Preview: 2014 Materials Research Society Fall Meeting & Exhibit

Hynes Convention Center and Sheraton Boston Hotel, Boston, Massachusetts

Meeting: November 30–December 5
Exhibit: December 2–4

www.mrs.org/fall2014

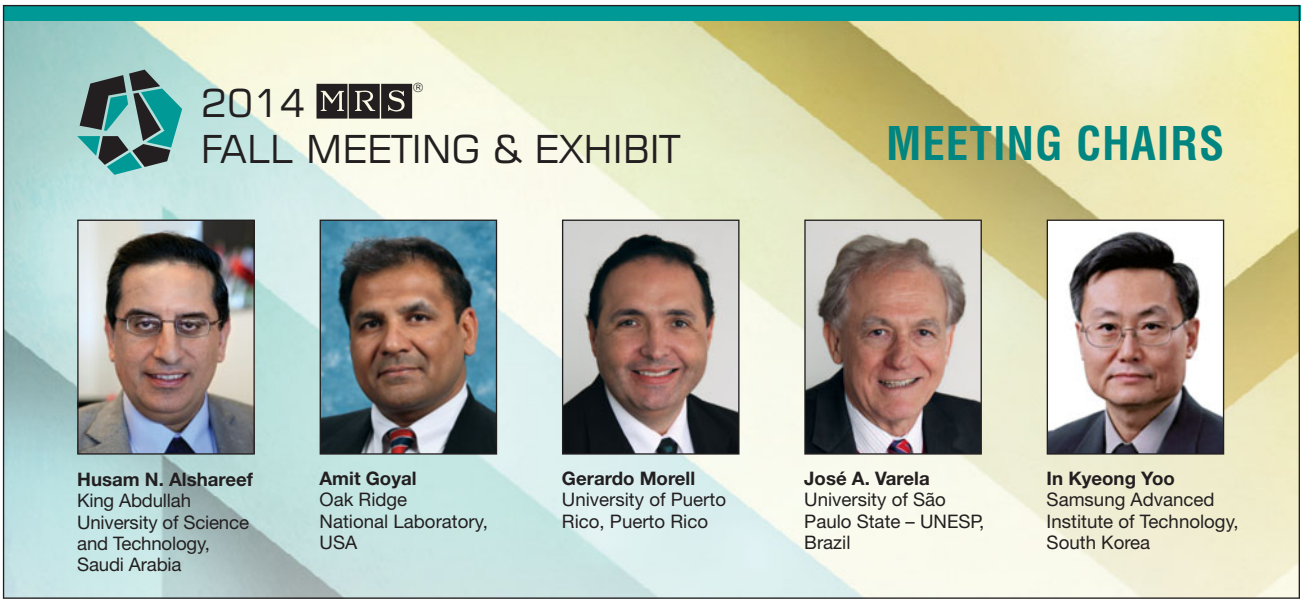
The Materials Research Society (MRS) will hold its 2014 Fall Meeting at the Hynes Convention Center and the Sheraton Boston Hotel in Boston, Mass., November 30–December 5, 2014. The Meeting will include a technical program, tutorials, a plenary session, an award ceremony, an equipment exhibit, poster sessions, a career center, and other special activities. Symposium proceedings will be published and made available free online to MRS members.

MRS Meetings focus on the interdisciplinary nature of materials research worldwide. The program's 52 symposia address leading-edge research and capture the extraordinary progress in materials science and technology, organized into the following clusters.

Advances in the design, synthesis, and processing of biomaterials and soft matter continue to expand the use of these materials in a wide variety of applications. This cluster on **Biomaterials and Soft Materials** captures this progress, with symposia aimed at organic bioelectronics; multifunctional polymeric and hybrid materials; medical applications of noble metal nanoparticles (NMNPs); materials and concepts for biomedical sensing; hard-soft interfaces in biological and bioinspired materials—bridging the gap between theory and experiment; reverse engineering of bioinspired nanomaterials; plasma processing and diagnostics for life sciences; micro/nano engineering and devices for molecular and cellular manipulation, stimulation, and analysis; and emerging 1D and 2D nanomaterials in health care.

