

The News and Information Publication of The Society of Rheology
Volume 73 Number 2 July 2004

Rheology Bulletin

*Biorheology/
Hemorheology:
Sibling Societies Focus
on the Flows of
Biofluids*



Also Inside:

**Macosko Awarded Bingham Medal
Denn Wraps up as JOR Editor
Technical Program for Lubbock**

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The Cover shows an illustration of red blood cells flowing in an arteriolar. The cells deform to orient themselves to the streamlines to reduce flow resistance. The figure is from Schmid-Schönbein, H., Grunau, G. and Brauer, H. *Exempla hämorheologica 'Das strömende Organ Blut'*, Albert-Roussel Pharma GmbH, Wiesbaden, Germany, 1980, and was provided by Professor Oguz K. Baskurt.

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The Rheology Bulletin is the news and information publication of The Society of Rheology (SOR), and is published twice a year in January and July. Subscription is free on membership in The Society of Rheology

Change of address or letters to the editor: rheology@aip.org

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.

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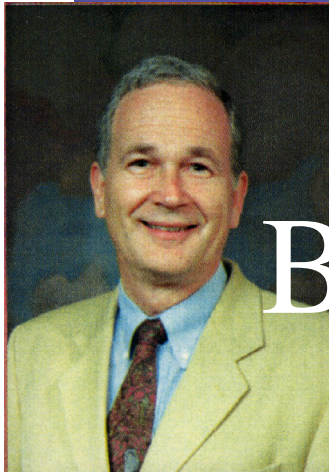
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Chris Macosko Named 2004 Bingham Medalist

At the spring 1994 Executive Committee meeting, Christopher W. Macosko was selected as the 57th recipient of the Bingham Medal of The Society of Rheology. Macosko, professor of Chemical Engineering and Materials Science at the University of Minnesota, is an expert in the field of reactive polymer rheology and the author of 2 books. He has supervised 60 doctoral and 30 masters students and published more than 300 refereed journal articles. Macosko received the 1988 Charles M.A. Stine Award from the AIChE and the Pall Award for Applied Polymer Research in 1997. In 2001 Macosko was elected to the National Academy of Engineering.

Profile Contributed by Frank S. Bates

Chris Macosko has been running his entire life. Born in Connecticut in 1944, his family moved to Berea, Ohio just outside Cleveland, when he was three years old. At Berea High School Chris excelled in academics, but his fondest memories derive from chasing people, as captain of the cross-country team, and as a member of the outdoor four-by-one mile relay team that set a school record that still stands today. Perhaps anticipating a tenacity that would serve the rheology community later in his career, Chris once completed, and won, a track event with a broken leg! In April 2004 Macosko was inducted into the Berea High School Hall of Fame.

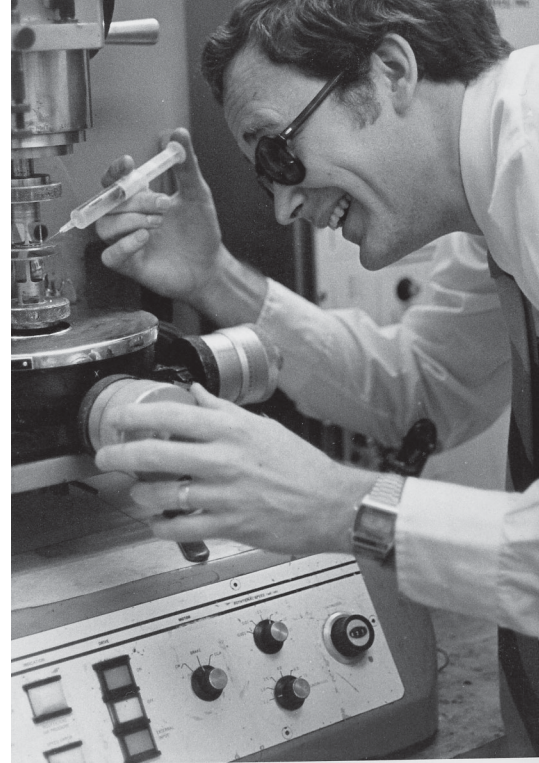
Prior to matriculating at Carnegie Mellon University, Chris spent part of 1962 as an exchange student in West Berlin, experiencing a unique glimpse of world affairs at a critical juncture in the twentieth century. Along with more running (as captain of the track team, he once won the individual mile and took second in the half mile in a single meet) and a full slate of classes, Chris found time to write for "Steel Magazine". His interviews with scientists and engineers around Pittsburgh in the mid-1960's drove him into the lab, and planted the seeds of an impending career in softer materials.

After graduating with a chemical engineering degree from CMU in 1966, Chris attended Imperial College in London, and completed a master's degree under the supervision of Ken Weale. His project, high pressure polymerization kinetics, provided his initial exposure to polymer science and engineer-

ing. Upon returning to the U.S., Chris married Kathleen and entered the graduate program at Princeton in the fall of 1967. While working under the tutelage of Bryce Maxwell, Macosko and fellow graduate student Joe Starita conceived the ideas that culminated in the development of a new, less compliant rheometer. The subsequent evolution of the Rheometrics Company (now part of TA Instruments) in the early 1970's represents one of the pivotal developments in the field of rheology. Chris graduated with a Ph.D. in chemical engineering in 1970, perhaps overshadowed by honorary degree recipients Bob Dylan and Coretta King.

