



Meeting Scene...

Presented by the Materials Research Society

2011 MRS Spring Meeting

A Publication of the
Materials Research Society
Advancing materials. Improving the quality of life.

San Francisco, CA
April 25 - 29



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MEETING PREVIEW

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The [2011 Materials Research Society Spring Meeting](#) will be held in San Francisco from April 25-29. The Chairs, Ping Chen, Chang Beom-Eom, Samuel S. Mao, and Ryan O'Hayre, have compiled an outstanding program of 50 technical symposia, broadly divided into the areas of Materials for Energy and Sustainability, Electronic and Photonic Materials, Nanomaterials and Nanotechnology, and Organic and Biomaterials.

During the Meeting, we will be sending you a summary of highlights from the preceding day. The Kavli Lecture; the Plenary Session; the Technology Innovation Forum; the awards session; the OYI talk; Symposium X - frontiers of materials research; Poster award winners; the Science as Art competition; a sampling of exciting technical talks, and much, much more. Some of the anticipated highlights of the Meeting are previewed below.



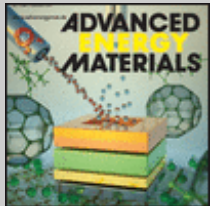
MEETING PREVIEW

- [Technical Program](#)
- [Plenary and Awards Sessions](#)
- [Special Events](#)

Other Links of Interest

- [Daily Event Schedule](#)
- [Itinerary Planner](#)
- [View Presentation Guidelines](#)

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TECHNICAL PROGRAM

■ [Technical Program](#)

Technical sessions include a core of 51 technical symposia in five topical clusters:

Materials for Energy and Sustainability

- [Symposium A:](#) Amorphous and Polycrystalline Thin-Film Silicon Science and Technology
- [Symposium B:](#) Third-Generation and Emerging Solar-Cell Technologies
- [Symposium C:](#) Advanced Materials Processing for Scalable Solar-Cell Manufacturing
- [Symposium D:](#) Compound Semiconductors for Energy Applications and Environmental Sustainability
- [Symposium E:](#) Energy Harvesting--From Fundamentals to Devices
- [Symposium F:](#) Renewable Fuels and Nanotechnology
- [Symposium G:](#) Complex Oxide Materials for Emerging Energy Technologies
- [Symposium H:](#) Electrochromic Materials and Devices
- [Symposium I:](#) Nanoscale Heat Transfer--Thermoelectrics, Thermophotovoltaics, and Emerging Thermal Devices
- [Symposium J:](#) Protons in Solids
- [Symposium K:](#) Frontiers of Solid-State Ionics
- [Symposium L:](#) Interfacial Phenomena and In-situ Techniques for Electrochemical Energy Storage and Conversion
- [Symposium M:](#) Nanostructured Materials for Energy Storage
- [Symposium N:](#) Recent Developments in Materials for Hydrogen Storage and Carbon-Capture Technologies

Electronic and Photonic Materials

- [Symposium O:](#) Materials, Processes, and Reliability for Advanced Interconnects for Micro- and Nanoelectronics
- [Symposium P:](#) Interface Engineering for Post-CMOS Emerging Channel Materials
- [Symposium Q:](#) New Functional Materials and Emerging Device Architectures for Nonvolatile Memories
- [Symposium R:](#) Phase-Change Materials for Memory and Reconfigurable Electronics Applications
- [Symposium S:](#) Plasma-Assisted Materials Processing and Synthesis
- [Symposium T:](#) High-Speed and Large-Area Printing of Micro/Nanostructures and Devices
- [Symposium U:](#) Nuclear Radiation Detection Materials
- [Symposium V:](#) Rare-Earth Doping of Advanced Materials for Photonic Applications
- [Symposium W:](#) Recent Progress in Metamaterials and Plasmonics

Nanomaterials and Nanotechnology

- [Symposium Y:](#) Functional Two-Dimensional Layered Materials
- [Symposium Z:](#) Nanoscale Electromechanics of Inorganic, Macromolecular, and Biological Systems
- [Symposium AA:](#) Micro- and Nanofluidic Systems for Materials Synthesis, Device Assembly, and Bioanalysis II
- [Symposium BB:](#) Nanoscale Heat Transport--From Fundamentals to Devices
- [Symposium CC:](#) Hybrid Interfaces and Devices
- [Symposium DD:](#) Quantitative Characterization of Nanostructured Materials



