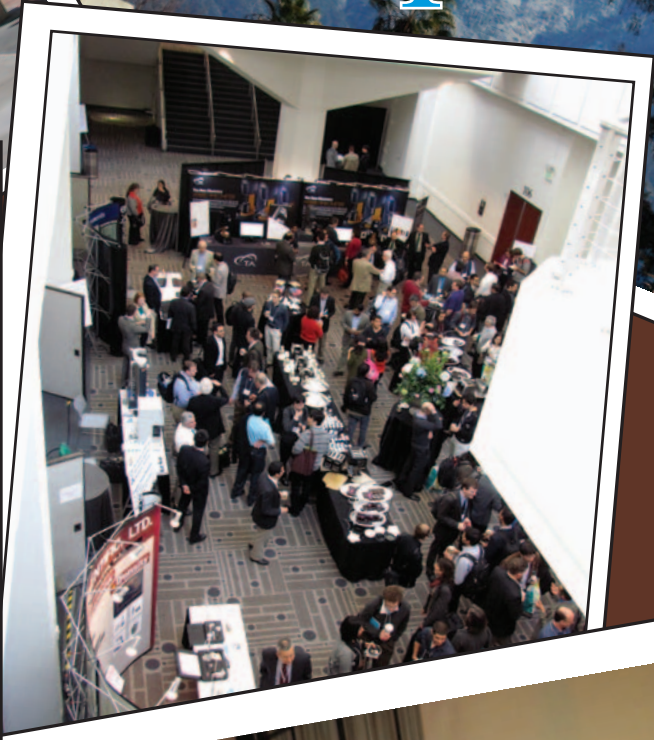


Rheology Bulletin

Pasadena Report



Inside: McKinley selected for Bingham
Underhill selected for Metzner
85th Annual Meeting in Montréal

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Meeting of the Board of Managers of AIP Publishing LLC (publisher of the *Journal of Rheology*) in New York City, 28 May 2013: from left, SOR President Jeffrey Giacomin, Eva Adams (AIP, Corporate Strategy Director), Lou Lanzarotti (AIP, Chairman of the Board of Governors). Photo by Fred Dylla.

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and is also available through the *iRheology* app.



Bingham medalist 2013: Gareth H. McKinley

Profile by the Editor, based on the nomination materials

Gareth H. McKinley is a world renowned rheologist who has made broad ranging and penetrating contributions to rheology and non-Newtonian fluid mechanics. Amongst his many contributions, he is perhaps best known for his extensive experimental studies on extensional rheology and large amplitude oscillatory shear (LAOS) flow, and for elucidation of elastic instabilities and their mechanisms. Gareth's contributions are captured in more than 200 publications, which have been cited more than 6000 times.

Gareth H. McKinley received his B.A. and M. Eng. in chemical engineering from University of Cambridge, Cambridge, England in 1985 and 1986, respectively, and his Ph.D. in chemical engineering from the Massachusetts Institute of Technology, Cambridge, Massachusetts, USA in 1991, the same year he became a member of the Society of Rheology. Gareth's Ph.D. work was with Bob Armstrong and Bob Brown on the topic on LDV measurements of viscoelastic flow instabilities in complex polymer flows. Following his studies at MIT, Gareth joined the faculty at Harvard University in 1991 as Assistant Professor of Engineering Sciences, became Associate Professor of Natural Sciences in 1995, and moved to MIT in 1997, where he is School of Engineering Professor of Teaching Innovation and Associate Head for Research in the Department of Mechanical Engineering.

Gareth is one of the best and most respected experimentalists in the field of non-Newtonian fluid mechanics. In research, Gareth has shown considerable acumen at learning new areas and in synthesizing a variety of diverse topics into his research. Much



of the success in his research is the result of his understanding not only the polymer chemical structure

and rheology of the viscoelastic fluids he is studying, but also the nonlinear dynamics of these flows. This has led him to significant, new interpretations of viscoelastic flow phenomena. As a result, he was the first to develop a comprehensive map of flow transitions in a viscoelastic fluid. He has written significant papers on complex viscoelastic flows, including flow through abrupt contractions, flow near stagnation points (around cylinders and spheres), and torsional flow between parallel plates and between a cone and plate. These studies represent significant advances in viscoelastic fluid mechanics, by showing the evolution of flow families as important dimensionless groups are varied. Previously, the literature on these flows was restricted almost exclusively to illustrations of non-

Newtonian behavior observed under isolated conditions of either high Deborah number or high Weissenberg number. The separation of Deborah and Weissenberg number effects in these experiments has led to his postulate of an appropriate dimensionless scaling for the onset of viscoelastic instabilities caused by an interaction of streamwise normal stresses and streamline curvature. Gareth is able to make



Chasing down the gravitational effects in extensional rheometry, Gareth took his equipment to the NASA Reduced Gravity Research Program (the KC-135 "Vomit Comet") in 2001 for some zero-g rheometry.



connections between his experiments and nonlinear dynamics, and he in fact shapes his experiments based on the nonlinear theory.

Gareth is very perceptive and quick to see new, interesting problems. For example, in the course of rheologically characterizing the Boger fluids used in his research, he noticed the same kind of "antithixotropy" that had been noted previously on higher molecular weight samples, although this effect was thought not to occur for the particular molecular weight range he was studying. He became interested in the origin of the apparent increase in viscosity and through careful investigation was able to show that the observation results from a fluid-mechanical instability in the cone-and-plate or parallel-plate experiments used to measure viscosity and not from a feature of the rheology (i.e., antithixotropy). From his analysis he then showed that the critical onset point should depend on the Deborah number and not on the Weissenberg number or shear stress as had been supposed by others in the literature. He has furthermore discovered the fundamental structure of the spiral instabilities in these flows and provided a much needed set of experiments for modelers.



Early in his career, Gareth turned his attention to one of the most significant problems confronting experimental rheology, namely

Members of the McKinley group gather in Lisbon in 2012 as part of the International Congress on Rheology. Back row: J.P. Rothstein, J. Soulages, A. Aardekani, S.J. Haward, C.J. Pipe, C. Clasen, M.-A. Fardin, T.J. Ober, R.H. Ewoldt; middle row: P.K. Bhattacharyya, P. Erni, GHM, M.S.N. Oliveira; front row: A. Jaishankar, J.P. Rich, L. Casanellas.

(Continues page 13)



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2013 Metzner Early Career Award: Patrick T. Underhill

Patrick T. Underhill, Assistant Professor of Chemical & Biological Engineering at Rensselaer Polytechnic Institute, has been awarded the 2013 Arthur B. Metzner Early Career Award of The Society of Rheology. This award singles out a Society member younger than 35 who has distinguished him/herself in rheological research, rheological practice, or service to rheology.

Underhill obtained a B.S. in chemical engineering and a B.S. in physics, both summa cum laude, from Washington University in St. Louis in 2001. In 2006 he received his Ph.D. in Chemical Engineering from the Massachusetts Institute of Technology, working with Pat Doyle. Thereafter, he joined the group of Mike Graham at the University of Wisconsin, Madison as a postdoctoral research associate. Underhill joined Rensselaer Polytechnic Institute as an assistant professor in the Department of Chemical and Biological Engineering in 2008 and was awarded an NSF CAREER Award in 2010.

