the 2014 awards ceremony) will offer a memorable, moving occasion to celebrate the excellence of their colleagues. We hope members early in their careers will take advantage of this chance to congratulate mentors and be inspired to strive for similar heights themselves."

- **Elizabeth Holm**, 2013 TMS President

SOCIETY AWARDS

2014 TMS Fellows

John Allison

Professor, University of Michigan

Kevin Hemker

Professor and Chair, Johns Hopkins University

Enrique Lavernia

Dean and Distinguished Professor, University of California

Michel Rappaz

Professor, École Polytechnique Fédérale de Lausanne

Ruslan Z. Valiev

Professor, UFA State Aviation Technical University

Alexander Scott

Distinguished Service Award

Barry Welch

Retired, Welbank Consulting

Application to Practice Award

Iver Anderson

Senior Metallurgist, Ames Laboratory

2014 Brimacombe Medalists

Louis G. Hector Jr.

Technical Fellow, General Motors Research and Development

C. Robert Kao

Professor, National Taiwan

University

Diana Lados

Associate Professor, Worcester Polytechnic Institute

Eric M. Taleff

Professor and Charlotte Maer Patton Centennial Fellow in Engineering, University of Texas

Bruce Chalmers Award

Pradeep K. Rohatgi

Distinguished Professor, University of Wisconsin-Milwaukee

Cyril Stanley Smith Award

Anthony Rollett

Professor, Carnegie Mellon University

Early Career Faculty Fellow Award

Daniel Gianola

Assistant Professor, University of Pennsylvania

Michele Manuel

Assistant Professor, University of Florida

Educator Award

Donald Sadoway

John F. Elliott Professor of Materials Chemistry, Massachusetts Institute of Technology

Hong Yong Sohn

Professor, University of Utah

Institute of Metals

Lecturer & Robert

Franklin Mehl Award

Jagdish Narayan

John C. Fan Distinguished Chair Professor, North Carolina State University

Leadership Award

John Lewandowski

Arthur P. Armington Professor of Engineering II, Case Western Reserve University

Morris Cohen Award

Carlos Levi

Professor, University of California

Vittorio de Nora Prize

for Environmental

Improvements in

Metallurgical Industries

Abdalla Ahmed Al Zarouni

Senior Manager, Technology Development, Dubai Aluminum Co. Ltd.

William Hume-Rothery

Award

Rainer Schmid-Fetzer,

Professor, Clausthal University of Technology

AIME AWARDS

AIME Honorary

Membership

David Seidman

Walter P. Murphy Professor of Materials Science and Engineering, Northwestern University

AIME Champion H.

Mathewson Award

Neal Evans

Consultant, Proton Power Inc.

Philip J. Maziasz

Distinguished Research Scientist, Oak Ridge National Laboratory

John P. Shingledecker

Senior Project Manager, Electric Power Research Institute

Michael J. Pollard

Engineering Specialist, Caterpillar Technical Center

AIME Robert Lansing

Hardy Award

Dallas Trinkle

Associate Professor, University of Illinois

AIME-EPD James

Douglas Gold Medal

Barry Welch

Retired, Welbank Consulting

AIME Henry deWitt Smith

Scholarship

Somayah Pasebani

Student, University of Idaho

Jacob McMurray

Student, University of Tennessee



143rd TMS-AIME Annual Awards Banquet

DIVISION AWARDS

ELECTRONIC, MAGNETIC & PHOTONIC MATERIALS DIVISION (EMPMD)

Distinguished Service Award

Raymundo Arroyave
Associate Professor, Texas
A&M University

Laura Turbini
Consultant, International
Reliability Consultants

Distinguished Scientist/Engineer Award

Michael McHenry
Professor, Carnegie Mellon
University

John Bardeen Award Ramamoorthy Ramesh

Deputy Director, Oak Ridge
National Laboratory

JEM Best Paper Award

Auriane Etienne
Universite et INSA de Rouen

Emmanuel Cadel
Universite et INSA de Rouen

Agnes Lina
EDF R&D

Laurent Creton
EDF R&D

Philippe Jean Pareige
Universite et INSA de Rouen

EXTRACTION & PROCESSING (EPD)

Distinguished Lecturer Award

Brajendra Mishra
Professor, Colorado School of
Mines

Distinguished Service Award

Thomas Battle
Senior Metallurgist, Midrex
Technologies

Science Award

Nazmul Huda
Lecturer of Mechanical
Engineering, Macquarie
University

Jamal Naser
Associate Professor,
Swinburne University of
Technology

Geoffrey Brooks

Head, High-Temperature
Processing Group, Swinburne
University of Technology

Markus A. Reuter
Professor, Outotec Oyj, Aalto
University

Robert W. Matusiewicz
Technical Development
Manager-TSL Smelting,
Outotec Limited

Technology Award

Gwang Seop Lee
Processing Technology Team,
Korea Resources Corporation

Masahito Uchikoshi
Assistant Professor, Tohoku
University

Kouji Mimura
Associate Professor, Tohoku
University

Minoru Isshiki
Professor Emeritus, Tohoku
University

LIGHT METALS DIVISION (LMD)

Distinguished Service Award

Cynthia Belt
Energy Management
Consultant

Technology Award

Gary Tarcy
Manager, Smelting Research
and Development, Alcoa Inc.