[Nanofactory Instruments](#)

In situ TEM/SPM; AFM-TEM
Systems; TEM Nanoindentation
Visit Booth 215



[Global Foundries](#)

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- [Symposium EE](#): Semiconductor Nanowires--From Fundamentals to Applications
- [Symposium FF](#): Surfaces and Nanomaterials for Catalysis through In-situ or Ex-situ Studies
- [Symposium GG](#): Titanium Dioxide Nanomaterials
- [Symposium HH](#): The Business of Nanotechnology III
- [Symposium II](#): Ion Beams--New Applications from Mesoscale to Nanoscale

Organic and Biomaterials

- [Symposium JJ](#): Biological Hybrid Materials for Life Sciences
- [Symposium KK](#): Microbial Life on Surfaces--Biofilm-Material Interactions
- [Symposium LL](#): Biomimetic Engineering of Micro- and Nanoparticles
- [Symposium MM](#): Organic Bioelectronics and Photonics for Sensing and Regulation
- [Symposium NN](#): Electronic Organic and Inorganic Hybrid Nanomaterials--Synthesis, Device Physics, and Their Applications
- [Symposium OO](#): Synthesis and Processing of Organic and Polymeric Materials for Semiconductor Applications
- [Symposium PP](#): Engineering Polymers for Stem-Cell-Fate Regulation and Regenerative Medicine

General Materials Science

- [Symposium X](#): Frontiers of Materials Research
- [Symposium QQ](#): Carbon Functional Interfaces
- [Symposium RR](#): Fundamental Science of Defects and Microstructure in Advanced Materials for Energy
- [Symposium SS](#): Forum on Materials Education and Evaluation--K-12, Undergraduate, Graduate, and Informal
- [Symposium TT](#): Laser-Material Interactions at Micro/Nanoscales
- [Symposium UU](#): Crystalline Nanoporous Framework Materials--Applications and Technological Feasibility
- [Symposium VV](#): Future Directions in High-Temperature Superconductivity--New Materials and Applications
- [Symposium WW](#): Multiferroic, Ferroelectric, and Functional Materials, Interfaces, and Heterostructures
- [Symposium XX](#): Computational Studies of Phase Stability and Microstructure Evolution
- [Symposium YY](#): Computational Semiconductor Materials Science

General Interest

Symposium X: Frontiers of Materials Research

[Abstracts](#) for all talks are also available.

■ [Symposium X - Frontiers of Materials Research](#)



Symposium X includes invited talks by specialists, which are authoritative reviews for nonspecialists. The Symposium X talks will be held in the Exhibit Hall.

From Mud and Electrodes to Catalysts and Conductive Nanomaterials

Leonard Tender, Naval Research Laboratory, Washington, District of Columbia.
(Tuesday, April 26, 2011, 12:15 p.m.)

Superconductivity at 100 - The Achievements, the Promises and the New Challenges

David C. Larbalestier, NHMFL-FSU, Tallahassee, Florida.
(Wednesday, April 27, 2011, 12:15 p.m.)

Non-oxide Materials for Photocatalytic Water Splitting under Visible Light

Kazunari Domen, School of Engineering, The University of Tokyo, Tokyo, Japan.
(Thursday, April 28, 2011, 12:15 p.m.)

■ [The Exhibit](#)

The Materials Research Society invites your participation in the 2011 MRS Spring Exhibit. Set for April 26-28, 2011, at Moscone West, the MRS Spring Exhibit provides a unique opportunity to present innovative products and services to over 5,000 attendees from all sectors of the global materials science and engineering communities.



