

Preview: 2012 Materials Research Society Fall Meeting & Exhibit

Hynes Convention Center Boston, Massachusetts

Meeting: November 25-30 Exhibit: November 27–29 www.mrs.org/fall2012

2012 FALL MEETING CHAIRS



Chennupati Jagadish Australian National University

2012

MRS

MEETING

FALL



Thomas Lippert Paul Scherrer Institut



Amit Misra Los Alamos National Laboratory



Eric Stach Brookhaven National Laboratory



Tina Xu University of California-Berkeley

The Materials Research Society will hold its 2012 Fall Meeting at the Hynes Convention Center in Boston, Mass., November 25-30, 2012. The meeting will include a technical program, tutorials, a plenary session, an awards ceremony, an equipment exhibit, poster sessions, a career center, funding seminars, 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 52 symposia that addresses leadingedge research and captures 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 fundamental materials science are needed in all areas of energy research; the cluster Materials for energy technologies captures the progress and opportunities in energy production, storage, and sustainability. Developments in thermoelectrics, electrocatalysis, solid-oxide fuel cells, and lithiumion batteries will comprise the storage and power conversion areas. Photovoltaic technologies from the materials to systems level will be discussed, and a specific focused symposium on smallmolecule organic solar cells is included. Novel developments in hierarchically structured materials for energy storage and conversion and functional oxides for renewable energy applications will be described. Crucial issues regarding energy-critical materials and MRS

materials for sustainability will be addressed in separate symposia.

The cluster Soft materials and biomaterials comprises a diverse array of activity, highlighting the versatility of this class of materials. Symposia concerning the electronic properties of polymers, from single-crystalline materials for semiconducting applications to polymer-based photovoltaics, will be presented. Self-assembly forms another core area, with separate symposia concerning biomolecular and biomimetic self-assembly, protein- and peptide-directed self-assembly, colloidal crystals, quasicrystals and their assemblies, and directed self-assembly for nanopatterning. Novel approaches to the creation of bioinspired surfaces, precision polymeric materials, new membrane platforms, and the application of biomimetic nanoscale platforms for biomedical applications will also be reviewed.

Symposia concerning the synthesis and function of a broad range of materials will be available in the cluster Functional materials and nanomaterials. providing coverage from nanostructures (semiconductor nanowires, carbon nanostructures, and Group-IV nanostructures) to oxide semiconductors, and oxide nanoelectronics and multifunctional dielectrics. Recent advances in optical, acoustic, and other emerging nanomaterials, as well as optically active nanostructures,



Hotels in Boston

The 2012 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/f12-lodging.

Discounted Reservation Deadline: November 2, 2012

- Sheraton Boston Hotel
 Tel: 617-236-2000
 39 Dalton Street
 Boston, MA 02199
- Boston Marriott Copley Place
 Tel: 617-236-5800
 110 Huntington Avenue
 Boston, MA 02116
- The Westin, Copley Place Boston Tel: 617-262-9600 10 Huntington Avenue Boston, MA 02116
- The Boston Park Plaza Hotel &
 Towers
 Tel: 800-225-2008
 50 Park Plaza at Arlington Street
 Boston, MA 02116-3912
- Hilton Boston Back BayTel: 617-236-110040 Dalton StreetBoston, MA 02115

Discounted Reservation Deadline: November 26, 2012

■ Embassy Suites Boston at Logan Airport Tel: 617-567-5000 207 Porter Street

Boston, MA 02128

State and local taxes are currently at 14.45%



2012 MRS Fall Meeting Registration Rates		
	Pre-Registration Before 5:00 p.m. (EST) November 9, 2012	On-Site Registration After 5:00 p.m. (EST) November 9, 2012
Member	\$485	\$585
Student Member	\$110	\$140
Nonmember	\$595	\$695
Student Nonmember	\$135	\$165
Unemployed/Retired	\$135	\$165

comprise separate themes. Two topical symposia concerning flame synthesis of nanostructures and the geometry and topology of functional nanomaterials are also included.

Dramatic advances in structural materials continue apace and will be highlighted in the cluster **Structural and advanced materials** comprising symposia concerning complex metallic alloys, nanostructured metals, intermetallic-based alloys, reactive materials, and amorphous solids. Materials for nuclear energy, nuclear-waste management, and performance of materials in extreme environments link back to the "energy" theme. At a fundamental scale, the atomic structure and chemistry of domain interfaces and grain boundaries will be explored.

