

Rheology Bulletin



Spreading Rheology Around the World



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- *Bingham to Cates*
- *Metzner to van Ruymbeke*
- **Come to Kyoto!**
- **South American Rheology**
- **ExCom Actions**



**XVIIth ICR
Kyoto, 2016**



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On the cover:

For many years the SOR has supported an outreach program designed to grow interest in rheology around the world. This year, Bingham Medalists Gerry Fuller and Chris Macosko traveled to Argentina and Colombia to teach a rheology short course and to mentor interested scientists and engineers as they worked to establish national rheology societies in those countries. See the article on page 10. The cover includes a photo of attendees at the short course which took place in Colombia at the Universidad de los Andes, Bogotá.

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Michael Cates is the 2016 Bingham Medalist



*By Ron Larson
University of Michigan, USA*

I am delighted to profile Michael Cates, who has been named the 2016 Bingham Medalist of The Society of Rheology. Mike is the 19th Lucasian Professor of Mathematics at the University of Cambridge, UK. He is also a Fellow of the Royal Society (FRS) and Fellow of the Royal Society of Edinburgh (FRSE). Prior to July 2015, he held the Chair of Natural Philosophy (1708) and was the Royal Society Research Professor at the School of Physics and Astronomy, University of Edinburgh. He completed his Ph.D. studies in 1985 under Sir Sam Edwards from Cambridge University with a thesis on The Statistical Mechanics of Complex Polymers. He won the Gold Medal of the British Society of Rheology in 2009 and the Weissenberg Award of the European Society of Rheology in 2013, which are the highest honors in the field of rheology from the United Kingdom and the European rheology societies, respectively. He has co-authored over 300 publications, many of them of high impact in the field of rheology. There are few who have contributed to the science of rheology as profoundly as has Mike Cates, as detailed briefly below.

Thread-like micelles. Cates is especially well known among rheologists for his work on the dynamics and rheology of threadlike micelles, wherein he combined reptation theory with a model of breakage and re-joining of long micelles. The initial work, published in 1987, immediately and clearly explained the mystery of the nearly single-relaxation-time behaviour of some of these solutions. In the original paper and subsequent work, a range of conditions and phenomena were covered, including fast and slow breakage, fluctuation effects and Rouse modes, and nonlinear effects as well, all with great elegance and enduring impact. Reading his very first papers on the subject, it is astonishing to realize how much of the physics, including the multiple dynamical regimes, were laid out correctly. Thus, some 25 years later, the work remains the standard theory for the rheology of thread-like micelles, serving the same role for surfactant solutions that the Doi-Edwards theory serves for entangled polymers. Surfactant solutions remain of great intellectual and practical interest: they are widely used in shampoos, body washes, and other cleansers and personal care products.



*In performance at
the condensed matter
Burns Supper, an
annual occurrence
during Mike's years in
Edinburgh.*



Left: Mike, far left alongside his mother, with three of his five siblings and their families at a family event near Cambridge. Right: Mike with his partner, artist Henry Jabbour, at an Edinburgh garden party.

Soft Glassy Materials. Nearly equally well known is Cates' work on the dynamics and rheology of what have come to be known as "soft glassy materials," which typically have a virtually inaccessible longest relaxation time. In 1997, with Sollich and others, Cates proposed a simple generic model to explain their low frequency dynamics, including 'aging' as they slowly relax toward equilibrium. The model demonstrated that anomalous properties of emulsions, foams, and the like, could be made explicable by adopting the viewpoint of glass physics, thus connecting the dynamics of pastes and gels with those of glasses.

Cates, with Sollich and Fielding, showed that only minor modifications of the original model are needed to give new insights into the interplay between aging and shear-banding. This work showed great imagination and courage in tackling a most profound and difficult aspect

(Continues, p16)



Mike taking time off from a workshop at the Aspen Centre for Physics.

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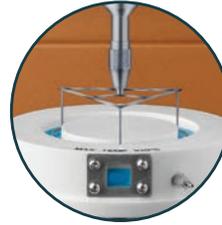
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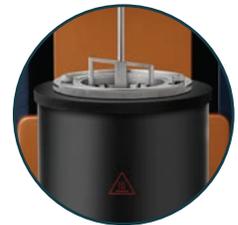
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Evelyne van Ruymbeke Receives 2016 Metzner Award

Profile by Hiroshi Watanabe

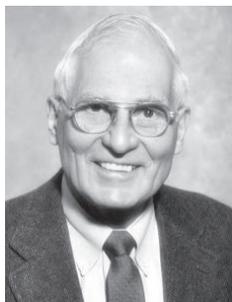
Institute for Chemical Research, Kyoto University, Japan

I am honored to profile Dr. Evelyne van Ruymbeke of the Institute on Condensed Matter and Nano-science, Université Catholique de Louvain, the recipient of the 2016 Arthur B. Metzner Early Career Award of The Society of Rheology.



I have been working in the vital field of rheology of polymers and soft matter for more than 30 years. Dr. van Ruymbeke is the most brilliant young rheologist I ever met in my career over those years. I had my first chance to talk with her at the European Rheology Conference 14 years ago, and I remember that her presentation about the entanglement dynamics of polymers was very clear and impressive. For molecular description of the entanglement dynamics, she developed a theoretical framework being based on her “time-marching algorithm” (TMA). The TMA framework determines the competition of all relaxation mechanisms automatically and self-consistently, and is applicable to polymers of various topological architectures such as comb, pom-pom, and even more complicatedly branched chains. Her theory, combining the TMA framework with the tube model, has been proven in my estimation to be the best among the theories developed so far. Indeed, her achievement has been well recognized in the rheology community, as evidenced by, for example, the 2011 JOR Publication Award (van Ruymbeke et al., *J. Rheol.*, 54, 643, 2010).

Dr. van Ruymbeke carefully analyzes rheological phenomena from various points of view thereby resolving very basic problems, for example, the combination of the TMA algorithm and tube model mentioned above. As another example, I would like to cite her work about the difference between the experimental and theoretical dilation exponents for the entanglement mesh. She showed, for the first time in the world, that the difference results from the equilibration of the chain tension on the mesh dilation, and successfully formulated a theory incorporating this tension equilibration process (van Ruymbeke et al., *Macromolecules*, 45, 2085, 2012). Validity of her theory has been proven through careful comparison with experiments. Furthermore, she has extended her analysis to polydisperse polymers having distributions in both molecular weight and branching architecture, thereby establishing a novel way to resolve detailed molecular structures from the measured rheological data (van Ruymbeke, *Soft Matter*, 9, 6921, 2013). She has also extended her analysis to super multi-arm star chains (soft colloids) to find a unique interplay between the dynamic and static (thermodynamic) features of those chains (van Ruymbeke et al., *Soft Matter*, 6, 891, 2010). Dynamics and rheology of associating polymers having various architectures have been investigated extensively in the last decade and are indeed the central research subject of the European ITN project known as *SUPOLEN*. (www.supolen.eu/) initiated in 2013. Dr. van Ruymbeke has been leading this project as the chief coordinator and as the principal investigator. Supolen also includes an educational aspect, and she has been organizing summer schools/workshops for grad-school students. As for the research in Supolen, Dr. van Ruymbeke has carefully analyzed the coupling between the entanglement dynamics of the chain and the inter-chain association/dissociation reaction. Her analysis led to a theory based on her time-marching algorithm (originally developed for non-associating, entangled polymers). Her theory has revealed several novel features, for example, a Rouse-like transition attributable to hindered fluctuation and blinking of the associating sites that occur in a time scale longer than the lifetime of association (van Ruymbeke et al., *Macromolecules* 48, 7300, 2015). Such a feature should change with the competition between the chain dynamics and reaction, and she is now making further effort to characterize this competition in general cases.



In summary, Dr. Evelyne van Ruymbeke has an outstanding research ability that enabled her to make the brilliant achievements described above. The Society of Rheology is pleased to confer on her the 2016 Arthur B. Metzner Early Career Award.

