



Preview: 2013 Materials Research Society Fall Meeting & Exhibit

Hynes Convention Center and Sheraton Boston Hotel, Boston, Massachusetts

Meeting: December 1–6

Exhibit: December 3–4

www.mrs.org/fall2013



2013 **MRS**[®]
FALL MEETING
& EXHIBIT

Meeting Chairs



Charles T. Black
Brookhaven National
Laboratory



Elisabetta Comini
University of Brescia



Gitti Frey
Technion—Israel
Institute of Technology



Kristi L. Kiick
University of Delaware



Loucas Tsakalakos
General Electric—
Global Research
Center

The Materials Research Society will hold its 2013 Fall Meeting at the Hynes Convention Center and the Sheraton Boston Hotel in Boston, Mass., December 1–6, 2013. 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.

The increasingly cross-disciplinary worldwide activity on materials research culminates every year in the MRS Fall Meetings. Symposium organizers from around the world have created a program of 51 symposia that address leading-edge research and capture the extraordinary progress in materials science and technology, featuring an exciting mix of well-established and popular topics. The symposia are 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 Matter** captures this continuum, with symposia aimed at simulation-based

methods for designing soft materials, and contemporary chemical approaches to soft material synthesis. Symposia are also targeted in the mechanics of biomaterials, the engineering of bioinspired structural materials, and the fundamentals of both hydrogel and assembled polymeric systems. The use of these classes of materials as instructive interfaces will be highlighted in symposia aimed at soft- and biomaterials as tools for understanding biological processes and for integration with organic electronics. This cluster will also highlight multiple areas in which biomaterials, soft matter, and composites are being employed for specific biomedical applications, including tissue engineering, cancer treatment, neural interfaces, and diagnostic devices.

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 in plasmonics, metamaterials, and photoactive organic materials, as well as organic micro lasers, comprise separate themes. Two topical symposia concerning large-area patterning and solution-based processing of functional electronic/photonics materials and devices are included.

This program provides a forum for presentation and discussion of advances in materials science driving improvements in energy conversion and storage. Three of the symposia in this cluster on **Energy and Sustainability** are directed to photovoltaic energy conversion, with topics including inorganic thin films, organic and hybrid organic/inorganics, and earth-abundant materials. New devel-

2013 MRS Fall Meeting Registration Rates

	Pre-Registration apply before 5:00 p.m. EST on November 15, 2013	On-Site Registration apply after 5:00 p.m. EST on November 15, 2013
Member	\$485	\$585
Student Member	\$110	\$140
Nonmember	\$595	\$695
Student Nonmember	\$135	\$165
Retired/Unemployed	\$135	\$165



Hotels in Boston

Reserve online at www.mrs.org/fall-2013-lodging

The 2013 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-2013-lodging.

Discounted Reservation Deadline: November 6, 2013

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

Discounted Reservation Deadline: November 8, 2013

The Boston Park Plaza Hotel & Towers
Tel: 800-225-2008
50 Park Plaza at Arlington Street
Boston, MA 02116-3912

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

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

Discounted Reservation Deadline: November 9, 2013

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

Discounted Reservation Deadline: November 18, 2013

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

opments in materials for thermoelectric energy conversion, nuclear power, and catalysis will be discussed. The program features two forums highlighting the progress and technological issues in materials for energy storage, including in rechargeable batteries and at grid scale. Other symposia will emphasize development of new techniques for characterizing energy materials, including methods for their study in operating environments and approaches for understanding critical materials interfaces.

Dramatic advances in materials and analyses methods continue apace. Symposia in the cluster on **General Materials and Methods** will highlight the synthesis of new materials with 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 electron- and ion-based methods, *in situ* scanning probe microscopy approaches for correla-

tive structure–functional measurement, and materials exploration through neutrons and x-rays. Furthermore, advanced approaches to deal with defects, fractures, and microstructural complexity will be coupled with new theory and materials simulation capabilities to improve understanding of inorganic materials.

Two symposia regarding the social relevance of technical advances in materials science are programmed at this meeting in the cluster on **Materials and Society**. In particular, materials issues in art and archaeology will be highlighted, as well as the contributions of materials science in engineering education. These symposia will disseminate advances and promote communication in the materials research community.

In the cluster on **Nanomaterials**, symposia concerning the synthesis and function of a broad range of nanomaterials will be available, from semiconductor nanowires to nanocomposites, carbon nanostructures, and cellular materials. Recent advances in microelectromechanical systems, phonon engineering, nanoscale patterning and self-assembly, and oth-

er emerging nanomaterials comprise separate themes. Two topical symposia concerning nanostructured materials in extreme environments and elastic strain engineering for unprecedented materials properties are included.

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.

Special sessions and events

The **Plenary Session** will be held on Monday, Dec. 2, at 6:30 p.m. in the Grand Ballroom of the Sheraton Hotel. This year's plenary speaker is **David L. Morse**, executive vice president and chief technology officer of Corning Inc. Morse will discuss the advances in glass research, based on Corning's Internet video series, "A Day Made of Glass."

The **Award Ceremony** will convene on Wednesday, Dec. 4, at 6:30 p.m., in the Grand Ballroom of the Sheraton Hotel, at which the Von Hippel Award, Turnbull Lectureship, MRS Medal, Materials Theory Award, and Graduate Student Gold and Silver Awards will be presented. The ceremony will be followed by the **Von Hippel Award** address by **Mildred S. Dresselhaus**, Professor of Physics and Electrical Engineering and Emerita Institute Professor at the Massachusetts Institute of Technology. Dresselhaus received the Society's highest honor for "her pioneering contributions to the fundamental science of carbon-based and other low electron density materials, her leadership in energy and science policy, and her exemplary mentoring of young scientists."