Location

Moscone West (Level 1)
800 Howard Street
San Francisco, CA 94103

Exhibit Hours

Tuesday, April 26 -- 11:00 am to 2:00 pm and 4:30 pm to 8:30 pm; Poster Session 5:00 to 8:00 pm
Wednesday, April 27 -- 11:00 am to 5:00 pm
Thursday, April 28 -- 10:00 am to 1:30 pm

View a list of the [2011 MRS Spring Meeting Exhibitors](#)

Download a [Complimentary Exhibit Pass](#)

■ [Technology Innovation Forum](#)

*Wednesday, April 27, 8:30 AM- 12:00 Noon
Moscone West, Level 3, Room 3005*

Join us for our second annual Technology Innovation Forum—Transitioning Materials for New Markets: Future Power and Energy Needs. The Forum provides a stage for industry leaders and venture capitalists to discuss their strategic goals, marketing philosophies and technology needs, with the intent of finding a materials “match” for future communication, innovation and

partnership.

8:30 am

University Spin-Outs in Clean Energy: Challenges and Opportunities

Yet-Ming Chiang

Kyocera Professor

Department of Materials Science and Engineering, MIT

Co-Founder, A123 Systems, Inc.

8:55 am

SunShot: Leveraging Public and Private Capital to Achieve National Objectives in Solar Energy

Minh Le

Chief Engineer

Solar Energy Technologies Program

U.S. Department of Engineering

9:20 am

Commercializing Early Stage Research

David H. Wells

Greentech Team

Kleiner Perkins Caufield & Byers

10:15 am

Crossing the Chasm from Lab to Fab—A Corporate Venture Perspective

Anand Kamannavar

Associate Investment Manager

Applied Ventures, LLC

10:40 am

Corporate Venture Capital: Sustaining US Commercialization In Breakthrough Materials

David J. Parrillo

Global R&D Director

The Dow Chemical Company

Solar Solutions R&D

11:05 am

Interesting or Innovative: Thoughts on Commercialization of Nanomaterials

Brent M. Segal

Director of Research Science

Lockheed Martin Corporation

11:30 am

Panel Discussion

■ [Tutorials](#)

A total of 8 tutorials are scheduled. Meeting registrants can attend the tutorials for free - there is a nominal charge for the optional tutorial notes.

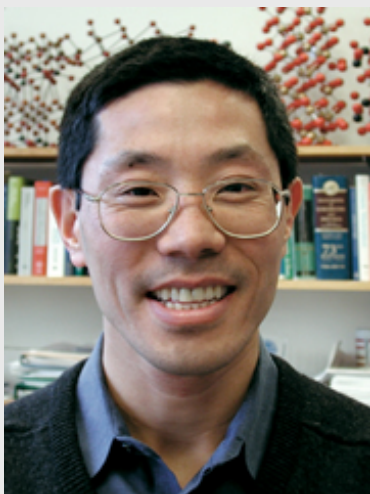
- [Tutorial A: Thin-Film Silicon Materials and Devices for Large-Area and Flexible Solar Cells and Electronics](#)
- [Tutorial C/D: Solar Photovoltaics - Materials, Devices Fundamentals, and Manufacturing Considerations](#)
- [Tutorial Q: Fundamentals of Emerging New Nonvolatile Memories](#)
- [Tutorial R: Overview of Phase-Change Materials, Their Physics and Applications](#)
- [Tutorial S: Plasma Deposition Tools-Growth Phenomena and Selection Criteria](#)
- [Tutorial Z: Piezoresponse Force Microscopy and its Applications in Energy Materials and](#)

[Biological Systems](#)

- [Tutorial KK: Imaging Biofilms and Quantifying Structures](#)
- [Tutorial SS: Developing Materials Science Activities for Everyone](#)

[PLENARY AND AWARDS SESSIONS](#)

■ [Plenary Session](#)



Yet Ming Chiang, Massachusetts Institute of Technology
Wednesday, April 27, 6:30 pm
Marriott Marquis Hotel

Materials, Systems, and Manufacturing Challenges for Electrochemical Storage at Transportation and Grid Scales

■ [Fred Kavli Distinguished Lectureship In Nanoscience](#)



Xiang Zhang, University of California, Berkeley
Monday, April 25, 7:00 pm
Marriott Marquis Hotel, Golden Gate Ballroom

Metamaterials -- Creating Properties that Do Not Exist in Nature

Recent theory predicted a new class of photonic composite materials whose properties, derived by structure rather than chemical compositions, promise unprecedented electromagnetic properties

that do not exist in nature, such as optical magnetism and negative refraction. Superlens made of metamaterials breaks the fundamental diffraction limit, which may have a profound impact on a wide range of applications such as nanoscale photonics, electronics manufacturing, and biomedical imaging.

