Winter 2013 Newsletter

DMP NEWSLETTER
Division of Material Physics

In this issue

A Message from the Chair

In Memory of Stanford R. Ovshinsky

It is of great sadness to us all to hear of the passing of Stanford R. Ovshinsky. He was a tremendous inspiration to materials physicists. He was a scientist ahead of his time with an amazing love for science, strong social convictions, and superb innovation that pioneered many inventions in the areas of intelligent machines, energy, and information technology. There are few areas of materials physics that he has not had a major impact in ranging from amorphous materials, nickel-metal hydride battery technology, thin film solar panels, flat panel displays, fuel cells, and nonvolatile phase-change memory. The latter field, Ovonics, bears his name. He has showed us all that with passion, enthusiasm, and drive anything is possible. Having started his working life as a machinist and toolmaker, he went on to solve many national and societal needs. He founded a number of companies focused on energy and information technologies including Energy Conversion Laboratory and Energy Conversion Devices, which he founded with his wife Iris, and later Ovshinsky Innovation LLC.

Stanford was made a Fellow of the APS in 1984 “For his contributions to the understanding, applications and development of amorphous electronic materials and devices.” This was in recognition of his outstanding work that was well ahead of its time. He was also a Fellow of AAAS, the Engineering Society of Detroit, and a Member of the Director’s Council at the Michigan Center of Theoretical Physics at the University of Michigan.

Stanford was a strong supporter of young scientists and the Division of Materials Physics. He set up the Ovshinsky Student Travel Awards to assist in the career of young researchers. The Awards were named after Iris Ovshinsky, who had a very strong interest and commitment to scientific education. It was endowed in perpetuity by the Ovshinsky family, their colleagues at Energy Conversion Devices (ECD) companies, and all their numerous friends from many social, intellectual and business relationships. The first student recipients received these awards in 2009 and until now a total of 38 students have received these travel awards.

The members of the scientific community, APS and the Division of Materials Physics will all remember Stanford Ovshinsky for his ingenious and inventive scientific contributions that are relevant to society as well as his inspiration of young scientists. His passing is a great loss to us all and he will be missed. We send our condolences to the Ovshinsky family and friends.

Newsletter

This Newsletter outlines many of the DMP sessions and activities at the upcoming March Meeting, the recipients of the Adler Award and McGroddy Prize, the new APS Fellows who were nominated through the DMP, the DMP student travel award winners, and the newly elected members of the DMP Executive Committee.

Now is the time to propose new Focus Topics for the 2014 March Meeting by contacting Laura Greene, who will be the DMP Program Chair for the 2014 March Meeting in Denver. The DMP focus topics provide an opportunity to gather related talks in distinct and well-defined focus sessions on topics of intense interest; they also provide the opportunity to mix invited and contributed talks in the same forum. Your colleagues will appreciate and benefit from your suggestions, so please see the detailed instructions below and send Laura Greene (lhgreene@illinois.edu) your ideas. After the new focus topics are announced later this year, please consider suggesting invited speakers to the organizers, so that the sessions will include the best possible invited program.

This is also a time to nominate distinguished members of our community for the David Adler Lectureship Award in the Field of Materials Physics, and the James C. McGroddy Prize for New Materials. Both of these awards bring high visibility and recognition to the recipients, so please consider who among your colleagues might be deserving and then put together a nomination packet. See http://www.aps.org/programs/honors/ for details of the nomination processes.

As will be immediately evident from the March Meeting program, materials physics is an exciting and growing field. The DMP membership contributes enormously to every aspect of the field, and the DMP Executive Committee members are very pleased that we can play a role.

We all look forward to seeing you in Baltimore,
Darrell G. Schlom, Chair
Division of Materials Physics

New members of the Executive Committee

The following members were elected to serve in the DMP Executive Committee

Vice Chair: John Mitchell
Member at Large: Julie Borchers
Member at Large: David Tanner
Councilor: James Chelikowsky

We congratulate the new members of the Executive Committee and look forward to their participation and leadership.