Pushed by mentor Leon Lapidus at Princeton, and pulled by Skip Scriven, Macosko accepted a faculty position at the University of Minnesota, the living dowry extracted by Neal Amundson from the university administration for agreeing to expand the chemical engineering program to include materials science and engineering. This gamble has paid sizable dividends. Chris spearheaded an interdisciplinary polymer program that drew Matt Tirrell (1977), me (1989), and Dave Morse (1997) to the department, while embracing chemistry faculty Stephen Prager, Wilmer Miller, Tim Lodge (1982), and Marc Hillmyer (1997).

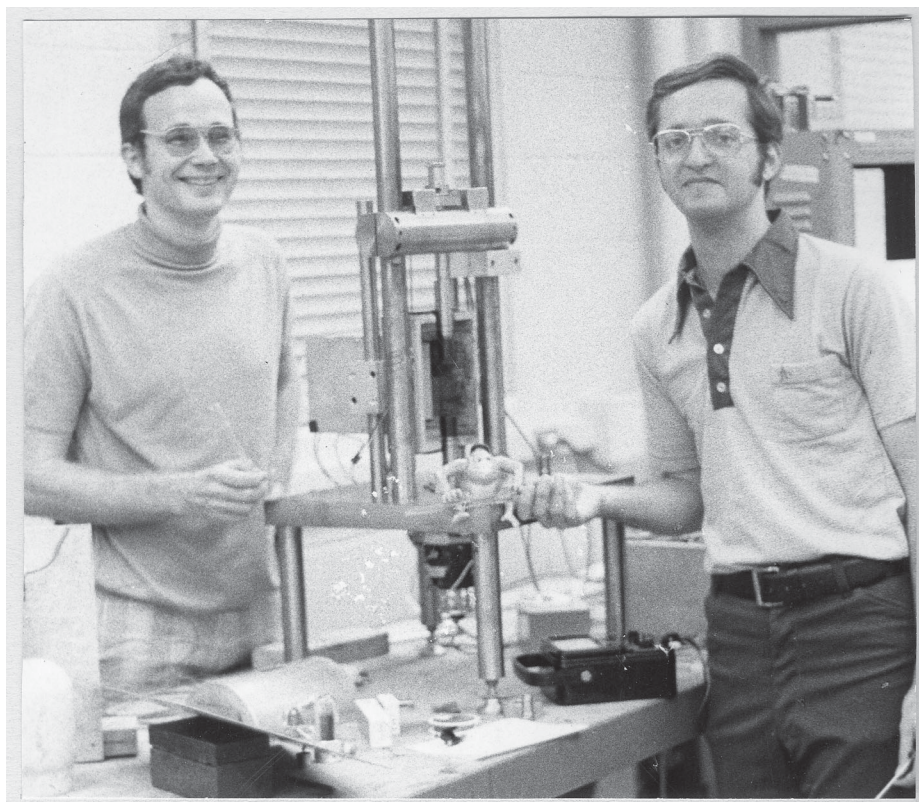
Since joining Minnesota, Macosko has distinguished himself as a terrific teacher and a leading scholar in the field of polymer science and engineering. His work addresses complex problems that couple reaction kinetics and the



Macosko has worked for 40 years on rheological problems.

development of molecular architecture to multiphase morphology, flow, and mechanical and other physical properties. Throughout his career, rheology has played a central role: examples include the characterization of network formation during gelation, elasticity of foams, interfacial area generation in reactive blends, and the viscoelastic character of composites.

After a highly productive lifetime on the run, my colleague Chris Macosko has now been recognized for professional activities centered on long time scales and slow recovery.



Chris Macosko and Bill Davis in the lab in the early days.

Journal of Rheology Editor Morton M. Denn has announced that he will step down as of July 1, 2005. Denn, Albert Einstein Professor and Director of the Levich Institute for Physico-Chemical Hydrodynamics at the City College of the City University of New York, has been editor of the JoR since 1995. He received the Bingham Medal in 1986.

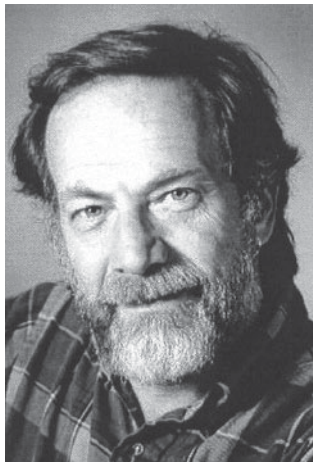
Denn came to the JoR with extensive editorial experience, having served as editor of the AICHE Journal from 1985 - 1991. Under his leadership the median time to publication for manuscripts received by the JoR was 218 days (about 7 months). Such timeliness is a credit to the diligence of the editor.

End of An Era: Mort Denn Steps Down as JOR Editor

As editor Denn oversaw the management of the JoR paper award, which is not a "best paper" award, as Denn frequently points out, but an award for an outstanding paper among "many fine papers [received] each year, any one of which would be deserving of this recognition." Denn has maintained the high quality of the journal throughout his tenure as editor. "JoR has the highest ISI Impact Factor of any research journal in the entire field of mechanics," he notes. As editor Denn also serves on the SOR Executive Committee. "The Society and the field of rheology as a whole have benefited enormously from Mort's ten years of service as Editor of the Journal of Rheology," says

SOR President Susan Muller. "His advice and counsel as a member of the Executive Committee have been invaluable and will be sorely missed."

