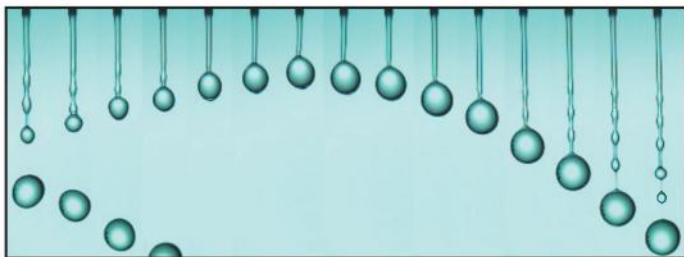

THE BRITISH SOCIETY OF RHEOLOGY

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THE BRITISH SOCIETY OF RHEOLOGY

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EDITORIAL

SUBMISSIONS TO THE BULLETIN

Submissions to the Bulletin may be made by any practical means – post, email, disk, fax, pigeon, donkey, *et cetera* but electronically is preferred (saves typing...). Most packages supported (Word, TeX, LaTeX, WordPerfect, ASCII, RTF) but always provide a contact name, address, eMail, or telephone number in case of problems.

The next copy date will be in April 2005 and, as always, all contributions are gratefully received. Late copy can sometimes be accommodated, however the facilities of the BSR and ESR web sites may also be appropriate. Please contact the Editor for details (Bogdan Dobraszczyk, b.dobraszczyk@reading.ac.uk).

COVER ILLUSTRATION

The cover illustration shows a sequence of high speed video images of an interesting phenomenon at the transition between dripping and jetting in polymer solutions: a large gobbling drop eating smaller ones that form and convect along the jet. Picture courtesy of Professor Gareth McKinley, Department of Mechanical Engineering, MIT.

We are continually looking for colour or black & white pictures (preferably of a rheological nature!) for the front cover of the Bulletin and Rheology Abstracts. Please contact Bogdan Dobraszczyk (Bulletin Editor), Gary Tucker (Abstracts Editor) or Nick Hudson (Publications Manager). Suggestions are always welcome!

BSR NEWS

British Society of Rheology Annual Award 2002 Professor Malcolm Mackley

Malcolm Mackley's research career in rheology has covered more than 30 years. Following Bachelor's and Master's degrees in Physics and Physics of Materials, he worked for 6 years with Felix Frank and Andrew Keller at Bristol University studying the science of crystallisation of fibrous polymers. These are strongly influenced by the flow conditions (especially elongational flow) under which they form and the liquid crystalline properties of these polymers confer highly advantageous improvements on their mechanical properties. This work engendered his lifelong interest in rheology, fluid mechanics and polymer science. From Bristol he moved to the Chemical Engineering Department in Cambridge and his scientific knowledge and understanding have enabled him to go on to invent scientific equipment, reactors and processes. Some of the highlights of his work are as follows:

He has developed innovative experimental techniques for the study of extensional flow with particular relevance to polymer systems which have been adopted around the world and further developed by Gerry Fuller (Stanford) for example.

He made the first optical observations of the defects in liquid crystal polymers which are known as disclinations and collaborated with Alan Windle (Cambridge) to develop a model description. In the course of this work on liquid crystal polymers the Cambridge Shear system was developed and is now manufactured commercially by Linkam Scientific who have sold over 60 units worldwide.

He invented processes for the manufacture of high modulus polyethylene based upon minimising the degree of chain entanglement (related to liquid crystallinity again!). The preliminary model for this behaviour has been taken up and refined by Gladden (Cambridge) and Gao (Hong Kong).

Over 25 years he has studied the way molten polymers flow, building up complementary expertise in experimental and numerical methods and establishing constitutive equations. He was the first to successfully match experimental flow birefringence data to numerical simulation and has collaborated with Sam Edwards (Cambridge) and several Chinese workers (Beijing), as well as being part of an important European consortium project studying polymer processing.

He pioneered the subject of oscillatory flow mixing as a process operation in which the reactants pass back and forth through an oscillating baffle, and again developed a fluid mechanics model for the process. Commercial applications include chemical reactors, coagulation and flocculation, and the technology has been used by major chemical, petrochemical and water companies. Oscillatory flow mixing groups have been established by his former co-workers, Roberts (Manchester) and Ni (Heriot-Watt).

He invented the cold chocolate extrusion process, which has been adopted by Nestle as an alternative to the (rheologically less interesting) hot flow of molten chocolate. This has involved investigation and modelling of flow instabilities such as necklace formation and stick-spurt phenomena – and an appearance on Tomorrow's World. He is the co-inventor of the Multi-Pass Rheometer as a means of studying rheology under process conditions and which has been applied to polymers, inks, paints and other complex fluids. Several commercial instruments have been purchased worldwide. It is highly appropriate that he is now Professor of Process Innovation in Cambridge.

With over 120 publications and contributions to journals, conferences and books, his output matches the breadth of his scientific interests. His published papers include work on

- polymers, emulsions, inks, chocolate, equine blood and shish kebabs;
- shear flow, elongational flow, numerical modelling, optical microscopy and heat transfer;
- capillaries, ducts, slits and baffles;
- experimental apparatus.

He holds several patents and has received prizes for his work from the Royal Society of Chemistry, the Institute of Physics and the Institution of Chemical Engineers. His work has been recognised worldwide and he is in demand as a guest lecturer.

I have known Malcolm personally for 30 years through our common interests in rheology and polymer science. His approach is characterised by dedication to his students, enthusiasm for his work and ideas, great flair for invention of devices and processes, and single-minded determination and persistence to press home, on colleagues and the world, the ideas and concepts he believes in.

So it is with great pleasure on behalf of the British Society of Rheology that I present our Annual Award for 2002 to Malcolm Mackley, Professor of Process Innovation at the University of Cambridge, in recognition of his work on the rheology and processing of polymeric liquids.

Geoffrey Maitland

British Society of Rheology

Minutes of the 63rd Annual General Meeting held in the Department of Chemical Engineering, Cambridge on Monday, December 15th 2003, starting at 6.00 pm

1. Present

The President, the Hon. Secretary and 12 members.

2. Apologies for absence

Received from R. Buscall, NE Hudson, G Tucker.

3. Minutes of the 62nd AGM

These were agreed as a true record of the meeting and signed by the President.

4. Matters arising

There were none.

5. Reports of the Officers

5.1. President

Geoff Maitland presented his report for the year in which he reported on progress that had been made in two main areas which he had targeted since taking office. These were to rationalise and upgrade the procedures for dealing with membership recording, subscriptions and Society publications, all of which are linked to moving over to electronic systems and the other was to address the services that the Society delivers to its members and how the Society can best encourage and support the science of Rheology, particularly in Britain.

He reported that the Society's website had been completely restructured during 2003 to give a wider range of information, that is regularly updated, and direct on-line access to many services, including subscriptions and publications (but also including information on Council business, upcoming conferences and sponsorship initiatives, particularly for students). He expressed the gratitude of the Society to Jon Harvey, an MSc student at Swansea sponsored by the Society to carry out much of the design and implementation work, Mike Webster who masterminded much of the upgrade and Chris Petrie, Webmaster, for all their sterling efforts to bring this on-line during the year. He reported that in this

development it had been necessary to reconstruct the membership database and the subscription history of each member. This had been achieved by an enormous amount of detective work and cross-checking from older paper records and pre-Microsoft databases by Jon, Mike and our Treasurer Rhodri Williams, ably assisted by members of Council in what became the great e_mail search. All members had been contacted about their subscription payment history and payment can now be made on-line. Through the honesty and commitment of many members, many outstanding back payments from previous few years when subscription reminders were not sent out have been recovered and the Society is now in regular contact with almost all active members.

He reported on another aspect of enhancing regular and rapid communication with the membership that had instigated during the year viz. the introduction of the monthly e_mail summary. He expressed the indebtedness of the Society to David Binding for his initiative in launching and maintaining this service. He informed the meeting that Rheology Abstracts and the Bulletin were also now available on-line, or by CD. He solicited the members for exciting images with a rheological context with which to populate the on-line picture gallery and also use for future covers of the Abstracts and Bulletin.