Light Metals Award

Mikhail Lukin
Reduction and Technical
Manager, RUSAL
Kubikenborg Aluminium AB

Richard Jeltsch
Jeltsch Consulting

Light Metals Subject Award-Alumina and Bauxite

Alexander Senaputra
PhD Candidate, Curtin
University

Phillip Fawell
CSIRO

Franca Jones
Senior Lecturer, Curtin
University

Peter Smith
CSIRO

Light Metals Subject Award - Electrode Technology for Aluminum Production

David Molenaar
Research Consultant, CSIRO

Tony Kilpatrick
CSIRO

Alex Montalto
Royal Melbourne Institute of
Technology University

Light Metals Subject Award - Warren Peterson Cast Shop for Aluminum Production

Dmitry Eskin
Professor, Brunel University

Noe Alba-Baena
Professor, Autonomous
University of Ciudad Juarez

Light Metals Subject Award – Recycling

Byoung-Gi Moon
Senior Researcher, Korea
Institute of Materials Science

JOM Best Paper Award

Laura Talens Peiró
Research Fellow, INSEAD
Europe Campus

Gara Villalba Méndez
Professor, Universitat
Autònoma de Barcelona

Robert U. Ayres
Professor Emeritus, INSEAD
Europe Campus

Energy Best Paper Award – Professional

Donna P. Guillen
Distinguished Staff Engineer,
Idaho National Laboratory

Energy Best Paper Award – Student

Jarrold D. Milshtein
Graduate Research Assistant,
Massachusetts Institute of
Technology

Soumendra Basu
Associate Division Head,
Boston University

Srianth Gopalan
Associate Professor, Boston
University

Uday B. Pal
Professor, Boston University

Magnesium Technology Best Paper – Application Award

Matthias Gieseke
Laser Zentrum Hannover e.V.

Christian Noelke
Laser Zentrum Hannover e.V.

Stefan Kaierle
Laser Zentrum Hannover e.V.

Volker Wesling
Clausthal University of
Technology

Heinz Haferkamp
Laser Zentrum Hannover e.V.

Magnesium Technology Best Paper - Fundamental Research Award

Bin Li
Assistant Research Professor,
Mississippi State University

Bo-Yu Liu
PhD Candidate, Xi'an
Jiaotong University

Zhi-Wei Shan
Executive Director, Xi'an
Jiaotong University

Magnesium Technology Student Paper Award

Victoria Miller
Graduate Student, University
of California

Tresa Pollock
Professor, University of
California

Magnesium Technology Best Poster Award

David Fullwood
Associate Professor, Brigham
Young University

Michael Miles
Associate Professor, Brigham
Young University

Timothy Ruggles
Brigham Young University

Travis Rampton
Brigham Young University

Raja K. Mishra
Staff Research Scientist,
General Motors Research
Laboratory

DIVISION AWARDS (cont.)

MATERIALS PROCESSING & MANUFACTURING DIVISION (MPMD)

Distinguished Service Award

James Sears

Senior Process Engineer-
Additive Manufacturing, GE
Global Research Center

Distinguished Scientist/ Engineer Award

Narendra Dahotre

Distinguished Research
Professor and Chair,
University of North Texas

STRUCTURAL MATERIALS DIVISION (SMD)

Distinguished Service Award

Eric Ott

Principal Engineer, GE
Aviation

Distinguished Scientist/ Engineer Award

G. Robert Odette

Professor, University of
California, Santa Barbara

JOM Best Paper Award

Teresa E. Perez

Engineer, Tenaris Research
Center

Nicholas Kirkland

Assistant Professor, Nagasaki
University

David S. Wong

Project Manager, University of
Auckland

Zhenke Teng

Research Engineer, United
States Steel Corporation

MPMD Young Leader Professional Development Award Winners

Srinivasa Rao Bakshi

Assistant Professor, Indian
Institute of Technology
Madras

Amber Genau

Assistant Professor, University
of Alabama

Paul Gibbs

Post Doctoral Research
Associate, Los Alamos
National Laboratory

J. Brian Jordon

Assistant Professor, University
of Alabama

Lan Li

Assistant Professor, Boise
State University

Nan Li

Staff Scientist, Los Alamos
National Lab

SMD Young Leader Professional Development Award Winners

Jennifer Carter

Assistant Professor, Case
Western Reserve University

Juan Pablo Escobedo

Lecturer (Assistant Professor),
University of New South
Wales

Jessica A. Krogstad

Postdoctoral Fellow, Johns
Hopkins University

Benjamin Morrow

Postdoc Research Associate,
Los Alamos National
Laboratory

John Nychka

Associate Professor
and Associate Chair
Undergraduate Studies,
University of Alberta