In his PhD work at MIT, Underhill studied polymer dynamics using bead-spring models. Bead-spring models perform well for very long polymers, but the traditional spring laws break down when used to model increasingly smaller segments of a DNA or polymer. Underhill applied first principles to this question and invented a new method for determining the spring force-law, the *Polymer Ensemble Transformation* (PET) method. This method uses the constant extension behavior of the true polymer to determine the spring force-law. Underhill developed new compact polymer spring law expressions that are now widely adopted in the modeling community.

In his post-doctoral work with Mike Graham, Underhill studied the collective dynamics of swimming microorganisms. Experiments with suspensions of swimming bacteria had shown that the flow field surrounding a collective of swimming microorganisms exhibits characteristic swirls and jets much larger than those produced when a single bacterium swims. Underhill approached the modeling of this problem by developing the first theory for diffusion and velocity

fluctuations in dilute suspensions of swimmers and later verified it with simulations. He found that behavior in such flows varied for “pushers,” swimming bodies pushed from behind by flagella, versus “pullers.” By combining simulations, theory, and mechanistic arguments, Underhill’s work put the topic on solid theoretical footing.

At RPI, Underhill has continued to work on polymer chain dynamics, exploring proper methods of incorporating excluded volume (EV) effects. Underhill’s modeling uses the idea of a “Pincus blob.” Underhill’s work revealed a problem with the common practice of including EV interactions at the length-scale of coarse-



grained beads of a bead-spring chain; this practice was based on the assumption that EV interactions do not exist on scales smaller than this (monomer size). Underhill has shown that the coarse-grained spring law must be derived with EV interactions included from

the start, producing a revised spring law. His work shows how properly accounting for EV in the spring law changes predictions of the rheological behavior of highly flexible polymers, such as long synthetic polymers or single-stranded DNA.

Underhill has been singled out by RPI as an outstanding teacher and has performed outreach service to K-12 students and teachers and to his professional societies, APS, AIChE, and of course, SOR. The Society congratulates the latest outstanding professional to be designated as recipient of the Arthur B. Metzner Early Career Award.



Profile assembled from
nomination letters



The SOR Early Career Award, established in 2009, is named for Art Metzner, distinguished rheologist, university professor, editor of the *Journal of Rheology*, and 1977 Bingham medalist.

Pasadena: A cure for the winter blues!



Team Caltech (above) provided registration services for the Pasadena meeting. Also in Pasadena, many of us met long-time *JOR* Editorial Assistant Marcy Fowler (left), who ran a *JOR* booth at the meeting.

Every four years or so, the Society of Rheology plans a February meeting in addition to the usual October meeting. February meetings are scheduled when a summer International Congress on Rheology takes place outside of North America; shifting the annual meeting to February gives the Congress more space on the scientific calendar and provides the rheological community with more time for research progress between meetings.

February meetings hold a challenge and an opportunity.

The challenge is to attract attendees, given the break from the October routine. The opportunity is the chance to program the meeting for a venue that shines in February, as opposed to enduring the climatological conditions in many rheological locales north of the 40th parallel.

In February 2013 a team of Southern California rheologists met the challenge and hosted the Society in Pasadena, California USA—and the weather did not disappoint. Five days of sunshine, mild weather, and the study of deformation and flow – what’s not to like! The Local Arrangements Committee members were John Brady (chair) from Caltech, Julie Kornfield (Caltech), Andy Kraynik (Caltech) and Maryam Sepehr (Chevron). Meeting attendance was 337, a robust number for a February meeting (compare with 256 for Lubbock in 2005 and ~290 for Hilton Head in 2001). Even an East Coast blizzard did not diminish meeting attendance.

The Technical Program Committee for Pasadena was co-chaired by Shelley Anna (Carnegie Mellon University) and Carlos Rinaldi (University of Florida). Suspensions and Colloids remains a popular session, taking place throughout the conference (49 papers). Sessions were held on Polymer Solutions and Melts (39), Self-Assembling, Associating and Gel-Like Systems (35), Biological Systems (21), Emulsions, Foams and Interfacial Rheology (19), Blends and Composites (14), Electric and Magnetic Field Effects in Rheology (10), and Solids and Glasses (9).

The Pasadena meeting began with a Welcoming Reception hosted by TA Instruments; the reception was held in the Pasadena Convention Center concourse, where instrument vendors were set up for the meeting’s technical-instruments exhibit.

Technical sessions were held Monday through Thursday morning. Tuesday was a busy day, beginning with the Bingham lecture by Ralph Colby of Pennsylvania State University: “Linear viscoelasticity of associating ionomers.” The



technical sessions were broken up by a lunch-time Society Business meeting conducted by President Jeff Giacomini and the evening Awards Reception and Bingham Banquet. The Awards Reception was sponsored by a generous contribution from Xpansion Instruments.

The Awards Reception and Bingham Banquet were both held at the Caltech Athenaeum. The Caltech Athenaeum was established in 1929 to be a gathering place to stimulate friendship and exchange of ideas among lovers of science, art, and literature. The concept of such a club is based on the London Athenaeum, itself based on the Ancient Greek edifices dedicated to Athena, the goddess of wisdom.

In the Greek version, poets, philosophers, and orators gathered in the Athenaeum to read and discuss their work. It is therefore suited that the scholars and poets of rheology met in February at an Athenaeum to further their friendship and exchange of ideas.

The highlight of the Banquet evening was the roasting and toasting of 2012 Bingham Medalist Ralph Colby by his former students Jai Pathak and Charlie Lusignan. In his remarks, Colby reiterated the oft-heard observation that the rheological community is welcoming and nourishing to participants at all stages of their careers. Also at the Bingham Banquet, the Metzner Early Career Award was presented to Charles Schroeder (University of Illinois, Urbana-Champaign) and the 2012 *JOR* Publication Award, sponsored by TA Instruments, was given to Ryan Krumb and Charles Zukoski for their 2011 paper “Nonlinear rheology and yielding in dense suspensions of hard anisotropic colloids,” *J. Rheol.* 55(5), 1069-1084.

The Poster Session was held on Wednesday, with refreshments generously supplied by Anton Paar USA. The well-attended event included the Student/Post-Doctoral Poster Competition, which resulted in the conferring of four poster awards (see Society Business section of this *Bulletin*).

The final day of the meeting saw the introduction of a new tradition to SOR meetings: the Metzner Award Presentation. In Pasadena, the 2012 Metzner Early Career Award recipient, Charles Schroeder, gave an unopposed, 40-minute presentation (including questions) at 8am on Thursday on “New directions in single polymer dynamics: Molecular rheology, hybrid biomaterials, and microfluidic trapping.” The Metzner presentation was added to the annual meeting program to allow a wider audience to hear about the work of our Metzner Early Career awardees.