Working with Denn since 1996 as Editorial Assistant has been Elizabeth Frey. Frey's work on the Journal began when Denn was at UC Berkeley and contin-



ued after Denn's move to the Levich Institute in 1999. Frey's long service on the Journal provided continuity that was important for the smooth functioning of the Journal. "I asked her to continue when I moved from Berkeley because I could not imagine anyone else who could do the job as well, as our authors and reviewers appreciate," notes Denn. Frey retired from UC Berkeley in 2004 but will continue to work with Denn on the Journal through July 2005.

The SOR Executive Committee has appointed a committee to oversee the search for a new editor. The new editor will serve

continues back page

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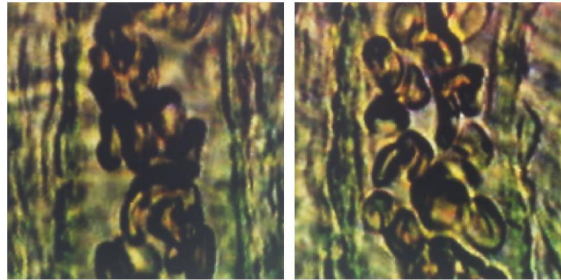
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The International Society for Clinical Hemorheology

Oguz K. Baskurt
President, ISCH

Hemorheology deals with the flow and deformation behavior of blood and its formed elements (i.e., red blood cells, white blood cells, platelets). The rheological properties of blood are of both basic science and clinical interest: the rheological behavior of blood may affect blood flow in the vascular system, and blood rheology can be altered in many disease states. There is an increasing amount of clinical and experimental data clearly indicating that the rheological characteristics of blood are a major determinant of proper tissue perfusion, and that rheological abnormalities are associated with impaired delivery of oxygen and nutrients and the removal of waste products.

Blood is a suspension of cellular elements in a salt plus protein solution termed plasma. While



Normal red blood cells (left) and artificially hardened cells (right) show an effect of velocity profile as they are transported through a microvessel. Photo courtesy of G. B. Nash.

plasma behaves as a simple Newtonian fluid, blood exhibits non-Newtonian shear-thinning behavior and a yield stress; the reversible shear stress dispersion of red cell aggregates is the primary cause of blood's non-Newtonian behavior. The fluidity of blood is thus determined by plasma viscosity, the rheologic behavior of cellular elements, the nature and intensity of cell-cell interactions, and the volume fraction of blood occupied by the formed elements, especially red cells (i.e., the hematocrit).

Since red blood cells constitute about 99% of the cellular elements, the behavior of these cells dominate in determining the macroscopic rheological behavior of blood.

Although studies of blood rheology date from at least the early studies of Poiseuille, modern concepts in hemorheology have only been established since the second half of the twentieth century. The discipline of clinical hemorheology underwent rapid development

during the 1970's and 1980's, in large part due to support by pharmaceutical companies and equipment manufacturers. Various instruments and devices were developed specifically for blood rheology studies, including low shear Couette viscometers, controlled shear stress rheometers, micropore filtration systems to quantify red blood cell deformability (i.e., the ability of a red blood cell to adopt a new shape in response to external forces), and defined shear rate systems to analyze red

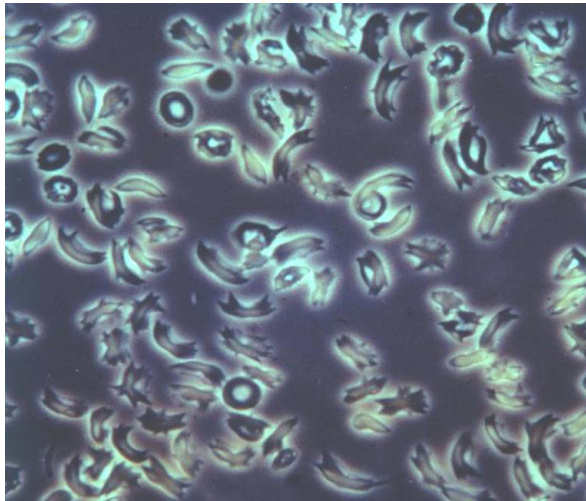
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The International Society of Biorheology

Edgar A. O'Rear, Gerard Nash, Roger Tran-Son-Tay, Nobuji Maeda and Harry L. Goldsmith
Officers of the ISB

"Biorheology" is taken to mean the study of the deformation and flow of biological materials. Although much work in this field has centered on the properties of blood and blood vessels, other fluids (such as mucus and synovial fluid) or tissues (such as skin and bone) have been the subjects of biophysical analysis. Historically, some of the earliest studies of flow were motivated by an interest in biology. In 1835, the great

French physician and scientist Jean-Leonard Marie Poiseuille (1797-1869) described in vivo observations on blood flow in "Recherches sur les causes du mouvement du sang dans les vaisseaux capillaires." His work with capillary vessels led him to conduct further experiments in glass tubes of very small diameter and, of course, to arrive at the relationship now known as the Poiseuille (or Hagen-Poiseuille) Law.



Red cells from a patient with sickle cells disease, showing transformation in shape upon removal of oxygen. Photo courtesy G. B. Nash.

The term biorheology was first introduced by the late Alfred L. (Al) Copley in 1948 at the 1st International Congress of Rheology, to describe the science underlying studies at the interface between biology and rheology. With George Scott Blair, he initiated a conference on the flow properties of blood and other biological systems in Oxford (1958) and a symposium on biorheology at the 4th International Congress of Rheology (1964). With the help of Robert Maxwell at Pergamon Press, Copley and Scott Blair started the journal *Biorheology*, now in its 41st year of publication. Copley also established in 1966 the International Society of Hemorheology, which changed its name 3 years later to the International Society of Biorheology (ISB) to reflect the active research in fluids and tissues other than blood.