He reported on the launch in 2003 of Rheology Reviews, an annual overview of key and topical rheological areas written by world-leading authorities. He expressed his thanks to thank Ken Walters and David Binding for their excellent initiative and hard work in launching what he believed would become a fundamental series essential for every card-carrying rheologist's office and bookshelf.

He reminded the meeting that last year it had been reported that one of the Society's founders, Dr Vernon Harrison, had left a bequest of £2000 to the Society. He reported that Council had decided to initiate a new Society award, the Vernon Harrison Annual Doctoral Prize, for the most outstanding PhD thesis in rheology in each academic year. He expressed the gratitude of the Society to Dr Harrison for providing some funds and impetus for this initiative and reported that the first award would be presented tomorrow. He encouraged all PhD supervisors to consider entering their best students for this award.

He reported on an emerging pattern of the Society combining forces with the Institute for Non-Newtonian Fluid Mechanics for a Spring Meeting, with organising a meeting on its own in the Winter. One aim had been to

encourage younger researchers and grass-roots work in-progress with informal meetings such as this one. He asked members for feedback on the format and timing of such meetings. He reported that Council was in the process of putting together a proposal to hold the 2007 AERC in the UK, probably in Wales.

Finally, the President thanked all the members of Council for their hard work and support over the past year. He reported that three members of Council, Phil Banfill, Geoff Brownsey and Oliver Harlen, were stepping down at this meeting and thanked them for their valuable contributions to the Society. He reported that in recognition of his work for the Society Council had decided to make Geoff the second winner of our Distinguished Service Award.

5.2 Treasurer

Rhodri Williams presented his report on the financial health of the Society. Due to the recent change in the financial year of the Society the next set of accounts to be presented will be for an eighteen month period ending on 31st December 2002. The accounts would be submitted to the Charity Commissioners as soon as a clear picture of income related to membership subscriptions for that period was known. He reported that even in a period in which there were two major areas of expenditure for the Society, related to web development and Rheology Reviews, the overall loss for the year was predicted to be approximately £1,300. The Treasurer added that the finances of the Society were in a healthy state. However, it was important to ensure that Rheology Reviews succeeded from a business point of view so that it could be sustained for the future.

5.3 Hon. Secretary

Tim Phillips reported that there had been three nominations for the inaugural Vernon Harrison Doctoral Prize and all three had been short-listed for the prize.

5.4 Membership Secretary.

Mike Webster reported that the membership of the Society was currently 448. During the year the Society had welcomed 30 new members. However, 30 members had also resigned. He reported that Council was trying to attract new members to the Society.

5.5 Bulletin Editor.

Oliver Harlen reported that there had been three editions of the Bulletin produced during the year. He thanked those who had contributed articles and book reviews. He thanked the advertisers for providing the funds to cover the costs of producing the Bulletin and Nick Hudson for overseeing the production and distribution of the publication.

5.6 Abstracts Editor.

A report was received from Gary Tucker which mentioned that volumes 45 (3&4) and 46 (1,2&3) had been produced during the year and that issue 46 (4) would be ready by January. He added that there were currently 5 abstractors. The President thanked the Abstracts Editor and the abstractors for their work.

6. Resolution 1. Change in Date for the AGM of the Society.

Rule 7(b) of the Society states that the Annual General Meeting shall be held in the month of September or thereabouts in each year upon a date and at a time to be fixed by Council. Following the decision of the Society at the EGM in December 2002 to change the end of the financial year of the Society from June 30th to December 31st, Council recommends that the date of the Annual General Meeting of the Society be moved to the Spring.

The resolution was carried. Voting: for (39), against (1), abstentions (0).

7. Resolution 2. Temporary Extension of Terms of Office of Council Members.

Rule 5(b) of the Society states that the President shall be elected at an Annual General Meeting to serve in that office for two years and all other members of Council shall be elected at each Annual General Meeting to serve for one year. If Resolution 1 is passed the Council of the Society recommends that the term of officers elected at the AGM in 2003 together with that of the President be extended until the AGM in Spring 2005, to cover this interim period. Thereafter, the period of office will revert to 12 months.

The resolution was carried. Voting: for (40), against (0), abstentions (0).

8. Officers and Council members

There being no further nominations to Council, the nominations

circulated with voting papers were approved by postal and electronic voting and unanimously by those present at the meeting. The Council for 2003-05 was therefore elected as follows:

President	Professor Geoff Maitland
Hon. Secretary	Professor Tim Phillips
Hon. Treasurer	Professor Rhodri Williams
Membership Secretary	Professor Mike Webster
Bulletin Editor	
Abstracts Editor	Mr Gary Tucker

Ordinary Members of Council

Mr Derek Bell

Dr David Binding

Dr Bill Frith

Dr Nick Hudson

Dr Phil James

Professor Chris Petrie

In the absence of any nominations the Meeting gave the Council the authority to co-opt someone to assume the role of Bulletin Editor.

9. Any other business

None.

There being no other business the meeting closed at 6.30 pm.

TN Phillips	GC Maitland
Hon. Secretary	President

Report on the Conference on Industrial Rheology, Hoole Hall Hotel Chester 5-7 April, 2004

The University of Wales Institute of Non-Newtonian Fluid Mechanics Conference for 2004 on Industrial Rheology was held in the historic city of Chester. It consisted of 24 talks of approximately 30-40 minutes with topics covering typical issues encountered in industry: detailed rheological models of materials, numerical realization and validation of models, measurement and response of material properties under various conditions of temperature and pressure. One of the main purposes of the meeting was to recognise and celebrate the 60th birthdays of Dr Martin Laun of BASF and Professor Howard Barnes of Unilever. Their extended lectures described their experiences in 'Industrial Rheology' and gave some pointers to the future.

The conference opened with a talk by D.V. Boger, Something old, something new, and something very new in industrial rheology. The title making passing reference to his recent marriage. One of the problems discussed was that of pumping sediment through pipes. Engineers generally prefer turbulent flow to avoid setting as laminar flow tends to cause the sediment to dump thus blocking the pipe. Both shear and thermal history were relevant in this problem. The 'very new' topic referred to microchannel contraction producing dramatic hyperelastic effects. J.R.A Pearson, discussed the role of diffusion in non-Newtonian fluid mechanics. He argued that a number of interesting properties of chemically-tailored surfactants in colloidal solution that form micelles can be understood using a 'toy' model based on diffusion. D.R. Oliver, gave a talk on Simultaneous shear and squeezing flow applied to a ceramic paste. The idea for a new method of measurement using a device which simultaneously rotates and compresses two surfaces came in part by chance, was found to measure shear viscosity which agreed with that found by other methods, but the squeezing viscosity was found to be high. The talk also discussed the 'Brazil' effect, which refers to the cracking of the ceramic paste when squashed. The effect of boundary conditions on structure formation of PA fibres, was the title of the talk given by I. Emri. It concerned the ambient conditions affecting polymeric materials making the transition from molten to solid state. He makes the point that the same material undergoing different solidification processes can exhibit radically different material properties in their final state. The effects of heat and pressure during the phase transition (Thermo-mechanical boundary conditions) on amorphous materials is relatively well understood but on semi-crystalline polymers the subject is much less explored and methods appropriate for amorphous material analysis fail in the semi-crystalline case. The problem is compounded by the difficulty X-ray scattering techniques have in distinguishing the materials.

Zeolites were the subject of G.N. Greaves talk, Solid state rheology of zeolites under thermobaric stress. These structures are highly porous, meaning they have a high surface area. The talk detailed the properties of zeolites as revealed by synchrotron radiation diffraction methods. One industrial relevance of Zeolites is that their superior properties over conventional melt glass hold out the possibility for the creation of perfect glasses. B. Debbaut presented his results on The double convected pom-pom model: a numerical validation for contraction flow. Some defects associated with current pom-pom models were shown to be overcome by this new model (DCPP), which was applied in the severe test of abrupt planar contraction with extrudate swell and compared with birefringence data. The DCPP accounts for branching in macromolecular structures, which was shown to affect the macroscopic rheology of the fluid. E.I. Frenkin presented a talk entitled, Thermophysical characteristics of PP/LCP blends under high pressure. The slides consisted of a number a graphs relating pressure, volume and temperature of these materials. One application is the prediction of shrinkage in injection mouldings of given blends of polymers.