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. For a list of all recipients and the criteria of the Metzner award, see www.rheology.org.

Report from the President

On 1 May 2016, I chaired my first Executive Committee meeting of the Society at AIP Headquarters in College Park, Maryland (see photo on page 9). We had a packed agenda with 13 busy people giving up their May-Day Sunday to attend to the needs and issues facing the Society, and many others joining from California, Virginia, Massachusetts, Texas and Eindhoven by Webex. I am constantly amazed at the level of selfless effort and dedication that many people devote to our Society, and it is no wonder that for many of us it is where we feel most 'at home' despite the many conferences we attend throughout the year.

Albert Co, in his role as Secretary, provides a summary of the items discussed in his minutes elsewhere in this *Bulletin*, but in this letter I just want to add a little context to some of the interesting issues and topics that your Executive Committee is presently grappling with. As always, please feel free to contact me or any other member of the executive committee with ideas of interest and topics of concern.

Firstly, regarding the *Journal of Rheology*, we are living in a time of transition as our new Treasurer, Chris White, highlights in his report elsewhere in this issue. For the last 25 years the *Journal* has been a steady source of revenue for the Society that has helped enable our mission of promoting global interest and awareness in rheology throughout the scientific community. However, shrinking library budgets and the rapid growth of open access publishing has put severe pressure on subscription numbers and the net profitability of the *Journal*. We are closely monitoring these changes and, in conjunction with AIP Publishing, making incremental changes to our publishing procedures. You will have noted the change in journal page format with the Jan/Feb issue of *JOR* this year; our previous custom size journal form factor required printing on regular US Letter size paper and then trimming to size, plus additional costs for custom binding operations. By switching to regular US Letter size paper (the same format used for other AIPP journals) we save on both of these operations, and this is estimated to save us over \$20,000 annually. Secondly, through Chris's fiscal investigations we have learned that international airmailing fulfillment costs for sending the *Journal* to individual members add up to over \$13,000 per year. AIPP will be switching our interna-

tional mailing operations to another vendor from 2017 and this should also save us over \$5000 annually, and we are promised no degradation in fulfillment service performance. In addition, we will be offering all individual regular members a new option with your 2017 renewal. Many of you have told us that you would prefer to be able to get direct electronic access to PDF copies of articles published in the *Journal*, and this will now be possible; for no difference in membership fee you will be offered the choice of selecting to receive either electronic access to *JOR Online* or a print copy of each issue as you currently do. If you wish to obtain both e-access and a print copy, this will also be available for an additional charge.



On your 2016 subscription form you may also have noticed an additional innovation we introduced last year; the ability to voluntarily donate directly to The Society of Rheology (which is a nonprofit registered in the state of New York). In fact SOR members can make additional donations at any time throughout the year (<https://www.associationsciences.org/SOR/Donation.aspx>). I am happy to say that in 2016 we have so far received over \$1000 in donations from individual members; money that we have put towards sending SOR student members to the ICR in Japan this summer. We will be offering the opportunity to donate again this renewal cycle and if you have the ability to make an additional donation to support the Society's activities we encourage you to do so.

As we investigated the possibility of soliciting donations, we began to learn more about the regulations and best practices governing non-profit operations. Because The Society of Rheology's financial resources have grown substantially over the past twenty years, we have begun actively investigating the relevant guidelines regarding external auditing of our activities. Chris White is leading this effort to ensure our fiscal transparency and we anticipate establishing a standing audit committee in the near future. If you are interested in serving on such a committee please let Norm or me know.



Seated: Anne Grillet, Norman Wagner (VP), Gareth McKinley (Pres). Standing left to right: Kalman Migler, Faith Morrison (Rheology Bulletin Editor), Ralph Colby (JOR Editor), Greg McKenna (past president), Chris White (Treasurer), Saad Khan, Mike Solomon (MAL), Albert Co (Secretary), Andy Kraynik, Maryam Sepehr (MAL).

Finally, in my previous letter to the *Bulletin* I noted that Jeff Giacomini has agreed to serve in the informal role of SOR Historian as we enter the last decade of our first century. He recently recorded an oral history with Bob Bird (shortly after Bird's 92nd birthday!) and Giacomini is currently making plans for additional recordings over the coming months. Together with AIP staff, Jeff and I hope to offer an information session and 'master class' in conducting oral history interviews at the Tampa Meeting in February 2017. Do let us know if you are interested in attending. Also, if you have nominations for possible interview subjects, please let Jeff and me know, and if you have additional thoughts on preparing for our centenary celebrations please share them. To get you thinking, you may like to know that the Optical Society – another founding member of the American Institute of

Physics – is celebrating its centenary with 'A Century of Optics' this year; www.osa.org/en-us/100/osa100/. How should we characterize our first 100 years? A Century of Soft Matter? A Rheology Century?

I look forward to seeing some of you in Japan this August, which will promise many memorable events and sights (trust me on this!) and to also seeing many more of you in Tampa next Spring.

Gareth McKinley
President, The Society of Rheology





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The attendees at the Buenos Aires, Argentina rheology short course at the National University of General San Martín.

International Outreach in South America

*Chris Macosko, University of Minnesota
Gerald Fuller, Stanford University*

During the week of April 3rd 2016, Chris Macosko and Gerry Fuller offered short courses in rheology to large audiences in Buenos Aires, Argentina and Bogotá, Colombia. The air travel to provide this educational experience was sponsored by the educational outreach fund of The Society of Rheology. Local accommodation and meal costs were supported by a combination of support from TA Instruments (organized by Dr. Abel Gaspar-Rosas) and our Argentine and Colombian hosts.

Interest and the application of rheology in South America is vibrant and growing. Indeed, the International Congress on Rheology will be held in Rio de Janeiro in 2020 and hosted by the Brazilian Society of Rheology. The purpose of these short course offerings was to bring practitioners of rheology together in the southern and northern reaches of this continent and help them appreciate the benefits of coalescing into regional societies of rheology working



Colombian organizers with their guests. From left: Jorge Medina, Gerry Fuller, Chris Macosko, Oscar Álvarez, and Felipe Salcedo.

groups. In addition to presenting fundamental concepts of rheology and their application to a variety of characterization and processing problems, the courses introduced the audiences to the advantages of joining the international community of rheologists.

The courses in each country ran for two full days (Monday and Tuesday in Argentina, and Thursday and Friday in Colombia). Wednesday was spent flying from Buenos Aires to Bogotá to span this vast continent. The courses were comprehensive and covered rheological material functions, linear and nonlinear viscoelasticity, microstructural modeling, the design of shear and extensional rheometers, polymeric liquids and suspensions, numerical modeling of process flows, and interfacial rheology. This material was reinforced by in-class demonstrations and problem-solving break-out exercises.

The responses in both countries were outstanding with audiences in the range of 70 to 80 people in both locations. These strong responses were made possible by the active organizational efforts of the leadership teams in both countries. The team in Argentina was headed by Ing. Lucia Garaventa (SEGEMAR), Professor Élica Hermida (The National University of General San Martín), Dra. Ana María Rojas (UBA Industrias), and Lic. Alejandro Bacigalupe (INTI Caucho).

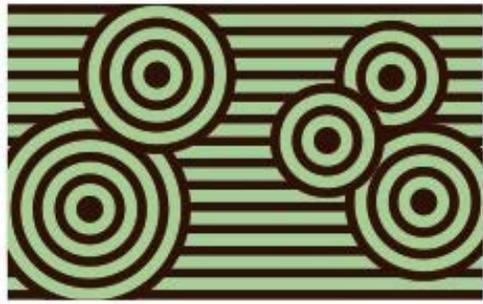
Three faculty from Universidad de los Andes (Bogotá, Colombia), Professors Jorge Medina, Oscar Álvarez, and Felipe Salcedo marketed and organized the course held on that university's campus.