To describe biorheology as the study of the flow and deformation of biological materials understates the diversity of interest and impact of the field. Research links scientific discovery to engineering design, and by incorporating approaches such as complex mathematical and computational analysis, applies them to

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Hemorheology

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blood cell aggregation (i.e., the reversible formation of red cell-red cell aggregates at stasis or low shear).

Whole blood and plasma viscosity, as well as red blood cell deformability and red blood cell aggregation, have been found to be altered in several disease states (e.g., diabetes, infection, myocardial infarction, stroke). The field of clinical hemorheology deals primarily with such alterations; studies also include the effects of altered blood rheology on blood flow and tissue perfusion, sometimes using animal models of disease processes. The development and study of therapeutic measures and agents that can normalize hemorheological parameters are also part of this field.

The International Society for Clinical Hemorheology (ISCH) was founded in 1993 in Vienna, Austria during the 1st International and 8th European Congress of Clinical Hemorheology. The purpose of ISCH is to advance and disseminate knowledge of the discipline of clinical hemorheology, and the application of this discipline to human welfare. The society organizes conferences and workshops on all aspects of clinical hemorheology, establishes committees to work on special topics related to clinical hemorheology, encourages scientists working in this area by award programs, and facilitates the exchange of ideas and information between clinical and basic scientists.

In order to more effectively carry out its mission, the ISCH has jointly organized its international conferences with the International Society of Biorheology (ISB): the next joint meeting is scheduled for Chongqing, China in 2005. The ISB has a more basic science focus, and thus the joint ISCH-ISB conferences offer a rich environ-

ment for the exchange of ideas and for establishing cooperative efforts between basic science and clinical investigators. ISCH also organizes symposia at various scientific meetings in order to promote the discipline, and provides travel support for young scientists, especially from countries with less favorable economies, to enable their participation in its meetings.

Biorheology

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clinical studies involving patients. At the molecular level, biorheologists are interested, for example, in the signal transduction pathways associated with the response of cells to deformation. This is important in the field of tissue engineering where mechanical environment during growth can affect cell orientation and material properties of a tissue construct or living implant. Understanding such effects aids in preparing, over the time frame of a few weeks, a viable implant which will adequately mimic human tissue evolved over many years. The typical construct is non-homogeneous and non-isotropic with a biodegradable polymeric scaffold that provides transient physical support while cells undergo seeding, differentiation, proliferation and maturation to create an extracellular matrix and their own support. This presents a significant challenge since satisfactory performance of the implant often means matching deformation character of the construct and native tissue. Examples include the making of a leak proof suture between a coronary artery and a tissue-engineered blood vessel for bypass surgery or the making of a safe seal against infection at the boundary between synthetic and native skin.

Biorheology has also provided insights into the causes of disease or their diagnosis. Complex analysis of the flow of blood and of mass transfer equations at circulatory bifurcations



An illustration of red blood cells flowing in an arteriolar. The cells deform to orient themselves to the streamlines to reduce flow resistance. Photo courtesy O. K. Baskurt.

and in the coronary arteries, larger vessels where blood can be treated as a homogeneous fluid, yielded mechanisms which may explain respectively the formation of aneurysms or the role of hypertension in atherosclerosis and myocardial infarction. In other cases, it is essential to address hemorheology at the level of the individual cell with sickle cell anemia being a commonly cited clinical example. The well-known biochemical defect manifests itself in altered mechanical behavior at the level of the red cell. Biorheologists have also helped elucidate the role of adhesion in leukocytes carrying out their function as part of the body's defense against pathogens. How do white blood cells "know" where to go? An infection of bacteria in tissues leads to the release of factors that cause endothelial cells lining the blood vessel walls to display adhesion molecules. The increased presence of the adhesion molecules results in an interaction between circulating leukocytes and the vessel wall, eventually leading to their migration through a gap between the junctions of the endothelial cells out into the infected tissue. Not only do the local conditions of flow directly influence the physical cell-cell interactions, but they also regulate the expression of genes by the endothelial cells, making the whole 'inflammatory' response a model of how physical processes impinge on biological systems.

The development of artificial organs and other medical devices often requires not only biocompatibility in the usual chemical sense,

but also rheological compatibility. Measurement of shear stress levels and assessment of the susceptibility of blood cells to the effects of mechanical trauma were central to the improvement of prosthetic heart valves and the development of a safe implantable artificial heart. Mechanical trauma has also been implicated in cell loss as blood passes through the toroidal rotary seal in a continuous flow cell separator, and may contribute to anemia in patients on hemodialysis.

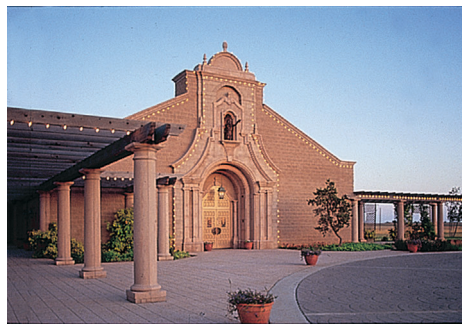
The International Society of Biorheology promotes cooperation among scientists, engineers and physicians from around the world with an interest in the field of biorheology. ISB is truly international in scope, claiming representation from over 30 different countries, primarily in Europe, North America and Asia.