Corinne Packard

Assistant Professor, Colorado
School of Mines

Michael R. Tonks

Computational Microstructure
Science Group Lead, Idaho
National Lab

YOUNG LEADER AWARDS

Young Leader

International Scholar to JIM

Michele Manuel

Assistant Professor, University
of Florida

Young Leader

International Scholar from JIM

Hiromichi T. Fujii

Assistant Professor, Tohoku
University

EMPMD Young Leader Professional Development Award Winners

Saryu Fensin

Technical Staff Member, Los
Alamos National Lab

Shih-kang Lin

Assistant Professor, National
Cheng Kung University

Yan Li

Senior Package Failure
Analysis Engineer, Intel
Corporation

Fan-Yi Ouyang

Assistant Professor, National
Tsing Hua University

Amit Pandey

Postdoc Research Associate,
Rolls Royce LG Fuel Cell

Hans Shin

Materials Engineer, Pacific
Testing Labs Inc

Eva Zurek

Assistant Professor, State
University of New York

EPD Young Leader Professional Development Award Winners

Salvador Barriga

Research Engineer &
Technical Leader, Infinium Inc

Yulia Meteleva-Fischer

Postdoctoral Researcher,
Materials Innovation Institute
M2i

Zhiwei Peng

Research Assistant Professor,
Michigan Technological
University

LMD Young Leader Professional Development Award Winners

Cheuk Yi Cheung

Postdoctoral Fellow,
University of New South
Wales

In-Ho Jung

Associate Professor, McGill
University

STUDENT AWARDS

TMS Best Paper Contest - Graduate

First Place:

Kaiyuan Yu

Texas A&M University

Second Place:

Yi Wang

University of Tennessee

TMS Best Paper Contest - Undergraduate

First Place:

Harshal Agrawal

Visvesvaraya National
Institute of Technology

J. Keith Brimacombe Presidential Scholarship

Kathleen Chou

University of Michigan

ADDITIONAL AWARDS

Acta Materialia Gold Medal Award

Robert O. Ritchie

H. T. & Jessie Chua
Distinguished Professor of
Engineering, University of
California

Acta Materialia Materials & Society Award

Karl A. Gschneidner, Jr.

Anson Marston Distinguished
Professor, Iowa State
University

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R&D Manager, Los Alamos National Laboratory

Structural Materials Division**Rajiv S. Mishra**

Professor, University of North Texas

About the Honoree

Ellen Swallow Richards (1842-1911) was the first female student to attend MIT, earning a degree in chemistry in 1873. She was also an accomplished professional who took an active role outside of the laboratory and was elected the first female member of the American Institute of Mining Engineers (today's American Institute of Mining, Metallurgical and Petroleum Engineers). She is also recognized as the founder of the field of ecology. Beyond her pioneering achievements, she remained dedicated to public service and was known as a fervent advocate for women's education and professional opportunities.

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THE FIRST TMS SUMMIT ON CREATING AND SUSTAINING DIVERSITY IN THE MINERALS, METALS, AND MATERIALS PROFESSIONS (DMMM1)

Honoring the First Female Member of AIME: Ellen Swallow Richards

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Abundant research demonstrates that a diverse talent pool increases productivity, competitiveness, and creativity – but this diversity is often untapped relative to professionals in the minerals, metals, and materials communities. To address the issue, The Minerals, Metals & Materials Society (TMS) is coordinating the efforts of several associations within the science and engineering community to organize this inaugural two-and-one-half day summit in 2014 (with follow-on actionable outputs) that will feature:

- **U.S. Government, Academia, and Industry Attendees:** Up to 300 professionals will gather to focus on the underrepresentation of gender and race from the U.S. Government, academic, and industry perspectives
- **Workshop-like Format:** Parallel sessions will provide an interactive forum for engaging on specific topics such as communication, mentoring, and creating a diverse workplace
- **Panel Discussions:** Crosscutting issues of diversity and inclusion will be addressed by panels of representatives from throughout the minerals, metals, and materials communities
- **Skills and Tools Development:** Special sessions will provide skills and tools for early-career, mid-career, and senior management professionals to implement in their workplaces
- **Follow-on Resources:** The output from the summit will be captured and used to develop toolkits and guidance subsequently available via the conference website

Conference Organizers

Elizabeth Holm, Carnegie Mellon University (Chair)

Viola Acoff, University of Alabama

Eliana Fu, Titanium Metals Corporation

Mary Korpi, Newmont Mining Corporation

Alexis Lewis, Naval Research Laboratory

Kray Luxbacher, Virginia Tech

Jonathan Madison, Sandia National Laboratories

Michele Manuel, University of Florida

Wayne Jones, University of Michigan (Advisory Committee Chair)

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