The attendees at both courses included university students, faculty and industrial practitioners and in many cases they traveled long distances. The two classes are shown in the accompanying photographs (page 11, cover).

The class participants demonstrated lively enthusiasm for the course material and actively shared their experiences studying and utilizing rheology to address problems ranging from food and personal product processing, polymer processing, and oil production and transportation. Great interest was expressed in both countries in developing societies of rheology, and we look forward to receiving Argentine and Colombian rheologists at our meetings. We both thoroughly enjoyed the wonderful hospitality of our South American rheology friends. One quickly learns that the Argentines' favorite drink, *mate*, is a dense, non-Brownian suspension that will overcome any jetlag-induced drowsiness. And we also learned that it is “Colombia” and not “Columbia” (major revision to all of our slides was in order!).



Argentine organizers with their guests. From left: Alejandro Bacigalupe, Chris Macosko, Élica Hermida, Gerry Fuller, Lucia Garaventa, and Abel Gaspar-Rosas.



XVIIth ICR Kyoto, 2016

Everything is in place for the seventeenth International Congress on Rheology, taking place 8-13 August 2016 in Kyoto, Japan. Please join the world rheological community for this gathering, which brings us together every four years to strengthen our community, exchange ideas, and grow the field of rheology. The chair of the organizing committee is Hiroshi Watanabe (Kyoto University, Japan).

ICR 2016 begins on Sunday 7 August with two short courses. Course A is *Complex Fluid-Fluid Interfaces: Capillarity and Interfacial Rheology* with instructors Gerry Fuller (Stanford University, USA) and Jan Vermant (ETH, Switzerland). Course B is *Dynamics of Soft Matters: Diffusion and Rheology in Polymers*, with instructors Masao Doi (Beihang University, China) and Yuich Masubuchi, (Nagoya University, Japan). The short courses continue through Monday noon.

Meeting registration begins Monday 8 August in the afternoon, and the conference kicks off with a reception Monday evening. Sessions run Tuesday through Saturday noon, with time off on Thursday afternoon for excursions. Other social events planned include the Tuesday evening beer party (at Uzumasa movie studio), a second beer party after the excursions on Thursday (at Kyoto TERRSA), the Congress Dinner on Friday evening (at Westin Miyako Hotel), and a farewell lunch on Saturday, to close off the program.



Alexei Likhtman was part of a team that received the 2005 JOR Publication Award; shown above JOR Editor John Brady, Likhtman, and Oliver Harlen.

A special session has been organized in honor of Professor Alexei Likhtman (University of Reading, UK). Professor Likhtman was an outstanding scientist and world-class rheologist who tragically passed away in October 2015. His contributions to entangled polymer dynamics using theory and computer simulations were profound and plentiful. This made him an obvious choice for organizing the session on "computational rheology" at ICR2016; a charge that he gracefully accepted. The Organizing Committee has designated a sub-session of computational rheology as the *Likhtman Session*, in his memory and honor.

Kyoto is both an ancient and a modern city; the city served as the capital of Japan from the 8th to the 19th centuries (1200 years). Summers in Kyoto are warm and wet; plan for temperatures from 25°C (overnight) to 35°C (daytime).

The conference site, Kyoto TERRSA (Shin-machi Kujyo Minami-ku, Kyoto, Japan; Tel:+81-75-6923400), is located nearby Kyoto station which is conveniently connected to Kansai international airport (KIX) and the other major cities in Japan via JR railways. The conference location is in the center of the Kyoto city area and close to the various sight-seeing spots. An accompanying persons program has been assembled and details of this and all aspects of ICR2016 can be found on the conference website, icr2016.com. Please join us this summer!

Come to Kyoto!

Rheology Bulletin, 85(2) July 2016

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88th SOR Meeting: Tampa Bay, Florida 12-16 February 2017



Technical Program

Technical co-Chairs:

Anke Lindner, ESPCI and Université
Paris Diderot, Paris, France
Kalman Migler, NIST, Gaithersburg,
MD USA

Plenary and Award Lectures

Monday (Plenary):

Eric Furst, University of Delaware,
DE USA

Tuesday (Bingham) :

Mike Cates, Cambridge University,
UK

Wednesday (Plenary):

Zvonimir Dogic, Brandeis University,
MA USA

Thursday (Metzner):

Evelyne van Ruymbeke, Université
catholique de Louvain, Belgium

**Short Course:
Interfacial Rheology
(see page 27)**

Sessions

Suspensions, Colloids and Granular Media

Jason Butler, University of Florida, FL USA
Jeremie Palacci, UC San Diego, CA USA

Micro/Nano Fluidics and Probe Rheology

Mónica Oliveira, University Of Strathclyde, UK
Gordon Christopher, Texas Tech University, USA

Non-Newtonian Fluid Mechanics & Instabilities

Sandra Lerouge, Université Paris Diderot, Paris France
Becca Thomases, UC Davis, CA USA

Biorheology & Active Fluids

David Saintillan, UC San Diego, CA USA
Christian Wagner, Universität des Saarlandes, Germany

Emulsions, Foams & Interfacial Rheology

Cécile Monteux, ESPCI Paris, France
Sachin Velankar, University of Pittsburgh, USA

Polymer Solutions & Melts

Carlos R López-Barrón, ExxonMobil Chemical
Company, Baytown, TX USA
Nicolas Alvarez, Drexel University, PA USA

Advanced Techniques and Methods

Anthony Kotula, NIST, Gathersburg, MD USA
Matthew E. Helgeson, UC Santa Barbara, CA USA

Solids & Composites

Jon Seppala, NIST, Gathersburg, MD USA
Cathy Jackson, Dow Chemical, Collegeville, PA USA

Self-assembled Systems, Gels and Liquid Crystals

Kendra Erk, Purdue University, IN USA
Virginia Davis, Auburn University, AL USA

Poster Session

Daniel Blair, Georgetown Univ, Washington DC USA
Steve Hudson, NIST, Gathersburg, MD USA

of aging materials, namely the lack of a well-defined linear relaxation spectrum. In addition, he and his coworkers have also contributed greatly to the theory of glassy materials more generally, including recent work describing the nonlinear rheology of both “simple” glasses and polymeric glasses.



Colloidal glass rheology. In 2002, Cates helped lead a key Edinburgh collaboration showing that mode coupling theory (MCT) is the method of choice to describe hard-sphere colloids with short-range attractive interaction. Their subsequent simulations have confirmed this, while also highlighting where MCT fails. With Fuchs, also in 2002, Cates used MCT to obtain the first quantitative theory for the yield and shear-melting of colloidal glasses. It has spawned successful ‘schematic’ models of shear thickening and, with Brader, Cates later generalized it to give a full nonlinear constitutive equation for colloids close to the glass transition subjected to arbitrary flow histories. The model admits a simple schematic representation that exhibits the first statistical-mechanical derivation of a von-Mises like yield surface for a plastic material. This work on colloidal glass rheology also inspired a promising effort to understand polymer glasses, and fed into a new understanding of shear banding in hard-sphere colloids. Most recently, Cates has focussed on addressing the shear-thickening of very dense suspensions of large particles in which Brownian motion does not dominate, building on an emerging realization (thanks to Denn, Morris, Pouliquen, Lemaitre and others) that the flow of very dense suspensions is dominated by friction at interparticle contacts. In 2005, Cates showed that, unlike earlier (hydrodynamic) models, an MCT-based schematic approach to shear thickening accounts for the bizarre bistability of droplets of dense colloidal suspension: when prodded with a spatula, these can convert into a metastable jammed state, which returns to a flowable droplet if vibrated.