Symposia concerning the utilization of a broad range of advanced materials in electronics and photonics devices and applications will be available, from oxide semiconductors to diamond, compound semiconductors, and magnetic nanostructures. In this cluster on **Electronics and Photonics**, recent advances are covered in emerging non-graphene 2D atomic layers and van der Waals solids; graphene and graphene nanocomposites; optical metamaterials and novel optical phenomena based on nanofabricated structures; materials and technology for nonvolatile memories; frontiers in complex oxides; oxide semiconductors; hybrid oxide/organic interfaces in organic electronics; fundamentals of organic semiconductors—synthesis, morphology, devices, and theory; and diamond electronics and biotechnology—fundamentals to applications.

Materials science advances driving improvements in energy conversion and storage are highlighted in the **Energy and Sustainability** cluster. Symposia will focus on advances in materials science, processing, and engineering for fuel cells and electrolyzers; wide-bandgap materials for solid-state lighting and power electronics; organic photovoltaics—fundamentals, materials, and devices; sustainable solar-energy conversion using earth-abundant materials; perovskite-based and related novel material solar cells; technologies for grid-scale energy storage; materials challenges for energy storage across multiple scales; synthesis, processing, and mechanical properties



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of functional hexagonal materials for energy applications; molecular, polymer, and hybrid materials for thermoelectrics; advanced materials and devices for thermoelectric energy conversion; materials for advanced nuclear technologies; scientific basis for nuclear-waste management; and materials as tools for sustainability.

In the cluster on **Nanomaterials and Synthesis**, symposia concerning the synthesis and function of a broad range of nanomaterials will be available. Harsh environment sensors and related electronic and structural components—design, synthesis, characterization, and utilization; flame and high-temperature synthesis of functional nanomaterials—fundamentals and applications; semiconductor nanocrystals, plasmonic metal nanoparticles, and metal-hybrid structures; 3D mesoscale architectures—synthesis, assembly, properties, and applications; directed self-assembly for nanopatterning; semiconductor nanowires—growth, physics, devices, and applications, are all topics to be covered.

Theory, Characterization, and Modeling is the focus of another cluster. Symposia will discuss carbon nanotubes—synthesis, properties, functionalization, and applications; mathematical and computational aspects of materials science; *in situ* characterization of dynamic processes during materials synthesis and transformation; advances in scanning probe microscopy for multimodal imaging at the nanoscale; advances in nanoscale subsurface, chemical, and time-resolved studies of soft matter; scaling effects in plasticity—synergy between simulations and experiments; informatics and genomics for materials development; and advanced materials exploration with neutrons and x-rays—the state of the art in the international year of crystallography.

Materials and analyses methods continue to advance dramatically. Symposia in the cluster on **General Materials and Methods** will highlight the synthesis of new materials, with an emphasis on the relationships between composition, structure, and properties, as well as the application of cutting-edge characterization methods. At a fundamental scale, atomic structure, surface chemistry, interfaces, grain boundaries, and dislocations will be explored. Forefront approaches to materials characterization will include structure–property relations in amorphous solids; recent advances in reactive materials; defects and radiation effects in advanced materials; bridging scales in heterogeneous materials; advanced structural and functional intermetallic-based alloys; hierarchical, high-rate, hybrid, and roll-to-roll manufacturing. One symposium will focus on undergraduate research in materials science. These symposia will disseminate advances and promote communication in the materials research community.

Poster sessions, an integral feature of MRS meetings, will be held during the evenings. The meeting chairs will award prizes of up to $500 for the best posters during each session.

Plenary session and awards

The **Plenary Session** will be held on Monday, Dec. 1, at 6:30 pm, in the Sheraton Boston Hotel, second floor, Grand Ballroom. This year's plenary speaker is **Hyuk Chang**, Senior Vice President and Samsung Fellow at Samsung Advanced Institute of Technology (SAIT), a corporate research center of Samsung Electronics Co., South Korea. Chang will discuss the "innovation loop" in organic semiconductors, inorganic nanomaterials, and optical film materials for display devices as well as energy storage, conversion, and ion-transport materials for rechargeable batteries, with a talk entitled "Innovation in Electronic Materials: Creating Novel Devices with New Functionalities."