A recurring feature in many of the talks is the stress-strain graphs and its associated viscosity-strain graphs. H.M Laun gave a talk based on, Thirty years of industrial polymer rheology at BASF. Concepts such as strain hardening in planar extension, viscosity dependence on molecular weight and hydrostatic pressure, wall slip and quasi-state elongation flow were touched on as well as how to stretch fluids in a controlled fashion. Rheometers such as the Sandwich rheometer capable in high shear rate conditions were pictured. The numerical simulation software, POLYFLOW was mentioned using the model K-BKZ, which compared well with experiment. Possible applications were discussed including automatic gear shifting, removal of oil from water.

Howard Barnes gave a talk covering 30 years of industrial dispersion rheology at Unilever (the Cinderella Rheology?), covering early years and taking us through the development of various rheometers and the necessity for them to the link between rheology and end user assessment. The chain of processes at Unilever is broadly described as follows: formulation-processing-microstructure analysis-rheology-consumer assessment. These stages corresponding to Chemical engineering-colloid science-Physics-mathematics-applied psychology. Rheology at Unilever can be dated back to the 1940s with V. Vand's analysis of concentrated suspensions using X-ray refraction and also a development of his own viscometer. Despite the rather daunting title, Morphology development in a PS/PMMMA polymer blend during flow in dies, P Moldenaers gave a very clear talk on the effect of fibrils on the rheology of materials. Fibrils are fibres of approximately $2\mu\text{m}$ in length. The talk made reference to the theoretical work of Tomotika and presented a number of experimental results confirming this work including the prediction of fibril break up off the centre of the axis of the die. Rheology was shown to embrace the art of road building in a talk by C. Gallegos

entitled, Rheology of recycled-EVA modified bitumen. Typical problems encountered by the road building industry are rutting caused by vehicle imposed stresses, low temperature cracking and fatigue cracking. To improve the mechanical properties of the bitumen it is proposed that recycled EVA is mixed in. The source of the EVA is from industrial and domestic waste thus the improvement comes at relatively low cost and has a potentially good environmental side effect. Properties of the blend were studied at the extreme temperature range from low working end use temperatures to high manufacturing temperatures. Beneficial results suggested increased road abrasion, higher viscosity, rutting is avoided at higher road temperatures, lower viscosity at temperatures above 90C is useful for processing. The improved rheological properties were attributed to microstructural changes, which were in part measured predominantly by oscillatory shear tests at normal climate extremes.

Some unusual experimental results were explored numerically in a presentation by M.P. Escudier in Experiments and numerical simulations of viscoelastic flow through sudden expansions. Attempts made to duplicate experimental predictions with the PTT model failed to find velocity overshoot near walls (cat's ears). Also downstream results were poor. The three causes of the difficulties were high Reynolds number, where inertia plays a significant role, extreme three dimensional geometry with sudden contraction and expansion through two outlets, and the non-Newtonian fluid consisting of various concentrations of polyacrylamide a shear thinning liquid.

The importance of rheology to food manufacture was illustrated in the talk by I.B. Cruz in Influence of the operating conditions on the gelatinization of rice flour during expansion. The problem posed is to control by thermal and pressure conditions the outcome of an extrudate from a die driven by a screw at speeds of 150rpm and at various water concentrations. The samples were collected not only at the die put during the barrel so that the process along the length of the extruder can be monitored. Pictures illustrating some results due to the different conditions were given. The final test, one suspected, was human assessment of texture, appearance and possibly taste.

Rheology has as its core doctrine 'everything flows'. J. Piau's talk entitled, 'Macro and micro rheometry of carbopol gels', was concerned with materials bordering on solids; that of soft materials, in particular highly concentrated gels. These are suggested to be made of swollen microgel particles. They are sufficiently 'solid' to have an elasticity modulus and yield stress is a salient feature of these materials. The talk illustrated mechanical and physical experimental data associated with these materials at various time scales and discussed the difficulties of rheometry due to evaporation and slip.

'Macro and micronic rheometry of carbopol gels', was the title of the talk by H.P. Hurlimann. In fact the talk was largely concerned with an advanced machine design for rubber batch mixing, drawing in references to micronic rheology, macroscopic rheometry, model and scaling laws and semi dilute rheograms. He also mentioned the importance of the non solubility of carbopol gels. He reminded us for current mixing processes of imperfections such as loss of homogeneity and poor dispersion. He also emphasized the practical limits that industrial processes impose such as working temperatures and flow constrictions in dies.

The talk entitled 'Rheology of highly filled polymers using squeezing flow' by D. Baird addressed the problem of measurement of highly viscous viscoplastic fluid. Ordinary conventional techniques such as cone and plate or capillary rheometers can fail to characterize the material because of melt and edge fracture. The solution proposed is to use squeezing flow. To implement this approach a choice of power law model of the fluid coupled with numerical simulations using finite elements was investigated for estimating squeezing force for various gap to radius ratios.

'Melt rheology of industrial polymers: relating stress to strain and energy' was the subject of M.H. Wagner's talk. Many materials containing polymers are polydisperse. That is, particles in suspension that are not identical, but have a range of shapes and sizes. Central to the discussion was Molecular Stress Function theory, which he extended in the talk to include a new dissipative constraint release process. Bailly stayed with the topic entangled polymers. How to predict viscoelastic properties of the fluid given knowledge of the architecture of entangled polydisperse linear and asymmetric star molecules. Relaxation of entangled polymers is mainly governed by three processes: reptation, which is the dominant mechanism for linear polymers; tube length fluctuations, which is the main relaxation mechanism for star molecules; and thermal constraint release. The talk showed how to combine all these properties into a global model. Central to the model was the probability of chain configuration. After an overview of tube models R. Keunings presented a new model named the CRAFT chain model, where 'CRAFT' stands for Constraint Release Average Full Tensorial. As in Wagner's talk this discussion was concerned with a constitutive relation for blends of entangled linear polymers. The model is built upon a tensorial expression for a full chain representation of the microstructure and reptation and stretch relaxation mechanisms are accounted for, while both thermal and convective constraint release are introduced in a unified formulation. The CRAFT model promises to be a good compromise between simple, single-segment constitutive equations (e.g. DE, DCR-CS) and expensive, full-chain stochastic models.

Oleg Kulikov's talk was concerned with the delay of melt fracture of extrusions by various means including adding thermoplastic elastomers to the inside of a

die. The additives are much more resistant to wear than non coated dies. This was a preliminary investigation and the results given have importance in some practical industrial situations. Complex fluids for hydrocarbon recovery-rheology in extremus, was the subject of G.C. Maitland's talk, which was essentially concerned with oil or water based mud. During the oil drilling process mud is pumped into the hole so as to stimulate oil production and to inhibit production of water and sand. The condition extremes are high pressure and high temperature and also a large range of temperatures. For extrusions to be of acceptable industrial standards the importance of the geometry of the die is important. In his talk entitled 'Optimization of profile extrusion dies: numerical and experimental work', Pinho showed how, with given limits, how a geometry could be evolved to minimize internal stresses. Chinestra gave a very fast moving talk entitled ' α -NEM and model reduction: two new and powerful numerical techniques for simulating complex flows'. He proposed a new efficient and accurate approximation based on an adaptive model reduction which couples the proper orthogonal decomposition with an approximation basis enrichment based on the use of Krylov subspaces. Lagrangian formulation of fluid flow suffer from the numerical disadvantage of severe distortion of the material coordinates in space. Semi Lagrangian techniques get round this problem by remeshing at frequent time steps. However, F. Chinestra points out that this too is a drawback. 'NEM' in the talk's title refers to Natural Element Method which he points out has the capabilities of the Lagrangian models to describe the flow front tracking as well as for treating convection terms related to the fluid microstructure evolution, without the mesh quality requirement characteristics of the standard finite elements method. To illustrate the power of the approach simulations were shown of waves breaking, and a dam break.

To finish off the conference a talk entitled, 'Rheology of coarse particle suspension such as fresh concrete' by Wallevik from Iceland. This was a highly entertaining discussion of the evolution of the concrete industry and their concerns. As he pointed out, the concrete industry is probably the largest industry in the world, but despite this funding for devices such as rheometers can be sometimes hard to find. However, the industry now recognizes the value of rheology in the science of concrete and there is much activity mathematically to improve the state of the art. The observation of how little the concrete industry has changed fundamentally since its inception was humorously illustrated by two pictures: early days by a picture of his son making a sand castle; the current state of the art by a cartoon showing sand castle building being controlled by computer.

