

Feature

Conference Overview



Lynne Robinson



MS&T'12 celebrated a decade of making learning and scientific exchange more convenient and affordable through a unique partnership of some of the world's leading materials professional societies.

A decade ago, it seemed like a really good idea. A group of leading materials professional societies pooled their resources and wisdom to organize a technical meeting that highlighted and encouraged synergies across disciplines, while enabling common members to participate in the activities of multiple organizations within one event. That idea has since evolved into a really good conference—the Materials Science & Technology Conference and Exhibition (MS&T).

“MS&T is a great example of collaboration,” said James Robinson, TMS executive director and member of the conference leadership team, along with the other organizing society executive directors. “It is rare that four organizations can set aside their unique cultures and agendas to create what is, in essence, an entirely new organization dedicated to the conduct of this event.”

Elizabeth Holm, TMS Vice President, echoed this perspective when she kicked off MS&T'12 as the moderator and session chair of the opening plenary, calling the meeting “a unique materials conference organized by a diverse group of societies.” Holm noted that although the partner societies—The American Ceramic Society, the Association for Iron and Steel Technology, ASM International, and TMS—focus on the specific interests of their mem-

bers, a number of cross-cutting issues impact on all materials disciplines, with the plenary typically being reserved “to discuss these topics as a whole.” (See the plenary overview presented later in this article for information on this year's topic.) However, once the packed plenary had concluded, this intersection of common concerns and shared ideas was still evident throughout the conference.

The following pages glimpse a few of the highlights experienced by the more than 3,200 materials scientists and engineers who gathered in Pittsburgh, Pennsylvania from October 7–11 for MS&T'12. The spirit of collaboration that has marked this meeting from the beginning will be that much stronger next year when the Metallurgy and Materials Society (MetSoc) of the Canadian Institute of Mining, Metallurgy, and Petroleum (CIM) joins the MS&T organizing societies and their programming partner, NACE International, for MS&T'13 in Montreal. (See sidebar, “Submit Your Abstract to MS&T'13.”)

Said Robinson on looking forward to the 11th edition of the conference, “Organizing MS&T is a complex undertaking, but the effort is made more than worthwhile by the rewarding experiences realized by volunteers and attendees, as well as advancement of the materials community at large. I only see continued growth for this meeting.”



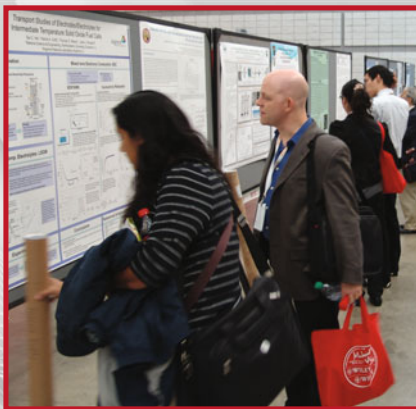
Sridhar Seetharaman, POSCO Professor of Materials Science and Engineering and co-director, Center for Iron and Steel Research, Carnegie Mellon University, was the keynote speaker for the Young Leaders Tutorial Luncheon.



The ICME Committee was one of many TMS volunteer groups that met during MS&T'12 to continue their important work. From left are: Paul Mason, George Spanos, Peter Collins, and Carelyn Campbell.



Between formal sessions, MS&T'12 attendees took the opportunity to continue the exchange of ideas and to plan their next steps in their conference experience.



Poster sessions offered authors the chance to creatively present their research.



MS&T'12 FACTS AND FIGURES

October 7–11, 2012

David L. Lawrence Convention Center, Pittsburgh, Pennsylvania

Top Ten Symposia at MS&T'12

Symposium	Number of Papers Presented
Phase Stability, Diffusion, Kinetics and their Applications (PSDK-VII)	57
Joining of Advanced and Specialty Materials (JASM XIV)	52
Failure Analysis and Prevention	51
Steel Product Metallurgy and Applications	50
Multifunctional Oxides	48
Glass and Optical Materials	46
Green Technologies for Materials Manufacturing and Processing IV	43
Next Generation Biomaterials	43
Novel Sintering Processes and News in Conventional Sintering and Grain Growth	43
Solidification, Crystal Growth, and Microstructural Correlation with Properties of Materials: To Celebrate the 75th Birthday of Professor Martin E. Glicksman	38

Statistical Snapshot

- 3213 attendees
- 1530 presentations
- 103 exhibitors
- 87 posters
- 65 symposia
- 8 special lecture sessions



Elements of Successful Innovation Highlighted at MS&T'12 Plenary

“Innovation means not just doing good science, but also bringing ideas to the marketplace.”