Ralph Colby receives the 2012 Bingham award from SOR President Jeff Giacomini.



The gathering of the Bingham medalists at Pasadena: front row Bill Russel, John Dealy, 2012 Medalist Ralph Colby, Bill Schowalter and Henning Winter; back row Ron Larson, Eric Shaqfeh, Gary Leal, Gerry Fuller, John Brady, and Greg McKenna.

The Pasadena meeting continued the tradition of enjoyable and productive SOR meetings, and demonstrated the health of our field. We now look forward to our next opportunity to meet and discuss the science of deformation and flow. À Montréal!

Montréal!

85th Annual Meeting of The Society of Rheology: 13-17 October 2013 Montréal, Québec, Canada



The 85th Annual Meeting of The Society of Rheology will be held in Montréal, Canada 13-17 October 2013. Our host for the meeting is Marie-Claude Heuzey of the École Polytechnique de Montréal. The Technical Program Chairs are Wesley Burghardt (Northwestern University) and Daniel Klingenberg (University of Wisconsin, Madison).

Old Port of Montréal
Credit : © Marie-Reine Mattera

The technical program will take place at the Hilton Montréal Bonaventure convention hotel located in downtown Montréal.

The Hilton Montréal Bonaventure is steps away from major attractions, the business district, and public transportation (metro and train central station), which is convenient for all guests. What's more, a vast array of nearby theatres, movie houses, and gourmet restaurants await conference attendees, and Old Montréal will offer visitors an excellent opportunity to enjoy the city's "joie de vivre" in an Old World setting.



Two optional SOR short courses will take place in Montréal, on Using Large-Amplitude Oscillatory Shear (Ewoldt and Giacomin) and Computational Rheology via LAMMPS (Lechman, Lane, and Plimpton); for details, see the article in this *Bulletin* and the SOR website.



Saint-Paul Street
Credit : © Ron Stern

Montréal is one of North America's most cosmopolitan cities. Not only is the city home to over sixty international organizations and the main venue for countless annual events and festivals, Montréal, an international city where French and English are the main languages, is a multicultural city in which over 160 languages are spoken.

Details of how to get to Montréal, register for the meeting, etc. are available on the conference website www.rheology.org/sor/annual_meeting/2013Oct/. Rendez-vous à Montréal!

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Two Short Courses in Montreal

Using Large-Amplitude Oscillatory Shear (LAOS)

Randy H. Ewoldt

Mechanical Science and Engineering
University of Illinois at Urbana-Champaign

A. Jeffrey Giacomin

Rheology Research Center and Mechanical Engineering
University of Wisconsin at Madison

12-13 October 2013

1 day of lecture and ½ day hands-on experience.

A popular use for commercial rheometers is the large amplitude oscillatory shear (LAOS) experiment, or oscillatory strain sweep. Rheologists have always used this to prepare for a linear viscoelastic frequency sweep. Beyond linear viscoelasticity, the nonlinear LAOS experiment generates rich data related to material structure, processing, in-use conditions, and function; nonlinear rheology is also a strong guide to the development of constitutive models. This course addresses the unique challenges of experimentally generating, analyzing, and interpreting data from LAOS, and other large amplitude oscillatory techniques. Of the various nonlinear deformation protocols, oscillatory techniques are powerful in that they systematically survey the broad range of deformation timescales and amplitudes (the Pipkin space), and quantify both elastic and viscous components simultaneously. Oscillatory techniques can also probe nonlinearity more gradually than step inputs, which is valuable for probing shear-sensitive materials such as biological gels. This course offers a comprehensive introduction to those industrial researchers, graduate students, and faculty that seek to probe microstructure, develop constitutive models, or simply fingerprint the nonlinear behavior of viscoelastic materials. Enrolled students will receive software for analyzing raw oscillatory data, along with a playbook for acquiring and analyzing data from LAOS.

(Continues, page 14, 1st column)

Computational Rheology via LAMMPS

Jeremy Lechman

Reactive and Nanoscale Processes Department
Sandia National Laboratories

Matt Lane

Materials Science and Engineering Department
Sandia National Laboratories

Steve Plimpton

Computational Sciences Center
Sandia National Laboratories

12-13 October 2013

2 day course including hands-on exercises

Particle-based simulation has, in recent years, made great strides toward closing the gaps in understanding the rheological behavior of complex, multi-constituent and multiphase systems. Due to advances in both computational infrastructure and techniques, macroscopic rheological models can now be extracted from numerical simulations of individual interacting components at ever-finer length and time resolutions (e.g. grains, colloids, macromolecule, and atoms). Obtaining and analyzing this detailed information is crucial for prediction and designed control of the rheological behavior of complex fluids in countless manufacturing/industrial, biological and environmental processes.

In this course we introduce participants to the relevant methods and techniques for numerical simulation of complex fluids for rheological applications using the Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS), an open-source molecular dynamics package (lammmps.sandia.gov). Mathematical and numerical tools for gaining physical understanding are emphasized. Particle based simulations, both classical molecular dynamics and coarse-grained methods, are discussed. Hence, the participant will receive an

(Continues, page 14, 2nd column)

(Continued from page 4)



that of developing experimental methods for determining unambiguously the elongational properties of mobile polymer liquids. Gareth and his collaborators were instrumental in advancing and popularizing

both the Tam Sridhar filament stretching extensional rheometer and the Vladimir Entov capillary breakup extensional rheometer for elongational flow rheology measurements of low- to moderate-viscosity fluids. He has developed microfluidic extensional rheometers using hyperbolic contraction and cross slot devices, as well as ultralow viscosity extensional rheometers measuring beads-on-a-string formation in a free jet. Altogether, he has over 60 publications on this topic, with more than 2000 citations, including an *Annual Review of Fluid Mechanics* article written with Tam Sridhar.

In recent years, Gareth has become an authority on large-amplitude, oscillatory shear flow (LAOS) measurements. Here he and his group have developed a technique and protocols for LAOS measurements and interpretation, and have used these developments to characterize wormlike micellar systems, gels, and slug mucus.

A measure of Gareth's stature in the fields of rheology and non-Newtonian fluid mechanics is his service as Executive Editor of the *Journal of Non-Newtonian Fluid Mechanics* from 2001 through 2009 (and at a young age). During his tenure as Executive Editor the impact factor increased from 1.35 in 2001 to 2.00 in 2009. He currently serves on the editorial boards of the *Journal of Rheology*, the *Journal of Non-Newtonian Fluid Mechanics*, *Rheologica Acta*, and *Applied Rheology*. Gareth has been active in Society of Rheology governance, serving on the Executive Committee, on the Technical Program Committee, and on various standing committees.

Gareth has done much of his work in collaboration with graduate students and postdocs at Harvard and MIT. In the process of educating these students, he has produced a string of successful young rheologists and academics (eight to date). Many of his former students and postdocs gathered for a group photo in Lisbon in 2012 (see accompanying photograph).