Other important work. Among Cates’ many fundamental discoveries, work that impacts rheology includes his lattice Boltzmann simulations on colloids in binary solvents, where he found an entirely new type of gel (the bicontinuous interfacially jammed emulsion gel or ‘bijel’) in which the interface between two bicon-

tinuous fluids is arrested by a monolayer of colloidal particles. This structure was subsequently created by an experimental team in Edinburgh, is the subject of two patents, and forms the basis of a continuing programme in the design of new materials for Li-Ion batteries and other applications. In addition, with Tailleur, Cates predicted the MIPS (Motility-Induced Phase Separation) paradigm, whereby active colloids

with purely repulsive interactions can phase separate into dense and dilute coexisting phases, so long as their effective propulsion speed is a sufficiently strongly decreasing function of density. This idea proved useful in biological contexts and then came into its own in explaining the very strong phase-separation tendencies seen experimentally in self-propelled, autophoretic Janus colloids. This work, which addresses separation into two phases that are both isotropic, complements efforts by Cates and coworkers and others to understand the statistical physics of self-propelled rods in phases with long-range orientational order. Finally, In 1994 (with Bouchaud and others) Cates created a successful model for avalanche dynamics in sandpiles, explaining the observed hysteresis of the average slope. From 1995 on, he and his collaborators developed a new continuum approach for finding the stress in static granular packings.

Beyond science. Mike has broad interests in music, the arts, and outdoor recreation. During his 20 years in Scotland he got to know the songs of Robert Burns, some of which he occasionally performs, and completed the Munros (which means that he has climbed all 282 of Scotland’s hills over 3000ft high). Cambridge has fewer hillwalking options; but having moved back there in 2015 to take up the Lucasian Professorship, he will probably now last several more years without knee surgery! Mike grew up in the south of England, one of six children; his extended family includes 4 nieces and 8 nephews. He is supported in life by his partner, Henry Jabbour, a visual artist born in Lebanon who specializes in figurative painting.

Mike Cates is well known for crystal clear writing and speaking, deep physical insight, and mastery of mathematics. He exhibits a keen wit, broad interests, an excellent sense of humour, skilled leadership, devoted mentorship, and gracious hospitality. His receipt of the Bingham Medal is well earned and will add to its luster.



NEWS

XVIIth Congress on Rheology Kyoto 2016

The XVIIth International Congress on Rheology, Kyoto, Japan, 8-13 August 2016, is opening soon! Please visit the Congress website at icr2016.com. See also the article in this *Bulletin*.

We look forward to seeing you in Kyoto this August.

Best regards from the Organizing Committee of Kyoto 2016



Celebrating the Pioneering Work of Sir Sam Edwards

The Isaac Newton Institute, Cambridge UK announces the Soft Matter - Theoretical and Industrial Challenges Workshop, to be held 7-9 September 2016.



This event aims to highlight developments in theoretical physics and mathematical frameworks for the modelling and simulation of soft matter systems, with particular emphasis on how these models can inform industrial processes, materials, and design. It is also a celebration of the highly influential and ground-breaking work of the

late Sir Sam Edwards who played a pivotal role in bringing advances in the physical sciences to bear on major industrial problems.

More information, including a provisional program, may be found on the event web page. The program will include a poster exhibition and drinks reception on Wednesday 7th and on Thursday 8th there will be a Memorial Event for Sir Sam Edwards, followed by a workshop dinner at Gonville & Caius College.

There is a nominal registration fee to cover the cost of refreshments and materials and en-suite accommodation is available at a cost of £75.00 per night. Please indicate under 'Additional Information' when registering if you will require accommodation. To register, go to http://www.turing-gateway.cam.ac.uk/smi_sep2016.shtml.

Please route any queries via the contact details on the event web page.

2016 JOR Fellows Announced

The SOR Fellowship status recognizes a history of distinguished scientific achievement, a significant technological accomplishment, and/or outstanding scholarship in the field of Rheology. Service to the Society is also an important component to Fellowship status. The inaugural class of fellows was elected in 2015. No more than 0.5% of the Society membership may be selected in a given year, so that a maximum of seven new Fellows were able to be selected in 2016. In addition, Members of the SOR Executive Committee are ineligible until two years after completion of their terms. The Society of Rheology is pleased to announce the SOR Fellowship Class of 2016:

SOR Fellowship Class of 2016

Antony Beris
David Boger
Pierre Carreau
Ole Hassager
Paula Moldenaers
Roger Tanner
Jan Vermant

The 2016 Fellows will be formally inducted at the 88th Annual Meeting in Tampa Bay (February 2017). For more on SOR Fellows, please see www.rheology.org/sor/Fellowship/.

2016 JOR Publication Award Announced

The JOR Publication Award committee has identified the paper that will be designated the recipient of the 2016 JOR Publication Award. The paper is "Stress localization, stiffening, and yielding in a model colloidal gel" by **Jader Colombo and Emanuela Del Gado** (*J. Rheol.* 58, 1089 (2014); <http://dx.doi.org/10.1122/1.4882021>).

The Journal of Rheology Publication Award committee of the Society annually selects a paper published in *Journal of Rheology* during the preceding two years for special recognition at the annual meeting and for a monetary award. This award, first presented in 1994, is supported by TA Instruments of New Castle, Delaware. All Publication award papers are made free open access on the JOR website; a list of all awardees is on the web at www.rheology.org/sor/awards/publication. The 2016 award certificates and prize will be awarded at the banquet during the 88th Annual SOR meeting in February 2017 in Tampa Bay, Florida USA. Congratulations to the recipients!

2016 Roy W. Tess Award in Coatings

Mark Soucek will receive the Roy W. Tess Award in Coatings for 2016. The announcement was made by the Officers and the Award Committee of the Division of Polymeric Materials: Science and Engineering (PMSE) of the American Chemical Society.



Soucek is a Professor in the Department of Polymer Engineering at the University of Akron. He has 15 issued U.S. patents and pending patent applications and has over 150 peer reviewed publications of which 15 are chapters in books, and 34 additional publications in proceedings and preprints. His research is well funded by government grants and industry contracts with a wide range of industrial companies.

Soucek will receive the Tess Award in August, 2016 during the 252nd National Meeting of the American Chemical Society in Boston, MA.

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. It is funded by a grant to the Division from Dr. and Mrs. Roy W. Tess. The purpose of the award is to encourage interest and progress in coatings science technology and engineering and to recognize significant contributions to the field. The Award consists of a plaque and a \$3000 cash prize.

SOR Education Committee Seeks Help with Rheology Outreach Efforts in Denver

The Education Subcommittee led by Jonathan Rothstein organized and ran an extremely successful outreach event in Baltimore at the Maryland Science Center. This event took place on 11 October 2015, the Sunday prior to the start of the SOR Annual Meeting. This outreach event was built off the experience and success of the 2014 outreach event at the Franklin Institute in Philadelphia and is the start of an annual tradition for the SOR. As in years past, the SOR provided hands-on demonstrations aimed at children of all ages and adults with the goal of teaching them about rheology and letting them play with some interesting materials. More than thirty SOR members volunteered their time and energy and expertise to the outreach event making it easy for the kids to discover just how cool Science can be. The SOR would like to thank all those who volunteered in Baltimore and encourage anyone who is interested in helping out in the future to contact Jonathan Rothstein (Rothstein@ecs.umass.edu). The next SOR outreach event will be take place ahead of the Denver meeting in October 2017.



SOR Smartphone App: Second App Effort Added

At the Executive Committee meeting in May, Secretary and Webmaster Albert Co reported on an added direction in the development of mobile SOR apps. The change was in response to the availability of cross-platform development tools that share codes.

The SOR *ad hoc* Committee on Meeting App(s) began work on smartphone software for both the iOS and Android platforms beginning in October 2014. The committee is composed of Randy Ewoldt, chair, Matthew Reichert, Maryam Sepehr, Albert Co

(ex officio, Secretary), and Jason Maxey (ex officio, Chair of the Membership Committee). At that time, the primary goal for the app was for it to be used in conjunction with SOR annual meetings. The first version of the meeting app was used during SOR 2015 Baltimore. Developed by Core-Apps, the software registered a high usage rate, including 430 device downloads (including iOS, Android, and others).