With that comment, Terry P. Smith, technical director, 3M Corporate Research Materials Laboratory, began exploration of the MS&T'12 plenary topic, “Challenges for Materials-Intensive Industries: Consumer Products, Energy, and Transportation.” As the first of three speakers, Smith shared how 3M has maintained its competitive advantage through the implementation of a successful innovation framework. With examples drawn from the corporation's work in such areas as nanocomposites, automotive lighting, and “green” adhesives, Smith noted that a 3M solution generally “mixes and matches” technology platforms and markets. “Technology is shared across the

company,” he said. “Something great being developed in one division often can be used by another.” Enabling this synergy, continued Smith, is a “flat” corporate culture “that allows people to talk among themselves, while also giving them the latitude to do things on their own.”

Other strategies for successful innovation that Smith discussed was the creation of a “strong, centralized research laboratory that serves as a broker of technology” and a coherent strategic vision communicated with all stakeholders and delineating a clear path focused on 3M's core technology platforms. “The quality and number of technology transfers are important metrics for us,” he said, although he also noted that investing in innovation often requires patience. Meeting the challenge of delivering

technologically complex products to the marketplace “plays to the strength of materials scientists,” Smith said, since success requires a multi-disciplinary approach dependent on basic materials, processing, and economic considerations.

While Smith examined the business decisions driving innovation at 3M, Luana Iorio, technology leader, Manufacturing Technologies, GE Global Research, discussed “innovation accelerators” that her company has adopted to speed delivery of new material systems to market. “The intersection of design, materials, and manufacturing is innovation, with software and computational tools facilitating interaction among the groups,” she said. Iorio differentiated this from the conventional approach that dictates materials and manufacturing selection as “a mostly sequential process, with few interactions. This limits design options.”

Iorio continued that the emerging discipline of integrated computational materials engineering (ICME) provides “the framework for collaboration among materials, manufacturing, and product design.” She noted that adopting this approach has opened “opportunities to drive new product capability, giving designers new degrees of freedom that will provide long-term competitive advantage.”

Also accelerating the design cycle at GE has been the utilization of additive manufacturing “to quickly produce and test new design concepts,” said Iorio. She discussed how additive manufacturing enables far greater geometric complexity of materials than conventional processing at a much lower cost, allowing for more customized solutions and holding “great promise to tailor material properties in unprecedented ways.”

The challenge of optimizing both ICME and additive manufacturing, Iorio said, is “too broad for a single



Elizabeth Holm, TMS Vice President (left), served as moderator and session chair for the MS&T'12 plenary, which brought together attendees from all of the conference's participating organizations (below).





Responding to audience questions are (left to right) Elizabeth Holm, Terry Smith, Luana Iorio, and Matthew Zaluzec.



Zaluzec cited the TMS Second World Congress on ICME and the Orlando Materials Innovation Principles as steps to facilitating the collaboration needed to realize the full benefits of ICME.

company to do alone. Collaboration is essential with universities, companies, and national laboratories.”

Matthew J. Zaluzec, senior technical leader and manager, Global Materials and Manufacturing Research, Ford Motor Company Research and Innovation Center, echoed the themes of cross-disciplinary interaction and organizational collaboration emphasized by the previous two speakers.

Zaluzec’s presentation covered how the automotive sector contends with industry-specific issues rising from high-volume applications, stringent safety regulations, and aggressive fuel economy targets. “We are not necessarily inventing new materials, but rather driving improved quality, performance, and safety at competitive costs. We tend to focus on teaching existing materials new tricks,” he said.

Zaluzec noted that Ford’s efforts have generally focused on advanced high-strength steels, but aluminum, magnesium, and carbon fiber composites also offer new opportunities, enabled by ICME techniques and practices. Like Iorio, Zaluzec urged collaboration to ensure the fullest potential of ICME and highlighted the TMS Second World Congress on ICME and the Orlando Materials Innovation Principles coordinated by TMS as critical steps in this direction. To emphasize this point, Zaluzec closed his presentation with a quote from Henry Ford: “Coming together is a beginning, staying together is progress, and working together is success.”

Editor’s Note: For additional information on the Second World Congress on ICME, July 7–11, 2013, in Salt Lake City, visit the conference web-

site at <http://www.tms.org/ICME2013>. Background on the Orlando Materials Innovation Principles is available at <http://www.tms.org/orlandoprinciples>.

