

Division of Polymer Physics Newsletter

October 1,
2000

B. L. Farmer

Call for Nominations: Executive Committee Elections

The Nominating Committee has proposed the following slate of candidates for positions on the DPOLY Executive Committee:

For Vice Chair: Frank S. Bates, University of Minnesota
 Karl F. Freed, University of Chicago

For Member-at-Large: Wesley R. Burghardt, Northwestern University
 Karen I. Winey, University of Pennsylvania

For Secretary-Treasurer: Barry L. Farmer, Air Force Research Laboratory
 Phillip H. Geil, University of Illinois

Members of the Division are hereby invited to submit nominations for these positions. As provided by the Bylaws, any candidate named by not less than 1% of Division members (currently, 11) shall be considered nominated. Nominations should be sent to the Secretary-Treasurer and must be received no later than **October 31, 2000**.

2001 Polymer Physics Prize and 2001 Dillon Medal Winners

Masao Doi (Nagoya University) will receive the 2001 Polymer Physics Prize, sponsored by the Ford Motor Company. The citation will be:

For pioneering contributions to the theory of dynamics and rheology of entangled polymers and complex fluids

Klaus Schmidt-Rohr (Iowa State University) will receive the 2001 Dillon Medal, sponsored by Elsevier Science Ltd., publisher of *Polymer*. The citation will be:

For his creative development of new NMR methods and their insightful use to elucidate polymer structure and dynamics.

The winners will be honored by special symposia at the March Meeting of the Division.

MEMBERS WANTED!

Remember the first year membership in APS and DPOLY for students is **free!**
Membership forms are available on-line at </memb/student.cfm>

DEADLINES

October 31	Executive Committee Nominations
November 3	Padden Award Nominations
December 1	Abstracts for March Meeting

March 2001 Program

The next March Meeting will be held in Seattle, WA the week of March 12-16, 2001. The DPOLY Program Chair is Peter Green (University of Texas, e-mail: green@che.utexas.edu). Planned focused symposia are described below. Abstracts should be submitted via the web or e-mail according to the guidelines on the next page and available from the APS or DPOLY Home Pages. The deadline for abstracts is **December 1, 2000**. (Nominations and abstracts for the Padden Award and Symposium are due November 3, 2000.). March Meeting ID: MAR01

4. Polymeric and Organic Materials

- 4.1 Structure and Morphology
- 4.2 Mechanical Properties
- 4.3 Electrical and Optical Properties
- 4.4 Surfaces, Interfaces and Thin Films
- 4.5 Phase Behavior
- 4.6 Solutions, Gels, Polyelectrolytes and Biopolymers
- 4.7 Synthesis and Processing of Filled Polymer Systems
- 4.8 Polymer Dynamics, Rheology and Processing

Focus Topics

- 4.9.1 Reactive Compatibilization in Polymer Blends (DPOLY)
- 4.9.2 Polymer Surfaces and Biocompatibility (DPOLY)
- 4.9.3 Computer Simulations of Thermodynamic and Dynamic Properties: New Trends (DPOLY)
- 4.9.4 Polymeric Nanostructures: Synthesis and Processing (DPOLY)
- 4.9.5 Perspectives on the Glass Transition in Bulk and Thin Film Materials (DPOLY)
- 4.9.6 Hydrogen in Materials (DMP)
- 4.9.7 Multiscale Dynamics, Relaxation and Charge Transport in Polymers (DMP/DCMP)
- 4.9.8 Organic Electronic Materials and Devices (DMP)

4.9.1 *Reactive compatibilization in polymer blends*: Immiscible polymer blends typically possess inferior mechanical properties relative to their constituents. The large interfacial tension between the phases, making it difficult to control the size and dispersion of the phases, coupled with weak interfacial adhesion together contribute to poor mechanical performance. The physical addition of interfacially active block copolymers to improve the situation has had limited success. However, compatibilization of the blend via *in situ*

formation of block or graft copolymers by interfacial chemical reactions has had measurable success. The intent of this symposium is to bring together academic and industrial researchers to discuss recent experimental and theoretical advances and to address a range of outstanding technical challenges in this area.

4.9.2 Polymer surfaces and biocompatibility: Polymeric materials play an important role in many biomedical applications, including replacement organs and tissue, implants, endovascular devices and surgical aids. In these applications, surface properties, as well as structural and dynamic properties, of the relevant polymeric materials must be well understood to meet stringent biomedical use criteria. Often what is meant by biocompatibility is loosely defined and used to test, screen, or to formulate requirements. This symposium is centered around the need for a clearer working definition of biocompatibility of polymer surfaces. Only then can more systematic design, screening, and fabrication of polymeric materials with biocompatible surfaces be achieved. Polymer physics as a discipline has a unique role to play in this interdisciplinary field. Hence this symposium will bring together physicists, chemists and biologists to develop a more rational understanding of the concept of biocompatibility, and to decide how best to design and fabricate the relevant surface properties of polymeric materials. (Hyuk Yu, University of Wisconsin)

4.9.3 Computer simulations of thermodynamic and dynamic properties: new trends - Computer simulations have become increasingly important with the advent of increasingly powerful computers, since the results obtained can now more readily be compared to experimental data on real polymer systems. This symposium will focus on new developments in this area, focusing primarily on new problems [e.g., the glass transition, reversible gelation] and on new techniques which facilitate these simulations [new parallel methods, multiscale modeling]. In all cases we shall explicitly make connections to real experimental systems, in a manner that is more insightful than traditional theoretical methods. (Sanat Kumar, Pennsylvania State University)