I'll discuss recent progress that demonstrated the intriguing physics. We created the first bulk optical metamaterials that show the negative refractions. We demonstrated the superlens and optical cloak using carefully designed plasmonic materials dispersions. The recent discoveries on new topological symmetry such as Mobius symmetry in metamaterials reveal a fundamentally new realm of physical properties that do not occur in nature materials. I will further discuss an array of new technologies, including a superlens for nanoscale lithography that could transform the next generation of nanomanufacturing and plasmon lasers that could act as sources of coherent light on the molecular scale.

■ [Outstanding Young Investigator Award Talk](#)



Dmitri V. Talapin, University of Chicago
Tuesday, April 26, 5:05 pm
Moscone West, Room 3004

Nanocrystal Solids—A Modular Approach to Materials Design

The 2011 MRS OYI Award is presented to Dmitri V. Talapin, University of Chicago, “for methodological developments of synthesis and self-assembly of inorganic nanocrystals and for fundamental studies transforming colloidal nanostructures into electronic and optoelectronic materials.”

■ [Innovation in Materials Characterization Award](#)

Tye T. Gribb, (DTE Research & Design LLC), **Thomas F. Kelly**, and **David J. Larson** (Cameca Instruments, Inc.)
Thursday, April 28, 5:15 pm
Marriott Marquis, Golden Gate A/B



(Left to right) Thomas F. Kelly, Tye T. Gribb, David J. Larson

The Second Revolution in Atom Probe Tomography by Jules Verne

The 2011 IMC Award will be presented to Tye T. Gribb, (DTE Research & Design LLC), Thomas F. Kelly, and David J. Larson (Cameca Instruments, Inc.) “for the highly successful conception, design, fabrication, and commercialization of an ergonomic three-dimensional local-electrode atom probe (LEAP) tomograph that enables the determination of the local composition information, on an atom-by-atom basis, of metallic, semiconducting, ceramic and organic materials, on a subnanometer scale, in direct space, with high mass resolving power and signal-to-noise ratio, permitting the determination of small concentrations of all elements.”

■ [Graduate Student Awards](#)

Talk presentations for GSA finalists will be held from 12:00 noon to 4:00 pm on Tuesday, April 26, in two concurrent sessions in Pacific B/C rooms of the San Francisco Marriott Marquis. The Awards will be presented on Wednesday evening during the Awards Presentation.

SPECIAL EVENTS

■ [Science Education and Outreach Events](#)

Discover an MRS Community of Science Education and Outreach Events

The Materials Research Society is playing a major role to bring the education and research communities together at the 2011 MRS Spring Meeting. Join us for exciting hands-on activities, demonstrations, information areas and seminars to engage future materials scientists and engineers.

Information Areas:

- NISE Network Science Collaborators
- NanoDays 2012 and NISE Network
- Strange Matter
- Hands-on Nano-coffee Hours



[Acta Materialia Gold Medal Forum: Frontiers in Thin-Film Epitaxy and Nanostructured Materials](#)

Monday, April 25
 8:00 am-5:30 pm
 Room 2014, Moscone West Convention Center

Forum sponsored by Kopin Corporation

The forum addresses critical issues related to synthesis and processing, defects and interfaces, atomic and nanoscale characterization, structure-property correlations, and modeling of nanostructured materials. The issues involved with thin films and layered structures, self-assembly processing, control of defects and interfaces, orientation control and epitaxy across the misfit scale, and stability of nanostructures need to be addressed from a materials science perspective. The same is true for bulk structures, innovative processing routes, control of dislocations and grain boundaries, the role of twinning, size-dependent mechanical properties, and the stability of nanostructures, which also need to be considered from that viewpoint. These issues are crucial for the development of test device structures and the transition of materials science for the benefit of society.