A major activity of ISB is a triannual International Congress of Biorheology that rotates among the three aforementioned continents. With strong cultural and multidisciplinary technical components, these meetings stand out in what they offer attendees in terms of combined professional satisfaction and personal enjoyment. At the meeting, the Society also commemorates the contributions of Jean-Leonard Marie Poiseuille by honoring a distinguished biorheologist with the Poiseuille Gold Medal. The presentation ceremony and lecture by the recipient is a highlight of each Congress. Recent venues have been Antalya (Turkey), Pécs (Hungary) and Big Sky, Montana with the next meeting scheduled for July 2005 in Chongqing, China, www.icbicch.com.

Many believe that the next major economic cycle in the United States will be tied to biology and medicine. It would seem that the prospects for future work by rheologists in these areas will be good. Readers interested in learning more about ISB can visit www.coe.ou.edu/isb/.



76th Annual SOR Meeting to be held 13-17 February 2005 in Lubbock, TX USA



Ten symposia and a poster session will cover topics from biological systems to glassy polymers at the 76th Annual SOR meeting (see listing next page). Abstracts may be submitted through the Society's web site from late July until October 15, 2004. Abstracts for poster presentations may be submitted through December 10, 2004.

Invited speakers for Lubbock are David Weitz, Harvard University USA, Gareth McKinley, Massachusetts Institute of Technology USA, and Bingham medalist Chris Macosko, from the University of Minnesota USA. Weitz is an expert in experimental soft condensed matter physics and has worked on gels and biomaterials among other topics. McKinley is known for his work on hydrodynamic instabilities and extensional rheometry. Bingham medalist Macosko (see profile page 4) is highly regarded for his contribu-

tions to the study of multistructured polymer systems.

Also in Lubbock two short courses aimed at newcomers to rheology will be offered. A two-day course "Beginners' Rheology" will run 12-13 February with instructors Faith Morrison and Jeffrey Giacomini. In addition, a half-day course on "Rheological Data Analysis and Comparison to Theory" will be offered on February 13 by Henning Winter. Both courses assume that participants have minimal knowledge of rheology, with the first aimed at teaching rheological analysis (standard flows, material functions, constitutive equations, some rheometry) and the second concentrating on using software tools for making rheological calculations.

All sessions will be held at the Lubbock Memorial Civic Center, which is a one-block walk from the

conference hotel. The meeting will begin with a Sunday reception, there will be a Society Luncheon on Monday, and the Bingham Award will be presented to Macosko at a dinner on Tuesday evening. The poster session will take place on Wednesday evening.

Information about getting to Lubbock appeared in the January 2004 Bulletin and is on the web along with detailed information on the Lubbock meeting:
www.rheology.org/sor/info/meeting_announcements.htm.

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For instructions on submitting abstracts, go to www.rheology.org/sor/

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5. Self-Assembled & Associating Fluids

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6. Dilute Solutions

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7. Multiphase Fluids

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8. Entangled Melts & Solutions

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9. Experimental Methods

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Wesley Burghardt
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10. 50 Years of WLF: Glassy Polymers & Related Systems

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11. Posters

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Rheology News



ICR2004 Seoul this Summer

The 14th International Congress on Rheology will take place in Seoul Korea on August 22-27. Details and registration materials for ICR2004 may be found on the conference web site www.icr2004.or.kr. Registration fees are US \$680 for delegates, US \$200 for students and US\$350 for accompanying persons.

JOR Submission Goes Electronic

The Journal of Rheology will transition to exclusive electronic submission and handling of journal articles over the next 12 months. The change to mandatory electronic submission, adopted by the SOR Executive Committee in April 2004, will reduce the paperwork associated with

manuscript handling and is projected to reduce costs at the Journal.

To handle this change, the SOR Exec Com authorized the purchase of PeerX-Press (PXP), software recommended by SOR staff at the American Institute of Physics. The next Editor of the JoR will oversee the transition of the Journal to the new system, which will be optional between January and July 2005, and mandatory after July 2005.

Vol 2 of *Rheology Reviews* now Available

The British Society of Rheology (BSR) has published its second volume of *Rheology Reviews*, containing 7 substantial reviews of current topics of interest in rheology. RR2004 is edited by David M. Binding and Ken Walters and is available in printed or CD format from the BSR. For more information please visit www.bsr.org.uk.

New Fixture for Solids Rheology

Malvern Instruments (Bohlin) has introduced a new fixture that enables large solid samples to be tested while immersed within a temperature-controlled liquid. Temperature control is by means a Peltier device, and the manufacturer claims that liquid heat-transfer medium supplies better temperature control compared to forced gas or radiation. Samples of up to 10 by 13 by 50mm may be accommodated and the working temperature range is -15C to 95C depending upon the fluid medium used.

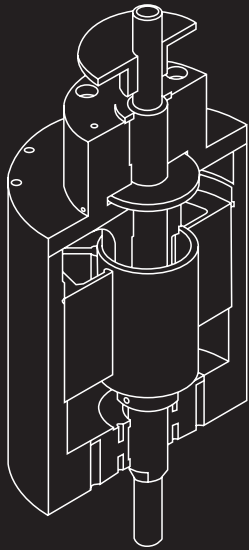
Coatings Short Courses Offered

The Coatings Research Institute at Eastern Michigan University offers a variety of short courses throughout the year on subjects related to coating and coating flows. For more information visit www.emich.edu/public/coatings_research/schedule.html.



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Nominations Invited for the 2005 Bingham Award

Nominations for the Society's highest honor, the Bingham Medal, should be submitted before 15 January 2005 to the chair of the Bingham Award Committee:

William Tuminello
Western Research Institute
365 North 9th Street
Laramie, WY 82072 USA
wtuminel@uwyo.edu

Rules and some guidelines governing the Award are on the web at www.rheology.org/sor/awards/bingham/nom2004.htm.