Call for DMP Focus Session Topics for 2014 APS March Meeting

The Division of Materials Physics organizes a large number of Focus Topics for each APS March Meeting. A Focus Topic generally consists of a series of sessions, each of which is typically seeded with one invited talk, the remainder of the session being composed of contributed talks (see http://www.aps.org/units/dmp/newsletters/summer2012.cfm for a list of Focus Topics for the 2012 March Meeting). While many Focus Topics are continued from year to year, some are removed and some new topics are added in fields of current interest.

We are now soliciting new ideas for Focus Topics for the 2014 March Meeting, and we hope you will send suggestions. Your suggestions should provide the following information:

- Title of the Focus Topic
- The nominator's name, affiliation, phone number and e-mail address
- Suggestions for possible organizers
- A brief description of the scope of the topic.

Please send your suggestions by March 15 to Laura Greene (lhgreene@illinois.edu), who will be the DMP Program Chair for the 2014 meeting. Suggestions received after March 15 will be reviewed by the DMP Executive Committee if time allows.

March Meeting: Location

The 2013 March Meeting of the APS will take place, March 18-22, 2013 in the Baltimore Convention Center, Baltimore, Maryland. All scientific sessions will be in the Baltimore Convention Center but events and activities may be in Baltimore Convention Center or the Hilton Baltimore Hotel. Check event details for time and place. The Hilton is connected via sky bridge to the Baltimore Convention Center.

For further information see:
http://www.aps.org/meetings/march/index.cfm

For the DMP sponsored sessions see:
http://flux.aps.org/meetings/YR13/MAR13/Unit_MAR13_DMP.pdf

March Meeting: DMP Sponsored Meetings

The Division of Materials Physics will sponsor the following meetings during the 2013 March meeting in Baltimore. This is your opportunity to interact with the Executive Committee and to become informed of the activities of the Division.

The Hilton Baltimore, 401 West Pratt Street • Baltimore, Maryland, 21201 • USA
Phone: 1-443-573-8700

Tuesday March 19th
DCMP/DMP Joint Fellows and Awards reception
5:30-7:00 pm
Key Ballroom 9-10, Hilton Baltimore

DMP Business Meeting
7:00-8:00pm
Holiday Ballroom 1, Hilton Baltimore

The American Physical Society-Division of Materials Physics Ovshinsky Student Travel Awards

The Ovshinsky Student Travel Awards have been established to assist the career of student researchers. The Awards are named after Iris and Stanford Ovshinsky who had a very strong interest and commitment to scientific education. The awards have been endowed by the Ovshinsky family, their colleagues at Energy Conversion Devices (ECD) companies and all their numerous friends from many social, intellectual and business relationships.

The Ovshinsky Student Travel Awards will be presented at the DCMP/DMP New Fellows and Award Winners Reception, Tuesday, March 19, 5:30 p.m. in the Key Ballroom 9-10, Hilton Baltimore

We are extremely grateful to the Ovshinsky family for this award. Special thanks go to Prof. Brian Schwartz who has made this award possible and for all his efforts on behalf of Materials Physics over the years.

The winners of the 2013 Ovshinsky Student Travel Awards for Materials Physics are:

NAME	INSTITUTION
Phillip Barton	University of California, Santa Barbara
Stephen Boona	Michigan State University
Dwaipayan Dasgupta	University of Massachusetts, Amherst
Yanan Geng	Rutgers University
Jason Kawasaki	University of California, Santa Barbara
Moureen Kemei	University of California, Santa Barbara
Hyunsoo Kim	Iowa State University
Xiaochang Miao	University of Florida

Award and Prize Winners

James C. McGroddy Prize for New Materials

John B. Pendry
Imperial College
"For the discovery of metamaterials."
David R. Smith
Duke University
"For the discovery of metamaterials."
Costas M. Soukoulis
Iowa State University
"For the discovery of metamaterials."

David Adler Lectureship Award

Jean-Luc Bredas
Georgia Institute of Technology
"For his outstanding computational studies of the electronic, charge transport, and optical properties of conjugated polymers and related materials and their impact on organic electronics and photonics."