Gareth enjoys the support and partnership of his wife Julie; together they have raised three great kids; Colin

(19), Paige (17), and Miles (15). When his family was asked what they think their Dad likes outside of work, it sounded very much like rheology: The kids recount tales of experimenting/playing with dry ice that he brought home from work, the summer they had to leave the spider web on the front door and use the side door so as not to disturb the web making, and countless hours playing with oobleck when they were little. Most recently, Gareth taught a program at the local children's museum with daughter Paige and he beamed with pride as she demonstrated ferro fluid (even though ultimately she wore a large amount of it.). There is nothing better than having a Dad who likes and actually encourages getting dirty in the pursuit of good science. When pressed, there are some non-scientific interests attributable to Gareth; including scuba diving, early morning runs, hosting students/



Gareth McKinley and Chris Macosko try out their back-up gig: Macosko and McKinley Rheometer Repair LLC. Fast, cheerful service! And very reasonable rates.

colleagues at home, F1 motor racing, sports cars, the Tottenham Hotspurs football club, single malt scotch, and vintage port. If there's a joke, a celebration, or a laugh, Gareth is all in.

In summary, Gareth is a leading figure and an influential, respected scholar in non-Newtonian fluid mechanics. His carefully executed, well thought-out experiments are viewed as definitive by the non-Newtonian fluid mechanics community. Gareth is truly deserving of the 2013 Bingham Award from The Society of Rheology.

Course Outline: Using LAOS

- I. Rheological Material Functions Review
- II. Small Amplitude Oscillatory Shear (SAOS) material functions
- III. Large Amplitude Oscillatory Shear (LAOS) material functions
- IV. Rheometers
- V. Experimental Errors
- VI. Signal Processing
- VII. Interpretation of Results
- VIII. Examples of Using LAOS
- IX. Beyond LAOS: Examples of Oscillatory Deformation to probe nonlinearities

introduction to the basics of particle-based numerical simulation using LAMMPS. This will include writing and running LAMMPS input scripts and using the code to compute rheological properties of both atomic-scale and coarse-grained systems. Lectures on the technical basics will be interleaved with hands-on tutorial sessions. Rheological applications will be emphasized with a number of case studies and group discussions. Short-course participants will have an opportunity to discuss their particular research interests and applications.

Although some coding experience would be helpful, it is not required to use the LAMMPS package. Some familiarity with molecular modeling would also be helpful, although not required. Students should come with personal laptop, running Windows, MacOS, or Linux. A pre-built Windows executable version is available on the LAMMPS download site (lammmps.sandia.gov/). Mac and Linux users should download and install LAMMPS prior to the course. Detailed instructions are given on the website in the 2nd chapter of the manual.

Course Outline: LAMMPS

- 1: Overview of Molecular/Particulate Dynamics via LAMMPS (Plimpton)
- 2: Getting started with LAMMPS (Lane)
- 3: Hands-on applications lab I (Plimpton, Lane, Lechman)
- 4: Atomistic Applications (Lane)
- 5: Coarse-grain Applications (Lechman)
- 6a: Common equilibrium calculations (Lechman)
- 6b: Hands-on applications lab II (Plimpton, Lane, Lechman)
- 7a: Common non-equilibrium calculations (Lechman)
- 7b: Hands-on applications lab III (Plimpton, Lane, Lechman)
- 8a: Getting under the hood – Making Changes to LAMMPS (Lane)
- 8b: Recent development and future additions (Plimpton)
- 8c: Hands-on applications lab IV, Discussion



Presidents Marianna Kontopoulou and Jeffrey Giacomini forging strong ties between the Canadian Society of Rheology and The Society of Rheology, at Queen's University in Kingston, Canada (1 May 2013). Photo credit: Maureen Plunkett.



The Society of Rheology was founded in 1929 to foster the study of the mechanical properties of deformable materials. SOR is a founding member of the American Institute of Physics.

Visit our web site www.rheology.org/sor/



NEWS

SOR Officer Elections this Summer/Fall

This year is an election year in The Society of Rheology, and the report of the Nominating Committee was emailed to the members on 14 February 2013.

The candidates for office are:

President:

Gregory B. McKenna

Vice-President:

Gareth H. McKinley
Lynn M. Walker

Secretary:

Albert Co

Treasurer:

Montgomery T. Shaw

Editor:

Ralph H. Colby

Members-at-Large:

Shelley L. Anna
Michael D. Graham
William Hartt
Marie-Claude Heuzey
Eric S. G. Shaqfeh
Dimitris Vlassopoulos
Norman J. Wagner

Balloting will take place electronically; members in good standing will receive instructions by email on how to cast their ballots electronically. The Constitution specifies the balloting to begin at least 80 days before the annual meeting, and thus for 2013, balloting will begin 25 July 2013 and will end 13 September 2013.

Travel Grants Available for Montréal

The Society of Rheology is offering student-member travel grants to support the cost of attending its 85th Annual Meeting in Montréal, Québec, Canada. These grants are available to any graduate student who is a member in good standing of the Society as of 6 September 2013, and whose faculty advisor is also a member as of that date. In addition, the student must coauthor a paper or present a poster at the meeting, and stay in the official meeting hotel, Hilton Bonaventure. We anticipate that each grant will cover up to a maximum of four nights lodging (double occupancy) at the conference rate (sorry, no funds are available for registration or travel costs to and from the meeting). Only students who have not received a travel grant for an SOR meeting (or the SOR ICR travel grant) in the past are eligible.

To apply, the student must write a letter requesting the grant; and the student's advisor should add a letter of support, certifying that both the advisor and the student are members of the Society and indicate the title and session of the submitted presentation abstract (or poster) and that the student will be the presenter. Only one application per faculty advisor will be accepted for this meeting. Letters from the student and advisor should be uploaded as ONE PDF file onto:

www.che.udel.edu/forms/sor-stg-2013.html

starting 16 July 2013 and by the close of 6 September 2013. Notification will be made shortly thereafter.

