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FIAP Election Results

By Eric Moser and Jenna Zinck

The FIAP membership recently elected the following new executive committee members:

APS Councilor: Stuart Wolf

Member at Large: Joanna Batstone, Robert Brown

Vice Chair: Gordon Thomas

The election occurred in August, and the new officers will begin their terms at the 2000 March meeting.

Congratulations to the election winners. We are looking forward to working with you. Thanks go out to Wade Adams, Arthur Davidson, Bernardo Jadaszliwer, Stefan Zollner, Keith Jackson, and Don Wiff, the nominees who were not elected. We appreciate your willingness to help FIAP. For readers interested in reviewing the biographical information on the election candidates.

Holding this year's election on a website was a new undertaking for FIAP. Ken Lyons of AT&T and the APS Forum on Education was instrumental in helping set it up and he provided the website engine that the election was held on. Many thanks to Ken. FIAP members were notified of the election either via an email message or with a postcard reminder to visit the voting website. Most voters visited the website and submitted their ballots almost immediately after receiving the email. Very few comments and no complaints were logged.

Holding the yearly election on an interactive webpage and publishing this newsletter exclusively on the FIAP website are important changes that now become standard practice for FIAP. The significant cost savings associated with communicating electronically allows FIAP to use its limited budget to better serve the industrial physics community, such as through organization of workshops, seminars, and topical conferences. In a previous year, FIAP spent a total of \$7,370 for printing and mailing of newsletters and ballots. Thanks to electronic balloting, the total cost associated with

this year's FIAP election was only \$250, which covered printing and mailing of postcards to those FIAP members who have not registered an e-mail address with the APS. (By the way, if you haven't done so already, please register your e-mail address with APS!)

We need the support of all FIAP members to make the electronic ballot and newsletter maximally effective.

FIAP Program for March 2000

By Laura Smoliar (vice chair) and James Kaufman (chair elect)

This year FIAP and APS are introducing a new series of special sessions in addition to the regular FIAP program. This new "Technology of the Year" series will feature industrial applications of physics which are strategic to one or more industries based in the city that is hosting the March Meeting. This year's topic is Polymer Physics and the Sessions will be co-sponsored by FIAP and DHPP. Also, please take note of the special FIAP invited session on tribology and the complementary DMP focus session to which FIAP members are encouraged to submit abstracts.

Special Polymer Sessions

The Polymer Physics of Adhesion:

This session will feature the varied applications of high polymers with the main focus on adhesion. Speakers from both industry and academic institutions will present their recent research results on high polymer physics and its applications in adhesion and adhesives. Organizer: Yong Hsu, 3M Corp

Invited Speakers

1. Michael J. Owen "Controlled Adhesion of Silicone Elastomer Surfaces" Dow Corning Corporation
2. Matthew Tirrell "Contact mechanics measurements of adhesion" University of California, Santa Barbara
3. Anna Balazs "Adhesion at Polymer/Solid Interfaces: Implications for Fabricating Nanocomposites" University of Pittsburgh
4. Thomas P. Russell "Controlling the Characteristics of Polymer Interfaces" University of Massachusetts
5. Sumita Mitra "Adhesion of dental materials to tooth structure" 3M Company

Proton Exchange Membrane Fuel Cells

This special session which will span two APS time slots will feature 6 speakers followed by a panel discussion. PEM fuel cells offer a revolutionary change in the way electric power is generated for motive, stationary and portable applications under 250kW. With the potential for high quality electric power at high fuel efficiency, and near zero pollution, the market potential for fuel cells is rapidly expanding as global corporations address the significant commercialization barriers to make this technology finally become a reality. This session will address a number of these barriers from the perspective of materials needs, performance requirements and high volume manufacturability, materials, mechanisms and processes. Following the invited talks, this session will feature a panel discussion where the speakers and audience can address some of the most challenging problems associated with alternative electric power generation.

Organizers: Dr. Mark K. Debe, 3M Company Eric Moser, Intermagnetics General Corp.

Invited Speakers

1. "PEM fuel cell mechanisms and processes" - Dr. Mahlon S. Wilson, Los Alamos National Laboratory
2. "Proton Exchange Membranes -a broad perspective of perfluorinated ionomers", Dr. Simon Cleghorn, W. L. Gore & Associates, Inc.
3. "Proton Exchange Membranes -properties of ultra-thin ionomeric membranes" , Dr. Dvora Perahia, Clemson University,
4. " PEM fuel cell catalysts- anodes and cathodes" - Dr. Philip N. Ross, Jr., Senior Scientist, Lawrence Berkeley National Laboratory
5. "Bi-polar plates, flow fields and stack design criteria", Dr. Frano Barbir, Energy Partners
6. "Gas Diffusion Layers", Dr. James M. Larson, 3M Company
7. "Bi-polar plates, flow fields and stack design criteria" - Dr. Frano Barbir, Energy Partners

Polymer Structure and Dynamics at Interfaces: Molecules to Device Applications

The structure and dynamics of polymers were found to be strongly affected by interfacial interactions. These effects have been in the core of numerous studies and diverse device applications. This symposium will bring together different aspects of interfacial effects on both the structure and dynamics on polymeric films. It will encapsulate a broad range of studies, from the basic theoretical aspects through experiments, to device applications.