2012 Fellows nominated by DMP:

Blick, Robert H.
University of Wisconsin, Madison
Citation: For his distinctive contributions to the physics of quantum dots and nanomechanical systems, and for his fine contributions to developing new on-chip screening methods for ion channel spectroscopy and mass spectroscopy of proteins

Brock, Joel D.
Cornell University
Citation: For innovative time-resolved and in-situ synchrotron x-ray experiments on the structure, dynamics, and growth mechanisms of complex, low-dimensional systems, including liquid crystals, charge density wave systems, ion-bombarded surfaces, electrodeposition and pulsed-laser deposited complex oxides.

Cammarata, Robert
Johns Hopkins University
Citation: For pioneering contributions to the thermodynamics and mechanics of surfaces, thin films, and nanomaterials, and to the synthesis, processing and mechanical behavior of nanocomposite thin films.

Carpick, Robert W.
University of Pennsylvania
Citation: for his outstanding contributions to developing an atomic-level understanding of the tribological phenomena of friction, adhesion, and wear

Chen, Gang
Massachusetts Institute of Technology
Citation: For pioneering contributions to the understanding of heat transfer at nanoscale and to the development of thermoelectric energy conversion technologies

Gopalan, Venkatraman
Pennsylvania State University
Citation: For his insightful use of symmetry combined with optical and scanning probe methods to better understand domain walls and the influence of defects, rotations, and strain on ferroelectrics and multiferroics.

Hersam, Mark C.
Northwestern University
Citation: For pioneering research on the fundamentals and applications of nanoelectronic materials, including the development of methods for sorting carbon nanotubes and graphene, and for chemical functionalization of semiconductor surfaces

Kuk, Young
Seoul National University
Citation: For seminal work in understanding the geometric and electronic properties of carbon-based nanomaterials, including fullerenes, nanotubes and graphene, and pioneering contributions in the development of scanning probe microscopy and structural determination of material surfaces

Lin, Jingyu
Texas Tech University
Citation: For her seminal contributions to our fundamental understanding of the electronic and optical properties of the group III-nitride semiconductors and her significant impact on the use of these materials for nanophotonic devices.

Mathur, Neil D.
University of Cambridge
Citation: For seminal contributions to the science and technology of magnetic and multiferroic oxides

McCartney, Matha R.
Arizona State University
Citation: For outstanding contributions to the development of off-axis electron holography and applications to the quantification of nanoscale electrostatic and magnetic fields

Ohno, Hideo
Tohoku University
Citation: For outstanding research in materials and device physics, especially the observation of ferromagnetism in magnetically doped III-V semiconductors and their application to spintronics.

Redwing, Joan
Pennsylvania State University
Citation: For key contributions to the mechanistic understanding of materials synthesis by vapor growth, including Si and SiGe nanowires, group-III nitrides and boride-based superconductors.

Sinnott, Susan B.
University of Florida
Citation: For significant contributions developing and applying atomistic methods to investigate the physical and chemical properties of nanomaterials, material surfaces, and interfaces

Stemmer, Susanne
University of California, Santa Barbara
Citation: For major contributions to molecular beam epitaxy of oxide thin films, the development of new dielectrics for compound semiconductors, and the advancement of transmission electron microscopy as a quantitative tool in materials science.

Zhang, Qiming
Pennsylvania State University
Citation: For his pioneering work in electroactive polymers in exploiting defect modifications to significantly enhance the performance of materials and in advancing their application for energy conversion and energy storage

March Meeting: DMP Sponsored Symposia & Special Events

I. Session B47: Invited Session: Physical Organizing Principles of Biomineral Formation

Sponsoring Units: DBIO DMP
Room: Hilton Baltimore Holiday Ballroom 6; Monday, March 18, 2013 11:15AM - 1:39PM

11:15AM
B47.00001 Phase transitions and their energetics in calcite biominerals
Invited Speaker: PUPA GILBERT, University of Wisconsin – Madison

11:51AM
B47.00002 Bottom-up molecular models of hierarchical mineralized tissues: Structure, mechanics, biology
Invited Speaker: MARKUS J. BUEHLER, Massachusetts Institute of Technology

12:27PM
B47.00003 Reverse engineering biological crystal growth
Invited Speaker: DERK JOESTER, Northwestern University

1:03PM
B47.00004 Bio-Inspired Approaches to Crystals with Composite Structures
Invited Speaker: FIONA MELDRUM, University of Leeds

