DMP NEWSLETTER
Division of Materials Physics
A Division of The American Physical Society • www.aps.org/units/dmp/ Spring 2004

DATES TO REMEMBER:

May 14, 2004
Deadline for submission of Focus Topic proposals to Lynn A. Boatner

July 1, 2004
Deadline for sending nominations for McGroddy Prize to Morrel H. Cohen

Deadline for sending nominations for Adler Award to Chris J. Palmstrom

Early July
List of 2005 DMP Focus Topics posted on web and e-mailed

August 31, 2004
Deadline for submitting invited speaker suggestions for Focus Topics (via the web)

Dec. 1, 2004
Abstract deadline for March 2005 APS Meeting in LA

In this Issue ...

MESSAGE FROM THE CHAIR

Mission:

The mission of our Division is the advancement and diffusion of knowledge in the field of materials physics. I am humbled by both the awesome task of working to realize our mission, as well as by the vision and leadership of the Chairs who preceded me. Special thanks go to my mentor, Past Chair Jim Chelikowsky. I hope that this letter will engage you in the activities of the DMP in support of its mission. It is an auspicious year that includes the inauguration of the World Year of Physics in 2005, as we will see below…

Montreal:

We have just emerged from the March Meeting in Montreal, the largest in the history of the APS with roughly 6,000 abstracts and a similar number of attendees. Among other activities, we used the occasion to help celebrate this year's Physics Nobel Laureates. DMP sponsored or co-sponsored over 150 sessions in Montreal that featured over 125 invited speakers. This was accomplished by utilizing the excellent skills of 74 organizers clustered in 31 Focus Topics. The organizers were recruited in an open call and supported by members of the DMP Executive Committee. This grand-scale exercise says much about who we are and what we bring to the APS. The numbers show that over 350 people helped focus our program on the nearly 1,800 contributed talks presented. Each year new organizers are recruited. This shows that we are committed to reach out and empower our members.

Awards:

We touched the professional lives of eleven new APS Fellows who were sponsored by DMP. (See: http://www.aps.org/units/dmp/dmpfellows.cfm). This year Chia-Ling Chien of The Johns Hopkins University was our Adler Lectureship recipient, and Loren Pfeiffer of Lucent Technologies was the McGroddy New Materials Prize winner. The selection process to bestow these honors utilizes committees of peers with rotating membership and with procedures that are overseen and reviewed by the Society.Thus, it illustrates our core value of utilizing the democratic process to engage and reward our members.

Identity and Values:

The DMP adds value to APS by serving to welcome the whole spectrum of the materials community. We encompass not only physicists in physics departments, but also those in non-traditional positions, be they materials scientists, chemists, or engineers, in academia, industry, and government-funded research laboratories. We serve as an arm of APS that reaches out to those in related societies, such as AVS, MRS and IEEE. We are over 2,100 strong. We work closely with other units of the APS. Another singular value is that we work to highlight and nurture the quest for new materials, be it via bulk synthesis, top-down, bottom up, or virtual strategies (i.e., via single-crystal growth, lithography, self-assembly, or computer simulation, respectively). New materials and processes serve as a corner-

stone of progress. They are needed for economic prosperity and to serve the strategic interests of the world's population, including the preservation of the environment and its fragile ecosystems for future generations.

Outreach:

In addition to the high profile activities mentioned above, we work to help increase science funding and visibility in our discipline. We co-sponsor Congressional Visits Day in Washington, D.C. to brief staffers of our elected officials in the House and Senate. We work on the annual "Letters to Congress" Program each year, and already helped send over 3,500 letters to urge that U.S. science funding be increased. We also join forces with the other member societies of the Federation of Materials Societies (FMS) to work to increase the impact, visibility, and awareness of the importance of materials research. (See http://www.materialsocieties.org/). Internationally, we are working in solidarity with 30 other countries to celebrate the World Year of Physics in 2005 to encourage the unity of physics, bring the excitement of physics to the public, and inspire a new generation of scientists. It is timed to coincide with the centennial celebration of Albert Einstein's "miraculous year." (See http://www.physics2005.org/). Also, to inspire the next generation we participate in an annual "Lunch with the Experts" program that reached out to dozens of graduate students this year in Montreal. Each year we also have a program to welcome and engage high school physics teachers at our March Meeting. These teachers become energized to touch the imagination of their students in refreshing new ways.

Town Meetings:

In the coming year we are stepping up our activities by launching a series of town meetings. The first was held in Montreal to be followed by a series of regional one-day meetings around the country. The purpose is three-fold: (i) we need to identify the grand challenges in our discipline, (ii) we need to gear up for the next decadal study of physics by the National Academy, and (iii) we need to find new ways to engage science writers so that the popular press will help us to get the message out to the public and to policy-makers in Washington that we deserve their support. To stimulate dialogue, we have started to create a list of questions that should help shape our direction for the next decade. The list below was presented by Jim Chelikowsky at the Town Meeting in Montreal. Reflect on it and send Jim (jrc@msi.umn.edu) your own formulations so that we can create refined lists to stimulate dialogue at forthcoming regional meetings. Also, APS has set up a web-based Town Meeting Discussion Board. You can find the link to it on the APS homepage (http://www.aps.org/).

