

DMP NEWSLETTER

Division of Material Physics

A Division of The American Physical Society

November 1996

In this Issue

This newsletter announces the 1997 Adler Award winner. Enclosed also is your ballot for the 1997 elections to the DMP Executive Committee. Biographies of the candidates are given. Terms of service are three years. Notice is also served herein that DMP Bylaws amendments will be voted on by our membership at the next annual DMP Business Meeting held during the 1997 March Meeting in Kansas City.

For the listing of the DMP's 22 focused session and 9 general session topics for the upcoming March Meeting refer to our August newsletter. The DMP March Meeting program was orchestrated under the expert leadership of DMP-Chair Slade Cargill III.

TABLE OF CONTENTS

John Joannopoulos Wins
1997 Adler Award
New Nobelist is DMP
Member
DMP Awards Task Force
Visit the DMP Homepage
Amendments to DMP
Bylaws
Membership Drive
Present Officer and
Members at Large List
And the Nominees Are...
Biographical Summaries
and Statements

John Joannopoulos Wins 1997 Adler Award

Professor John D. Joannopoulos of the Physics Department of the Massachusetts Institute of Technology has been selected to receive the 1997 David Adler Lectureship Award. The Award was established to recognize an outstanding contributor to the field of materials physics, who is noted for the quality of his/her research, review articles and lecturing, and consists of \$1,000 and a certificate. The citation which will appear on John's certificate reads:

"For his pioneering use of modern computational tools for the calculation of the electronic, vibrational and optical properties of amorphous, crystalline and photonic bandgap materials, including their surfaces and defects, and for his excellence in lecturing, writing and training students in these areas."

John will present his Adler Lecture at the 1997 APS March Meeting in the DMP Focus Session 15b, Materials Theory: Electronic and Atomic Structure. In addition, John's certificate will be presented to him during a Ceremonial Session scheduled for 5:30 PM, 17 March at the Kansas City Convention Center.

New Nobelist is DMP Member

Nobel Prize winners in Physics and Chemistry were announced in October. David M. Lee, Douglas D. Osheroff and Robert C. Richardson won in Physics for their discovery of superfluidity in helium-3, and Robert F. Curl, Jr., Harold W. Kroto and Richard E. Smalley won in Chemistry for their discovery of fullerenes. Professor Richardson is a DMP member.

These two discoveries were previously recognized in APS citations for the Buckley Prize (1981) and the International Prize for New Materials (1992), respectively. This attests to the importance and impact of APS prizes. See the following article on DMP efforts to secure the future of APS materials-related prizes.

DMP Awards Task Force

APS materials-related prizes identify individual excellence and major achievements, and also help broadly to define the significance of our collective research endeavors. This latter function is increasingly important in the light of shifting national budgetary priorities. The Executive Committee of DMP has formed a Task Force headed by Jim Davenport, DMP Chair-Elect, to ensure the future vitality of the endowments that provide the financial underpinnings of these awards. In particular, it is of critical importance to reestablish the International Prize for New Materials, which has not been awarded for two years. We will be coordinating our efforts with other interested units of APS, especially DCMP.

Visit the DMP Homepage: </units/dmp>

Our Homepage on the World Wide Web contains all types of Divisional information, including current and back issues of the DMP Newsletter. Our growing library of "[Images of Materials](#)" brightens up our homepage and simultaneously provides a valuable visual statement that helps to describe us as a scientific community. Thanks to all of our contributors. Send your comments and contributions to Sam Bader, DMP Sec./Treas.

Special thanks go to outgoing APS Webmaster Mike Woodward for his prompt and skillful attention in bringing the DMP homepage to fruition.

Amendments to the DMP Bylaws

The following amendments to the DMP Bylaws are proposed in order to put present practices on a formal basis and, thus, to provide guidance to future Divisional leaders. The amendments involve deadlines and officer assignments. The proposed amendments are being endorsed by the DMP Executive Committee, the APS Constitution and Bylaws Committee, and the APS Council, as required by APS procedures. This article serves as notice to our membership that a vote will be taken on the proposed amendments at the annual DMP Business Meeting held during the 1997 March Meeting in Kansas City.

In the excerpted portions of the Bylaws that appear below, deletions are denoted by ***(...)*** and additions by the capitalized word that follows each deletion. The full text of the Bylaws appears on our homepage.

1. Article VII Sec. 3 on Nomination and Election Procedures

Change November and March deadlines to October and February, respectively, as follows:

"...The Nominating Committee shall notify the Secretary-Treasurer of the results by **15** ***(November)* OCTOBER**. The election ballot shall contain those names and also those of other candidates nominated by petition of five percent of the membership of the Division (determined on the previous June 30) and received by the Secretary-Treasurer by **1** ***(November)* OCTOBER....** The Secretary-Treasurer shall poll the Division membership by mail ballot, with a closing date of **1** ***(March)* FEBRUARY....** The Secretary- Treasurer shall communicate the results of the election to the Chair at least one ***(week)* MONTH** prior to the Regular Meeting and shall publish the results in a newsletter."