II. Session C3: Invited Session: Metamaterials

Sponsoring Unit: DMP
Room: Ballroom III; Monday, March 18, 2013 2:30PM - 6:06PM

2:30PM
C3.00001 **James C. McGroddy Prize for New Materials Lecture:** Transformation optics shapes metamaterials
Invited Speaker: JOHN PENDRY, Imperial College London

3:06PM
C3.00002 **James C. McGroddy Prize Talk:** TBD No abstract available
Invited Speaker: DAVID SMITH, Duke University

3:42PM
C3.00003 **James C. McGroddy Prize Talk:** Photonic Metamaterials: Review, Challenging and Opportunities
Invited Speaker: COSTAS SOUKOULIS, Ames Lab/Iowa State University, USA & IESL-FORTH, Greece

4:18PM
C3.00004 Three-dimensional Chiral Plasmonic Oligomers
Invited Speaker: MARIO HENTSCHEL, 4th Physics Institute and Research Center SCoPE, University of Stuttgart

4:54PM
C3.00005 TBD No abstract available
Invited Speaker: XIANG ZHANG, University of California-Berkeley

5:30PM
C3.00006 TBD No abstract available
Invited Speaker: MARTIN WEGENER, Karlsruhe Institute of Technology

III Session N3: Invited Session: Physics For Everyone

Sponsoring Unit: DMP
Room: Ballroom III; Wednesday, March 20, 2013 11:15AM - 1:39PM

11:15AM
N3.00001 New ways to engage the public with quantum physics
Invited Speaker: JULIEN BOBROFF, Laboratoire de Physique des Solides, Universite Paris Sud & CNRS

11:51AM
N3.00002: The Physics of NASCAR: Why Going Fast is Harder than You Might Think
Invited Speaker: DIANDRA LESLIE-PELECKY, West Virginia University

12:27PM
N3.00003 How the “Blues” reveals the intimacy of music and physics
Invited Speaker: J. MURRAY GIBSON, Northeastern University, College of Science

1:03PM
N3.00004 How Plastics Work
Invited Speaker: LOUIS BLOOMFIELD, University of Virginia

1:39PM
N3.00005 Looking at Art in the IR and UV
Invited Speaker: CHARLES FALCO, University of Arizona

IV Lunch with the Experts (Graduate Students)

Room: Convention Center, Sharp Street Lobby; Wednesday, March 20, 3013 12:00 PM. - 1:30 PM

Graduate students may sign up to enjoy a complimentary box-lunch while participating in an informal discussion with an expert on a topic of interest to them.
Topics Include:

Division on Materials Physics (DMP) Sponsored Topics:
Interdisciplinary Science of Nanoscale Junctions
Mark Hybertson, Brookhaven National Laboratory
Computational Materials Physics: From Laptops to Supercomputers
Bruce Harmon, Ames Laboratory
Metal and Semiconductor Nanoparticles
Matthew Pelton, Argonne National Laboratory
Multifunctional Materials and Spintronics
Chris Palmstrøm, University of California at Santa Barbara

V Session U33: Focus Session: Organic Electronics and Photonics - Organic Photovoltaics I - Theory and Processing

Sponsoring Unit: DMP
Room: 346; Thursday, March 21, 2013 11:15AM - 2:15PM

11:15AM
U33.00001 **David Adler Lectureship Award in the Field of Materials Physics Lecture**
Invited Speaker: JEAN-LUC BREDAS, Georgia Institute of Technology

VI Session W1: Invited Session: Superconductivity at High Pressure

Sponsoring Units: DCMP DMP
Room: Ballroom I; Thursday, March 21, 2013 2:30PM - 5:30PM

2:30PM
W1.00001 Achieving higher TC superconductivity in dense cuprates, iron selenides, and hydrocarbons
Invited Speaker: XIAO-JIA CHEN, Geophysical Laboratory, Carnegie Institution of Washington

3:06PM
W1.00002 Elemental superconductivity at high pressure1
Invited Speaker: KATSUYA SHIMIZU, KYOKUGEN, Osaka University

3:42PM
W1.00003 NMR Studies of Novel Electronic Phases in Low Dimensional Molecular Solids at High Pressure and Low Temperature
Invited Speaker: STUART BROWN, UCLA