Peter C Bollada, Institute of Mathematical and Physical Sciences, University of Wales Aberystwyth

Commentary on the 2004 Vernon Harrison Annual Doctoral Prize Award

The Vernon Harrison PhD Prize was instituted in 2003 following a bequest to the Society by an eminent former member. Council decided that such a prize was a suitable way to use and recognise Dr Harrison's generous donation and also to promote and recognise excellence in research amongst the emerging generation of young rheologists. Nurturing the future of our subject is one of the key roles of the Society and with this award, alongside the Annual Award and Gold Medal, we aim to reward early achievement and encourage promise for the future.

This year, I am pleased to announce that the Prize has been awarded to Dr Sally Everitt of the Department of Applied Mathematics, University of Leeds, for her thesis 'Bubble Growth in Polymeric Liquids' reporting her research carried out under the supervision of Dr Oliver Harlen. The adjudicating panel consisted of Dr Tim Phillips, Dr Nick Hudson and myself. We thought that this was an excellent piece of research, carried out in the true spirit of classical British Applied Mathematics in that it combines modelling, analysis and simulation of the highest quality. The problem of modelling the dynamics of bubbles in foams is complex and in the thesis Dr Everitt considers a number of model problems to shed light on the salient features of the problem. These gave considerable insight into the way bubbles grow in complex liquids, without and with reaction. I will not give further details here as Dr Everitt will shortly be telling us about it - the presentation will also be available on the Society's website. The work takes a novel approach and adds greatly to our understanding of this important but neglected area of rheology. The feelings of the panel were strongly reinforced by the comments of the external examiner, who acts as a referee under the guidelines for the award. The panel therefore had no hesitation in making the 2004 award to Sally Everitt.

It therefore gives me great pleasure, on behalf of the Society, to present Dr Everitt with this certificate to commemorate the award and a cheque for £500. We look forward to your talk and to your continued success in the world of rheology, wherever that may take you. Many congratulations.

Geoff Maitland, President, December 16th 2004

The Vernon Harrison Annual Doctoral Prize – Call For Entries

The Vernon Harrison Prize is awarded annually by the British Society of Rheology for the most distinguished PhD thesis in rheology. This aims to recognise excellence, creativity and novelty in research and is awarded to the postgraduate student who, in the opinion of the adjudicating committee, has

made the most original and significant contribution to any branch of rheological research (experimental, computational or theoretical) leading to the award of a PhD degree in a given academic year. The prize is partly supported by the Vernon Harrison Bequest.

Entries are now invited for the 2005 award. The prize will be £500, an illuminated certificate and a copy of Rheology Reviews 2005. Any person who plans to submit and successfully defend a thesis in any area of rheology at a higher education institution in the United Kingdom between 1 September 2004 and 31st August 2005 is eligible.

Each entry should consist of:

- a two page summary of the research written by the candidate, emphasising in clear terms the key achievements which especially distinguish it as a candidate for this award;
- a letter from the thesis supervisor confirming the recommendation of the award of a PhD to the candidate and supporting the case for the award, highlighting the specific original contributions of the candidate;
- the name and address of the external PhD examiner, who should have been contacted by the supervisor to ensure that they are willing to give an independent reference if approached by the assessors.

The Committee may subsequently ask to see a copy of the final version of the thesis to help them reach their decision.

An Adjudicating Committee appointed by the Council of the British Society of Rheology will consider the entries. Particular attention will be given to the scientific originality and quality of the thesis, its coherence and overall presentation and the significance the research to the field in general. Theses where rheology is a major, but not the sole, scientific theme will be considered. Entries will be selected by the Adjudicating Committee for presentation at the Winter Meeting of the British Society of Rheology (date and venue to be decided). The Adjudicating Committee may award any number of first and secondary prizes. Travel funds will be available to assist candidates to attend the prize meeting.

Proposals for the 2004-5 Award should be sent **by September 16th 2005** to the Secretary:

Professor Tim Phillips

School of Mathematics Tel: +44 2920 874194

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Senghennydd Road email: *PhillipsTN@cardiff.ac.uk*

Cardiff CF24 4AG

United Kingdom

Commentary on British Society of Rheology Winter Meeting
Complex Fluids in Complex Flow
University of Wales, Swansea
December 15th-16th 2004

The meeting was opened by Professor Peter Townsend, pro-Vice-Chancellor of the University of Wales Swansea and former BSR President, who gave a fascinating insight into the historical connections between Swansea and the minerals industry, the city being the centre of the world copper and zinc smelting industry in the 19th century. The BSR Annual Award was presented by Geoff Maitland, resplendent in his chain of office, to Dr John Rallison, of the Department of Applied Mathematics and Theoretical Physics, University of Cambridge, for his significant contributions to the rheology of suspensions and polymer solutions. A citation for this award is given later in the Bulletin. He presented his award lecture on *Singularities in Non-Newtonian Flows*, describing how such singularities are defined by a point where stresses becomes infinite. These singularities are of interest in flow at or near sharp corners, or stagnation points in extensional flow, and may reflect local conditions, where for example, polymers become fully stretched and behave as rigid rods, giving rise to an anisotropically viscous liquid. John's stimulating lecture, closely linking the key mathematical issues to the underlying physics, got the meeting off to a splendid start.

This was followed by a related talk given by Professor Tim Phillips of Cardiff University on *Efficient and Stable Spectral Element Methods for Predicting the Flow of an XPP Fluid Past a Cylinder*, using numerical predictions of planar contraction flows. He described the use of an extended Pom-Pom model (XPP) for describing the flow of branched polymer melts and demonstrated how alternative numerical schemes converged on the same results. Professor David Gethin from the Welsh Centre for Printing and Coating, University of Wales Swansea then gave a presentation on *Thixotropy in Inks and Binders*, describing the importance of binder systems used in inks for their flow properties in printing. The pigment types used in inks had marked effects on their viscoelastic properties, and he concluded that simple rheological measurements often did not differentiate the behaviour of inks under practical conditions on the press. Dr Chris Wright, EPSRC Advanced Fellow at the University of Wales Swansea, followed with a talk on *The Application of Atomic Force Microscopy to the Rheological Properties of Materials*. This described the imaging capabilities of Atomic Force Microscopy (AFM), which is capable of resolving down to the atomic level (nm) for hard elastic solids. For soft solids, such as biological materials and polymers, the resolution is much lower, but it has the advantage that measurements can be made *in vivo*, with very little preparation required and the ability to measure in liquid environments. He described his work on

nanoscale imaging of adhesion of microspores to surfaces, and stretching the protein gluten. AFM is capable of force-distance measurements between living cells and surfaces in aqueous environments, thus making *in vivo* measurements of adhesion between biological cells and substrates possible, a subject of great interest in medical and pharmaceutical applications. This was made possible by simultaneous high speed video microscopy and force measurement on the AFM.

After tea, Dr Phil Bowen of Cardiff University, gave a presentation on *Transient Fuel Spray Impingement*, on how to optimise fuel interaction during gasoline direct injection. The properties of the fuel were shown to change on impingement with a surface, with the fuel starting to ignite at much lower temperatures. Techniques have been designed to simulate an engine environment for validation of modelling sequences, such as optical access to areas of interest within the engine, Phase Doppler Anemometry, Particle Imaging Velocimetry and high speed imaging to measure particle velocity and droplet sizes within the fuel after fuel injection. Dr Bogdan Dobraszczyk, University of Reading spoke on the *Rheological and Polymer Molecular Structure-Function Relationships in Gluten in Relation to Bubble Stability in Baking*, showing how the extensional rheology of expanding doughs under conditions relevant to baking was directly related to the stability of gas bubbles in bread doughs during baking. The day finished with Dr Chris Arnold, University of Wales Swansea, with a talk on *The Viscoelastic Nature of Environmental Stress Cracking in Polymers*, who described how Environmental Stress Cracking was the largest single cause of failure in polymers in service, often leading to unexpected brittle failure. This was shown to start with nucleation of microscopic voids within the polymer, forming crazes which act as sites of crack initiation.