SOR Executive Committee Begins Search for JOR Editor

Society President Susan Muller has appointed an ad hoc Editor Search Committee chaired by

former SOR president and Bingham medalist Kurt Wissbrun to identify a new editor for the Journal of Rheology. Also serving on the search committee are two other Bingham medalists, current past president Bill Russel and Professor Gary Leal of the University of California, Santa Barbara.

The charge to the committee is to recommend an interim editor who will serve out the remainder of Denn's term as editor, which runs until October 2005. The interim editor will then stand for election in 2005 in accordance with the SOR constitution.

2005 Nominating Committee to be Formed

The SOR will hold officer elections in 2005, and the Nominating Committee for those elections will be formed in late Fall 2004. The SOR constitution provides for a three-member nominating

committee to report its recommendations at least 145 days prior to the Annual Meeting, approximately 24 May 2005. Members interested in serving on the Nominating Committee should indicate their interest to a member of the SOR Executive Committee. International and industrial members are particularly encouraged to serve.

Minutes of the Executive Com- mittee Meeting Sunday, April 4, 2004

Susan Muller called the meeting to order at 8:29 a.m. in the Edens Room of the Four Points Sheraton O'Hare Hotel in Schiller Park, Illinois USA. Committee members in attendance were Susan Muller, Monty Shaw, Jeffrey Giacomini, Bill Russel, Mort Denn, Andy Kraynik, Wes Burghardt, Lynn Walker and Timothy Lodge. Invited guests were Janis Bennett, Pat Mather and Faith Morrison. The minutes of

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the previous meeting were read and approved.

Monty Shaw led a discussion on putting the whole Bulletin onto the website. A motion passed to put minutes to all meetings and Society reports (now published in the Bulletin) onto the Society website for members only.

Pat Mather, Chair of the Membership Committee, reports that as of the end of March 2004, only 1445 of our 1702 members in 2003 had renewed. Members are encouraged to renew promptly. Mather then led a discussion on making it easier to join The Society of Rheology. A motion was passed to enable on-line new member application from the Society website. Finally, Mather reported on an enthusiastic campaign to reach out to new members. The Membership report was accepted.

Treasurer, Monty Shaw, led a discussion on Society finances. The financial position of the Society is sound. A motion was passed to restate the annual meeting reserve for 2003 from \$70,000 to \$100,000. The Treasurer's report was accepted.

Mort Denn, Editor, reported that the Journal of Rheology is healthy. Articles over the period

March 18, 2003 - March 17, 2004: 146 submitted, 45 accepted, 49 rejected, 2 withdrawn and 50 pending. Mean time for acceptance: 139, mean time for rejections 29. Mort Denn announced that he will complete his 10-year Editorship on July 1, 2005. Janis Bennett, our Society liaison with the American Institute of Physics (rheology@aip.org) led a discussion on electronic journal editorship. A motion to make web-based article submission and review processes for the Journal of Rheology mandatory on July 1, 2005 was passed. A motion was also passed to adopt the PeerX-Press (PXP) software used by AIP for these processes.

Susan Muller led a discussion on forming the Journal of Rheology Editor Search Committee. A short list of committee candidates was developed. Jeffrey Giacomini, Editor for Business, reported that the Journal of Rheology On-Line is healthy, attracting a record 20,093 non-image requests from a record 2,351 unique hosts each month. Of the 2,700 articles archived, about 3,300 articles (1,700 unique) are downloaded each month.

Susan Muller, for Norm

Wagner, Education Committee Chair, reported on the short course possibilities for the Lubbock meeting (February 12-13, 2005). The two-day "Beginners' Rheology" course by Faith Morrison and Jeffrey Giacomini was chosen, along with a parallel one-day course (February 13, 2005) by Henning Winter titled "Rheological Data Analysis and Comparison to Theory". A short course on "Microrheology" by Michael Solomon and James Harden was chosen for the Vancouver meeting (October 15-16, 2005). Contact Norm Wagner (wagner@che.udel.edu) with short course suggestions for future meetings.

Faith Morrison, the new Editor of the Rheology Bulletin, led a discussion about her plans for the Bulletin, and reported on Bulletin finances. A motion passed to upgrade our Bulletin to a four-color format and revise the Bulletin advertising rates accordingly.

Janis Bennett, our Society liaison with the American Institute of Physics led discussions on undergraduate student mentorship in rheology and on eliminating blank pages from the Journal of Rheology.

Wes Burghardt, Technical

Program Chair for the Lubbock Meeting (February 13-17, 2005) reported on session titling for this, our next annual meeting. Everything is in order. Vice-President Andy Kraynik then led a discussion on adjusting the Editor's honorarium. For Greg McKenna, Local Arrangements Chair for the Lubbock meeting, Susan Muller reported that everything is progressing nicely. For Savvas Hatzikiriakos, Local Arrangements Chair for the Vancouver meeting (October 16-20, 2005), Susan Muller reported that all is well.

Andy Kraynik, for Gerry Fuller, Local Arrangements Chair for the ICR in Monterey, reported on planning. Everything is moving along swimmingly. A motion was passed to provide the ICR 2008 Organizing Committee with a budget of \$10,000 for meeting planning and promotion. Andy Kraynik, for Albert Co, Local Arrangements Chair for the Portland, Maine meeting (October 8-12, 2006), reported that planning is progressing agreeably. For Jules Magda, Local Arrangements Chair for the Salt Lake City meeting, Andy Kraynik announced that the meeting will be

held October 7-11, 2007, at the Hilton Salt Lake City Center, an ideal facility for our meeting.