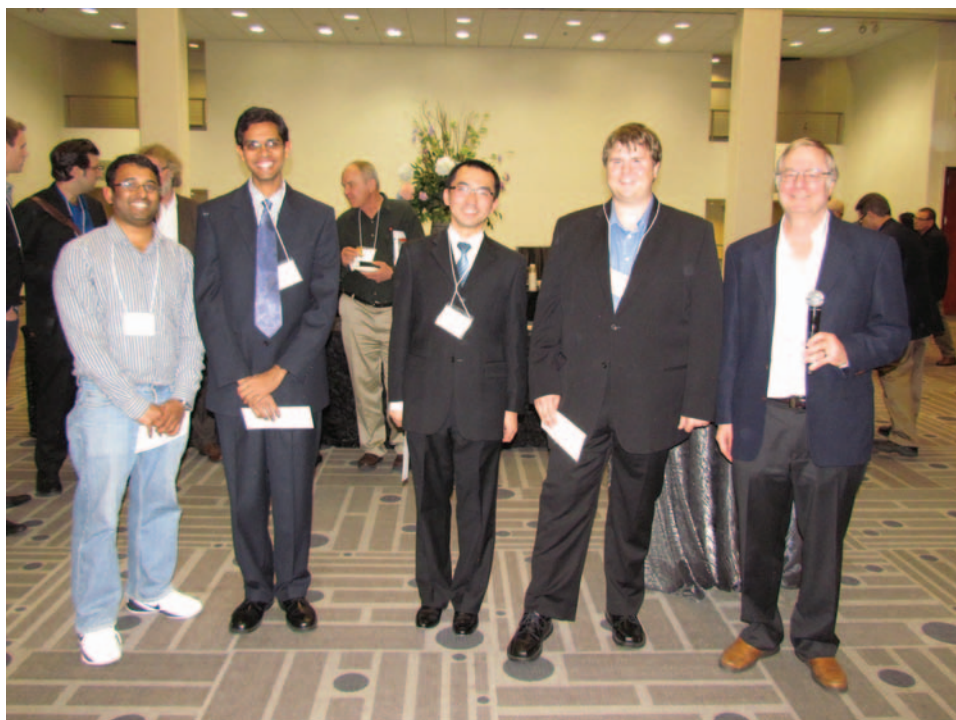
Inquiries can be sent to the following e-mail address:

SOR-STG@udel.edu

Pasadena Student/Post-Doctoral Poster Contest Results Announced

Since 2001, the Society of Rheology has conferred Best Student Poster Awards in conjunction with the annual meetings. The awardees for the 84th Annual Meeting,

Student/PostDoc Poster Contest winners, from left: Deepak E. Solomon (4th Place), Rangarajan Radhakrishnan (3rd Place), Mu Wang (2nd Place), and Gregory Newbloom (1st Place) with Society of Rheology Vice President Greg McKenna.



The poster session was sponsored by Anton Paar USA, who also offered a prize drawing held in conjunction with the poster session. The drawing winner was Gengxin Liu, University of Akron (center), who received a \$1,000 Expedia gift certificate. Representing the sponsors at the event were: Wolfgang Baumgartner, Scott Sensen, Pete Wheeler, Sally Snead, Gina Paroline, and James Eickhoff.



February 2013,
Pasadena, California
meeting are:

Gregory Newbloom (1st Place)

"Enhanced charge transport through engineering the network structure of conjugated polymers for photovoltaic applications"

Gregory Newbloom¹, Katie Weigandt², Jeff Richards¹, Pablo de La Iglesia¹, and Danilo Pozzo¹

¹Chemical Engineering, University of Washington;

²Center for Neutron Research, National Institute of Standards and Technology

Mu Wang (2nd Place)

"Boundary driven compression of hard sphere suspensions at constant velocity and normal stress"

Mu Wang and John F. Brady

Division of Chemistry and Chemical Engineering,
California Institute of Technology

Rangarajan Radhakrishnan (3rd Place)

"Importance of solvent quality on the hysteresis in the coil-stretch transition of flexible polymers"

Rangarajan Radhakrishnan and Patrick T. Underhill
Chemical and Biological Engineering, Rensselaer
Polytechnic Institute

Deepak E. Solomon (4th Place)

"Measurement of hydrodynamic resistance due to purely

elastic instabilities in curvilinear microchannels"
Deepak E. Solomon and Siva A. Vanapalli
Chemical Engineering, Texas Tech University

The poster competition is designed to encourage student and post-doctoral presentations and participation in the meeting and to recognize excellence. To participate in the competition, candidates submit an abstract through the normal meeting process and also submit a PowerPoint-type poster in PDF format by the appropriate deadline listed on the Web.

The competition is divided into two sections: Student (prior to receipt of PhD) and Post-doctoral. In the event of a small number of submissions in either category, the Society reserves the discretion to combine the two categories (this was done in Pasadena). The posters and the presentation of the poster are judged first from the submitted electronic version and second during the meeting. The judging criteria are on the Society's Website. The prize money for the poster competition is supplied by The Society of Rheology; the poster session refreshments in Pasadena were generously provided by Anton Paar USA.

DuPont Announces Young Professors Award Recipients

In May, DuPont Corporation named 14 young faculty members to its 2013 Class of Young Professors. Over the next three years, the company will provide these awardees with more than \$824,000 to support their research work.

The DuPont Young Professor program is designed to help promising young and untenured research faculty working in areas of interest to DuPont begin their research careers. Since 1968, DuPont has provided nearly \$50 million in grants to greater than 680 young professors in more than 130 institutions in 14 countries.

Candidate professors are nominated for the award by a member of the DuPont technical staff and the nominator serves as the

liaison between the company and the faculty member. During the three-year award, each grant recipient is invited to present a seminar on his or her work to the DuPont research community.

Roy Tess Award in Coating

Gordon P. Bierwagen of North Dakota State University, Department of Coatings and Polymeric Materials, will receive the Roy W. Tess Award in Coatings for 2013. Bierwagen received a B.S. degree in chemistry and mathematics from Valparaiso University and a Ph.D. in Physical Chemistry from Iowa State University. Bierwagen has been an active industrial and academic researcher since 1969, has published over 160 peer-reviewed publications, and has been Editor-in-Chief of *Progress in Organic Coatings* for 16 years. Bierwagen will receive the Tess Award during the 246th National Meeting of the American Chemical Society in Indianapolis, IN. The Tess Award is presented annually by the Division of Polymeric Materials: Science and Engineering in recognition of outstanding contributions to coatings science, engineering and technology.

On the Record: Acrivos

1994 Bingham medalist Andreas Acrivos (City College of New York) tells the story of his life and career in an interview online with 2011 Bingham medalist and Acrivos former student Eric Shaqfeh. To see the interview, go to this site:

www.annualreviews.org/doi/story/10.1146/multimedia.2013.02.06.139



Minutes of the ExCom Meeting

Sunday, 10 February 2013
Pasadena, California

Attending: Jeffrey Giacomini, Greg McKenna, Albert Co, Monty Shaw (on speaker phone), Ralph Colby, Faith Morrison, Shelley Anna, Norm Wagner, Anne Grillet, Chris White, Bridget D'Amelio (AIP, on speaker phone), Gerry Fuller, Andy Kraynik, John Brady, Wesley Burghardt, Don Baird, Marie-Claude Heuzey, Jason Maxey.

President Jeffrey Giacomini called the meeting to order at 9:00 a.m. in the San Marino Room, Hilton Pasadena, Pasadena, California.

The minutes of the 22 April 2012 Executive Committee meeting were read by Secretary Albert Co. A motion to approve the minutes was passed.

Monty Shaw reported on the financial status of the Society and *JOR*. The Society finances for 2012 look good since there were no annual meetings, no awards, and no student travel grants (except for the ICR student travel expenses, which were less expensive than usual). A deficit is projected for 2013 due to two annual meetings, two sets of awards, and two sets of student travel grants. The *JOR* is doing well financially. Shaw also showed graphs of declining incomes and increasing expenses over the last decade. Several options to enhance income and reduce costs were discussed. Giacomini reported that an ad hoc Budgeting Reform Committee has been formed to look into the investment of part of the reserve fund. The committee consists of Faith Morrison (chair), Chris White, and a third member to be appointed. A motion to approve the Treasurer's report was passed.