The Conference Dinner was held at the Swansea Marriott Hotel, complete with festive hats and Christmas crackers. Professor Howard Barnes reflected on the long-term connections of Swansea with rheology, particularly through Professor Jim Oldroyd, and on the continuity from his research to the present day activities in theory, simulation and measurement. He proposed a toast to the Society, the award winners and the meeting organisers. In his response, Geoff Maitland spoke of the range of meetings and awards that the Society now sponsors and after illustrating how the concept of the Deborah Number could be a dangerous one for rheologists attempting to walk on water, congratulated Sally Everitt, John Rallison and David Boger on their awards and achievements. He then presented the Society's Distinguished Service Award (which is only rarely made) to Dr Geoff Brownsey. Over a period of 15 years of almost continuous service between 1987 and 2003, Geoff was a member of Council, Rheology Abstracts Editor (1989-93), Secretary (1994-98) and Membership Secretary (2000-2003), making an outstanding contribution to the Society's activities and organisation across the board. Alongside this, in his role at the Institute of Food Research in Norwich he has made his own contributions to rheology research in areas

ranging from structure-property relationships in gelling polysaccharides to the surface rheology of lipid-damaged beer foams. He was presented with an illuminated certificate citing his long-serving contributions to the Society.

Day 2 of the meeting started with the presentation by Geoff Maitland of the Society's highest award, the Gold Medal, to Professor David Boger in recognition of his outstanding contributions to the rheology of particulate and polymeric fluids and its application to industrial problems. The full citation for the award is given elsewhere in this Bulletin. David expressed his delight at receiving the award and paid tribute to his many students, postdocs and colleagues who had contributed to his achievements over the years, especially Ken Walters, who he claimed coined the term 'Boger Fluids'. He then presented his Gold Medal lecture on 'The Rheology of Particulates' which explained how he got involved in suspension rheology through being asked to solve real practical problems by the mineral industry and how this led to research in both measurement techniques for high concentration slurries and to a recognition of the major effects on the rheology of these systems played by surface chemistry. The lecture ended by coming full circle to practical solutions for how to manage the enormous volumes of mineral waste by dewatering and pumping as high solids volume suspensions...'environmental rheology'. Although only covering a fraction of the contributions to the subject for which he was being recognised, David's talk clearly illustrates the quality and depth of his research and his enthusiasm and commitment to rheology and its socio-economic implications. This was followed by a showing of the UWINNFM film on 'Boger Fluids' which gave a timely summary of David's seminal contributions to polymer rheology and contraction flows.

The post-coffee session consisted of three talks on rheological techniques. Howard Barnes ('Sample Artefacts in Rheology') described how particle sedimentation effects, even when extremely slow and giving rise to only a few microns of free solvent at the sample surface, can have a major influence on flow curve measurements in parallel plate geometries. He presented a simple three-layer model for accounting for such effects and suggested methods for avoiding artefacts. Russell Davies ('Wave Dispersion in Rheometry') presented an analysis of wave dispersion techniques, particularly (but not exclusively) as applied to the Virtual Gap Rheometer. He presented relationships which enable the relaxation time spectrum of a fluid, and hence the real and imaginary parts of the shear modulus, to be determined solely from measurements of density and the phase velocity over a range of frequencies. He also showed that when measurements are made over a finite range of frequencies, there is additional benefit in including group velocities in the measurement set. The third talk was by Roy Carter on 'The Time and Temperature Scanning Rheometer'. This consists of a vertically oscillating probe, which is disposable, which measures phase and amplitude changes to monitor the rheology of materials over time or

with temperature. It is designed to cover a wide range of effective viscosities (10^{-10} to 10^4 s⁻¹), in the range 0.5 to 5 Hz and from -20°C to 400°C. Roy gave examples of its application to a range of systems including epoxy thermosets and there was some discussion of potential enhancements such as wider frequency range.

The final item of the meeting was the presentation of the Society's newest award, for young rheologists: the Vernon Harrison PhD Prize for the best thesis in rheology over the past year. This was presented to Dr Sally Everitt of the University of Leeds for her research on 'Bubble Growth in Polymeric Liquids'. Again the presentation address is given elsewhere in the Bulletin. Dr Everitt then gave her Award Lecture and described how polymeric foams are complex systems, widely used in applications ranging from car steering wheels to cavity wall insulation. To understand the effects of viscoelasticity on bubble expansion during their formation, she studied a number of model systems. For injection moulding of non-reactive polymers, Oldroyd B and Pom-pom constitutive models were used to investigate bubble growth driven by gas diffusion; for reactive polymers a new fluid model was developed based on linear theory for a gelling liquid which produces gas as a side product of the cross-linking process. Three models of increasing complexity were studied: low bubble concentrations where they are essentially isolated, a two dimensional hexagonal array model to examine the effects of larger volume fractions where the bubbles interact and deform, and finally a study of the issues surrounding a distribution of bubble sizes and the Oswald ripening phenomena that cause large bubbles to grow at the expense of smaller ones. The elegant way that these three substantial and complex areas were summarised in the talk and Sally's confident delivery demonstrated that the second Vernon Harrison award is in good hands.

The meeting ended with lunch and a tour of the newly inaugurated Interdisciplinary Nanotechnology Centre, which displayed an array of state-of-the-art experimental techniques and high promise for taking experimental rheology into new aspects of the micro- and nano- regimes, to complement the advances being made in bridging the molecular to bulk length scales through simulation. Thanks go to Mike Webster, Rhodri Williams and Tim Phillips for organising an excellent meeting.

GOLD MEDAL CITATION – DAVID BOGER

BSR Winter Conference, Swansea, December 2004

The Gold Medal of the British Society Rheology is not awarded every year. Just 13 Gold Medals have been awarded in 38 years, beginning with that to Marcus Reiner in 1966. It is awarded every few years in recognition of truly outstanding contributions to the field of rheology and the list of recipients is quite exceptional. The 14th medal being awarded today goes to a man who will make that list even more impressive than it is already.

David Boger is one of the most recognisable people in the world in our area of science – he is readily recognisable by sight, ‘by sound’ (by that I refer to his distinctive voice) and, above all, by name and reputation. The basic statistics are very impressive: In a career that has spanned almost 40 years since being appointed lecturer at Monash University in 1965, David has published in excess of 320 articles in journals and conference proceedings: He has co-authored 5 books, produced several films and videotapes illustrating rheological phenomena, received numerous national and international honours and awards and been associated, professionally, in one way or another, with over 90 companies worldwide.

However, the bare numbers do not do justice to the influence that his work has had, and continues to have, on research activity in rheology. While at Monash, (specifically via a paper in the *Journal of non-Newtonian Fluid Mechanics* in 1977), he introduced the world to a very special class of fluids that have become known simply as Boger fluids. These fluids, primarily low concentration polymer solutions in an appropriate solvent, exhibit very high levels of elasticity yet possess a relatively high shear viscosity that remains essentially constant over a very wide range of shear rates.

This innovation served as a spark, igniting much activity that had previously been inhibited by the inability to observe the effects of elasticity in isolation from the influences of variable viscosity and inertia. Many hundreds of papers have appeared since then, in which Boger fluids have been studied in their own right or have been used to investigate specific complex flow situations. Many Boger fluids are optically clear and lend themselves to non-intrusive visualisation techniques – techniques that David has used extensively to illustrate the behaviour of complex fluids in complex flow situations. Many of us are very familiar with the fantastic array of images to be found in his book “Rheological phenomena in focus”, co-authored with Ken Walters and published in 1993.

It is true that Boger fluids have, in one way or another, led to many of the awards bestowed upon David, including the Annual Award of the British Society of Rheology, in 1983. However, David has contributed much more than that to our understanding of complex fluids and their behaviour. He has been instrumental in the development of experimental measurement techniques with important contributions

to Vane rheometry, squeezing flows, capillary and slit techniques as well as visualisation and velocity measurement utilising photographic techniques.

Following his appointment as Professor of Chemical Engineering at the University of Melbourne in 1982, his research activity increased dramatically, with extensive contributions particularly to the area of suspension rheology, including high concentration slurries and muds. More recently he has been involved with work aimed at linking and manipulating the rheological and processing properties of particulate fluids through control of the surface chemistry.