The meeting went into Executive Session at 4:11 pm.

Journal Editor Denn stepped out. A motion passed unanimously to increase the Editor's stipend to \$16,000, effective January 1, 2004. Journal Editor Denn stepped back in. A motion passed unanimously to endorse the recommendation of the Bingham Nomination Committee that Professor Christopher W. Macosko be awarded the Bingham Medal, our Society's highest honor, at the Lubbock Meeting in February 2005.

The meeting adjourned at 4:30 p.m.

Treasurer's Report

To the Membership: While refraining from going to full color, you will note in the Balance sheet a yellow row, which highlights the net position of your Society. The increases suggest that the financial clouds we see on the horizon have not created yet a rainy day, but they have not gone away. For a number of years

running, we have been fortunate to have a break in the clouds in the form of some unforeseen but fortunate happening--extraordinary returns on the CD, legal settlements, and profits from annual meetings are recent examples. And 2004 is no exception; we are currently enjoying a reduction in production rates for the Journal. By January 2006, we will be paying 40% less than in 2003!

The sheet entitled "The Society of Rheology" is a statement of the overall receipts and disbursements and contains the proposed 2005 budget. This will be presented to the membership for approval at the next Annual Meeting of The Society (February 15, 2005). A couple of items are higher than normal: Future Annual Meetings (because of ICR planning and advertising expenses); Bingham Medal (two medals to be given in 2005); and Student Member Travel (two meetings).

These are temporary, which means that the deficit budget is probably not the beginning of a downward spiral experienced by other societies. We should also note that the Executive Committee approved overruns for 2004 for Future Annual

Treasurer

Meetings (also for ICR planning and advertising plus deposits on other meetings), the Bulletin (to go to full color) and new equipment for the JoR and the Website. But counter-ing these somewhat is a

book net on the Pittsburgh meeting and short course of \$16,775, which just came in. You will be hearing a lot about the new on-line handling of JoR manuscripts; the expenses for this start in 2005 and

are included in the 2005 JoR budget. At steady state this will cost The Society around \$8000, depending on manuscript flow.

Respectfully submitted,
Montgomery T. Shaw,
Treasurer

Treasurer's Report

The Society of Rheology Receipts and Disbursements

(USD)	Budget 2005	Budget 2004	Actual 2003	Budget 2003	Actual 2002
RECEIPTS					
Dues	55,000	55,000	58,271	60,000	55,963
Interest	9,000	9,000	8,266	14,000	14,062
Journal of Rheology	241,596	238,500	261,770	256,300	268,284
Mailing List Sales	1,000	1,000	697	500	1,135
Bulletin Advertising	2,000	2,000	1,488	2,000	2,023
Annual Meeting (net)	0	0	11,099	0	4,752
Short Course (net)	0	0	15,061	0	1,298
TOTAL RECEIPTS	308,596	305,500	356,651	332,800	347,516
DISBURSEMENTS					
AIP Dues Bill & Collect.	10,000	7,000	10,106	6,000	10,362
AIP Adm. Services	9,500	9,500	9,549	9,500	9,500
AIP Mem. Soc. Dues	7,600	7,600	7,585	7,500	7,528
Contributions and Prizes	3,000	3,000	1,994	3,000	2,011
Renewal Billing	0	0		0	0
Journal of Rheology	229,872	256,197	247,382	259,847	244,834
Bulletin	3,500	4,000	3,302	7,000	3,640
Bingham Award	14,000	7,500	5,015	7,500	5,000
Executive Cmt. Meetings	13,000	9,000	12,464	7,500	5,996
Pres. Discretionary Fund	1,500	1,500	0	1,500	0
Treas. Discr. Fund	1,500	1,500	0	1,500	0
Progr. Chm. Discr. Fund	4,000	2,000	1,895	2,000	708
Office Expenses	6,000	6,000	5,270	2,000	5,948
Banking Services	100	100	78	100	88
Liability Insurance	7,500	6,000	4,330	4,000	4,133
Membership Broch. & Appl.	1,000	200	0	200	0
Accountant	2,200	2,200	1,920	2,200	1,900
Student member travel	18,000	600	0	5,000	3,366
Annual meetings, future	7,000	3,000	1,000	3,000	0
Website	1,000	1,000	0	1,000	832
Miscellaneous	1,000	1,500	425	1,500	0
TOTAL DISBURSEMENTS	341,272	329,397	312,315	331,847	305,847
Net	-32,676	-23,897	44,337	953	41,669

Journal of Rheology

Receipts and Disbursements (USD)

	2005 Budget	2004 Budget	2003 Actual	2003 Budget	2002 Actual
RECEIPTS					
Subscriptions	188,596	187,000	204,598	209,000	215,712
Reprint Sales	7,000	5,500	5,876	6,500	5,467
Ad Sales	33,000	32,000	33,052	35,000	33,615
CD sales (net)	0	0	0	0	0
JORO revenue	12,000	13,000	17,034	4,300	11,869
Miscellaneous	1,000	1,000	1,210	1,500	1,622
TOTAL RECEIPTS	241,596	238,500	261,770	256,300	268,284
DISBURSEMENTS					
Ads	9,000	9,000	7,360	9,000	9,755
Reprints, Single Copy	5,400	5,400	5,445	6,532	6,010
Paper, Printing	33,578	38,000	34,853	39,484	36,147
SOR Editorial	48,170	49,897	52,388	47,000	46,116
Production	52,500	73,500	73,179	78,400	72,863
Fulfillment	7,600	6,300	6,924	8,300	6,922
Distribution	18,524	20,500	19,226	21,031	18,397
Electronic publishing	48,000	48,000	42,332	44,000	41,115
Miscellaneous	7,100	5,600	5,675	6,100	7,511
TOTAL DISBURSEMENTS	229,872	256,197	247,382	259,847	244,834
Net	11,724	-17,697	14,388	-3,547	23,450

The Society of Rheology, Inc.