2. Article VIII Sec. 2 on Committees This amendment makes the DMP Chair the Program Committee Chairperson to conform to current practices, and reads as follows: "The ***(Chair-Elect)* CHAIR** shall be Chairperson of the Program Committee."

Membership Drive

The following plan can potentially double our size. It requires each of us to encourage one colleague or friend to affiliate with DMP by paying the \$6 annual fee. Instructions on how to become a member of DMP (or any other APS unit) appear on [our homepage](#), or simply call (301) 209-3280 with your APS membership number and credit card handy, or write to APS headquarters. As we build our membership base, we increase the visibility of DMP as a vibrant part of APS, and we also strengthen the impact of our numerous outreach efforts to Washington and to related Societies.

Elections to the Executive Committee

The present officer list (with expiration dates that follow the March Meeting) includes:
(Full addresses appear on the DMP homepage.)

Past Chair	J. Murray Gibson	1997	j-gibson@uiuc.edu
Chair	G. Slade Cargill III	1997	SC15@columbia.edu
Vice Chair	James B. Roberto	1997	robertojb@ornl.gov
Chair Elect	James W. Davenport	1997	Daven@bnl.gov
Sec./Treas.	Samuel D. Bader	1999	bader@anl.gov
Councillor	Howard K. Birnbaum	1999	FAX: (217) 244-2278

and Members at Large include:

Lynn E. Rehn	1997	Lynn_Rehn@qmgate.anl.gov
Andrew Zangwill	1997	Zangwill@zang1.physics.gatech.edu
Frances Hellman	1998	fhellman@ucsd.edu
Patricia M. Mooney	1998	mooney@watson.ibm.com
Shirley Chiang	1999	chiang@physics.ucdavis.edu
Robert B. Laibowitz	1999	laibow@watson.ibm.com
David Long Price	1999	price@anlpns.pns.anl.gov

According to our By-laws, at the end of the APS March Meeting, the present Chair moves to Past Chair, the Vice Chair becomes Chair and the Chair Elect becomes the Vice Chair. All nominees must be members of the DMP on the June before election.

AND THE NOMINEES ARE...

The Nominees to fill 1997 vacancies are listed below followed by brief biographical summaries.

Vice Chair (Vote for one)

[Frances Hellman \(University of California, San Diego\)](#)

[Lynn E. Rehn \(Argonne National Laboratory\)](#)

Member-at-Large (Vote for two)

[Hubert E. King, Jr. \(Exxon Research and Engineering Company\)](#)

[Max G. Lagally \(University of Wisconsin-Madison\)](#)

[Julia Phillips \(Sandia National Laboratory, Albuquerque\)](#)

[Chris G. Van de Walle \(Xerox Palo Alto Research Center\)](#)

Ballots must be received by S.D. Bader no later than **February 1, 1997**. Please vote and return your ballot promptly either by mail or by FAX: (630) 252-9595. Be sure to include your name and signature.

Biographical Summaries/Statements

Vice-Chair:

FRANCES HELLMAN

Frances Hellman is an Associate Professor in the Physics Dept. at U.C. San Diego. She was an undergraduate at Dartmouth College and received her Ph.D. from the Applied Physics Dept. at Stanford University in 1985. She came to UCSD from AT&T Bell Labs in 1987 and has set up an active research laboratory. In addition to classroom teaching and graduate and post-doctoral research supervision, she has been very involved with undergraduate research.

Her research efforts have primarily focused on magnetism and magnetic materials and on the influence of the vapor deposition growth process on amorphous or structurally-ordered, chemically-disordered thin film materials. These materials are important for both technological (magneto-optical recording) and fundamental reasons. She has taken advantage of Si micromachining technology to develop microcalorimeters capable of measuring thin film specific heat with orders of magnitude more sensitivity than any existing apparatus; a current project involves development of this capability for nano-scale biological systems. Hellman is also involved in understanding the normal state and superconducting properties of doped C60 and has recently published results on a new class of magneto-resistive materials.

She is active in both the Materials Physics and Magnetism communities. Responsibilities include: Executive Committee of the Division of Materials Physics; APS co-representative to the national Federation of Materials Societies; DMP representative to the Centennial APS meeting; Advisory Board for the Los Alamos Neutron Scattering Center; advisory committee for the MMM (Magnetism and Magnetic Materials) Conferences; member of MRS and AVS. She has been program co-chair and served on the program committee for several MMM and INTERMAG conferences, and co-organized the DMP focus sessions on magnetic heterostructures for the 1995 March Meeting.