Organizer: Dr. Dvora Perahia, Clemson University

1. "Diblock co-polymers and surface patterning", Paul M Chaikin, Princeton University
2. "Theoretical insight into polymer structure near interfaces" ,John G. Curro, Sandia National Laboratories
3. "The glass transition at polymer surfaces", Miriam.Rafailovich, SUNY Stony Brook
4. " Motion of Molecularly Thin Polymer Films under Boundary Lubrication", Bruno Marchon, IBM Almaden Research
5. " Capillary Driven Penetration of Microporous Coatings by Viscoelastic Fluids", David Yarusso, 3M Corp

Sessions Sponsored or Cosponsored by FIAP

Focus Sessions--These accept contributed talks

16.9.1 Applications of Optical Techniques

Organizers: W. H. Weber, Ford and Ran Liu, Motorola

Invited Speakers:

1. Leah Bergman, North Carolina State University, "Raman and photoluminescent studies of III-V nitrides"
2. Michael Downer, University of Texas at Austin, "Second harmonic spectroscopy of semiconductor interfaces: fundamentals and applications"

2.9.2 Group IV Semiconductor Alloys (co-sponsored with DMP)

Organizers: Stefan Zollner, Motorola and Reuben Collins, Colorado School of Mines

Invited Speakers:

1. Patricia Mooney, IBM Yorktown, "Microstructural and optical characterization of thick relaxed SiGe"
2. H. Joerg Osten, Institut fuer Halbleiterphysik, Germany, "SiGe:C alloys: Growth, properties, HBT devices"

16.9.2 Materials Theory and Computation (co-sponsored with DMP)

Organizers: K. C. Hass, Ford, S. T. Milner, Exxon, S. T. Pantelides, Vanderbilt

Invited Speakers:

1. Chris Wolverton, Ford, "Computer-aided predictions for lightweight automotive alloys"
2. Alex Demkov, Motorola, "Ab initio calculations of electron transport through thin MOS structures"
3. Karl Sohlberg, Oak Ridge, "Hydrogen and its role in catalytic aluminas"
4. Glenn Fredrickson, UC Santa Barbara, "Finding new polymer mesophases with theory"

FIAP Invited Sessions:

Metamaterials

Metamaterials are artificially constructed materials with qualitatively new responses that do not occur in nature. This new functionality is derived from extrinsic ordered inhomogeneities whose scale is smaller than some characteristic coherence length. These inhomogeneities can take the form of voids, particles, wires, layers etc to form a structure whose properties transcends those of any intrinsic materials or any of the constituents. Photonic band gap materials, exchange spring magnets, artificial ferrites are a few examples of such metamaterials.

Session Organizer: Valerie Browning, Naval Research Laboratory

Invited Speakers:

1. Dr. Rodger Walser, University of Texas, "Metamaterials: What are they and what are they good for?"
2. Dr. Eli Yablonovitch, UCLA, "Photonic Crystals as Meta- Materials"
3. Dr. Akhlesh Lakhtakia, Pennsylvania State University, "Sculptured Thin Films: Accomplishments and Promises"
4. Dr. Charles T. Black, IBM TJ Watson Research Center, "Electron-Tunneling in Self-Assembled Nanoparticle Arrays"
5. Dr. Richard Ziolkowski, University of Arizona, "Synthesis of Smart Skins Using Artificial Dielectric and Magnetic Molecules"

Molecular and Materials Approaches to Applied Tribology

This session will focus on how a fundamental materials/ molecular approach to tribology helps solving practical problems. It will include presentations from both academic and industrial participants who will review some of the fundamentals of the physics and chemistry phenomena at a sliding interface.