Ralph Colby gave the *JOR* Editor report. Various graphs showing *JOR* statistics were shown. For 2012 the number of new manuscript submissions is 140, slightly higher than the last four years. The acceptance rate is 47%. The average time from receipt to first decision is 65 days; from receipt to final decision, 94 days. How to get reviews back in a more timely fashion was discussed. Also discussed was how to prevent some papers from being decided much later than the average. The current impact factor of *JOR* is 2.978; the five-year impact factor, 3.093. The *JOR* is publishing about 300 pages per issue. The PXP eCopyright feature is now available for authors to complete and submit the Transfer of Copyright Agreement online at the time of submission. Authors can now check the status of submitted manuscripts with iPeerReview, an AIP iOS app. New for the January/February 2012 issue is the color cover art. Authors of the featured color art receive extra copies and a high-resolution PDF file of the cover.

A motion to approve the Editor's report was passed.

Anne Grillet reported for the Education Committee. The two-day short course "Microfluidics and Its Application" (Instructors: Anubhav Tripathi, Charles Schroeder, and Annie Colin) has 24 registered, including 13 Caltech students. This course has a hands-on component. Grillet showed the history of student enrollment of short courses. This year's short course will lose about \$2,000. The total honorarium (all instructors) is \$2,100 for a 2 day short course and \$1,400 for a 1 day short course. A short course will break even at about 20 registrants. Travel and hotel expenses for up to three instructors are also paid. For the Montréal (October 2013) meeting, the Committee proposed two parallel short courses: (i) a two-day short course on "Computational Rheology using LAMMPS" (Instructors: Jeremy Lechman, Matt Lane and Steve Plimpton) and (ii) a 1.5-day short course on "Using Large Amplitude Oscillatory Shear (LAOS)" (Instructors: Randy Ewoldt and Jeffrey Giacomini). The computational rheology short course will make use of LAMMPS, the powerful open-source particle dynamics code from Sandia National Laboratories. The LAOS short course will consist of one day of lecture on Saturday and a half day of hands-on experiments on Sunday. After Giacomini recused himself, motions to accept both proposals for the Montréal meeting were passed. A motion to approve the report was passed.



Chris White reported for the Membership Committee. Historical data of membership were presented. At the end of 2012, there were 1414 dues-paying members. The gift to graduated PhD students went well and is well-received. A motion to approve the report was passed.

Bridget D'Amelio of AIP noted some personnel changes at AIP. As of 1 February 2013, AIP publishing is done by AIP Publishing LLC, a separate entity wholly owned by AIP. The migration of Scitation to pub2web® is currently on target and will be completed by the end of April 2013. The current MACS database will be replaced by the Advantage fulfillment system. This conversion and implementation project will affect many areas of AIP and a number of the Member Societies.

Giacomini reported that AIP, with recommendations from its legal counsel, moved to form AIP Publishing LLC, which does all AIP publishing. The Board of Managers of this LLC shall not contain members from member societies that publish outside of AIP. The AIP Publishing LLC Board of Managers has been formed and will meet shortly. For the Societies that do publish their scholarly journals through AIP, their Society Presidents shall serve on this AIP Publishing LLC Board of Managers.

D'Amelio showed DeepDyve, "Netflix for Researchers". The program allows users to read rented full article as often as they would like until the rental period expires. Rented articles cannot be downloaded, printed, or shared. A motion to request AIP to prepare a DeepDyve contract for Treasurer Shaw's approval was passed.

D'Amelio also illustrated the new Web interface of the Scitation site. Feedback is solicited.

Albert Co reported that work is proceeding on website updating. Co has found a way to search through the *Rheology Bulletin* PDF files on the web. Registering for the meeting as a member right after renewing or joining the Society has become a problem because Co has to go into the system manually to adjust the records. There was extended discussion on how to minimize this. It was proposed to make the gap between member and nonmember registration rates to be \$40; \$25 for students. These are the current membership dues.

Gerry Fuller (Delegate to International Committee on Rheology) reported that the ICR in Kyoto, Japan will be held on 8-13 August 2016.

Shelley Anna reported that the Technical Program in Pasadena had 282 submissions, comparatively higher than previous February meetings (2005 Lubbock had 223; 2001 Hilton Head had 217). The last few October meetings had 390 (2011 Cleveland), 398 (2010 Santa Fe), and 375 (2009 Madison) presentation/poster submissions.

Andy Kraynik reported for John Brady on the Pasadena meeting, and then as Co-Chair of the Meetings Policy Committee. Kraynik showed proposed meeting registration fees for Montréal but did not have final numbers. He was encouraged to keep the member/nonmember differential at \$40 and \$25 (regular/student). Kraynik also suggested that the website clearly state every member of the exhibitor team must register for the meeting.

Wesley Burghardt reported that the Technical Program for the Montréal meeting (October 2013) is in good shape.

Marie-Claude Heuzey (Chair of the Local Arrangements Committee) reported on local arrangements for the Montréal meeting, to be held at the Hilton Montréal Bonaventure on 13-17 October 2013. Currently the AV costs come in at \$33K, which is very high. Gerry Fuller and Anne Grillet volunteered to be in the planning committee of the SOR-AIP Industry/Faculty/Student Forum. They will setup the time with Bo Hammer; Heuzey will get a room for the time they pick.

Norm Wagner reported for Michael Mackay (Chair of the Local Arrangements Committee) on the preparations for the Philadelphia meeting, which will be held at the Loews Philadelphia Hotel on 5-9 October 2014.

Giacomin will appoint the technical program chairs presently. Grillet noted that there will likely be two short courses. Kraynik will work with Mackay on the meeting planning.

Chris White reported on the preparation of the Baltimore meeting, which will be held in Hyatt Regency Baltimore on 11-15 October 2015. The exhibitor space has been increased. A great social program is planned at the National Aquarium in Baltimore. The current AV costs are \$17K.

Don Baird (Chair of the Local Arrangements Committee) reported on the local arrangements for the Tampa meeting (February 2017). The Grand Hyatt Tampa Bay has its own convention center.

Andy Kraynik reported for Matt Liberatore (Chair of the Local Arrangements Committee) on the local arrangements for the Denver meeting, which will be held at Embassy Suites Denver on 8-12 October 2017.

Gerry Fuller (Director, International Outreach Program) reported on international outreach activities. Fuller and Giacomin gave a short course in South Africa and will give another short course in Brazil. The Indian Society is doing well. There is an opportunity in Hungary; Fuller requested travel support for this meeting. A motion to approve the request was passed.

Faith Morrison reported for John Dealy (Chair, ad hoc Committee on Official Nomenclature and Symbols) on the final report of the ad hoc Nomenclature Committee. An amendment, an entry for the Peclet number was submitted by Norm Wagner, which Morrison accepted on behalf of the committee. She pointed out the recommendations on the back of the final report. A motion to approve the final report and the nomenclature passed unanimously.