Synthesis, characterization, and modeling methods, addressing forefront approaches to materials characterization, will include approaches to chemical imaging with integrated photon, electron, and ion methods; in situ electron microscopy approaches for correlative structure-property measurement; scanning probe microscopy; low-voltage electron microscopy; and materials exploration through neutrons and x-rays. Materials synthesis with roll-to-roll processing approaches and materials for biomedical sensing will be described. Advanced approaches for dealing with defects and microstructural complexity, and understanding materials through materials informatics and through multiscale materials simulation will round out the program.

To complement the scientific sessions, two symposia regarding the social relevancy of materials science and engineering education and the business of nanotechnology will be available, and tutorials will be offered in several technical areas. 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, Nov. 26, at 6:30 p.m. in the Grand Ballroom of the Sheraton Hotel. This year's plenary speaker is Nobel laureate **Dan Shechtman** of the Technion in Haifa, Israel, and Iowa State University. Shechtman will outline the discovery of quasicrystals and discuss their structure as well as some of their properties and uses.

The **Award Ceremony** will convene on Wednesday, Nov. 28 at 6:30 p.m. in the Grand Ballroom of the Sheraton Hotel, at which the Von Hippel Award, Turnbull Lectureship, MRS Medals, 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 **Stuart S.P. Parkin**, director of the IBM-Stanford Spintronic Science and Applications Center (SpinAps) at IBM Almaden Research Center in San Jose, Calif., on the topic of spintronics.

The other award recipients will deliver their talks as part of Symposium X, held at 12:15 p.m. in the Grand Ballroom of the Sheraton Hotel. **Robert Sinclair**, chair of the Materials Science and Engineering Department of Stanford University and director of the Stanford Nanocharacterization Laboratory, is the recipient of the **David Turnbull Lectureship**. He will present his lecture, "In situ high-resolution transmission elec-



tron microscopy of material reactions," on Tuesday, Nov. 27. MRS Medalist Jennifer A. Lewis, the Hans Thurnauer Professor of Materials Science and Engineering and director of the Frederick Seitz Materials Research Laboratory at the University of Illinois at Urbana-Champaign, will present her award talk, "Printing functional materials," on Wednesday, Nov. 28. MRS Medalist Miquel B. Salmeron of the University of California-Berkeley and Lawrence Berkeley National Laboratory will present his award talk, "Physics and chemistry of material surfaces under ambient conditions of gases and liquids: What's new?" on Thursday, Nov. 29.

John P. Perdew of Tulane University in New Orleans, La., selected to receive the Materials Theory Award for density functional theory, will present his talk, "Climbing the ladder of density functional approximations," on Monday, Nov. 26. 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."

A special Acta Materialia Materials and Society Award forum on advanced materials and their impact on society will be held in honor of award recipient Mildred Dresselhaus of the Massachusetts Institute of Technology. The full-day forum, chaired by Jay Narayan (North Carolina State University), John Baglin (IBM-Almaden), and Bill Appleton (University of Florida), will be on Sunday, Nov. 25 beginning at 8:30 a.m. The forum will address Dresselhaus's pioneering contributions in advanced materials with emphasis on thermoelectric and carbon-related materials, and how these contributions have resulted in the significant improvements in the quality of life.

New this year is a special emphasis on graphene. Organizers in Symposium W have included technical coverage of this topic as well as a tutorial to be held on Sunday, Nov. 25, and a forum to be held on Tuesday, Nov. 27, 1:30-6:00 p.m. in Ballroom B, Hynes. The forum will be coupled with the MRS Bulletin

expanded issue on graphene, with guest editors John J. Boeckl and Weijie Lu of the US Air Force Research Laboratory, and Patrick Soukiassian of Universite de Paris-Sud/Orsay and Commissariat a l'Energie Atomique et aux Energies Alternatives.

The discussion on materials and sustainability that began at the 2012 MRS Spring Meeting in San Francisco continues in this Meeting as Symposium G, "Materials as tools for sustainability." Complementing the symposium is a forum sponsored by the National Science Foundation (NSF) titled "Sustainability: Building teams to tackle complex problems." The forum will exemplify successful research efforts in sustainability and address challenges the materials community faces in conducting highly interdisciplinary research, forming teams with diverse backgrounds, and training the next-generation workforce. The forum will be held on Sunday, Nov. 25, then continue on Monday, Nov. 26 in conjunction with the MRS symposium.

Of particular concern in the area of sustainability is the availability of critical elements for energy, to be addressed in Symposium D. Disruptions in the supply of these materials can impede or prevent the adoption of new technologies and ultimately threaten energy security. The organizers will open the symposium with a panel discussion on global issues on Monday, Nov. 26, 11:00-12:00 p.m. in Hynes, room 313.