The **Award Ceremony** will convene on Wednesday, Dec. 3. The Von Hippel Award, the David Turnbull Lectureship, MRS Medal, Materials Theory Award, MRS Postdoctoral Awards, and Graduate Student Gold and Silver Awards will be presented. The ceremony will conclude with the **Von Hippel Award** address, by **Marvin L. Cohen** of the University of California–Berkeley, who will receive this year's award.

TUTORIALS

SUNDAY, NOVEMBER 30
HYNES CONVENTION CENTER

TUTORIAL K
Synthesis, Properties and Applications of Graphene
8:30 am-5:00 pm | Room 210

TUTORIAL L
Metamaterials and Plasmonics—From Fundamentals to Applications
8:30 am-5:00 pm | Room 208

TUTORIAL M
Emerging Materials and Devices for Nonvolatile Memories
9:00 am-5:00 pm | Room 206

TUTORIAL T
Fundamentals of Wide-Bandgap Materials and Devices for Optoelectronics and Power Electronics
8:30 am-5:00 pm | Room 202

TUTORIAL EE
Analysis of Radioactive Nuclear Materials
1:30 pm-5:00 pm | Room 204

TUTORIAL FF
Materials for Sustainable Development
1:00 pm-5:00 pm | Room 203

TUTORIAL OO
Fundamental Theory of Aberration-Corrected S/TEM and Environmental TEM and Their Applications on *In Situ* TEM Experiments
9:00 am-5:00 pm | Room 200

TUTORIAL TT
Neutron and X-rays—Sources, Instrumentation and Scattering
1:30 pm-5:00 pm | Room 201

TUTORIAL ZZ
Materials, Processes and Tools for Roll-to-Roll Fabrication of Flexible Electronics
1:00 pm-5:00 pm | Room 209

Named after Arthur von Hippel (1898–2003), the **Von Hippel Award** recognizes brilliance and originality of intellect, combined with vision that transcends the boundaries of conventional scientific disciplines. Cohen will be recognized for "explaining and predicting properties of materials and for successfully predicting new materials using microscopic quantum theory."

The **David Turnbull Lectureship**, named after the late David Turnbull of Harvard University, is awarded to recognize the career contribution of a scientist to fundamental understanding of the science of materials through

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experimental and/or theoretical research. **Rodney S. Ruoff**, Director of the Center for Multidimensional Carbon Materials (CMCM), Institute for Basic Science (IBS) and Distinguished Professor at the Ulsan National Institute of Science & Technology (UNIST), is this year's recipient. He is cited for "pioneering discoveries related to carbon materials and their innovative preparation, characterization, and mechanics."

The **MRS Medal** recognizes an exceptional achievement in materials research in the past 10 years. MRS will honor three individuals at the Fall Meeting. **Mercouri G. Kanatzidis**, the Charles E. and Emma H. Morrison Professor in the Department of Chemistry at Northwestern University, will receive an MRS Medal for "the discovery and development of nanostructured thermoelectric materials." **Sharon C. Glotzer**, Stuart W. Churchill Collegiate Professor of Chemical Engineering, and **Nicholas A. Kotov**, Joseph B. and Florence V. Cejka Professor of Engineering, both at the University of Michigan–Ann Arbor, will share a Medal for "foundational work elucidating processes of nanoparticle self assembly."

The **Materials Theory Award** recognizes exceptional advances made by materials theory to the fundamental understanding of the structure and behavior of materials. This award, endowed by Toh-Ming Lu and Gwo-Ching Wang, is intended to honor both those who have pioneered the development of a new theoretical approach and those who have used existing approaches to provide significant new insight into materials behavior. This year's recipient is **Long-Qing Chen** of The Pennsylvania State University for "his pioneering work in the development of the phase-field method and its applications in the computational modeling of mesoscale structures and their dynamics in inhomogeneous materials."

The new **MRS Postdoctoral Awards** recognize postdoctoral scholars who show exceptional promise, which may include excellence in scientific research, leadership, advocacy, outreach, or teaching during their postdoctoral assignment.