Jason Maxey presented a proposal to hold the annual meeting in Houston, Texas on 14-18 October 2018. Two hotel choices were presented. Options for social programs were discussed.

A motion to digitize the archives of the *Rheology Bulletin/Rheology Leaflet* by AIP, at the cost of up to \$7500, was passed.

The meeting entered into executive session at 3:00 p.m.

The list of nominees by the Nominating Committee was accepted.

Since the deadline for award nominations is 15 February 2013, the Bingham and Metzner committees will make their recommendations at a later date. The discussion and acceptance of the recommendations will be done electronically.

The Publication Award Committee will make their recommendation sometime during the annual meeting.

The discussion and acceptance of the recommendation will be done electronically.

Jason Maxey's proposal for the October 2018 meeting in Houston was approved unanimously, with enthusiasm.

The ad hoc Committee on Constitutional Reform (chaired by Gerry Fuller) will report at the October 2013 Executive Committee meeting. Gerry expects to add two members to this committee.

The meeting was adjourned at 3:38 p.m.
Submitted by Albert Co, Secretary

Minutes of the Business Meeting

Tuesday, 12 February 2013
Pasadena, California

President Jeffrey Giacomini called the meeting to order at 12:07 p.m. in Room C106, Pasadena Conference Center in Pasadena, California (87 in attendance). The minutes of the previous Business Meeting in Cleveland, Ohio were read by Albert Co and approved without addition or correction.

Monty Shaw presented the Treasurer Report. A motion to accept the report was seconded and passed.

Ralph Colby presented the *JOR* Editor Report. The average time from receipt to first decision is 65 days; from receipt to final decision, 94 days. The current impact factor of *JOR* is 2.978; the five-year impact factor, 3.093. The PXP eCopyright feature is now available for authors to complete and submit the Transfer of Copyright Agreement online at the time of submission. Authors can now check the status of submitted manuscripts with iPeerReview, an AIP iOS app. New for the January/February 2012 issue is the color cover art. A motion to accept the report was seconded and passed.

John Dealy (chair, ad hoc Committee on Official Nomenclature and Symbols) reported for the ad hoc Nomenclature Committee. The list of nomenclature was presented, with an amendment on Peclet number made at the Executive Committee meeting. Dealy pointed out the recommendations of the committee. A motion to accept the report was seconded and passed.

Anne Grillet reported for the Education Committee. A motion to accept the report was seconded and passed.

Chris White reported for the Membership Committee. A motion to accept the report was seconded and passed.

John Brady reported on the local arrangement of the Pasadena meeting. There were 337 registered for the annual meeting and 12 exhibitor registrations.

Marie-Claude Heuzey (Chair of Local Arrangements Committee for the 85th SOR Meeting) reported on the local arrangements for the Montréal meeting, which will be held at the Hilton Montréal Bonaventure on 13-17 October 2013.

Gerry Fuller (Director, International Outreach Program) reported on international outreach activities.

Jeffrey Giacomini (Associate Editor for Business of the *Journal of Rheology*) reported that the archive of *Rheology Bulletin* will be digitized by AIP and AIP had formed a separate AIP Publishing LLC, which publishes the *Journal of Rheology*.

Morton Denn pointed out an issue on the Rules regarding Representatives. The ad hoc Committee on Constitutional Reform, chaired by Gerry Fuller, will look into this.

A clarification of retired member status was requested.

Reducing the presentation time slot at the meeting from 25 minutes to 20 minutes was discussed. A straw vote revealed no preference for 20 over 25.

The meeting was adjourned at 1:15 p.m.
Submitted by Albert Co, Secretary.

Treasurer's Report

To the Membership:

The most important aspect of this report is the 2014 budget, which will be presented for your consideration and approval at the 85th Annual Meeting in Montreal. As with any organization, The Society of Rheology is subject to events that make prediction difficult. For example, the income of the *Journal of Rheology* was subject to a high and unexplained level of receipts from the Copyright Clearance Center (CCC). While we requested and received documentation for this unusual amount, we were not provided with an explanation, as was the case in 2011. So, for 2014, it is proposed to incorporate a conservative amount of this very beneficial income item.

Although we haven't quite closed out the 84th Annual Meeting (Pasadena), the indications are that we will enjoy a modest net profit for the event. Full details will be given at the Montréal meeting.

Respectfully submitted,
Montgomery T. Shaw, Treasurer



**The Society of Rheology,
Inc.**

Balance Sheet

(all amounts, USD)

	2012 Year End	2011 Year End	2010 Year End	2009 Year End	2008 Year End
Assets					
Cash in checking account(s)	73,886	41,084	13,257	18,330	10,859
Securities	0	0	0	0	0
Balance in AIP account	1,685,279	1,545,020	1,435,019	1,425,005	1,342,819
Total Assets	1,759,165	1,586,104	1,448,276	1,443,335	1,353,678
Liabilities and Net Assets					
Liabilities					
Deferred subscription revenue					
Deferred member dues					
Deferred revenue	114,980	111,633	89,283	125,501	87,675
Total Liabilities	114,980	111,633	89,283	125,501	87,675
Net Assets					
Publication reserve	450,000	450,000	450,000	450,000	450,000
Student travel grant reserve	30,000	30,000	30,000	30,000	10,000
Annual Meeting reserve	300,000	300,000	300,000	300,000	300,000
Operating reserve	150,000	150,000	150,000	150,000	100,000
Unrestricted	714,185	544,471	428,994	387,834	406,003
Total Net Assets	1,644,185	1,474,471	1,358,994	1,317,834	1,266,003
Total liabilities and net assets	1,759,165	1,586,104	1,448,276	1,443,335	1,353,678

Journal of Rheology

Receipts and Disbursements

(all amounts, USD)

	2014 Budget	2013 Budget	2012 Year End	2012 Budget	2011 Year End
RECEIPTS					
Subscriptions	142,000	145,000	145,850	150,000	150,980
Royalties & Reprint Sales	80,000	6,300	108,919	5,500	88,162
Ad Sales	45,000	49,000	39,602	45,000	51,856
JORO revenue	78,000	75,000	84,695	65,000	94,242
Miscellaneous	2,000	2,000	0	2,100	2,000
TOTAL RECEIPTS	347,000	277,300	379,066	267,600	387,240
DISBURSEMENTS					
Ads	11,000	14,000	10,305	12,000	13,033
Reprints, Single Copy	1,300	1,200	2,188	1,800	630
Paper, Printing	27,600	29,000	27,340	29,000	26,267
JoR Editorial	46,000	45,000	50,272	45,000	40,914
Production	38,000	38,000	35,955	35,000	38,250
Fulfillment	5,215	5,550	5,203	5,925	5,350
Distribution	20,900	19,900	20,630	22,650	20,026
Electronic publishing	52,000	50,000	49,239	41,000	47,830
Miscellaneous	7,750	8,200	4,866	7,000	8,849
TOTAL DISBURSEMENTS	209,765	210,850	205,998	199,375	201,148
Net	137,235	66,450	173,068	68,225	186,091