With the availability of cross-platform development tools, which share codes and make the development more accessible, SOR app development has extended to the Webmaster's position. Native apps for iOS, Androids and Windows will be developed in parallel. Co's first project is "Rheology Abstracts;" the app will access and search through abstracts of recent annual meetings. Since building apps for iOS will require Mac hardware, an additional \$1,000 (one-time) was approved by the ExCom to support this effort.

Following this app, Co will develop a new meeting app slated to be ready for the next SOR meeting in February 2017 in Tampa, Florida.

Minutes of the ExCom Meeting

Sunday, 1 May 1, 2016

American Center for Physics, College Park, Maryland

Attending: Gareth McKinley, Norm Wagner, Albert Co, Chris White, Ralph Colby, Greg McKenna, Maryam Sepehr, Michael Solomon, Jeffrey Giacomini, Faith Morrison, Andy Kraynik, Anne Grillet, Kalman Migler, David Baker (AIPP), Bridget D'Amelio (AIPP), Melanie Mueller (AIP), Liz Dart Caron (AIP). Via WebEx:

Patrick Anderson, Jonathan Rothstein, Jason Maxey, Gerry Fuller, Roseanna Zia, Donald Baird, Roger Bonnacaze, and Martin Sentmanat.

President Gareth McKinley called the meeting to order at 8:00am in Conference Room C, ACP, College Park, Maryland.

The minutes of the 11 October 2015 meeting were read by Secretary Albert Co. Change "concerns"

to "concern" in the paragraph on Treasurer's report. Change "golden access" to "gold open access" in the paragraph on open access policy. A motion to approve the minutes passed.

Ralph Colby gave the *JOR* Editor report. There will be a special issue on shear banding in May 2016. Guest editor is Suzanne Fielding. A total of 17 papers were submitted to the special issue in 2015; 11 are in the

process of being reviewed. Various graphs showing *JOR* statistics were shown. There were over 200 submissions in 2015; the acceptance rate was 67/212. Impact factor was 3.358 in 2015. It has been trending upwards since around 2006. Roseanna Zia volunteered to learn about editorship by working together with Colby in October 2015 on a temporary issue as Associate Editor; she is currently handling 12 *JOR* manuscripts on colloids and on simulations.

Colby reported that Dave Baker and Bridget D'Amelio of AIPP are attentive and helpful, but AIPP is very slow with seemingly routine tasks. *JOR* transitioned to a 2-column format with a different reference format. AIPP was slow to update the online Author Instructions, causing 20 papers to be submitted in the wrong (old) format. Updating to RevTex 4.1 caused other difficulties. Scitation has been extremely slow with a very strange layout, but that is planned to be fixed in 2016. Peer-X-Press is hard to use. The program keeps changing and that has frustrated the editors. Dave Baker reported there are three different manuscript-handling systems available: Peer-X-Press, (our current platform; big, but bulky), ScholarOne (expensive; not customizable), and Aries (also less customizable). Bridget D'Amelio stated that the Publishing Partnerships Committee (PPC) had a great deal of input and feedback about these issues and had started to talk about usability testing with updated version of Peer-X-Press. A motion to approve the editor's report passed. The Publication Award Subcommittee is still deliberating on the 2016 recipient.

Chris White reported on the financial status of the Society and *JOR*. White has prepared a narrative version of the treasurer's report, making alignment between costs and programs. Several items were discussed and will be summarized in a Treasurer's report to the Membership. A motion to approve the treasurer's report passed.

Anne Grillet reported for the *ad-hoc* Financial Committee. Grillet presented a travel policy for approval during the executive session. US government General Services Administration (GSA) guidelines and per diem allowances are going to be used. A newly created Travel Expense Reimbursement Form will be part of the policy and will make the Treasurer's job easier to carry out. Electronic submission of receipts and documentation are acceptable.

The creation of a permanent Investment Committee was deliberated. The committee would give investment advice to the ExCom for growing the reserves. Several items were discussed; these included a Conflict of Interest Policy, indemnification of the committee, consultation with legal experts, and formation of a standing committee, instead of an *ad hoc* one. Grillet also presented possible brokerage choices and investment recommendations.

Jonathan Rothstein reported for the Education Committee. The short courses in Baltimore (17 students in "Just in Time - Beginning Rheology;" 18 students in "Active and Passive Microrheology") received excellent feedback from the students; SurveyMonkey was used for the reviews. For the Tampa meeting, Jan Vermant and Gerry Fuller will give a two-day short course on interfacial rheology. A similar short course was last offered in 2011; a six-year gap seems reasonable for repeating the course. Reducing registration fees did not increase attendance. The plan is to go back to the usual pricing.

The K-12 outreach event at the Maryland Science Center was a great success, with more than 150 elementary and middle-school kids participating. No outreach event is currently planned for the Tampa meeting. An outreach event is planned for the Denver meeting in October 2017 at the Denver Museum of Science and Nature. John Dorgan has agreed to be the local arrangement coordinator for the outreach event at the Denver Museum. The coordinator will receive shipments of materials and equipment and will do some setup and prep work before the meeting. A budget of \$2,000 is needed for supplies and shipping. White asked if the committee has found a way to put the demonstrations "in a box." Rothstein indicated that this was not yet the case. The Committee has also received several requests from members for instruction guides for the experiments; the plan is to work on these this summer, along with handouts to be given out at the tables. Jason Maxey pointed out that members of the Society of Physics Students (SPS) are availing themselves of free memberships to SOR and maybe a focus on high school or college students would be another interesting effort.

Jason Maxey gave the report for the Membership Committee. Last year SPS membership was more than 90; this year it is less than 30. The current total number of members is a bit down from last year. The Committee plans to continue the lapsed member campaign, to leverage the SPS connections, and to design a new tri-fold brochure for distribution.

Norm Wagner reported on the Student Travel Grants. The ICR committee were very helpful and got favorable prices for student housing in Kyoto. Travel grants were awarded to 33 students to attend the ICR at a cost of about \$17,000 (within budget).

Gareth McKinley discussed SOR providing fiscal support of other small, focused meetings or workshops. Some objections were raised in the discussion. Faith Morrison suggested that instead of direct event support that the SOR could support student travel to the workshop and/or set up an exhibitor's table to encourage membership in the SOR. McKinley will use his presidential discretionary fund for this purpose.

Faith Morrison gave her report on AIP Governance.

Gerry Fuller reported that he and Roseanna Zia attended the AIPP Publishing Partnerships Committee (PPC) meetings and Zia presented editorial issues at the meetings.

David Baker (AIPP) presented the AIP Complete Upsell Initiative. He showed a graph of the number of *JOR* customers (about 1000) and gross revenue from 2010 to 2015. AIPP is proposing the AIP Complete Upsell Initiative, which is a publisher's consortium of 19 journals. The AIP-CUI includes post cancellation rights for institutions and a robust archival preservation solution for electronic content. Baker proposed that *JOR* join AIP Complete. Baker believes that there will be brand new customers developed from this initiative. The agreement will be multiyear. He asserted that libraries looked first at cancelling single-site subscriptions. Joining AIP Complete will need a three-year commitment from SOR. This would include giving AIPP free hand (with a floor) on pricing the *JOR*. This needs SOR approval by May 31.

Baker next described the online and print scenarios for *JOR*. He suggested that \$13k savings/year can be realized when print delivery drops to 1000 copies. He proposed that SOR decides on one of three options: option 1 -include online access in membership fee, print available for free; option 2, include online access in membership fee, charge for print; option 3, choose online access or print, additional fee for having both. Option 1 and option 2 are implementable immediately at no cost. Implementing option 3 would incur programming costs (one time) of \$5K to \$7K. The pros and cons of the three options were deliberated.