4.9.4 Polymeric nanostructures: synthesis and processing: Polymers offer unique opportunities for fabricating functional nanoscopic structures since this length scale is commensurate with radius of gyration, a natural length scale of polymer. By combining controlled interfacial interactions, commensurability, molecular architecture, and chemistry, extremely innovative approaches in the design, functionalization and utilization of nanostructures are emerging using self-assembly processes. Being chemical in nature, nanofabrication processes using polymers are simple, highly-parallel and robust. This symposium will bring together researchers to discuss recent developments in this area. (Thomas P. Russell, University of Massachusetts)

4.9.5 Perspectives on the glass transition in bulk and thin film materials: Changes in properties such as the viscosity, translational chain dynamics and the glass transition with decreasing film thickness in confined polymer systems are well documented. The glass transition temperature has been shown to increase, or decrease, with decreasing film thickness, depending on the polymer and the polymer segment/substrate interactions. However, large increases in the viscosity and reductions in the translational diffusion of

chains are reported in many systems that exhibit these changes in the glass transition. The nature of changes in the dynamics and in the glass transition with confinement and their relation to effects of chain packing and entanglements, together with interfacial interactions, remains an open question. This symposium will bring together researchers to discuss these and related issues in bulk and in confined polymer systems.

Web Submission of Abstracts

APS members can now submit abstracts via the World Wide Web by pointing their browsers to <http://abstracts.aps.org>. Simply click "Prepare an Abstract," and when the next page appears, select a meeting by clicking the appropriate button to the left of the meeting (March Meeting ID: MAR01). Specify the number of authors and collaborations or teams for your abstract, and click the "Create an Abstract for Me" button. We recommend that, prior to submitting abstracts, new users select the Test meeting and complete all steps in order to familiarize themselves with the process.

Call for Nominations: Frank J. Padden Jr. Award

The Frank J. Padden, Jr. Award, consisting of a certificate and appropriate recognition, recognizes a graduate student for "Excellence in Polymer Physics Research." To be considered for this award the student must be a member of the DPOLY, must be working toward the Ph.D. degree, must not have completed the requirements for the Ph.D. before November 3, 2000, and must submit the following:

- 1) an acceptable abstract for the DPOLY March Meeting (Note: Please submit by email and provide a paper copy for the award committee),
- 2) a 1 page C.V. (do NOT send papers or other attachments),
- 3) a letter from their thesis adviser addressing the quality of the graduate research and academic excellence.

Abstracts should be submitted by email to the APS by **November 3, 2000**. In the template space for Special Instructions, please insert "Padden Award Symposium". The abstract will be forwarded to the program chair for inclusion in the March meeting. A hard copy of the abstract, the C.V., and the adviser's letter should be sent directly to Ralph Colby at the address on the letterhead of this newsletter. They must be received by November 3, 2000.

The Education Committee will select 5 finalists based on quality of the research, abstract, C.V., and the adviser's letter. The finalists will be invited to attend a dinner (sponsored by the University of Akron) with members of the DPOLY Education Committee. On March 13, 2001 the Padden Award session will be held. Each of the 5 finalists will give a 12 minute (including time for questions) oral presentation. The session will be attended by the Education Committee, who will serve as judges, and by any other interested members of DPOLY or APS. The winner will be selected based on quality of the research, the presentation, and response to questions. The winner will be announced at the annual Business Meeting of the Division.

DPOLY Short Course: *Recent Advances in Polymer Simulations - March 10-11, 2001 Seattle, WA.*

Who Should Attend: Persons from both academic and applied/industrial institutions. This course will be relevant to physicists, chemists, engineers, faculty, postdocs, and graduate students, from both academic and applied/industrial institutions, particularly working in or with a view towards performing simulations to study polymers for melt, solution, or solid-state properties.

Topics:

- *Developing force fields using quantum calculations*
- *Atomistic MD simulations in melt and solid state*
- *Coarse-grained and mesoscale simulations*
- *Techniques for charged polymers*
- *Advances in Monte Carlo methods*
- *Simulations on cluster architectures*
- *New approaches to simulations with hydrodynamics*

Course Description: The state of the art in computer simulations of polymers has advanced rapidly over the past decade, due to a dramatic increase in available computer power and new computer architectures. The course will emphasize the connections between the most microscopic description of monomer properties using quantum computational chemistry techniques, via atomistic force fields and simulations, up through more coarse-grained descriptions of polymers. Throughout, lecturers will focus on what questions may be usefully answered today using simulations, and what answers remain elusive.

Registration Fees: \$400 (\$200 for students). To register for the short course, use the registration form in APS Meeting News or print the form from the meetings web site /meet/MAR01.

Organizer: Scott Milner, ExxonMobil Corporate Strategic Research, 1545 Route 22 East, Annandale, NJ 08822. Tel: (908) 730-2309, fax 2536; e-mail: stmilne@erenj.com

Confirmed Speakers: (as of press date)

Juan de Pablo, University of Wisconsin
Burkard Duenweg, Max Planck Institut, Mainz
Gary Grest, Sandia National Laboratory
Steve Plimpton, Sandia National Laboratory
Greg Rutledge, MIT
Grant Smith, University of Utah
Mark Stevens, Sandia National Laboratory

Special Issue: Journal of Polymer Science, Polymer Physics Edition

A special issue of *Journal of Polymer Science, Polymer Physics Edition* will publish papers presented at the March Meeting of the Division. There are no page charges for the journal, and authors receive a copy of the issue as well as 50 reprints free of charge. All manuscripts will be peer reviewed. Those accepted for publication within a limited time after the March meeting will appear together in the December issue of the Journal. **Manuscripts submitted for the 2001 special issue are due by April 1, 2001** and should be sent to:

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