He has combined his experience of basic research in rheology with his background in Chemical Engineering and exploited that expertise to tackle problems in a number of diverse industries, including food, petroleum and minerals. It is his ability to seek out real, complex industrial issues and demonstrate how to apply rheology to problems of worldwide economic and social importance that make David one of rheology's most effective practitioners and ambassadors. As Director of the Particulate Fluids Processing Centre (a special Research Centre of the Australian Research Council) his recent and current research interests include applications to atomisation, inkjet printing, and the exploitation of rheology in helping to solve significant environmental problems such as the minimisation of waste products in the minerals industry. Always with an eye on current funding fashions, he has even coined the phrase 'Environmental Rheology'

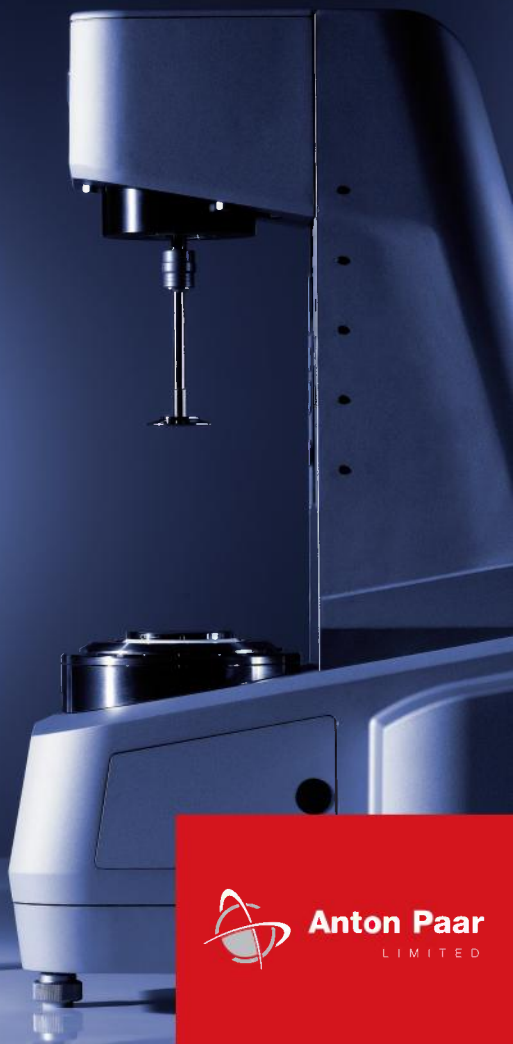
Of the many awards and honours received by David, I should mention one in particular. In 1995 he received the prestigious Walter Ahlström Prize, from the Finnish Academies of Technology – an award worth 80,000 Euros, made annually, and I quote: “to a remarkable achievement of application of technology by which man can achieve considerable savings in energy generally, and especially in the use of raw materials or in the declining of climate impacts” His success at exploiting rheology for solving industrial problems requires not only sound science. It also requires a degree of pragmatism. David is able to combine these two assets to great effect. This is illustrated, for example, in his work on the measurement of yield stress where he extols the benefits of a ‘fifty-cent rheometer’.

David has an excellent sense of humour and that allows me to mention that, of course, he is not perfect. For example, he is occasionally prone to slight exaggeration: A paper in 1974 claimed to provide the “Complete rheological characterisation of time-dependent food products” threatening, as a consequence, to make all future rheologists in that industry, redundant. Also, despite having travelled the world extensively, geography would appear **not** to be one of his strong points – for he rarely sees the world ‘the right way up’!

These are, however, minor aberrations that pale into insignificance compared to the wealth of knowledge and insight that David has contributed to our science. He is indeed a most deserving recipient of the British Society of Rheology Gold Medal.

David Binding

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BSR Annual Award Citation 2003
BSR Winter Conference, Swansea, December 2004
Dr John Rallison

The fact that this award for 2003 is being made in December 2004 is an appropriate symbol of the tardiness with which the Society has recognized the significant contribution to the rheology of suspensions and polymer solutions that has been made by John Rallison.

He completed a PhD at the Department of Applied Mathematics and Theoretical Physics of the University of Cambridge in 1977. His supervisor was John Hinch, who had himself completed a PhD five years earlier, under the supervision of George Batchelor, and is a former BSR Annual Award recipient. The two Johns have worked in the same Department and are Fellows of the same College, Trinity, so it maybe wise to adopt the Cambridge habit of referring to them by surname.

Rallison's thesis, entitled "The mechanics of fluid suspensions", dealt with Brownian rotations of non-axisymmetric particles and rigid constraints in Brownian Dynamics. After completing this, he held a Research Fellowship in mathematics at Trinity College, did post-doctoral work at the California Institute of Technology with Gary Leal, around the time Gerry Fuller was completing his PhD there, leading to a paper with Leal on dynamic light-scattering from macromolecules. After working with Andreas Acrivos he wrote one of the first papers using Boundary Integral Methods for Stokes flow, "A numerical study of the deformation and burst of a viscous drop in general shear flows". That and further research in the area led to the 1984 article on "The deformation of small viscous drops and bubbles in shear flows" in the Annual Review of Fluid Mechanics, which still today is regularly cited, despite there being a second review ten years later. A Harvard course on "The nature of mathematics" cites "Scaling Methods in Physics and Biology" by John Rallison, a chapter in "New Applications of Mathematics" edited by Christine Bondi.

He has written a number of other papers on drops, Stokes flow and, of more relevance to this award, has contributed significantly to theoretical and computational non-Newtonian Fluid Mechanics. Particular achievements are in the high Deborah number flow past a sphere, Rallison being the first to reach a Deborah number of 10 (by using a FENE dumbbell model), the first to show drag increase which triggered experimentalists to discover they had observed such but had dismissed it because all the available theory predicted drag decrease. Rallison contributed to the development of Lagrangian Finite Elements, with the first calculation to get a non-Newtonian increase in pressure drop, again using a FENE model and, importantly, explained in simple terms why there is an increase. The title of his important paper with Hinch, "Do we

understand the physics in the constitutive equation?", sums up a concern with more than just computation or mathematical flights of fancy. The catalogue could go on - instabilities in non-Newtonian flow, the question of dissipative stresses and of singularities in flows.

Rallison is currently Reader in Fluid Mechanics in Cambridge and his research students include two who have already become readers, albeit in less prestigious universities. Among his other activities should be mentioned service as Tutor in Trinity College and his current work as Director of the Isaac Newton Trust, which seeks to help students in financial need and to encourage them to apply to Cambridge; something that is particularly important in these days of increasing University fees.

It is a mark of the regard in which he is held that he has contributed obituaries in the Telegraph for Professor George Batchelor and for Professor David Creighton. One trivial fact that may have escaped his notice, which gives a suitable gravitas to the man to note that in an alphabetical list of Cambridge academics he lies between a (not, alas, the) Sir Walter Raleigh (Lecturer, 1907) and Ralph de Leicester (Chancellor, 1289).

Hinch sums him up as "remarkably clever" to which could be added "remarkably modest" - a web search revealed only two pages with photos of Rallison; pages devoted to the wedding of one of his former PhD students and to the retirement celebration of a former President of this Society. There is no doubt of the contribution that John Rallison has made to the international rheological community, as well as to higher education in Britain, so it is good to know that his modesty has not prevented him from accepting the Annual Award of this Society.

Chris Petrie

Conference Report: The XIVth International Congress on Rheology, Seoul, Korea

The XIVth International Congress on Rheology took place in Seoul, Korea from the 22nd to 27th of August, 2004. I received some financial support from the BSR to attend this conference and it was a great opportunity to increase my knowledge about rheology and find out about the most recent theoretical and experimental achievements.

The first day of the conference, I attended the plenary lectures given by Professors David Boger, Ronald Larson, Sangtae Kim and Manfred Wagner where I got a broad overview about the main subjects of the congress. In particular I enjoyed the talk by Prof. David Boger about the importance of the

Deborah number. In this exciting lecture, he presented examples of fluids where elastic effects are a function of the relaxation times. The examples showed that similar effects can be observed at macro and microscopic scale.