[MRS Late Show](#)

Making STUFF with David Pogue: Stronger, Smaller, Cleaner, Smarter
 Monday-Thursday, 10:00-11:00 pm
 Marriott Marquis Hotel | Yerba Buena Salons 4, 5, & 6

Last year we showed previews of *Making Stuff*, a four-part PBS primetime series on materials science produced by a collaboration among MRS, NOVA, the flagship PBS science documentary series, and others. Well, now you can see the whole series at the MRS Spring Meeting! If you missed the broadcast of these four programs on PBS, or even if you didn't, come enjoy the series in the company of your fellow materials scientists.

Copies of the series on DVD will be on sale at the meeting also, so you can take it with you wherever you go:

MAKING STUFF—
four-part series boxed DVD set

Step behind the headlines as *MAKING STUFF* dramatizes the human stories woven into the current wave of hi-tech breakthroughs. Hosted by the New York Times' lively technology correspondent David Pogue. Produced by NOVA and made in collaboration with the Materials Research Society.

SPECIAL PRICE! **\$20** per set

available for purchase at
the 2011 MRS Spring Meeting
Publication Sales, Moscone West

■ [Women in Materials Science & Engineering Breakfast](#)

Speaker: Fiona M. Doyle
 Donald H. McLaughlin Professor of Mineral Engineering
 Department of Materials Science and Engineering, University of California, Berkeley
Wednesday, April 27, 7:00 am
Club Room, Marriott Marquis Hotel

Women and Materials Science and Engineering-Is the “Leaky Pipeline” the Wrong Metaphor?
 Many discussions of the status and degree of participation of women in technical professions refer to the metaphor of the “leaky pipeline” to represent a journey that many embark upon, but few complete. Fiona Doyle believe that this metaphor is inappropriate, even counterproductive, to efforts to diversify the materials profession. Who wants to embark upon a journey with such high odds of being lost? Who wants to be isolated from the real world while being educated? She notes that individuals enter the materials field at different stages of their careers-undergraduate, graduate, postdoc, professional-rather than entering at a specific “inlet”. Similarly, the interactions between materials experts and those in other disciplines (which may result in people moving to other fields of specialization) shouldn’t be considered a loss, but rather a cross-fertilization vital to a broad engineering profession capable of responding to tod ay’s most pressing technical challenges. A metaphor that better captures the reality of the materials profession

seems essential for diversifying the field.

Men and women of materials science are invited to attend this discussion and complimentary breakfast. Advance sign-up required; sign up at MRS Information at the Moscone West by 12:00 noon on Tuesday, April 26.

■ [Government Agency Sessions: Materials Research Support](#)

[Science Policy Forum](#)

Energy Critical Elements -- Securing Materials for Emerging Technologies
Monday, April 25, 1:00 - 2:30 pm
Presenter: Jonathan G. Price, University of Nevada, Reno

Tuesday, April 26

[Intro. Mat Sci. Div. - NSF](#)

6:00-6:45 pm
Marriott Marquis, Yerba Buena 12/13

[DOD Army Research Office \(ARO\)](#)

6:45-7:30 pm
Marriott Marquis, Yerba Buena 14/15

[Air Force Office of Sci. Res \(AFOSR\)](#)

7:30-8:15 pm
Marriott Marquis, Yerba Buena 12/13

Thursday, April 28

[DOE Basic Energy Sciences \(BES\)](#)

6:00-6:45 pm
Marriott Marquis, Yerba Buena 12/13

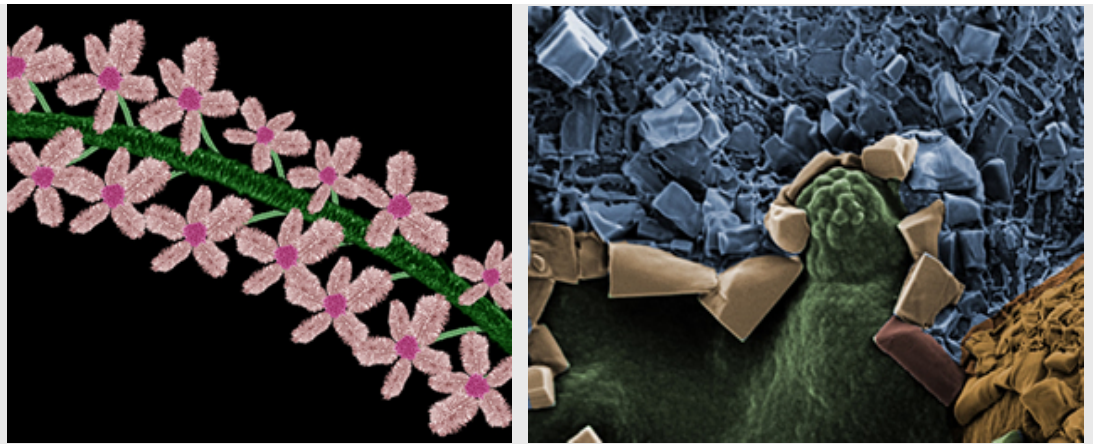
[Office of Naval Research \(ONR\)](#)