Organizer: Bruno Marchon, IBM Research

Speakers:

1. Mathew Mate (IBM Research): "Friction in disk drives and other household devices"
2. Stephen Didziulis (Aerospace Corp): "Fundamental Approaches to Spacecraft Tribology Issues"
3. Miquel Salmeron (Lawrence Berkeley Laboratories): "Nanoscale wetting and tribology of hard disk lubricants"
4. Jing Gui (Seagate): "Challenges of Head-Disk Interface Tribology for Ultrahigh Density Magnetic Recording"
5. Steve Granick (U. Illinois, Urbana): "God and Mammon in tribology"

Physicists at Start-Ups

Organizer: James Kaufman, IBM Research

1. Alex Glass, Executive Director, Bay Area Regional Technology Alliance, "Turning Technologies into Businesses: The challenge for the technical entrepreneur."
2. Lambertus Hesselink, Stanford University and Siros Technologies, "From the Classroom to the Boardroom"
3. Milton Chang, New Focus Inc., "Business Models that worked"
4. Gary Duck, JDS Uniphase, "The Growth of JDS Uniphase"
5. Richard Spitzer, IME Corp., "Challenges for Success in Startups"

Beyond Silicon

This symposium will report research into a number of the electronics technologies that are currently being funded because they offer some potential mid or long-term advantages over silicon technology. While nobody expects the market for silicon chips to stop growing, the Semiconductor Industry Association Roadmap points out that challenges to progress, especially beyond the 100 nm generation of technology, will be increasingly difficult to overcome.

Organizer: John Rowell, Northwestern University

Speakers:

1. "Quantum Information Technologies" Isaac Chuang, IBM Research
2. "Challenges presented in the Semiconductor Industry Association Roadmap" Paul Peercy, University of Wisconsin, Madison
3. "High Speed InP Circuits for Communications" Y.K. Chen, Lucent
4. "Resonant Tunneling Transistors", Alan Seabaugh of Raytheon/ Notre Dame.
5. "Superconducting Single Flux Quantum Logic", K. Likharev, NYU, Stonybrook

Materials Advances for Chemical Sensing Applications

There exists at present a need for real time, chemically specific sensors for applications ranging from monitoring automobile exhaust to anaerobic biological processes. Developments in materials science have lead to a variety of indicators including analyte specific quenching of the fluorescence from molecular clusters and the modulation of the

conductivity of doped oxides at high temperature by hydrocarbon gases. This symposium will explore how the synergy between the properties of materials and transduction techniques such as fiber optic probes and micron size hot plates are being utilized to develop chemically specific sensors for industrial and environmental applications.

Organizer: Ruby Ghosh, Center for Sensor Materials, Michigan State University

Chairman: Udo Pernisz, Dow Corning Corp.

1. "Tuning Micro-hotplate Arrays for Industrial and Environmental Monitoring" Richard E. Cavicchi and Steve Semancik, National Institute of Standards & Technology, Gaithersburg, MD

2. "Fiber Optic Oxygen Sensor using Molybdenum Chloride Cluster Luminescence" Ruby N. Ghosh, Center for Sensor Materials, Michigan State University, East Lansing, MI

3. "SiC based MOSFET Transistors for High Temperature Industrial Gas Sensing Applications" Anita Lloyd Spetz, S-SENCE and Applied Physics, Linköping University, Sweden

4. "Fiber-Optic Exhaust-Gas Sensor Based on the Fluorescence Characteristics of Cu Containing Zeolites" Jeffrey T. Remillard, Dept. of Physics, Ford Research Laboratory, Dearborn, MI

5. "Carbosiloxane Polymers with Synthetically Tunable Chemical and Physical Properties for Vapor Sensors" Jay W. Grate and Steven Kaganove, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, Richland, WA

Action Required to Continue Receiving "The Industrial Physicist"

Jeff Bebee

Circulation Director

American Institute of Physics

The American Institute of Physics (AIP) has been sending the bimonthly magazine, The Industrial Physicist (TIP), to FIAP members for a number of years. This made sense in light of FIAP's encouragement in the start of TIP, which has turned out to be a very valuable publication editorially for 60,000 readers.

In June 1999, AIP started charging \$30/year for subscriptions outside the USA in an effort to offset the high costs of foreign airfreight postage, and ultimately to move the publication nearer to break-even. FIAP members in particular were confused by this change, for they thought TIP was part of their FIAP membership. While TIP is published with the encouragement and moral support of APS and FIAP, it is not an APS publication, not financially supported by APS or FIAP, and not explicitly a benefit of membership. Nevertheless, in recognition of FIAP's goals and the special interest of FIAP membership in TIP, AIP will be reducing the rate for non-US subscriptions to \$15 for FIAP members. FIAP members in the USA also need to subscribe to The Industrial Physicist if they wish to continue receiving it. TIP is free to qualified readers in the USA.