Working list of challenging questions:

1. What are the rules that govern phase separation (i.e. stripes)? What are the rules that govern self-organization (i.e. hierarchical assembly)?
2. How does one describe materials whose electrons are neither perfectly localized nor fully itinerant (i.e. correlated electron systems)?
3. Is there a universal description of quantum transport, including spin transport, ballistic transport, molecular transport, Kondo...?
4. Can one predict the structure and properties of matter from a knowledge of the atomic constituents alone?
5. Is it possible to develop multi-scale methods (both in time and space) to predict the properties of matter?
6. How does one address information with light?
7. What are the ramifications of quantum entanglement and coherency in computation?
8. What is the theory of high-T_c superconductivity? What interactions can successfully pair electrons?
9. Can we integrate materials whose properties tend to be mutually exclusive, such as "ferromagnetic and superconducting," "photonic and semiconducing" and "bio and inorganic"?
10. Can one find nearly 100% spin polarized electron sources and retain interfacial control? Can one create a spin transistor with gain to enable spintronic applications? Can one find magnetic semiconductors that operate well above room temperature?

Focus Topics for 2005:

Let me end with a call for new suggestions for Focus Topics for the 2005 March Meeting in Los Angeles. Send your suggestions to the 2005 DMP Program Chair, Lynn Boatner (lb4@ornl.gov), by May 14, 2004. Include a short title, a paragraph that describes the type of abstracts that would be appropriate for the proposed topic, and full contact information for two (or more) potential organizers who are at different institutions. The tasks of the organizers of Focus Topics include evaluating and recommending invited speakers, choosing session chairs, working with partner units of APS as appropriate, and designating one of themselves to participate in the abstract sorting in December at the APS headquarters in preparation for the L.A. Meeting next March. The organizers need to balance each other and ideally represent different intellectual perspectives (i.e. theory vs. experiment; basic vs. applied), and different geographic regions, and aspire to honor our commitment to work towards gender balance and encourage under-represented groups. The DMP Executive Committee will evaluate all suggestions.

New Members:

I hope that I have provided a perspective that will connect you to the DMP and encourage you to seek out prospective new members. It's easy to affiliate online (http://www.aps.org/memb/unitapp.cfm). Also, to learn more about DMP visit our homepage (http://www.aps.org/units/dmp/). Feel free to contact me or any member of the DMP Executive Committee with your ideas, interests and concerns. The DMP Executive Committee contact info is on our website and is reprinted in this Newsletter for your convenience.

It is an honor to serve you. Let's see what we can build together!

-Sam Bader

DMP 2004 - 2005 Executive Committee:

Samuel D. Bader, Chair
Materials Science Division, Bldg. 223
Argonne National Laboratory
9700 S. Cass Ave.
Argonne, IL 60439
Tel: (630) 252-4960
Fax: (630) 252-5219
email: bader@anl.gov

Lynn A. Boatner, Chair-Elect
Solid State Division
Oak Ridge National Laboratory
MS-6056
Oak Ridge, TN 37831
Tel: (865) 574-5492
Fax: (865) 574-4814
email: lb4@ornl.gov

David H. Vanderbilt, Vice Chair
Dept of Physics & Astronomy
Rutgers University
136 Frelinghuysen Rd.
Piscataway, NJ 08854-8019
Tel: (732) 445-2514
Fax: (732) 445-4400
email: dhv@physics.rutgers.edu

Theodore L. Einstein, Sec./Treas. (2003-2005)
Dept. of Physics
University of Maryland
College Park, MD 20742-4111
Tel: (301) 405-6147
Fax: (301) 314-9465
email: dmpsectr@physics.umd.edu

Slade Cargill, Councilor 2001-2005
Dept. Materials Science & Engineering
Lehigh University
5 E. Packer Ave.
Bethlehem, PA 18015-3195
Tel: (610) 758-4207
Fax: (610) 758-4244
email: gsc3@lehigh.edu

James R. Chelikowsky, Past Chair
Dept of Chem Engr & Mater Sci
University of Minnesota
Minneapolis MN 55455
Tel: (612) 625-4837
Fax: (612) 626-7246
email: jrc@msi.umn.edu

Members at Large

Eric Chason (2004-2006)
Division of Engineering, Box D
Brown University
182 Hope St.
Providence, RI 02912
Tel: (401) 863-2317
Fax: (401) 863-7677
email: Eric_Chason@brown.edu

Arthur F. Hebard (2005-2007)
Department of Physics
University of Florida
2257 New Physics Building,
P.O. Box 118440
Corner of North-South Drive and Museum Way
Gainesville, FL 32611-8440
Tel: (352) 392-8842 (office)
(352) 392-9228 (lab)
Fax: (352) 392-3591
e-mail: afh@phys.ufl.edu

Julia W. P. Hsu (2005-2007)
Sandia National Laboratories
P. O. Box 5800, MS-1415
Albuquerque, NM 87185-1415
Tel: (505) 284-1173
Fax: (505) 844-1197
email: jwhsu@sandia.gov

Eric D. Isaacs (2003-2005)
1D-369
Bell Labs-Lucent Technologies
700 Mountain Ave.
Murray Hill NJ 07974
Tel: (908) 582-7261
Fax: (908) 582-4868
email: isaacs@lucent.com

Jacqueline Krim (2004-2006)
Dept. of Physics, Box 8202
North Carolina State University
Raleigh, NC 27695-8202
Tel: (919) 513-2684
Fax: (919) 515-1333
email: jkrim@unity.ncsu.edu

Talat S. Rahman (2003-2005)
Dept. of Physics
Kansas State University
Manhattan, KS 66506
Tel: (785) 532-1611
Fax: (785) 532-6806
email: rahman@phys.ksu.edu