6:45--7:30 pm
Marriott Marquis, Yerba Buena 14/15

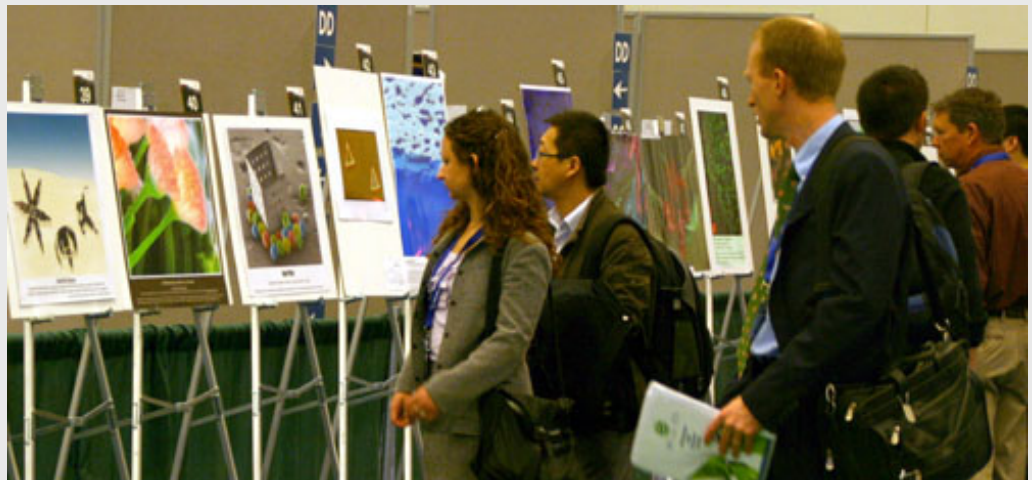
[DOE \(ARPA-E\)](#)

7:30-8:15 pm
Marriott Marquis, Yerba Buena 12/13

■ [Science As Art Competition](#)



As a special feature of the 2011 MRS Spring Meeting in San Francisco, we are continuing the popular "Science as Art" competition. The competition is open to all registered meeting attendees, with entries to be on display in the Moscone West Center. Multiple first-place and second-place awards of \$400 and \$200, respectively, will be presented to the winning entries at the meeting.



■ [Career Center](#)

Looking for a Job? We'll show off your talents to the world's most prestigious high-tech firms, universities and laboratories. At the Career Center, you can access many interesting job postings, visit recruitment booths and interview with prospective employers. Please bring extra copies of your resume for your own use.

The Career Center is FREE of charge to all MRS members and those registered to attend the meeting. Meeting attendees and MRS members may register as a job candidate on-site.

**2011 MRS Spring Meeting Career Center Hours of Operation
Moscone West Center Exhibit Hall (Level 1)**

- Monday, April 25 (Candidate Registration Only)
1:00 pm - 4:00 pm
- Tuesday, April 26
11:00 am - 2:00 pm, 4:30 pm - 6:00 pm
- Wednesday, April 27
11:00 am - 5:00 pm
- Thursday, April 28
10:00 am - 1:30 pm

■ [Professional Development Opportunities](#)

The offerings below are designed to help provide the skills, fundamentals and knowledge needed for both professional development and career enhancement in materials science and engineering.

- [Technical Poster Design Seminar](#)
- [Mastering Science Presentations Instructional Seminar](#)
- [Crafting Successful Broader Impacts Plans For NSF Proposals](#)

[ABOUT THE MEETING SCENE](#)

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