Statement: In my view, materials physics is the glue binding basic research to technological innovation and practical advances. One of my priorities in DMP will be to strengthen our ties to industry; links between academic, industrial, and national labs enhance the goals of each institution by facilitating exchange of advanced technology and ideas, as well as being of benefit to students looking for jobs. Possibilities include inviting more industrial speakers to our March meeting focus sessions, strengthening ties with the Forum on Industrial and Applied Physics through more interdisciplinary symposia, and working to expand the APS student summer industrial internship program. Other priorities include 1) re-instituting the New Materials Prize, 2) ensuring good representation of the best of Materials Physics at the upcoming Centennial APS meeting, and 3) developing a good working relationship with the newly-formed Topical Group on Magnetism and Its Applications, similar to our relationship with DCMP.

LYNN E. REHN

Lynn Rehn is a senior physicist and Associate Director of the Materials Science Division at Argonne National Laboratory. He received a B.A. degree (1967) from Albion College in Michigan, and a Ph.D. (1973) in Physics from the University of Illinois at Urbana-Champaign.

In 1970-71 he served with an outreach VISTA youth-education project in Gary, Indiana. From 1973-76 he was a Staff Scientist at the Kernforschungsanlage in Julich, Germany, and joined Argonne National Laboratory in 1976. His primary research interests include irradiation effects, ion-beam analysis and modification, solid-state amorphization, and high-Tc lattice instabilities, and has published over 200 papers and co-edited five books on these topics. He is currently Co-Editor of *Nuclear Instruments and Methods in Physical Research: B*, an Associate Editor for *Applied Physics Letters* and for *Applied Physics Reviews*, and serves on the Editorial Advisory Boards for *Nuclear Instruments and Methods in Physical Research A*, and the *Journal of Nuclear Materials*. He was a co-winner of the DOE award for "Outstanding Sustained Research in Metallurgy and Ceramics", is a Fellow of the American Physical Society, and a member-at-large of the DMP Executive Committee. He also chairs the Awards Committee of the Materials Research Society.

Statement: The Division of Materials Physics focuses its efforts on two important tasks: (1) serving the scientific and professional needs of DMP members through meetings and various other forms of communication, and (2) convincing those outside its membership, primarily federal agencies and the congress, of the critical role materials research will play in our nation's future. Because of its positive impact on both these objectives, I would make reinstatement of the New Materials Prize a cornerstone of the DMP Executive Committee's agenda. I have enjoyed, and benefited, from my ten years with the DMP. If elected to office, I promise to work diligently to serve the membership.

Member-At-Large:

HUBERT E. KING, Jr.

Hubert E. King, Jr. is a Staff Physicist at the Corporate Research Science Laboratories of Exxon Research and Engineering Company in Annandale, NJ. He obtained his undergraduate degree from the University of Kentucky and his Ph.D. from SUNY at Stony Brook in 1979. Following a post-doctoral fellowship at IBM's T. J. Watson Research Center in Yorktown Heights he joined ER&E in 1982. His research experience includes Visiting Scientist, Bell Labs (1976); Guest Investigator, The Carnegie Institution of Washington (1977-78); and Adjunct Professor of Physics, Ohio State University (1992-95). A member of the American Physical Society since 1980 and a Fellow since 1994, he has been active in the APS Industrial Summer Intern Program. He was Crystallography Representative to the Users Executive Committee at NSLS (1988-1990) and served on the Committee on Crystal Structure Determination at High Pressure of the International Union of Crystallography (1990-96). No stranger to multi-disciplinary research, he has authored or co-authored over 50 papers on topics in the fields of geology,

biology, chemistry, and physics. A common theme in much of his research is a quest to understand the role of high pressure on the properties of condensed matter. This has included studies of the structural, electronic, and magnetic state of various crystalline materials, as well as investigations into the molecular conformation in the liquid state. Much of his recent research has focused on two aspects of the liquid state at high pressures: transport in liquids as they approach the glassy state and the role of pressure on hydrophobic/hydrophilic interactions in water.

Statement: Through acting as role models, I believe Division of Materials Physics members can help our young proteges, students and post-docs, to succeed in this new world where both quality and relevance of science are used as measures. As a member of the Executive Committee I will work toward this goal through helping to obtain outstanding contributions for our Focused sessions, through dissemination of information on our member's science to internal and external bodies, and through efforts to more closely communicate with younger scientists.