After these lectures, the conference was divided into seven mini-symposia. Most of the talks I attended from the sessions of rheometry and experimental methods, polymer melts and microstructural modelling. The talks, which I attended, have given me a comprehensive overview over the progress that has been made in the areas of my research interests.

Some of my experimental results were presented in the talk about “The effect of compressibility, shear thinning, viscoelasticity and absolute pressure on time dependent pressure driven polymer melt flow”. This paper presents experimental evidence about the influence that overall pressure has on the rheology of a Linear Low density Polyethylene. The experimental results were compared with numerical simulations carried out by Dr. Rudy Valette. Both, pressure drop profile and birefringence patterns were modelled using a modified pompom model to take the pressure of the system and compressibility of the material into account.

In addition to the excellent talks that I attended, I also had the opportunity to meet rheologists from all around the world. In particular, I was introduced to Prof. Octavio Manero and Prof. Baltasar Mena from UNAM (my home university). I learnt about their areas of

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research and future possibilities to continue with an academic career after I finish my PhD.

After the conference was finished, I stayed a few more days to travel through Korea. I enjoyed a lot hiking through the mountains, visiting various temples and palaces, tasting traditional dishes, admiring and buying some handcrafts and learning about the country's history. The people were very warm and helpful. I appreciate all the attention they gave me during my stay in Korea. I am very grateful to the BSR for providing some funds to attend this conference. This was a unique opportunity for me and other research students to increase our knowledge and receive feedback about our work. As a consequence, my research work has been reinforced. I look forward to presenting a paper at the next conference.

Gabriela Hernandez

ESR Weissenberg Award 2005

Dear Colleagues,

It is my great pleasure to inform you that the ESR Weissenberg Award Committee, chaired by ESR President J.M. Piau, has decided to bestow the **Weissenberg Award 2005** to Professor **Roland KEUNINGS**.

The award will be delivered on the occasion of the 2nd AERC at Grenoble (April 21-23, 2005), <http://www.rheology-esr.org/AERC/2005/>

Professor Ken WALTERS, FRS, has kindly accepted to introduce the laureate.

Prof. Dr.-Ing. Manfred H. Wagner, Secretary ESR

Commentary on 312th BSR Council Meeting

10 members of Council assembled by 10:55 at the designated meeting room in Imperial College and decided that coffee was more important than starting the formal business on time. We were joined in the coffee room by the Nick who had flown down from Glasgow. We started the meeting a mere 15 minutes behind schedule. After a willing volunteer had been found to write this commentary (well I would say that, wouldn't I?) Council planned ahead and fingered our hard-working Secretary for the December meeting. Tim admitted that he had so far avoided writing a commentary and we speculated on the likely agreement between commentary and minutes next time.

We were deprived of the presence of Bogdan (our relatively new Bulletin Editor) who had a meeting in Manchester. The arrival of Malcolm (Council's nomination for our next President) was delayed by a meeting in Cambridge but

he had not missed too many items on the agenda by the time he arrived for a refresher course in the relaxed and friendly way Council conducts its business.

Representation of the BSR on the BSI (British Standards Institute) was an early item for discussion because it had been minuted for at least two meetings as awaiting action from the writer of this commentary! At last action had been taken and could be reported. The ancient history is that we had been involved in at least two BSI committees in the 1970s, dealing with rheological nomenclature and the rheological properties of plastics. Reorganization of the BSI has seen amalgamation of small committees and panels and we were now invited to participate in a committee on "Terminology for Rubber and Plastics" and one on "Plastics Testing". Council took the view that the BSR should be involved in this as part of its commitment to the advancement of rheology and Nick volunteered to take this on, hoping to work with BSR members who are already on these committees.

The next two items included the phrase "Business Plan" and addressed two areas where the Society has been spending money to improve its service to members and promote rheology. Any member who has not caught up with the new (since 2003) annual publication, "Rheology Reviews", and the redesigned web site at www.bsr.org.uk may not be likely to be reading this account, but if this does apply to you then do take a look at the web site and information there about Rheology Reviews.

The first two volumes (RR2003 and RR2004) look at the moment like loss leaders but Council devoted a good deal of time to discussing ways of increasing sales and reducing costs. It remains to be seen whether the business plan that emerges under Derek's coordination will look good enough for us to continue with RR2006 and beyond (RR2005 is already under way). The idea that Rheology Reviews is a service to the rheological community which BSR subsidizes from its reserves was accepted by Council but clearly we cannot go on for ever if we fail to cover costs. It was pleasing to be told that a major article referencing Rheology Reviews was due to appear in a prestigious journal; this seems to say that the publication is on the right lines and we can hope for it to be recognized as an important resource now and in the future.

The web site development has two aspects - it conveys information to members and helps in a number of administrative tasks. The latter has enabled the BSR to put its membership record management and subscription collection onto a more satisfactory basis than heretofore which is very necessary at a time when the honorary officers have many calls upon their time and energies. In a sense this means that the costs of the web site are recouped in subscription income and Council agreed to continue to spend money on web site maintenance and development. Nevertheless Council has agreed that we shall sell advertising

space on our web pages, possibly in conjunction with advertisements in the Bulletin (and Abstracts).

One important matter concerns the implications of Data Protection legislation for any use of our membership list. The BSR has never regarded this list (on paper, as it used to be) as something to sell but we recognize that in the past members could use the list to help them in marketing their company's products. Council agreed that members must be asked if they were willing for information, such as an address (postal or e-mail), to be included in a list that could be sold to appropriate companies (rheometer manufacturers, for example). These matters led to a later discussion of whether the Society needs someone like a marketing manager. Such a person would have a role in increasing income from advertising and finding new ways of generating income so that the Society can improve its services to the rheological community without having to raise subscriptions. With the changing activities of the Society, a full discussion of officers and their roles was scheduled for the December Council meeting.

After so much serious business, it was clear that we should not finish the meeting by 2pm and Council adjourned to Imperial College's Senior Common Room at 1:15 for a well-earned lunch in pleasant surroundings.

We were back at 2pm for Officers' reports which include a number of important items as well as the things we expect (which are, of course, equally important). Geoff reported very favourably on the ICR in Korea and, from the International Committee, that David James was handing on the job of ICR Secretary to Manfred Wagner. As is usual, the Congress President, Jae Hyun, is the new ICR President and ICR 2008 will be in Monterey (with a beach barbecue as the congress banquet). Among other forthcoming attractions, Geoff mentioned the 4th Pacific Rim Conference in August 2005 and our bid to host AERC 2007 (the 4th in the new series of Annual European Rheology Conferences).

Geoff raised the question of whether we should change the BSR practice of having our President (with a two-year term of office) as our International Delegate. Some views in favour of continuity of representation were expressed, but there was no clear support for any change. Geoff suggested that we discuss the number and roles of Officers at the next Council meeting, having the idea of a business or marketing manager as a useful role. He also reported that, following the death of John Harris (a BSR member for more years than anyone on Council) his daughter had approached the President about republishing the Karl Weissenberg 80th Birthday Essays which John had edited in the 1970s. Geoff, Gary and Nick were asked to consider possibilities.

Rhodri took us through the income and expenditure under 5 cost centres for 2003 and for 2004 to date. There was nothing surprising - the excess of expenditure over income had already been discussed in connection with the above-mentioned business plans. The need to get payment for advertisements

when they appear, rather than many months later, was urged (as sensible business practice). Our current generous practice is perhaps carrying the idea of being a registered charity a little too far.

Mike reviewed the membership, methods of payment and whether a more honorific type of membership was desirable in addition to the current honorary membership for those who retire after long membership of the Society. This is to be discussed at the next Council meeting. So far in 2004 we have 63 resignations and 52 new members, while membership income is at the same level as last year (sustaining the recovery from the low of 2002). There is the perennial problem of old standing order payments (some dating back, unchanged, to the days of the £1 annual subscription). Nevertheless, members will be encouraged to use standing orders to reduce the effort of chasing up overdue subscriptions.

Tim's report covered the planned awards and the shortage of entries for the Vernon Harrison Prize. In view of the closeness of the last Bulletin mailing to the original deadline, it was agreed to allow a further month and to let members know of this in the next e-mail to be sent out (very soon) by Dave. Bogdan's written report on the Bulletin gave us the deadline of 15th November for copy for the issue you are now reading. Gary reported that he had sought and received help from Nick in dealing with the large number of polymer-related abstracts. The next issue of Abstracts was on schedule in spite of the fact that both Gary and Nick had moved house recently. It's nice to know that dedication to rheology transcends such domestic non-trivia. Nick then mentioned the fact that what the membership database produces and what the label-printing software needs are not the same - modern technology, while helpful, is not quite seamless.