To Subscribe to "The Industrial Physicist": Fill out a qualification form from a recent issue, or log onto the subscription website at <http://www.cdmcon.com/ipy/subscrib.html> FIAP members outside the USA must pay \$15/year (reduced from \$30) to offset the costs of foreign postage. Payments should be sent with your qualification form to AIP, TIP Payments, P.O. Box 503284, St. Louis, MO 63150-3284.

Join FIAP-Make a Difference

By Steve Rosenblum, FIAP Newsletter Editor

The Forum on Industrial and Applied Physics is a unit of the APS which was formed to encourage the interaction of physicists in industry in the activities of the society. Membership in the forum offers you the chance to influence the directions that the Forum takes as well as to volunteer on some of these activities. Are there things the APS should be doing to enhance the professional careers of industrial physicists? Do we need to do more to provide opportunities for non-Ph.D. members? If so what should be done? What sorts of activities should the FIAP encourage? Should we sponsor tutorials at APS meetings directed at industrial physicists? If so, what topics should be taught? Should we sponsor sessions at meetings dealing with important topics in industrial research? If so, what topics do you think would be most interesting and attractive to you as an industrial physicist? What other issues should we champion which are of importance to you as an industrial physicist that might not be as important to a physicist in academic or government research? Join over 5000 other APS members in making FIAP your forum for action in the APS. As an APS member you are allowed to join up to two Forums at no cost. Still undecided? Visit our website for more information on our members and activities ([/FIAP/index.cfm](#))

APS Technical Network

by Arlene Modeste Knowles, AIP

The American Physical Society is creating an exciting new service, which may be of particular interest to FIAP members. This APS Technical Network for APS Members is a web-based database of information with the primary purpose of establishing a large professional network of physicists (defined broadly) across, academia, national labs, industry, and other places where physicists work. The new service, which is intended to be a benefit to APS members and does not generate any income whatsoever for the APS, will be developed in two phases. In the first phase, members who are willing to share their knowledge informally with other APS members, will be asked to supply information on their areas of technical expertise. In the second phase, members will be able to search the database by area of expertise, state, or keyword.

The idea for the database came from discussions with industrial physicists, particularly those in small companies, who expressed need for such a database of APS members whom they could contact informally when they had a technical problem. Since those discussions however, the scope of this Network has broadened. Many physicists and other professionals decide to change the direction of their research, enter new disciplines, or transition from academia to industry (or vice versa). The APS Technical Network can not only foster the technical development of these physicists, but can help them to establish professional contacts in those new areas of research and help them to find mentors to facilitate those transitions.

Arlene Modeste Knowles and Norval Johnson, have been leading the efforts to plan and construct this new service, and it is now being beta-tested. We invite all of you to participate in this beta-test. Just fill out the enrollment form, and send feedback on the process to Arlene Modeste Knowles (knowles@aps.org). You can find the APS Technical Network at [/TN/](#). Be sure to create your APS user account before enrolling!

Parkin awarded the 1999-2000 American Institute of Physics Prize for Industrial Applications of Physics

By James Kaufman

At the recent AIP Industrial Physics Forum for Corporate and Academic Leaders in Annandale, N.J., Stuart S.P. Parkin, IBM Fellow, was awarded the 1999-2000 American Institute of Physics Prize for Industrial Applications of Physics for "pioneering discoveries and original device demonstrations on giant magnetoresistive (GMR) sensors leading to the realization of GMR read-head technology for the magnetic recording industry." This prestigious prize is awarded every

two years for outstanding research that has an important impact on industrial applications. Parkin and his team conducted pioneering research on magnetic multilayers which led to new scientific insights, inventions, and important technological innovations instrumental to the advancement of magnetic data storage. When he first demonstrated the GMR effect in thin magnetic films using a practical deposition technique, Parkin opened the way for useful applications, such as the highly- sensitive magnetic recording sensors. GMR recording heads are critical to increasing the storage density of magnetic disk drives. Dr. Parkin made other important scientific discoveries that explained the behavior of these magnetic multilayer structures and aided the development of the recording heads.

Call for FIAP fellow Nominations

by James Kaufman

Dear FIAP Member,

Do you have a colleague who you believe should be a Fellow of the American Physical Society, or who you feel should receive an award for important contributions to Physics? If so, please consider nominating your colleague for Fellow of the APS, or for an appropriate award. There are many outstanding awards listed on the APS web page. You can find information on available awards and fellow nominations at: <http://www.aps.org>. Click on Prizes and Awards or on Fellowship

The deadline for submission of APS fellowship nominations for FIAP is February 20th, 2000. Details of the nomination process and the nomination form can be obtained from: </fellowship/>

A nominee must be a member of the APS. A valid nomination package must include a nomination form signed by two other APS members, a Curriculum Vitae, and at least two or three supporting letters.