In the first session of Symposium ZZ, NSF will hold an interactive communications event helping researchers learn how to explain to the public the relevance of materials research, and, more broadly, the value of scientific research to society. The session will be held on Monday, Nov. 26, 1:30-3:30 p.m., Hynes, room 300.

In the area of entrepreneurship, Symposium AAA is holding a roundtable where venture capitalists, lawyers, CEOs, patent attorneys, and bankers will gather to offer their time and advice to potential founder candidates of start-up companies. This is scheduled for Wednesday, Nov. 28, 1:30-5:00 p.m. in Hynes, room 205. The traditional Tech-

nology Innovation Forum will precede that on Monday, Nov. 26, 8:30-12:00 p.m. in the Sheraton Hotel, room Back Bay B.

MRS will also host a Congressional Fellowship Program Information Session on Wednesday, Nov. 28, 5:00-6:15 p.m. in Fairfax B at the Sheraton. Materials researchers will be able to hear about opportunities to participate in, and contribute to, the federal policymaking process, while learning firsthand about the intersection of science and US government policy.

A number of other events will also take place throughout the Meeting, including the Professional Development Workshop on "Achieving success through implementation of effective work-life satisfaction and mentoring strategies," with speakers Masha Fridkis-Hareli and Cindy Simpson, and a Career Center for meeting attendees, to be held Nov. 27-29 at the Hynes Convention Center. 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/fall2012.

For more information

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

The deadline to pre-register for the meeting is November 9, 2012, 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/fall2012.





Hynes Convention Center · Level 2

Tuesday, November 27 • 11:00 am – 5:30 pm Wednesday, November 28 • 11:00 am - 6:00 pm Thursday, November 29 • 10:00 am - 1:30 pm

10 Angstroms A & N Corporation Across International LLC **ACS Publications** AdValue Technology, LLC Advanced Polymer Materials Inc. Advanced Research Systems, Inc. Agilent Technologies AIP Publishing AIST-NT, Inc. AIXTRON SE AJA International, Inc. AldLab Chemicals LLC Aldrich Materials Science Alfa Aesar, a Johnson Matthey Company Alfred University Alicat Scientific, Inc. Amastan LLC American Physical Society ANA Innovation Labs and Services Inc. Anasys Instruments Corp. Andeen-Hagerling, Inc. Anfatec Instruments AG Angstrom Engineering Inc. Angstrom Sciences Inc. Angstrom Scientific Inc. Angstrom Sun Technologies, Inc. Annealsys Apple Academic Press, Inc. Applied NanoStructures, Inc. Applied Surface Technologies Arradiance, Inc. Asahi Spectra Co., Ltd. ASMEC GmbH Asylum Research ³

attocube systems AG Attolight AG AVS B&W Tek, Inc.

Baden-Wurttemberg International Balazs NanoAnalysis

a Division of Air Liquide BaySpec, Inc.

BigC: DinoLite Scopes Biolin Scientific, Inc. BioLogic USA

Blue Wave Semiconductors, Inc.

Brooks Automation, Inc.

Cambridge NanoTech Inc. Cambridge University Press Capovani Brothers Inc. Carl Zeiss Microscopy, LLC

Chemat Technology, Inc. ColdEdge Technologies, Inc.

COMSOL, Inc. CRAIC Technologies, Inc.

Cryogenic Limited

Crystal Bank CRYSTAL GmbH CrystalMaker Software Ltd. CSM Instruments Inc. cyberTECHNOLOGIES USA, LLC DCA Instruments, Inc.

DELMIC BV Delong America Inc.

Denton Vacuum, LLC Digital Surf SARL EBARA Technologies, Inc.

Ecopia Corp. eDAQ, Inc.

Electron Microscopy Sciences

EM4SYS Co., Ltd.

Energetiq Technology, Inc. European Synchrotron Radiation Facility/

Institut Laue Langevin FEI Company

First Nano, a division

of CVD Equipment Corp. Fischer Technology, Inc.

Fischione Instruments Flow Sciences, Inc.

FUJIFILM Dimatix, Inc. Gamry Instruments

Gatan, Inc.

Geib Refining Corporation Goodfellow Corporation

Guangzhou Mikrouna Mechatronics Technology Co., Ltd.

Hamamatsu Corporation HeatWave Labs, Inc.

Heidelberg Instruments Inc. Herzan LLC

Hiden Isochema Ltd. Hielscher USA, Inc.

Hitachi High Technologies America, Inc.

HORIBA Scientific

Hummingbird Scientific LLC Huntington Mechanical Laboratories, Inc.