Being honored for the **David Turnbull Lectureship** this fall is **Robert O. Ritchie**, H.T. & Jessie Chua Distinguished Professor of Engineering and chair of the Department of Materials Science and Engineering of the University of California–Berkeley, and Faculty Senior Scientist at Lawrence Berkeley National Laboratory. Ritchie received the award for "pioneering contributions to, and teaching us all how to think about, the mechanistic role of microstructure in governing fatigue and fracture in a variety of materials systems, and communicat-

TUTORIALS

Sunday, December 1
Hynes Convention Center

TUTORIAL N/Q

Organic Optoelectronics—Introduction to Materials and Device Physics

1:30–5:00 pm, Room 203

TUTORIAL P

Oxide Film Growth—Molecular Beam Epitaxy and Pulsed Laser Deposition Face-Off for Supremacy

1:30–5:00 pm, Room 201

TUTORIAL U

Imaging Magnetism with Electrons

1:30–5:00 pm, Room 206

TUTORIAL EE

Effects and Characterization of Radiation Damage in Nuclear Materials

1:30–5:00 pm, Room 202

TUTORIAL JJ

Advances in Fracture Modeling—Micromechanical, Computational and Multiscale Aspects

1:30–5:00 pm, Room 209

TUTORIAL LL

Nanomechanical Characterization with SPM—Overview and Industrial Applications

1:30–5:00 pm, Room 200

TUTORIAL NN

Materials by Design—New Materials Discovery by Inverting Conventional Approaches

9:00 am–5:00 pm, Room 204

TUTORIAL SS

Semiconductor Nanowires—Status, Requirements and Prospects of Applications in the Electronics and Photonics Industry

1:30–5:00 pm, Room 210

TUTORIAL VV

Advances in Additive Manufacturing

1:30–5:00 pm, Room 205

Monday, December 2
Sheraton Boston Hotel

TUTORIAL G

Integrating Biomaterials into Organic Electronics and Interfacing Organic Electronics with Biological Systems

8:30 am–Noon, Gardner

ing his scientific insights to the world audience through eloquent lectures and seminal publications.”

MRS Medalist Alexander A. Balandin of the University of California–Riverside is Founding Chair of the Materials Science and Engineering Department and Director of the Nano-Device Laboratory. Balandin is cited for the “discovery of the extraordinary high intrinsic thermal conductivity of graphene, development of an original optothermal measurement technique for investigation of thermal properties of graphene, and theoretical

explanation of the unique features of the phonon transport in graphene.”

David J. Srolovitz, the Joseph Bordogna Professor of Engineering and Applied Science at the University of Pennsylvania, has been selected to receive the **Materials Theory Award** for “decisive and highly influential contributions to the theory and simulation of microstructure, morphological evolution, mechanical behavior, and the structure and dynamics of interfaces.” This award is endowed by Toh-Ming Lu and Gwo-Ching Wang and “recognizes exceptional advances made by materials theory to the fundamental understanding of the structure and behavior of materials.”

The Technology Innovation Forum will be held on Dec. 4, 8:00 a.m.–2:30 p.m., allowing time to network until 3:30 p.m., at the Hynes Convention Center, room 300. This forum will offer perspectives from successful innovators, industry leaders, and investors on the process of taking a technology from conception to market impact. Panels will feature topics on the different approaches to partnering between small and large companies; the challenges and opportunities of transitioning from the laboratory to manufacturing, whether by partnering with a large company or by traditional private investment; and how to launch a start-up company.

New this year, the MRS Government Affairs Committee is moving the government funding seminars into a one-day event called the Government Agency Forum: Materials Research Support. The forum will be held on Tuesday, Dec. 3, 2013, 8:30 a.m.–5:00 p.m., in the Sheraton Boston Hotel. The tentative list of presenting agencies include, from the United States, the Air Force Office of Scientific Research, National Science Foundation, Office of Naval Research, and Department of Energy, Office of Basic Energy Sciences and the Department of Energy, Energy Efficiency and Renewable Energy; and from Europe, the European Union, Science, Technology & Education.

An information session on the MRS/OSA and MRS/TMS Congressional Science and Engineering Fellowship Programs will be held on Tuesday, Dec. 3,

5:30 p.m.–6:30 p.m. 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.

For the first time, MRS will host a group of undergraduate students from the Partnership for Research and Education in Materials (PREM), a program within the National Science Foundation that is designed to broaden participation of underrepresented minorities and enhance diversity in materials research and education. Among the activities planned, students will have the opportunity to participate in a poster design workshop and subsequently apply their new skills for a chance to be recognized and win prizes for the best undergraduate posters the following day. This event is organized by the Diversity Subcommittee of the MRS Member Engagement Committee.

A number of other events will take place throughout the Meeting, including opportunities in professional development and the Career Center where services include access to current job postings, a resume file for prospective employers, and on-site interview opportunities. To stay up to date with additional events and activities, access www.mrs.org/fall2013.

For more information

See the following pages for a list of exhibitors and proceedings that will be available for order.

The deadline to pre-register for the meeting is **November 15, 2013, 5:00 p.m. (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/fall2013.