Baker presented updates on the publishing platform. AIPP has selected a new vendor for its Scitation platform; the agreement was signed on 24 December 2015. The updated platform will improve discoverability, increase loading speed, work for desktop and mobile, and impose a branding prominence for SOR (a branding hierarchy of *JOR* first, then SOR, and AIP Scitation last). AIPP is almost half way through the process of transferring to the new platform. There are a number of milestones that need to be met. AIPP is asking for a designated SOR Liaison to be an approver for these issues.

Gerry Fuller reported on International Outreach activities. Chris Macosko and Fuller gave a two-day short course in Buenos Aires. People came from all over Argentina; between 80-90 people attended. Fuller and Macosko spent an evening talking with the attendees about the formation of their own rheology society; then they flew to Bogotá, Colombia and gave the two-day short course to a similar-sized audience. The activities for the full week were successful and received good

response. Fuller will work with Jason Maxey and the Membership Committee to encourage SOR membership in these two countries. He also recommended to them that they participate in the Tampa meeting; it would be generous of SOR to host the leaders from the two groups to attend our ExCom meeting in Tampa to learn how the society management works. Fuller will write a report for the July *Bulletin*.

Fuller presented a proposal for additional outreach activities. Recently he returned from Turkey, he would like to give the two-day short course there; he requested travel support for Macosko and himself. The second proposal is for outreach to Mexico. The society there is less active, but Fuller is considering how to help encourage the success of their societies of rheology. Wagner asked are the folks he talked to aware of the benefits of SOR membership—like student travel grants. Fuller said they are aware of that.

Roseanna Zia reported on AIPP 2016 policy and business actions that affect SOR and *JOR*. AIPP directs lower impact articles out of existing AIP journals into a new journal called AIP Advances. It also will accept some articles rejected from other AIP journals upon revision; there is an author fee of \$1350. Colby commented that there are lots of good papers that just do not have enough rheology in them to be publishable in *JOR*, and this could be a good publication venue for them.

Zia reported on AIPP-instituted changes in their Open Access policy. The AIPP goal is to have financially sustainable Green or Gold Access. The changes include: liberalized copyright policy to give authors ownership of the science; a 12 month embargo on the version of record; immediate author posting permissible for author manuscript; and managing journal revenue—AIPP tracks download and citation data. These policy changes are for AIP Core Journals only. SOR must explicitly adopt these policies for *JOR*.

AIPP also shifted their copyright policy. The copyright now belongs to the authors for all AIP journals; the journals retain the rights to publish/license. SOR must explicitly adopt these policies for *JOR*. AIP's new policy is consistent with the new *JOR* /SOR Copyright Transfer Agreement proposed by the *ad hoc* e-Publishing Committee in 2015.

Zia reiterated the modernization of Scitation, as discussed by David Baker. AIPP will need *JOR* folks to interact with as they update Scitation. Zia recommends repurposing the Electronic Publishing Committee. McKinley asked Albert Co to also be involved as SOR Webmaster.

The Electronic Publishing Committee will convene later this month. The agenda includes: clarify open access and copyright policy; review the copyright transfer agree-

ment that was adopted in 2015; gold access at \$2500; and consider vouchers or trades. We need to examine the impact of changes on our revenue and to keep up-to-date with the global open access initiatives.

McKinley proposes a forum be held on Monday at the Tampa meeting to spread information on electronic publishing. AIPP representatives will be invited.

Melanie Mueller (AIP) presented a poster on the History of the Society at the Baltimore 2015 annual meeting and had good interest from the attendees. She is also working on an Archives Portal as a single landing place for those interested in historical materials about The Society of Rheology.

Jeffrey Giacomini has set up an oral history date with Bob Bird. He wants to have more oral histories taken, with the help from Greg Good, Director of the Center for the History of Physics.

Andy Kraynik and Don Baird reported on the Tampa meeting in February 2017. The hotel is nice but very isolated; the on-site restaurants and catering are very expensive. The meeting registration is likely to be \$270; the room rate is \$219/night. The meeting is projected to be in the red by \$22,000.

Kalman Migler reported for the Technical Program Chairs of the Tampa meeting. There will be nine regular sessions and the poster session.

Albert Co reported on plans to develop mobile apps using cross-platform development that share codes. Native apps for iOS, Androids and Windows will be developed. The first project will be "Rheology Abstracts;" the apps will access and search through abstracts of recent annual meetings. Since building apps for iOS will require Mac hardware, an additional \$1,000 (one-time) is requested for the Webmaster expenses for this year. A motion to approve the request passed.

Gareth McKinley announced that Randy Ewoldt and Anne Grillet will be the Technical Program Chairs for the Denver Meeting in October 2017.

Jason Maxey reported on the local arrangement of the Houston (2018) Meeting. The venues for the social events were discussed.

Saad Khan presented a bid to host the October 2019 Annual Meeting in Raleigh, North Carolina.

Albert Co presented a bid to host the October 2019 Annual Meeting in Bangor, Maine.

Roger Bonnecaze and Martin Sentmanat presented a preliminary introduction of possible venues for hosting the Spring 2021 Meeting in Austin, Texas.

Liz Dart Caron (AIP) presented an update on AIP-SOR interactions.

The meeting entered into Executive Session at 3:15 pm.

Secretary's Report

Albert Co recused himself during the deliberation to select the site for the Fall 2019 Annual Meeting.

Raleigh, North Carolina was selected as the site for the Fall 2019 Annual Meeting. Bangor, Maine was selected as the site of the Fall 2021 Annual Meeting.

The list of 2016 SoR Fellows recommended by the SoR Fellowship Committee was accepted unanimously.

A request to rename The Society of Rheology was discussed.

The proposed SoR Travel Reimbursement Policy, as reported by Anne Grillet, was approved.

The AIPP Complete Upsell Initiative was discussed further. The consensus was that at this time there was not enough financial information provided. More information on revenue flow and the impact factors and subscription rates of the other journals will be helpful. A decision will be made when these are available.

The Investment Strategy Policy was deliberated further. Adjusting the Finance Committee and forming an Audit Committee were discussed. Bids will be requested from financial brokers. One thing to consider is how much to invest and how much to remain as liquid assets.

The *JOR* print versus online options for members were discussed further. The motion to implement option three (choose online access or print; additional fee for having both; one-time programming costs of \$5K to \$7K) passed, with 7 yeas and 1 abstain.

Strategies to increase the amount from donations were discussed. The donation fund can be used to support student travel to annual meetings.

The meeting was adjourned at 4:54 pm.

Submitted by Albert Co, Secretary

Treasurer's Report

Dear Society Members,

In this Treasurer's report, I would first like to express my deep thanks to Monty Shaw for his excellent work as treasurer over the past 18 years. I have only recently come to understand how much effort was required. I and the entire Society of Rheology thank you for this above and beyond service. THANK YOU!

The Society of Rheology (SOR) is in a solid financial position right now. SOR has significant financial reserves, a strong brand and a dedicated following. The accompanying charts document expenditures and revenues for the past



five years including the 2017 budget proposal. A quick summary shows that for 2015 that the SOR ran a small deficit of \$3k for the year. The *Journal of Rheology (JOR)* had a surplus revenue of \$87,914. The annual meeting in Baltimore ran a small deficit. The other major expenses were student travel \$31k, Awards \$24k, and Executive Committee operations \$18k.

2015 is a year with one annual meeting and healthy revenue from the *Journal of Rheology*, yet the SOR still ran a small deficit. In 2016 there is the International Congress on Rheology with student travel expense of ~\$20k, so the balance sheet should recover (budgeted surplus of \$34k). In 2017, SOR will host two meetings. Even if both meetings break even, the balance sheet will be challenged as the SOR is incurring outside expenses related to each meeting of ~\$50k/ meeting. This is the sum of \$24k in prizes and \$30k in student travel. In 2015, there was revenue from interest of only \$2,092.