HOTELS IN BOSTON

RESERVE ONLINE AT WWW.MRS.ORG/FALL-2014-LODGING

The 2014 MRS Fall Meeting will be held at the Hynes Convention Center and Sheraton Hotel in Boston, Massachusetts. For your convenience, special room rates have been arranged at the following hotels. Rooms are limited at these rates, so make your reservations early. Reservations can be made online at **www.mrs.org/ fall-2014-lodging.**

Discounted Reservation Deadline: OCTOBER 14

Sheraton Boston Hotel
Tel: 617-236-2000
39 Dalton Street, Boston, MA 02199

Discounted Reservation Deadline: NOVEMBER 7

The Boston Park Plaza Hotel & Towers
Tel: 800-225-2008
50 Park Plaza at Arlington Street, Boston, MA 02116

Westin Copley Place, Boston
Tel: 617-262-9600
10 Huntington Avenue, Boston, MA 02116

Discounted Reservation Deadline: NOVEMBER 8

Boston Marriott Copley Place
Tel: 617-236-5800
110 Huntington Avenue, Boston, MA 02116

Hilton Boston Back Bay
Tel: 617-236-1100
40 Dalton Street, Boston, MA 02115

Discounted Reservation Deadline: NOVEMBER 10

The Colonnade Hotel
Tel: 617-424-7000
120 Huntington Avenue, Boston, MA 02116

Discounted Reservation Deadline: NOVEMBER 18

Embassy Suites Boston at Logan Airport
Tel: 617-567-5000
207 Porter Street, Boston, MA 02128

Special sessions and events

Symposium X talks provide Meeting attendees with an overview of leading-edge topics. **Henry Snaith** of Oxford University, UK, will present "From Nanostructured to Thin-Film Perovskite Solar Cells" on Monday, Dec. 1; **Pulickel Ajayan** of Rice University, USA, will discuss "2D Materials Science: Graphene and Beyond" on Tuesday, Dec. 2; and **Angela Belcher** of the Massachusetts Institute of Technology (MIT), USA, will address "Giving New Life to Materials for Energy, the Environment and Medicine" on Wednesday, Dec. 3. **Cyrus Wadia** of the White House Office of Science and Technology Policy; **Linda Horton** of the US Department of Energy Office of Basic Energy Sciences; and **Laurie Locascio** of the US National Institute of Standards and Technology will present "The Materials Genome Initiative: The Vision and Opportunities for Basic Science and Advanced Manufacturing" on Thursday, Dec. 4. All sessions will be held in the Sheraton Boston Hotel, second floor, Grand Ballroom.

A rump session will be held on Wednesday, Dec. 3, at 4:30 pm, in the Hynes Convention Center, Level 3, room 313, on perovskite-based and related novel material solar cells.

The **Technology Innovation Forum** will be held on Monday, Dec. 1, at 1:30 pm, in the Sheraton Boston Hotel, second floor, Constitution Room. The keynote speaker is **Donald R. Sadoway**, John F. Elliott Professor of Materials Chemistry in the Department of Materials Science and Engineering at MIT, whose talk addresses "Inventing Inventors: Faculty at Their Best." New at this year's forum is **iMatSci—Innovation in Materials Science** where innovators can demonstrate their newest materials-focused technologies in practical applications. The goal is to attract industry leaders, innovators, and venture capitalists in one location to spur collaboration and accelerate the adoption of new materials technologies that deliver value in real-world applications.

The **Women in Materials Science and Engineering Breakfast** will be held on Wednesday, Dec. 3, 7–8:30 am. **Vernā Myers**, Esq., principal of Vernā Myers Consulting Group, LLC, will lead an interactive session about culturally effective habits needed to promote more diversity and inclusion in organizations with a talk entitled "Innovation and Inclusion: What It Takes to Move Diversity Forward."

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US government agency program managers will present information on funding opportunities in the materials science and technology research areas in **Government Agency Talks: Materials Research Support**. The forum will be held on Tuesday, Dec. 2 and Thursday, Dec. 4, 6–8:15 pm, in the Sheraton Boston Hotel. The tentative list of presenting agencies includes the National Science Foundation (NSF) Division of Materials Research, US Department of Energy Office of Basic Energy Sciences, US Army Research Laboratory, and the Defense Advanced Research Projects Agency.