The Society of Rheology

Receipts and Disbursements (all amounts, USD)

	2014	2013	2012	2012	2011
	<u>Budget</u>	<u>Budget</u>	<u>Year End</u>	<u>Budget</u>	<u>Year End</u>
RECEIPTS					
Dues	47,000	44,500	47,100	46,000	46,619
Interest	2,700	3,000	2,736	3,000	2,460
Journal of Rheology	347,000	277,300	379,066	267,600	387,240
Mailing List Sales	0	0	0	100	-15
Donations	0	0	0	0	0
Bulletin Advertising	8,000	10,000	7,625	10,000	11,500
Annual Meeting (net)	0	0	40,664	0	-6,874
Short Course (net)	0	0	1,961	0	2,929
TOTAL RECEIPTS	404,700	334,800	479,152	326,700	443,860
DISBURSEMENTS					
AIP Dues Bill & Collect.	11,000	11,500	11,027	11,500	11,104
AIP Adm. Services	8,000	10,000	7,500	8,000	9,218
AIP Mem. Soc. Dues	0	0	3,375	7,500	13,069
Contributions and Prizes	4,000	3,500	3,691	12,000	10,471
Early Career Award	9,000	18,000	0		
Journal of Rheology	209,765	210,850	205,998	199,375	201,148
Bulletin	18,000	18,000	18,225	22,000	13,406
Bingham Award	10,000	20,000	0	0	10,000
Executive Cmt. Meetings	18,000	20,000	16,566	13,000	20,370
Pres. Discretionary Fund	1,500	1,500	799	1,500	1,477
Treas. Discr. Fund	1,500	1,500	389	1,500	0
Bulletin Editor Discr. Fund	1,500	1,500	0	1,500	0
Progr. Chm. Discr. Fund	3,000	6,000	0	3,000	786
Webmaster Discr. Fund	3,000	3,000	3,500	3,000	2,246
International Activities Fund	5,000	5,000	4,292	5,000	2,000
Office Expenses	1,500	500	1,905	4,000	551
Banking Services	400	160	337	100	184
Liability Insurance	5,500	5,200	5,079	5,200	5,079
Membership Broch. & Appl.	0	0	0	2,000	0
Accountant	2,400	2,300	2,240	2,200	2,200
Student member travel	25,000	50,000	21,480	30,000	25,495
Annual meetings, future	6,000	6,000	1,267	6,000	0
Website	200	200	0	3,000	50
Miscellaneous	100	100	0	100	817
TOTAL DISBURSEMENTS	344,365	394,810	307,670	341,475	329,670
Net	60,335	-60,010	171,482	-14,775	114,190

end

Rheology Classified Ads

Instructor's Guide Available

Contact Monty Shaw (montgomery.shaw@uconn.edu) for a free copy of the Instructor's Guide for the text *An Introduction to Polymer Rheology* (Wiley, 2011). The guide has worked-out solutions to all the problems from the text that lack appended solutions, 57 additional problems with solutions, and a table of known typographical errors in the text. The Guide is intended for instructors of rheology courses that use *An Introduction to Polymer Rheology* as a required text.

An Invitation to Join The Society of Rheology

Dedicated to advancing the science of rheology: the study of deformation and flow of matter. The Society of Rheology was founded in 1929 to foster the study of the mechanical properties of deformable materials. SOR is a founding member of the American Institute of Physics. Visit our web site www.rheology.org/sor/ Apply for membership on-line.



1997 Bingham Medalist, former SOR President, serial meeting organizer, and current international outreach point-man Gerry Fuller turned 60 this year. His students and friends celebrated in Pasadena with this impressive confection. Happy Birthday Gerry!



From the mailbox: 1998 Bingham Medalist and former SOR President John Dealy had a mini reunion with three former students who went on to academic careers: Nicole Demarquete (École de Technologie Supérieure), Marie-Claude Heuzey (École Polytechnique de Montréal), Paula Wood-Adams (Concordia University), and John Dealy.



SOR Pasadena attendees Lisa Mondy, Monty Shaw, Susan Muller, and Albert Co enjoying the social program.

(Calendar, continued from page 24)

2016

8-13 August 2016
XVIIth International Congress on Rheology, Kyoto, Japan, Hiroshi Watanabe (every four years) (www.icr2016.com).

21-26 August 2016
International Congress of Theoretical and Applied Mechanics, ICTAM, Montréal, Québec, Canada (<http://iutam.org>).

2017

12-16 February 2017
88th Annual Meeting of The Society of Rheology, Tampa, Florida USA, Don Baird.

8-12 October 2017

89th Annual Meeting of The Society of Rheology, Denver, Colorado USA, Matt Liberatore.

2018

14-18 October 2018

90th Annual Meeting of The Society of Rheology, Houston, Texas USA, Jason Maxey.

For other meeting notices, see also

www.rheology.org/sor/info/Other_Meetings.htm

www.rheology-esr.net/

[www.appliedrheology.org/\(click on conferences\)](http://www.appliedrheology.org/(click on conferences))



CALENDAR OF RHEOLOGY CONFERENCES AND COURSES

2013

2-6 September 2013

14th European School on Rheology, Leuven
(<http://cit.kuleuven.be/smart/rheoschool>).

7-11 October 2013

1st International Conference on Rheology and Modeling of Materials, Miskolc-Lillafüred, Hungary, Laszlo A. Gótz (www.ic-rmm1.eu).

12-13 October 2013

SOR Short Courses "Computational Rheology via LAMMPS," by Jeremy Lechman, Matt Lane, and Steve Plimpton and "Using Large-Amplitude Oscillatory Shear (LAOS)," by Randy Ewoldt and Jeffrey Giacomini, Montréal, Québec, Canada (www.rheology.org/sor/short_course/2013Oct/).

13-17 October 2013

85th Annual Meeting of The Society of Rheology, Montréal Québec Canada, Marie-Claude Heuzey (www.rheology.org/sor/annual_meeting/2013Oct/).

2014

14-16 April 2014

Institute of Non-Newtonian Fluid Mechanics Annual Conference on Rheology, Ken Walters (www.innfm.org.uk).

6-11 July 2014

IUPAC World Polymer Congress (MACRO 2014) Chiangmai, Thailand, Supawan Tantayanon (www.macro2014.com/).

4-5 October 2014

SOR Short Course on Rheology (topic TBA), Philadelphia, Pennsylvania USA.

5-9 October 2014

86th Annual Meeting of The Society of Rheology, Philadelphia, PA USA, Michael Mackay.

2015

15 June 2015

15th International Congress of Biorheology and 8th International Conference on Clinical Hemorheology, Seoul.

10-11 October 2015

SOR Short Course on Rheology (topic TBA), Baltimore, Maryland USA.

11-15 October 2015

87th Annual Meeting of The Society of Rheology, Baltimore, Maryland USA, Kalman Migler and Jai Pathak.

(Continues, page 23)