Hysitron, Inc. Image Metrology A/S

Imina Technologies

Inel, Inc. INFICON

Innovative Technology, Inc. InstruTech, Inc.

International Centre for Diffraction

Data (ICDD) Intlvac ION-TOF USA, Inc. IOP Publishing iXRF Systems, Inc. Janis Research Company, LLC Japan Advanced Institute of Science and Technology Japan Science and Technology Agency Japan Society of Applied Physics

JASCO JEOL USA, Inc.

Kaufman & Robinson, Inc. Keithley Instruments, Inc. Kimball Physics, Inc KLA-Tencor Corporation

KP Technology Ltd. Kurt J. Lesker Company

Labtec Sales Partners LLC Lake Shore Cryotronics, Inc.

Leica Microsystems Inc.

Lovalite SAS

M. Braun, Inc. MANTIS Deposition Ltd.

McCrone Group MDC Vacuum Products, LLC

Metrohm USA, Inc. Mettler-Toledo, LLC

Michelson Prize & Grants Micro Materials Limited

Micro Photonics Inc.

MicroFab Technologies, Inc. Microtrac Inc.

MicroXact Inc. Mikromasch

Milestone Inc.

MMR Technologies, Inc. *

Molmex Scientific Inc. Montana Instruments Corporation

MTI Corporation MV Laboratories Inc. NanoAndMore USA Inc.

Nanofactory Instruments AB

Nanolnk, Inc. NANOLANE

NanoMagnetics Instruments Ltd. Nanomechanics, Inc.

Nanonics Imaging Ltd. Nanoscience Instruments, Inc.

Nanosurf, Inc.

Nanovea

National Nanotechnology Infrastructure Network

National Reconnaissance Office Nature Publishing Group

Neaspec GmbH Neocera, LLC

Netzsch Instruments N.A. LLC NIST/CNST

NIST/MSD

NOF America Corporation

Nor-Cal Products, Inc. **Novarials Corporation**

NT-MDT Co.

Oerlikon Leybold Vacuum Olympus America

Omicron NanoTechnology USA , LLC OptiGrate Corporation

OriginLab Corporation

Oxford Instruments America Inc. Oxford University Press

PANalytical Inc. Park Systems Inc. 1

Particle Sizing Systems Pascal Technologies Inc.

PerkinElmer Pfeiffer Vacuum

Photon etc. Photon Technology International, Inc.

Physical Electronics Plasma-Therm LLC

Plasmaterials, Inc. Princeton Instruments

Princeton Scientific Corp. Protochips, Inc. PVD Products, Inc. Quantum Design, Inc. Quartz Imaging Corporation R.D. Mathis Company Radiant Technologies, Inc. Refining Systems, Inc. Renishaw Inc. Research and PVD Materials Corporation RHK Technology, Inc.
Rigaku Americas Corporation

Rigaku Innovative Technologies, Inc. Rigaku Raman Technologies Rocky Mountain Vacuum Tech, Inc.

RSC Publishing

S.E.O. (Surface Electro Optics) SAGE Publications

Scientific Instruments, Inc. Seki Diamond Systems

SemiconSoft, Inc. Semicore Equipment Inc.

Sentys Inc. Solartron Analytical (AMETEK)

SonoPlot, Inc. SouthWest NanoTechnologies Inc.

(SWeNT) SPECS Surface Nano Analysis, Inc.

SPEX SamplePrep LLC SPI Supplies, Division of Structure Probe, Inc.

Springer

STAIB Instruments, Inc.

Strem Chemicals, Inc. 3

Structured Materials Industries, Inc. Super Conductor Materials, Inc.

SVT Associates, Inc.

TA Instruments *

Taylor & Francis-CRC Press Taylor Hobson, a Division of Ametek

TCI America Ted Pella, Inc. Tescan USA Inc.

The Mellen Company, Inc. Thermionics Vacuum Products

Thermo Scientific Toho Technology Inc.

Toshima Manufacturing Co., Ltd.

TREK, INC. Trion Technology, Inc.

TSI Inc. UES, Inc.

ULVAC Technologies, Inc. United Mineral & Chemical Corporation

USHIO America, Inc. Vacuum Atmospheres Company

VAT, Inc. VG Scienta, Inc.

Vigor Gas Purification Technologies Inc. Wafer World Inc.

Wiley

XOS

WITec Instruments Corp. J.A. Woollam Company, Inc. World Scientific Publishing Co.

XEI Scientific, Inc. Xolve, Inc.