An information session on the MRS/OSA and MRS/TMS Congressional Science and Engineering Fellowship programs will be held on Tuesday, Dec. 2, 5:15–6:15 pm, in the Sheraton Boston Hotel. Former Congressional Fellows will be available to discuss opportunities for scientists to learn about the field of science policy by spending one year as a special legislative assistant in the US Congress in Washington, DC.

This year marks the 10-year anniversary of the NSF's Partnerships for Research and Education in Materials (PREM) program, which is designed to broaden participation of underrepresented minorities and enhance diversity in materials research and education. Building on the undergraduate professional development and networking program launched at the 2013 MRS Fall Meeting, this year MRS will host a two-day commemorative event including more than 50 PREM students from Minority Serving Institutions. On Monday morning, Dec. 1, all Meeting attendees are invited to learn more about this program through talks from program and partner organizations as well as past participants and graduates. A special poster session featuring the PREM undergraduate students' research is planned later that evening.

The Impact of Materials on Society (IMOS) is a curriculum that teaches engineering and other undergraduate students about the relationship of materials and society throughout human history and into its future. With the support of the NSF, the IMOS subcommittee and faculty from the University of Florida (UF) will host a one-day training session for universities and community colleges for pilot program implementation starting in fall 2015. Since developing the course, UF has documented an increase in social and scientific literacy among engineering and non-science majors enrolled in the course, as well as a strong increase in the number of materials science and engineering majors. The long-term goal is to provide curriculum, training, and support to interested institutions once the upcoming pilot is completed.

For the first time, the Meeting will feature a Focus-on-Sustainability program of activities on Sunday, Nov. 30–Tuesday, Dec. 2. It will include a variety of technical sessions and non-technical programs and activities designed to raise the awareness of the nexus between materials, materials research, and sustainable practice. A highlight of the program will occur within Symposium FF: Materials as Tools for Sustainability, on Monday, Dec. 1, at 10:30 am, in the Hynes Convention Center, Level 2, room 203. A special roundtable panel session will immediately follow, featuring corporate social responsibility officers and environmental technology directors and facilitated by **Ivan Amato**, science communicator and public engagement professional.

MRS has expanded its Career Center in the Hynes Convention Center's Hub area adjacent to the Exhibit Hall. The Career Fair will include interviews with recruiters, job postings, industrial career seminars, résumé critiques, mock interviews, and informal mentoring. Students, postdocs, and seasoned professionals are all welcome.

A professional development workshop on "Strategic Negotiations: Alliances and Tactics" will be held on Sunday, Nov. 30, 1–4 pm, in the Sheraton Boston Hotel. The speaker is **Lee Warren**, Director Emerita of Professional Pedagogy at the Harvard Kennedy School and Associate Director Emerita of the Derek Bok Center for Teaching and Learning at Harvard University. Role-playing scenarios with personalized coaching will enable participants to learn about negotiation and leadership tactics.

The popular Science as Art competition will be held again at this Meeting. The competition is open to all registered Meeting attendees, with entries to be on display in the Hynes Convention Center. Multiple first-place and second-place awards of $400 and $200, respectively, will be presented. Guidelines and deadlines for entry will be available on the 2014 MRS Fall Meeting website.

A number of other events will take place throughout the Meeting, including other professional development opportunities. To stay up to date with additional events and activities, access www.mrs.org/fall2014.

The deadline to pre-register for the Meeting is November 14, 2014, 5:00 pm (EST). International travelers are reminded to allow ample time to obtain a visa, if necessary. For additional details about the Meeting, contact MRS Member Services, Materials Research Society, 506 Keystone Drive, Warrendale, PA 15086-7573, USA; email info@mrs.org, tel. 724-779-3003, and fax 724-779-8313. Details of various events and activities will be published in the Meeting Guide available on-site. The MRS website can be accessed for updated information on confirmed talks and details of special events, for more information on obtaining a visa, and for pre-registration: www.mrs.org/fall2014.

2014 MRS FALL MEETING REGISTRATION RATES

	PRE-REGISTRATION before 5:00 pm EST November 14	ON-SITE REGISTRATION after 5:00 pm EST November 14
Meeting Registration	$595	$695
Meeting Registration with MRS Member Discount	$485	$585
Student Registration	$135	$165
Student Registration with MRS Member Discount	$110	$140
Retired/Unemployed	$135	$165

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