Since taking over as Treasurer, I have moved SOR to QuickBooks online. This was done to increase the transparency and accountability of SOR financial record keeping. Now we have one location where several members (Gareth, Monty, Anne G., Norm, our accountants) can log in at any time and review the entire financial picture including transactions at any time. Based on suggestions from our accounting firm I am developing a proposal to be submitted to the Executive Committee for the creation of an Audit Committee. The proposed Audit Committee will document our policies and procedures relating to the movement and accounting of monies for SOR.

The membership voted on a dues increase from \$40 to \$65 which will be effective starting in 2017. This report is an opportunity to detail how those revenues and expenses relate to membership. Currently SOR has ~1124 paying members (estimate). Each of those members currently contribute \$40 annually to be a part of SOR. There are expenses with AIP associated with the dues collection. These total \$23k. So, the income from membership dues is \$45k and the related expenses are \$23k without considering the expenses of providing the *JOR*, the *Bulletin* or *Physics Today*. So another way to state this revenue is that the SOR receives about \$15/member after expenses related to collecting the dues. Delivery of the *JOR* costs SOR \$120/member in 2015 (normalized to a standard page count ~1600). Additionally, each member receives two issues of the *Rheology Bulletin* at a net cost of \$10/member yr. SOR also pays \$5/member to AIP for *Physics Today*. This results in a subsidy of approximately \$120/member every year. Raising the rate to \$65/member in 2017 should reduce the current subsidy to ~\$100/member.

Treasurer's Report

Treasurer's Report

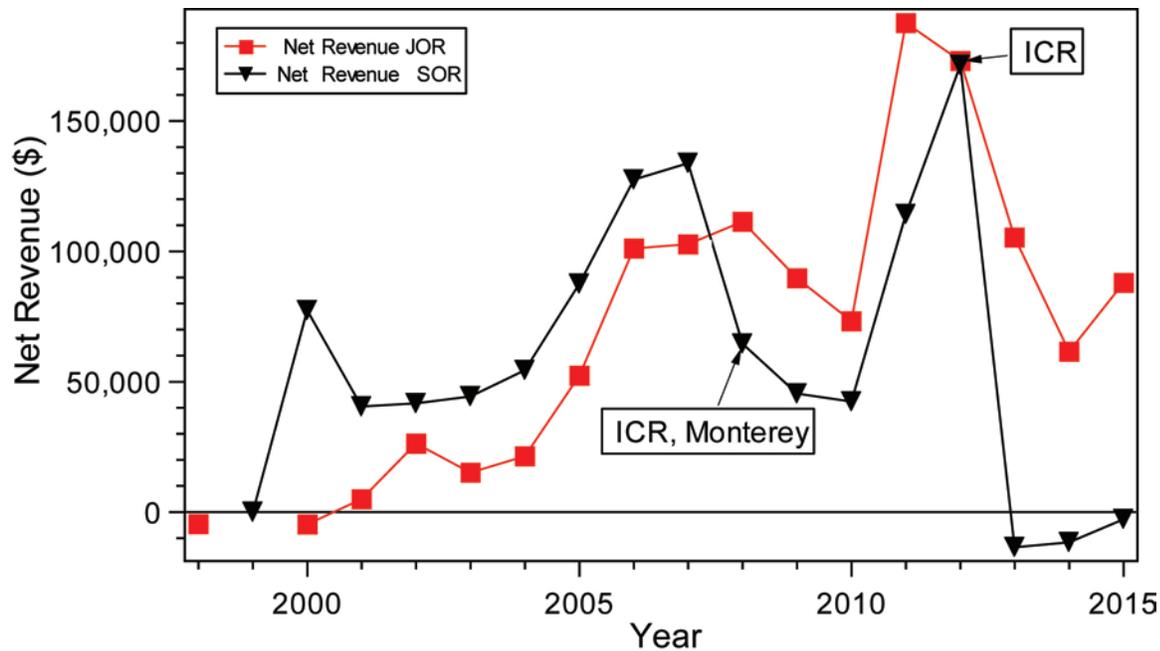


Figure 1: The annual net revenue from The Society of Rheology and *Journal of Rheology* from 1999 to present. The integrated area of the *JOR* curve is \$1.2M and SOR is \$1.0 M. In 1999 SOR had \$700k in reserves.

Longer term analysis

The longer term prospects for SOR have significant concerns. SOR is dependent on the surplus revenue from the *JOR* to support annual operating expenses. This trend is evident from Figure 1. Prior to 2008, SOR ran a consistent surplus as related to the *JOR* net revenue. This trend has been reversed since 2008. Going forward there is considerable uncertainty in the out year revenue projections for *JOR*. Open access, bundling, decreases in library subscriptions, increasing costs of collection may challenge the net revenue of *JOR* in future years. Even a small change in projected revenue of the *JOR* may severely impact the balance sheet of SOR. SOR has taken some steps to accommodate these risks, such as the formation of an *ad hoc* Finance Committee charged to develop an investment strategy for generating revenue based on investment of the financial reserves currently held in at AIP in a cash account bearing little return. This may yield up to \$25k/yr. but carries downside or upside risk on principle. Additionally, the increase in the dues to \$65 should increase the revenue by slightly more than \$28k/yr. (This is an estimate

$1124 \times 25 = \$28k$). All of these efforts will be overrun by even a slight negative change in the revenue model for *JOR*. Additional effort to increase the sales of *JOR* are being considered, specifically bundling the *Journal*. This too carries a downside risk as it will be selling the *JOR* at less than individual library subscription rates. Some changes have been implemented to reduce the cost of the *Journal* such as the new page format. Other proposals such as switching from a print based distribution to members (\$120/member) to online distribution (\$93/member) may save on the direct print costs, but may potentially negatively affect the advertising revenue from the print *JOR* (~\$30k/yr). It will be important for SOR to consider a future without the consistent significant revenue from the *JOR*. This will require significant changes in both the revenue and expense sides of the ledger. The SOR has sufficient reserves to manage for up to three years after a collapse in the *JOR* revenue so the situation requires careful observation but not extreme action.

Respectfully submitted,
Christopher C. White, Treasurer

**The Society of Rheology, Inc.
Balance Sheet**

(all amounts, USD)	2015 Year End	2014 Year End	2013 Year End	2012 Year End	2010 Year End
Assets					
Cash in checking account(s) ▼	25,181	69,163	147,077	73,886	13,257
Balance in AIP account	1,731,373	1,665,049	1,595,079	1,685,279	1,435,019
Total Assets	1,756,554	1,734,212	1,742,155	1,759,165	1,448,276
Liabilities and Net Assets					
Liabilities					
Deferred revenue	132,440	104,337	100,652	114,980	89,283
Total Liabilities	132,440	104,337	100,652	114,980	89,283
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	30,000
Annual Meeting reserve ▼	300,000	300,000	300,000	300,000	300,000
Operating reserve	150,000	150,000	150,000	150,000	150,000
Unrestricted	826,554	699,875	711,503	714,185	428,994
Total Net Assets	1,624,114	1,629,875	1,641,503	1,644,185	1,358,994
Total liabilities and net assets	\$ 1,756,554	1,734,212	1,742,155	1,759,165	1,448,276