Xradia Yeagle Technology Inc. Zeta Instruments Zygo Corporation

*See Ad in This Issue

Join us for a

Wine & Cheese **Happy Hour Reception**

on Wednesday from 5:00 to 6:00 pm



FALL MEETING Symposium Proceedings

These books are scheduled for publication by spring or early summer 2013.

FORTHCOMING FROM MRS
AT SPECIAL PRE-MEETING PRICES...

Place your order today for proceedings of the 2012 MRS Fall Meeting in Boston and SAVE!

Special prices (on left) effective until publication date. After publication date, the higher prices (on right) will go into effect.

Order at the Publications Sales desk at the 2012 MRS Fall Meeting in Boston or online at www.cambridge.org/us/mrsproceedings.

NOTE All volumes on this list will also be published electronically as part of the *MRS Online Proceedings Library (OPL),* now available at Cambridge Journals Online, and FREE for all current MRS Members.

Nonmembers and institutions can purchase a 12-month unlimited access package to the *OPL*. In the Americas, contact Andrea J. Cernichiari at acernichiari@cambridge.org for details. Outside the Americas, contact inlsales@cambridge.org.

B: Thermoelectric Materials Research and Device Development for Power Conversion and Refrigeration

Editors: G.S. Nolas, Y. Grin, A. Thompson, D. Johnson

ISBN: 978-1-60511-467-5 Volume: 1490 \$ 72.00 \$ 79.00 MRS Members \$ 90.00 \$ 99.00 Nonmembers

D/G: Materials for Sustainable Development—Challenges and Opportunities Editors: M-I. Baraton, S. Duclos, L. Espinal, A. King, S.S. Mao, J. Poate,

M.M. Poulton, E. Traversa ISBN: 978-1-60511-469-9 Volume: 1492 \$ 72.00 \$ 79.00 MRS Members \$ 90.00 \$ 99.00 Nonmembers

E/H: Photovoltaic Technologies, Devices and Systems Based on Inorganic Materials, Small Organic Molecules and Hybrids

Editors: K.A. Sablon, J. Heier, S.R. Tatavarti, L. Fu, F.A. Nuesch, C.J. Brabec,

B. Kippelen, Z. Wang, D.C. Olson

ISBN: 978-1-60511-470-5 Volume: 1493 \$100.00 \$112.00 MRS Members \$126.00 \$140.00 Nonmembers

F/Z: Oxide Semiconductors and Thin Films

Editors: A. Schleife, M. Allen, S.M. Durbin, T. Veal, C.W. Schneider,

C.B. Arnold, N. Pryds

 ISBN: 978-1-60511-471-2
 Volume: 1494

 \$100.00
 \$112.00
 MRS Members

 \$126.00
 \$140.00
 Nonmembers

L/M/Q/R/S: Biomimetic, Bio-inspired and Self-Assembled Materials

for Engineered Surfaces and Applications Editors: M.L. Oyen, S.R. Peyton, G.E. Stein

 ISBN: 978-1-60511-475-0
 Volume: 1498

 \$100.00
 \$112.00
 MRS Members

 \$126.00
 \$140.00
 Nonmembers

HH: Advances in Materials for Nuclear Energy

Editors: C.S. Deo, G. Baldinozzi, M.J. Caturia, C-C. Fu, K. Yasuda, Y. Zhang

 ISBN: 978-1-60511-491-0
 Volume: 1514

 \$ 72.00
 \$ 79.00
 MRS Members

 \$ 90.00
 \$ 99.00
 Nonmembers

JJ: Intermetallic-Based Alloys-Science, Technology and Applications

Editors: M. Heilmaier, I. Baker, S. Kumar, K. Yoshimi

KK: Complex Metallic Alloys

Editors: V. Fournée, M. Feuerbacher, Y. Ishii, C. Jenks

 ISBN:978-1-60511-494-1
 Volume: 1517

 \$ 72.00
 \$ 79.00

 \$ 90.00
 \$ 99.00

 Nonmembers

LL: Scientific Basis for Nuclear Waste Management XXXVI

Editors: N. Hyatt, K.M. Fox, K. Idemitsu, C. Poinssot, K. Whittle ISBN: 978-1-60511-495-8 Volume: 1518 **72.00** \$ 79.00 MRS Members **90.00** \$ 99.00 Nonmembers

TT: Defects and Microstructure Complexity in Materials Editors: A. El-Azab, A. Caro, F. Gao, T. Yoshiie, P. Derlet

 ISBN: 978-1-60511-503-0
 Volume: 1526

 \$ 72.00
 \$ 79.00

 \$ 90.00
 \$ 99.00

 Nonmembers