MS&T’12 PROCEEDINGS NOW AVAILABLE

While MS&T’12 attendees received a CD copy of the conference proceedings as part of their registration, this valuable resource is also available for purchase at www.wiley.com. Specific sessions represented in the 2012 proceedings include:

- Additive Manufacturing of Metals
- Advanced Understanding of the Atmospheric Corrosion of Materials
- Advances in Metal Casting Technologies
- Advances in Zinc-Based Coating Technologies for Steel Sheet
- Coatings for Corrosion and Wear Resistance Applications
- Fundamental Understanding of High-Entropy Alloy Formation and Their Properties
- Glass and Optical Materials
- Joining of Advanced and Specialty Materials (JASM XIV)
- MS&T’12 Poster Session
- Multi Scale Modeling of Microstructure Deformation in Material Processing
- Multifunctional Materials for Aerospace and Defense: Challenges and Prospects
- Pb-Free Solders and Next Generation Interconnects
- Powder Metallurgy Processing and Products
- Recent Developments in High Strength Steels for Energy Applications
- Recent Developments in Steel Processing
- Steel Product Metallurgy and Applications
- Symposium on the Fatigue of Materials II: Advances and Emergences in Understanding
- Titanium Alloys for Demanding Applications

TMS members are eligible to receive a 25 percent discount on the proceedings, as well as other TMS publications available through Wiley. To access the discount code, log on to the TMS Members Only home page and select “Books” under “Member Reading Room” on the menu bar.



Memories and Milestones

Special MS&T'12 Programming Honors TMS Members

Remembering Tony Pengidore



Anthony (Tony) Pengidore

“There is no such thing as saying a few words about Tony Pengidore,” said Stan Howard, professor, South Dakota School of Mines, during the opening tributes of the Anthony Pengidore Memorial Symposium. Pengidore, who passed away in September 2011 at the age of 51, was a chemical engineer who contributed mightily to the advancement of materials science through his volunteer work and personal example. Friends and colleagues speaking at the symposium recalled his intelligence (“Tony would work differential equations and calculus on his lunch break because he loved it.”); his professional generosity (“He always found time to work with young engineers and would help them break problems down into their fundamental elements.”); and his commitment to ensuring a new generation of well-prepared engineers, specifically through his roles as TMS Board Director, Professional Development, TMS Professional Registration Committee chair, and member of the TMS Education and Accreditation committees. As David Shifler, symposium organizer and current TMS Board Director, Professional Development, noted, “I believe his dedication and upbeat spirit has given inspiration to many to become involved in giving back to their profession.”

The core of the symposium’s content was generated by a panel discussion offering perspectives from materials science

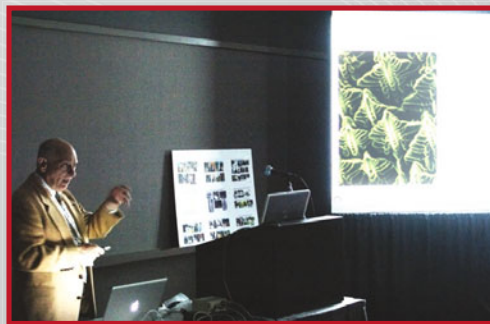
and engineering leaders on the topic, “Industrial Involvement in Academia.” Following the presentations was an exchange on potential strategies for preparing engineers for meeting the industrial challenges of the 21st century. The need for engineers to communicate effectively across disciplines, enhancing skills and access to modeling and computational tools, and the benefits of mentoring young engineers were among the issues discussed.



Panelists participating in the Anthony Pengidore Memorial Symposium were (left to right) James Robinson, TMS; Jason Gamble, NCEES; Hani Henein, University of Alberta; Nathan Mara, Los Alamos National Laboratory; Cal White, Kettering University; and Amy Rovelstad, Corning, Inc. Not pictured is David Shifler, moderator, from the U.S. Office of Naval Research.

Martin Glicksman: Insights from a Brilliant Career

Martin E. Glicksman, currently professor, University of Florida, and a 1994 TMS Fellow, celebrated his 75th birthday by holding a packed session room in rapt attention as he traced his research that “challenged conventional wisdom” regarding dendritic branching. His talk opened the Solidification, Crystal Growth and Microstructural Correlation with Properties of Materials Symposium organized to honor his many contributions over his long and distinguished career. Starting with a brief overview of his early studies, Glicksman went on to review the impact of his work with NASA in conducting space flight experiments on isothermal dendritic growth. He concluded by presenting his most recent findings, including the development of a mechanism that provides a deterministic process capable of inducing branching.



Martin Glicksman (above) presents his most recent studies in dendritic branching to an attentive audience (below).

Symposium Reflects Elizabeth Judson's Life and Work



Joseph L. Sussman, Managing Director of Accreditation, ABET, was a featured speaker at the Elizabeth Judson Memorial Symposium.



Elizabeth Judson

The Elizabeth Judson Memorial Symposium: ABET and Continuous Quality Improvement built on the success of the first Judson symposium, held at MS&T'11. After opening with a series of talks from experts involved in the accreditation process, the symposium concluded with a panel discussion. Topics that were examined included how to leverage data collected to demonstrate attainment of program outcomes for the purpose of creating and maintaining a premier academic program. Organized by the TMS Accreditation Committee, this second symposium was so successful that plans are underway for a third in honor of Elizabeth Judson's dedication to continuously improving education, particularly through her work as an Accreditation Committee member.