Balance Sheet (all amounts, USD)

End of year:	2003	2002	2001	2000	1999
Assets					
Cash in checking account	2,047	466	9,374	9,400	10,735
Securities	0	0	0	15,000	0
Balance in AIP account	938,047	915,334	843,151	827,040	766,911
Total Assets	940,094	915,800	852,525	851,440	777,646
Liabilities and Net Assets					
Liabilities					
Deferred revenue	143,603	162,363	137,468	181,800	183,203
Total Liabilities	143,603	162,363	137,468	181,800	183,203
Net Assets					
Publication reserve	450,000	450,000	450,000	450,000	450,000
Student travel grant reserve	10,000	10,000	10,000	10,000	10,000
Annual Meeting reserve	100,000	70,000	70,000	35,000	35,000
Operating reserve	70,000	70,000	70,000	70,000	70,000
Unrestricted	166,491	153,437	115,057	104,640	29,443
Total Net Assets	796,491	753,437	715,057	669,640	594,443
Total liabilities and net assets	940,094	915,800	852,525	851,440	777,646

the end

CALENDAR OF RHEOLOGY CONFERENCES AND COURSES

2004

4-6 August 2004

Nordic Rheology Conference 2004, Reykjavik
Iceland

22-27 August 2004

XIVth International Congress on Rheology, Seoul
Korea

29 August - 1 September 2004

Polymer Processing Society Asia/Australia
meeting, Gyeongju Korea

27-29 September 2004

Polymer Films and Fibers Symposium, Montreal,
Quebec Canada

4-5 October 2004

The 5th International Symposium on Binder
Rheology and Pavement Performance, Baltimore,
Maryland USA

7-10 November 2004

Regional Meeting of the Polymer Processing
Society, Florianopolis Brazil

2005

12-13 February 2005

SOR Short Course on *Beginners' Rheology*, by
Faith A. Morrison and A. Jeffrey Giacomin,
Lubbock, Texas USA

13 February 2005

SOR Short Course on *Rheological Data
Analysis and Comparison to Theory*, by
H. Henning Winter, Lubbock, Texas USA

13-17 February 2005

76th Annual Meeting of The Society of
Rheology, Lubbock, Texas USA

21-23 April 2005

2nd Annual European Rheology
Conference AERC 2005, Grenoble
France

30 May - 3 June 2005

12th International Congress of
Biorheology (12thICB) and 5th
International Conference on Clinical
Hemorheology (5thICCH), Chongqing
China

19-23 June 2005

21st Meeting of the Polymer Processing
Society, Leipzig Germany

26-29 June 2005

13th European Conference on Clinical
Hemorheology, Siena Italy

15-16 October 2005

SOR Short Course on *Microrheology*, by
Michael Solomon and James Harder,
Vancouver Canada

16-20 October 2005

77th Annual Meeting of The Society of
Rheology, Vancouver Canada

2006

27-29 April 2006

3rd Annual European Rheology
Conference AERC 2006, Hersonissos
Crete

7-8 October 2006
SOR Short Course on
Rheology (topic TBA),
Portland, Maine USA

8-12 October 2006
78th Annual Meeting of The
Society of Rheology, Portland,
Maine USA

2007
Spring 2007
4th Annual European Rheology
Conference AERC 2007,
location TBA

6-7 October 2007
SOR Short Course on
Rheology (topic TBA), Salt
Lake City, Utah USA

7-11 October 2007
79th Annual Meeting of The
Society of Rheology, Salt
Lake City, Utah USA

2008
17-23 August 2008
XVth International
Congress on Rheology and

80th Annual Meeting
of The Society of
Rheology, Monterey,
California USA

2009
October 2009
81st Annual Meeting of
The Society of
Rheology, Madison,
Wisconsin USA

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Milestones - Happenings

Christopher W. Macosko

has been named the recipient of the 2004 Bingham Medal; see profile page 4. The medal will be awarded at the 76th Meeting of The SOR in Lubbock, TX USA 13-17 February 2005.

Society member **John Casola** has been named 2003 Person of the Year by The Association of Modified Asphalt Producers (AMAP) in the USA. Casola is Product Sales Manager for asphalts at

Malvern Instruments and previously was Director of Technical Services for Bohlin Instruments until its acquisition by Malvern in November 2003.

Rheologist **Roy R. (Dick) Miller** passed away in March 2004 of pancreatic cancer. Miller held a Ph.D. in chemistry from the University of Chicago and spent most of his career with United Technologies, Chemical Systems Division in San Jose, CA USA. His work on the rheology of solid propellant dispersions with Bob Powell appeared in the JOR in 1991.

Denn Steps Down

continued from page 6

as interim editor until the 2005 election. Kurt Wissbrun leads the editor search committee which, in his words, "will endeavor to find a successor to Mort with the characteristics of Mort and his predecessors in the position - someone with the technical standing to command the respect of our community, with the dedication and diligence to execute the duties of the job, and with the vision to guide the Society in meeting the challenges of the changing technical and publishing landscape."



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