4:18PM
W1.00004 Pressure effects in cuprate and iron-based superconductors studied by muon spin rotation
Invited Speaker: HUGO KELLER, University of Zurich

4:54PM
W1.00005 Pressure tuning of magnetic fluctuation and superconductivity in $CeCoIn_5$
Invited Speaker: CARMEN ALMASAN, Kent State University

March Meeting: APS Special Symposia & Events

Session D1 APS Prizes and Awards Ceremonial Session

Sponsor: APS
Room: Hilton Baltimore Key Ballroom 8, Monday, March 18, 2013 5:45PM
Chair: Michael Turner, American Physical Society and University of Chicago

- Prizes and awards will be bestowed on several individuals for outstanding contributions to physics. Please plan on attending the Awards Program and join us in honoring these individuals. The names of the awards and awardees will be included in the printed Preamble distributed at the Meeting.

- The Welcome Reception will begin immediately following the Awards Program.

Session E11 Special Outreach Session: Meso-Physics

Sponsor: APS
Room: 310; Monday, March 18, 2013 7:30PM – 8:30PM
Chair: *Laura H. Greene, University of Illinois at Urbana-Champaign*

7:30PM
E11.00001: Meso Scale Science: Challenges and Opportunities
Invited Speaker: Harriet Kung, Basic Energy Sciences, Department of Energy, Office of Science

7:50PM
E11.00002: From Quanta to the Continuum: Opportunities for Mesoscale Science
Invited Speaker: George Crabtree, Argonne National Laboratory, Univ. of Illinois at Chicago

Session R0 Kavli Foundation Special Session: Forefront Physics for Real World Problems: Energy, Climate, and the Environment

Sponsor: APS
Chair: Michael Turner, APS President and University of Chicago
Room: Hilton Baltimore Key Ballroom; Wednesday, March 20, 2013 2:30PM – 5:30PM

2:30PM
R.00001: The Promise of Photovoltaics
Invited Speaker: Steven Chu, Secretary, U.S. Department of Energy

3:06PM
R.00002: Earth's Climate History from Glaciers and Ice Cores
Invited Speaker: Lonnie Thompson, Ohio State University

3:42PM
R.00003: Physical Controls of the Earth's Climate and Climate Change
Invited Speaker: Graeme Stephens, JPl, California Institute of Technology

4:18PM
R.00004: Environmental Forensics: Molecular Insight into Oil Spill Weathering Helps Advance High Magnetic Field FT-ICR Mass Spectrometry
Invited Speaker: Amy McKenna, National High Magnetic Field Laboratory

4:54PM
R.00005: Forefront Research in Batteries for Electric Vehicles
Invited Speaker: Stephen Harris, General Motors

Session S19 Funding Opportunities in Europe for Creative Minds from Anywhere in the World

Room: 321; Wednesday, March 20, 2013 5:45PM - 6:30PM

S19.00001: Funding Opportunities in Europe for Creative Minds from Anywhere in the World
Georgios Tzamalis, European Research Council

Session S22 The Status of NSF-DMR in FY13

Sponsor: NSF
Room: 324; Wednesday, March 20, 2013 5:45PM – 7:45PM

S22.00001 : The status of NSF-DMR in FY13
Invited Speaker: Mary Galvin-Donoghue, DMR, NSF

Session S48 Special Evening Event Hosted by the Editors of Physics

Sponsor: APS
Chair: *Jessica Thomas, Editor, Physics*
Room: Ballroom IV; Wednesday, March 20, 2013 7:30PM – 9:00PM

7:30PM
S48.00001: Social Gathering with Pizza and Beer

8:00PM
S48.00002: Why Condensed Matter Physicists Should Pay Attention to Atomic Physics
Invited Speaker: William D. Phillips, Joint Quantum Institute, NIST

Session X1 Nobel Prize Session: 2012 Nobel Prize Perspectives

Sponsor: APS
Chair: Daniel Lidar, University of Southern California
Room: Ballroom I; Thursday, March 21, 2013 5:45PM - 7:15PM

5:45PM
X1.00001: Controlling photons in a box and exploring the quantum to classical boundary
Invited Speaker: Serge Haroche, College de France, Ecole Normale Superieure

6:30PM
X1.00002: Superposition, Entanglement, and Raising Schroedinger's Cat
Invited Speaker: David J. Wineland, National Institute of Standards and Technology

March Meeting: Premeeting Workshops

Energy Workshop

Rooms: Convention Center Rooms 339-340; Sunday March 17, 2013 8:30 PM - 5:30 PM

Attendance is restricted to invitees who have submitted an application and been selected by a review panel.