Library Dedicated to the Memory of Bill Buckman



Raymond W. (Bill) Buckman, Jr.

The Raymond W. Buckman, Jr. Memorial Symposium for Refractory Metals and Alloys at MS&T'12 reflected on the professional legacy of a long-standing TMS member who once commented that his career had "gone from outer space to inner space." Following the session, family, friends, and colleagues gathered at Pittsburgh Materials Technology to dedicate a technical library in Buckman's name as part of this celebration of his life and career. Both the company and library stand on the site of the former Westinghouse Astronuclear Laboratory that Buckman had helped establish in Large, Pennsylvania. Archiving a number of reports authored by Buckman, the library and company are managed by Joseph Giglio, one of Buckman's long-time colleagues and TMS member.



The Buckman Library at Pittsburgh Materials Technology.



(Photo above): Brian Roberts (right), Buckman's grandson, cuts the ribbon to officially open the library, assisted by Norma Buckman.



(Photo right): Buckman's family participated in the formal dedication of the library named in his honor. Pictured are (left to right): Ray Buckman, son; Norma Buckman, wife; Mike Buckman, son; and Cindy Roberts, daughter.

Under One Roof

While each professional society supporting MS&T'12 offered a full agenda of programming and events geared to its particular members, conference attendees also had the opportunity to learn and network across organizations at a variety of intersociety events.

Exhibition Connects Ideas with Implementation



Meredith Drosback (right), TMS MGI Fellow, gained insights from conference attendees regarding the Materials Genome Initiative (MGI) at the Materials Innovation @ TMS booth. Joining her in the photo is Edward Herderick, vice chair of the TMS Public and Governmental Affairs Committee.



More than 100 companies participated in the MS&T'12 Exhibition.

Role Models, Mentors, and Friends



The ever-popular MS&T Women in Materials Science Reception gave female professionals at every career level a chance to share experiences and learn from each other, while also laying the foundation for valuable mentoring relationships.

2012 ASM/TMS Distinguished Lecture



(Photo right): Julia Weertman delivered the 2012 ASM/TMS Distinguished Lecture to a standing-room-only crowd on the topic, "Economics, Materials, and Materials Scientists." (Photo left): Weertman, a 1993 TMS Fellow and Walter P. Murphy Professor Emerita of Materials Science and Engineering at Northwestern University, (center) accepts her formal recognition of being selected for the lecture from Christopher Berndt, ASM International president (left) and Wolfgang Schneider, TMS president.

Giving Students a Start



(Photos above): More than 850 students participated in career development workshops, networking activities, and award programs developed just for them at MS&T'12.



Winners of the Material Advantage Undergraduate Student Speaking Contest are (left to right): 2nd runner-up, Jennifer DeHaven, Missouri University of Science and Technology; 2nd runner-up, Emily Fucinato, Pennsylvania State University; 1st runner-up, Ruilong Ma, Northwestern University; and contest winner, Spencer Wells, University of Illinois at Urbana-Champaign.

Introduction to ICME Short Course



Gregory Olson (standing), Walter P. Murphy Professor of Materials Science and Engineering, Northwestern University, was an instructor for the Introduction to Integrated Computational Materials Engineering (ICME) Short Course at MS&T'12. Developed as a joint effort between TMS and ASM International, the short course will be offered again at the TMS 2013 Annual Meeting and Exhibition in San Antonio, Texas, March 3–7.

And a Special Congratulations. . .

A number of TMS members were honored at The American Ceramic Society's 2012 Honors and Awards Banquet and the ASM Awards Dinner, both held during MS&T'12. For details on the awardees, turn to *Member News* in this issue of *JOM*.

SUBMIT YOUR ABSTRACT TO MS&T'13

The MS&T organizers are pleased to welcome the MetSoc Conference of Metallurgists (COM) as their newest programming partner when MS&T'13 travels to the Palais des congrès de Montréal, Quebec, Canada, October 27–31. MetSoc's strong focus on extractive and processing metallurgy will not only expand the conference's technical programming, but also enrich the intersociety sessions and activities that have become an MS&T standard. (An overview of COM 2012 included in this *JOM* issue's News and Update section previews what the COM will be adding to MS&T.) MS&T'13 will once more be organized by The American Ceramic Society, the Association for Iron and Steel Technology, ASM International, and TMS, with NACE International returning as a sponsor.

Abstracts for MS&T'13 will be accepted until March 15. For additional information on the MS&T'13 technical program, as well as abstract submission instructions, visit the conference website at www.matscitech.org.