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/

The Society of Rheology						
Receipts and Disbursements						
	2017	2016	2015	2015	2014	2013
	Budget	Budget	Year end	Budget	Year End	Year End
RECEIPTS						
Dues	73,060	46,000	44,980	48,000	45,590	49,305
Interest	2,000	1,200	2,092	1,800	942	1,174
Journal of Rheology	285,000	293,100	284,180	277,000	297,016	325,649
Mailing List Sales		0		0	0	0
Donations		0		0	0	0
Bulletin Advertising	9,000	7,600	9,505	7,200	8,092	6,340
Annual Meeting (net)	-	0	-14,589	0	2,181	-10,789
Short Course (net)	-	0	2,195	0	10,385	-6,376
TOTAL RECEIPTS	369,060	347,900	328,363	334,000	364,207	365,303
DISBURSEMENTS						
AIP Dues Bill & Collect.	30,000	11,000	27,876	11,000	10,287	11,033
AIP Adm. Services		1,200		7,500	1,106	7,500
AIP Mem. Soc. Dues		14,000		14,000	14,089	13,886
Contributions and Prizes	1,650	1,600	1,650	3,000	1,650	1,500
Early Career Award	15,250	8,500	7,625	8,500	7,620	15,100
Journal of Rheology	200,000	224,300	196,266	217,315	247,550	226,765
Bulletin	19,000	17,500	19,664	17,000	18,590	16,836
Bingham Award	32,000	0	16,126	15,000	10,000	20,000
Executive Cmt. Meetings	20,000	5,200	18,713	15,000	16,063	10,710
Pres. Discretionary Fund	1,500	1,500		1,500	1,824	919
Treas. Discr. Fund	1,500	1,500	197	1,500	288	0
Bulletin Editor Discr. Fund	1,500	1,500		1,500	517	0
Progr. Chm. Discr. Fund	3,000	3,000		3,000	-1,554	1,395
Webmaster Discr. Fund	3,000	3,000		3,000	1,447	3,000
International Activities Fund	5,000	5,000		5,000	0	1,313
Office Expenses	1,700	1,700		1,700	11,487	1,614
Banking Services		0		120	0	0
Liability Insurance	6,300	5,600	6,300	5,600	5,406	5,413
Membership Broch. & Appl.		100		500	0	62
Accountant	3,000	2,500	2,660	2,300	2,400	2,210
Student member travel	50,000	0	31,000	30,000	22,497	37,675
Annual meetings, future		3,000		4,000	2,925	1,076
Website	1,500	1,500	3,074	1,500	1,602	819
Miscellaneous		100		100	0	0
TOTAL DISBURSEMENTS	395,900	313,300	331,151	369,635	375,793	378,825
Net	-\$26,840	34,600	-2,788	-35,635	-11,586	-13,522

Treasurer's Report

(continues p26)

<i>Journal of Rheology</i>						
Receipts and Disbursements						
	2015	2014	2013	2012	2011	2010
REVENUES (AIP report)						
Advertising Sales	32,141	35,886	30,800	39,602	51,856	49,814
Royalties	28,369	33,197	69,736	108,919	88,162	4,277
Reprint Sales		0	0	0	0	1,060
Single-Copy Sales		0	105	0	0	105
JOROL Income		150,364	72,872	84,695	94,242	70,946
Subscriptions	213,692	75,569	148,137	145,850	150,980	159,285
Total Revenue	284,180	295,016	321,649	379,066	385,240	285,488
EXPENSES (AIP report)						
Fixed Expenses	114,966					
Online Expenses	22,166					
Print Expenses	59,134					
Adv. Prod. and Hand.		8,433	8,233	10,305	13,033	13,180
Production		53,010	42,120	35,955	38,250	36,322
Cash Discounts & Rebates		917	2,030	1,972	1,313	1,839
Legal Fees		0	0	0	0	0
Editorial Management		41,124	42,550	50,272	40,914	46,217
Reprint Printing and Mailing		91	0	221	630	679
Printing and Binding		29,425	25,123	17,839	17,398	20,124
Paper		12,968	10,735	9,501	8,869	8,480
Mailing Expense		19,857	18,598	14,465	12,493	4,523
Postage		5,081	5,066	5,154	6,751	15,609
Single Copies		0	15	0	0	15
Back copy expense		434	449	1,967	0	688
Subscription Ful'ment, Member		4,263	3,284	3,377	3,491	3,788
Subscription Ful'ment, Nonmem.		2,112	1,818	1,811	1,848	2,072
Subscription Ful'ment, Comp/Ex		0	15	14	11	22
Marketing Expense		1,965	2,900	1,209	652	735
Storage		1,252	962	1,011	781	723
JOROL Expense		51,785	49,609	49,239	47,830	55,765
Vendor Management Fee		272	1,470	1,213	2,972	984
One-time setups		0	900			0
Credit Card and Bank Fees		494	460	473	393	528
Total Expenses	196,266	233,483	216,337	205,998	197,630	212,294
NET	87,914	61,533	105,313	173,068	187,609	73,194

Treasurer's Report end

Planning Ahead? Short Course in Tampa Bay: *Interfacial Rheology*

11-12 February 2017
Grand Hyatt Tampa Bay

Interfaces are ubiquitous in soft matter systems, with applications in consumer products, biology and related materials. Fluid interfaces in complex fluids have in addition to the thermodynamics aspects, a dedicated rheological response which stems from the deformation of the interfacial structure. The field of interfacial rheology has been expanding rapidly over the past few years, both in terms of measurement techniques and a widening array of applications.

About the lecturers:

Gerry Fuller is professor of Chemical Engineering at Stanford University (USA).

Jan Vermant is professor of Soft Materials at the Swiss Federal Institute of Technology (ETH) in Zürich, Switzerland

Course outline:

Saturday

The course will start with an introduction on thermodynamics of interfaces and capillarity. We will then turn our attention to the role of interfaces in fluid mechanics, and gradually increase the complexity of the interfacial response introducing the relevant deformation modes and the role of the interface in drainage flows.

Measurement techniques for interfacial rheometry and structure will be discussed in detail, with an emphasis on the proper measurement of the different material functions and the experimental observables.

Sunday

The fundamental concepts will be applied to a range of applications, from thin film stability in lung surfactants and tear films, over particles and interfaces and Pickering emulsions, polymers at interfaces, other surface active components such as surfactants, proteins and fatty acids, ending with phospholipids. Applications will span topics as diverse as oil field applications, bacterial biofilms and monoclonal antibodies.

(Calendar, continued from page 28)

2018

April 2018

Annual European Rheology Conference, AERC2018.
Location TBA.

13-14 October 2018

SOR Short Course on Rheology (topic TBA), Houston, Texas, USA.

14-18 October 2018

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

2019

April 2019

Annual European Rheology Conference, AERC2019.
Location TBA.

19-20 October 2019

SOR Short Course on Rheology (topic TBA), Raleigh, North Carolina USA.

20-24 October 2019

91st Annual Meeting of The Society of Rheology, Raleigh, North Carolina, USA, Saad Khan.

2020

August 2020

XVIIIth International Congress on Rheology, Rio de Janeiro, Brazil, Paulo Mendes (every four years; in Europe in 2024).

2021

February 2021

92nd Annual Meeting of The Society of Rheology, location TBA.

October 2021

93rd Annual Meeting of The Society of Rheology, Bangor, Maine, USA, Albert Co.

For other meeting notices, see also:

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

www.appliedrheology.org



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CALENDAR OF RHEOLOGY CONFERENCES AND COURSES

2016

25-29 July 2016
32nd International Conference of the Polymer Processing Society (PPS32), Lyon, France, A. Maazouz. (pps-32.sciencesconf.org)

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

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

3-7 October 2016
4th International Conference on Competitive Materials and Technology Processes, Miskolc-Lillafüred, Hungary; László A. Gomze. (www.ic-cmtp4.eu)

2017

11-12 February 2017
SOR Short Course **Interfacial Rheology** by Gerry Fuller and Jan Vermant, Tampa Bay, Florida USA (see p27).

12-16 February 2017
88th Annual Meeting of The Society of Rheology, Tampa Bay, Florida USA, Don Baird, Technical Program by Kalman Migler and Anke Lindner.

3-6 April 2017
Annual European Rheology Conference AERC2017, Copenhagen, Denmark. (www.aerc2017.dk)

7-8 October 2017
SOR Short Course on Rheology (topic TBA), Denver, Colorado, USA

8-12 October 2017
89th Annual Meeting of The Society of Rheology, Denver, Colorado, USA, Matt Liberatore. Technical Program by Anne Grillet and Randy Ewoldt.

(continues, page 27)