A one-day workshop for graduate students and postdocs highlights the contributions physics-related research can make towards meeting the nation's energy needs in environmentally friendly ways. The workshop is aimed at young physicists who are concerned about the environment and who would like to find ways to use their scientific and quantitative skills to help meet the challenges that the world faces.
The workshop features plenary talks by leaders in the field of energy research. After an overview talk, there will be eight talks on different cutting-edge research areas. Each talk is aimed at the level of physics graduate students who are not experts in energy research. The goal of the workshop is to provide information to physics graduate students and postdocs on how they can contribute to energy and environmental solutions while doing exciting scientific research.

March Meeting: Tutorials

Sunday, March 17
Convention Center
Tutorial Program Chair: Mark Johnson, Naval Research Laboratory

Morning Tutorials
Convention Center
8:30 a.m. - 12:30 p.m.

Tutorial #1: New Directions in Biological Physics
Room 314
Tutorial #2: Complex Oxides
Room 315
Tutorial #3: Spintronics
Room 316
Tutorial #4: Quantum Information and Computation for Quantum Chemistry
Room 317

Afternoon Tutorials
Convention Center
1:30 p.m. - 5:30 p.m.

Tutorial #5: Jamming
Room 314
Tutorial #6: Graphene
Room 315
Tutorial #7: Quantum Optics of Quantum Dots
Room 316
Tutorial #8: Fundamental Science and Applications of Plasmonic Metamaterials
Room 317

March Meeting: Editorial Events:

Meet the Editors of APS Coffee Break
Tuesday, March 19 • 10:45 a.m. - 11:30 a.m.
Convention Center, Exhibit Hall EF
Wednesday, March 20 • 10:45 a.m. - 11:30 a.m.
Convention Center, Exhibit Hall EF

Tutorial for Authors & Referees
Wednesday, March 20 • 8:00 a.m. - 9:30 a.m.
Hilton Baltimore, Key Ballroom 9-10

Special Evening Event Hosted by the Editors of Physics
Wednesday, March 20 • 7:30 p.m. - 9:00 p.m.
Convention Center, Ballroom IV
APS Journals Booth
Tuesday, March 19 • 10:00 a.m. - 5:00 p.m.
Wednesday, March 20 • 10:00 a.m. - 5:00 p.m.
Thursday, March 21 • 10:00 a.m. - 4:00 p.m.
Convention Center, Exhibit Hall EF

DMP Executive Committee

The Executive Committee Officers for the 2012-2013 year, who begin their terms immediately following the March meeting in Baltimore, are:

Chair: Darrell G. Schlom (03/11-03/12)
Cornell University
Chair-Elect: David Cahill (03/11-03/12)
Univ. of Illinois Urbana Champaign
Vice Chair: Laura Greene (03/12-03/13)
Univ. of Illinois Urbana Champaign
*Vice Chair: John Mitchell (03/13-03/14)
Argonne National Laboratory
Past Chair: Peter Schiffer (03/11 – 03/12)
Penn State University
Secretary/Treasurer: Chris Palmstrøm (03/11-03/14)
University of California, Santa Barbara
*Councilor: James Robert Chelikowsky (01/13 - 12/16)
University of Texas, Austin

Members-at-Large:

Amanda Petford-Long (03/10 – 03/13)
Argonne National Laboratory
Philip Duxbury (03/10 – 03/13)
Michigan State University
Bruce Harmon (03/11 - 03/14)
Ames Laboratory
Charles Ahn (03/11 - 03/14)
Yale University
Mark Hybertsen (03/12 - 03/15)
Brookhaven National Laboratory
Susanne Stemmer (03/12 - 03/15)
University of California, Santa Barbara
*Julie Borchers (03/13 - 03/16)
NIST
*David Tanner (03/13 - 03/16)
University of Florida

*Newly elected