MAX G. LAGALLY

Max G. Lagally is Erwin W. Mueller Professor in the Departments of Materials Science and Engineering and of Physics at the University of Wisconsin-Madison. His research interests revolve around the nanomorphological and structural properties of surfaces, interfaces, and thin films and their relationship to film growth and electronic, optical, and magnetic properties. He has over 200 publications in these areas. He has been the recipient of several awards for this work, including the Adler Lectureship Award of the DMP and the Davisson-Germer Prize of the APS. He is a Fellow of the APS and the AVS. He presently serves as a Trustee of the AVS, on the Davisson-Germer Prize Committee of the APS, and the von Hippel Prize Committee of the MRS. Among a large number of past professional society activities and offices, he served on one of the first Executive Committees of the Materials Physics Topical Group before it became a division of the APS.

JULIA M. PHILLIPS

Julia Phillips has been Manager of the Surface and Sensor-Controlled Processes Department at Sandia National Laboratories in Albuquerque, NM since September 1995. After receiving her Ph.D. in applied physics from Yale University she spent 14 years at AT&T Bell Laboratories, most recently as supervisor of the Thin Film Research Group. Her research has been largely focused on the growth of thin films and the relationships between their structural and electronic and magnetic properties. Systems of interest have ranged from epitaxial insulators and metals on semiconductors through epitaxial electronic oxides and on to transparent conducting materials. She is an author of over 100 publications in refereed journals as well as numerous review articles and conference proceedings papers. She is a Principal Editor of Journal of Materials Research and served on the Editorial Board of Applied Physics Letters and Journal of Applied Physics (1992-94). She is a Fellow of the American Physical Society and has been active in the Materials Research Society, having served as symposium organizer (1987, 1990, 1994), meeting chair (1991), committee chair (5 committees), Secretary (1987-89), Councillor (1991-93), and President (1995). She serves on various advisory review panels including

the National Research Council Committee on Condensed Matter and Materials Physics (1996 - present), MIT Materials Science and Engineering Department Review Committee (1995 - present), Argonne National Laboratory Materials Science Division Review Committee (1995 - present), the Iowa State University Microelectronic Research Center Review committee (1996), and the DOE Council on Materials Science Panel on Fundamental Issues in Heteroepitaxy (1989). In 1994 she received the AT&T Bell Laboratories Research Area Affirmative Action Award for mentoring of undergraduate and graduate students and for the establishment of a seminar series for high school students.

Statement: "The Division of Materials Physics of the American Physical Society has an important role to fulfill. With work ranging from investigations of fundamental phenomena to their application in products that change our lives, the Division spans an area of inquiry whose importance is one of the easiest in all of physics to convey to the public. Effective communication of the role of materials physics in our everyday lives will be good not only for our subfield but for all of physical science.

At the same time, the landscape for materials physics is changing dramatically. The shift from an era of continual growth in support of physical science to one of much more modest growth or perhaps substantial decline demands that the community ensure that it is making the wisest use of its resources. Professional societies such as APS have an important role to play in: (1) communicating the issues to their members; (2) arranging forums for discussion of the issues; (3) responsible programming at technical meetings that highlights the most exciting areas of inquiry."

CHRIS G. VAN DE WALLE

Chris G. Van de Walle is a Member of Research Staff at the Xerox Palo Alto Research Center. He received the degree of Engineer from the University of Ghent, Belgium, in 1982, and his Ph.D. from Stanford University in 1986. He was a Fellow of the Belgian American Educational Foundation in 1982-1983. After a postdoc at the IBM T. J. Watson Research Center in Yorktown Heights, NY (1986-1988) he joined Philips Laboratories in Briarcliff Manor, NY (1988-1991). He also was an Adjunct Professor at Columbia University in New York (1991).

His research activities address a wide variety of problems in materials physics using first-principles computations. He has performed extensive studies of semiconductor interfaces, including the development of a widely used model for band offsets. He also investigates defects and impurities in semiconductors, with particular emphasis on doping problems and on the role of hydrogen. Recently he has been focusing on wide-band-gap semiconductors.

He chaired the 7th Trieste Semiconductor Symposium on Wide-Band-Gap Semiconductors in 1992, and the 23rd Conference on Physics and Chemistry of Semiconductor Interfaces in 1996; he will chair the Gordon Conference on Point and Line Defects in Semiconductors in 1998. He has also served on a number of program

committees, and has been an organizer of DMP Focused Sessions in 1992, 1994 and 1997. He is a Divisional Associate Editor for *Physical Review Letters*.

Statement: Recent changes in industrial laboratories and in priorities for federal funding are threatening the continuity of physics research. Professional societies such as the APS should play an active role in preserving and stimulating the research climate. Conferences, workshops and short courses are very effective forums for education and scientific exchange. Better coordination between DMP, DCMP and FIAP would improve meeting organization and scheduling, and ensure that the right audiences are targeted and reached.