By the time we reached the last substantial item - future scientific meetings - it was 3:50pm and some Council members needed to leave to avoid spending a night away from home (at the Society's expense). Arrangements for the Winter conference in Swansea were well in hand and it was agreed to hold the next Council meeting just before the conference. The future pattern seems to involve INNFM (University of Wales) spring conferences with BSR participation, Annual European Rheology Conferences (except in the year of an International Congress) and Winter (December) meetings of the Society. Some one-day meetings (e.g. of the Non-Newtonian Club) are also organized with the Society's support and cooperation. Support for students going to conferences (travel grants) has always been something the Society has offered. Council thought that these should be organized in a slightly more formal way, since last-minute applications are difficult to deal with fairly. This topic was added to the list for the next Council meeting.

The next Council meeting promises to be another busy one.

Chris Petrie

Letter to the Editor

Rheology and something else!

The 2004 BSR Winter Meeting held at Swansea University was an excellent opportunity to hear a number of lectures that covered a very broad range of rheology, science and application. It was also, as usual, a good chance to talk to other rheologists and get a feel for how they are thinking about their chosen areas of rheological expertise. This aspect of BSR meetings should not be overlooked as rheology, like all science disciplines, is continually changing in response to external force fields.

On this occasion I spoke in particular to two people who had interesting perspectives of future trends and directions. Our latest gold medal recipient, **Professor David Boger** was in town to present his gold medal address and his talk contained many interesting aspects, not least the way scientific rheological understanding has influenced the way mineral mining companies can handle waste products more efficiently and in a sustainable way. A tea break conversation issue that came up with David concerned the way in which Chemical Engineering and Rheology is taught in Melbourne, Australia. They found that Chemical Engineering on its own was not very popular with some students, however, Chemical Engineering and Bimolecular Science or Chemical Engineering and Business Studies was popular with both students and employers. By implication Rheology on its own will be of interest to relatively few, but **“Rheology and something else”** has far greater potential appeal. David’s own talk reflected this thinking. Whilst talking “pure rheology” he was somewhat apologetic to the audience, however when applying the rheology to the mineral waste pollution problem he was much more passionate.

My second informal conversation was with **Michael Melingo** who is the European Sales Director for TA Instruments. We started talking about the increased reliability of rheometers and how this has changed the skills required for service engineers. In the past, a skill of electronic circuits was essential, however increasingly an ability to diagnose system failures, rheological sample difficulties or operator inexperience are now the key issues. Someone with rheological expertise and other skill bases is required.

There is absolutely no doubt that globally we need to maintain a hard core of world class rheologists and hopefully the UK can sustain its fair share of committed rheologists in areas of experiment, theory, modelling and measurement. In addition we must however link with other subjects and applications in order that the **“rheology and something else”** dimension can be fulfilled. This broadening and diffusion of rheology is not without its challenges; however its objective is as equally important as pure rheology alone. I would be very interested to hear other members views on the way for example that the BSR can help contribute to both **“Pure Rheology”** and **“Rheology with something else”**.

Malcolm Mackley

MEMBERSHIP NEWS

Proposed members of the British Society of Rheology for (2004):

Dr Carlos Abad, Schlumberger Cambridge Research UK

Dr Edo S. Boek, Schlumberger Cambridge Research UK

Dr Valerie Anderson, Schlumberger Cambridge Research UK

Dr John P. Crawshaw, Schlumberger Cambridge Research UK

Dr Johan T. Padding, Schlumberger Cambridge Research UK

Prof Octavio Manero, Instituto de Investigaciones au Materiales Mexico

Dr Peter James Martin, Department of Engineering Science, University of Oxford
UK

Miss Letizia Mortara, Cranfield University UK

Mr Mahmood Ansari, Qom, Iran

Prof Christian Bailly, Université catholique de Louvain, Belgium

Dr Samiul Amin, Port Sunlight, UK

Dr Sophie Guillaume Nigen Chaidron, Annecy, France

Mr Chunlei Wu, University of Wales Swansea

Prof Seung Jong Lee, Seoul National University Korea

Mr Juan Pablo Aguayo, University of Wales, Swansea

Miss Yu Wen Chen, Dept. of Chemical Engineering, University of Cambridge

Dr Kevin Golden, University of the West of England, Bristol

Dr Tri Ratna Tuladhar, Cambridge, UK

Mr Alexander Baranov, Harrow, UK

Mr Jasvinder Mahey, TA Instruments Ltd, Crawley, UK

Mr James Joannou, TA Instruments Ltd, Crawley, UK

Mr Charles McCue, TA Instruments Ltd, Crawley, UK

Mr Michael Melingo, TA Instruments Ltd, Crawley, UK

Mr Daniel Slater, TA Instruments Ltd, Crawley, UK

Mr Mark Ellis, TA Instruments Ltd, Crawley, UK

Mr M. Javad Banaai, Dept. of Computer Science University of Wales Swansea

Mr Andrew Bache, Queen Mary University, University of London

Prof David T. Gethin, School of Engineering Science University of Wales Swansea

Mr David Craddock, University of Wales Aberystwyth

Dr T.V. Korochkina, School of Engineering Science University of Wales Swansea

Dr Eifion Huw Jewell, School of Engineering Science University of Wales Swansea

Dr Tim C. Claypole, School of Engineering Science University of Wales Swansea

Dr Adrian John Hill, Malvern Instruments UK

Dr Nathanael Inkson, Dept of Mathematics University of Leeds

Dr Vimolrat Ngamaramvaranggul, Chulalongkorn University, Thailand

Mr Mirdash Bakalli, University of Applied Sciences, Iserlohn, Germany

Dr Jason R Stokes, Unilever R&D Colworth UK

Prof Simon Biggs, Leeds University UK

Mr David Matthew Banaszek, University of Wales, Aberystwyth

Rheological Limericks

Rheology is a subject that seems to lend itself rather easily to limericks. We are probably all familiar with the 'spectacular' one that opens Chapter 2 of Bird, Armstrong and Hassager's 'Dynamics of Polymeric Liquids'. More recently I came across this little gem in an essay by Professor Arthur Lodge to commemorate Karl Weissenberg's 80th Birthday [1]:

Weissenberg said, "In liquids, confess
That large strains sometimes govern the stress."
Remarked Rivlin, "No drivelling!
In flows steady, though swivelling,
The elastic part must evanesce."

Then along came young Oldroyd, J.G.
"Things aren't quite as they seem now," said he;
"With components convected
(As H. Hencky selected),
One obtains a new D by DT."

This set me thinking that it would be good to have a 2005 limerick that celebrated the deeds and traits of more recent rheologists. So here is your chance! Please send your entries for publishing in the next edition of the Bulletin; a suitable prize will be awarded to the best entry.

Geoff Maitland

[1] The Karl Weissenberg 80th Birthday Celebration Essays, Ed John Harris, East African Literature Bureau, Nairobi, Kampala, Dar es Salaam, 1973.

AIMS OF THE SOCIETY

The way liquids flow and solids deform affects all aspects of life.

Extraction and processing of crude oil, moulding of plastics, use of toothpaste, spreading of margarine, painting and the lubrication of joints in the human body are all examples of processes depending upon rheological behaviour. Rheology is defined as the science of the deformation and flow of matter.

If your work is concerned with rheology in any way, then you have much to gain by joining the British Society of Rheology - publications, conferences and access to fellow members who, while working in a different discipline or industry, may be facing similar problems to yours.

The Society is non-profit making and is registered as a charity.

Soft Matter

Many members of the British Society of Rheology will have noticed that more and more of their work is being carried out in collaboration with scientists from other departments, as part of a growing trend towards interdisciplinary work, particularly on soft materials. In recognition of this, the Royal Society of Chemistry is launching a new journal, *Soft Matter*, in summer 2005.

‘The borders of physics, chemistry, and life and materials sciences are increasingly fading,’ says Ullrich Steiner, professor of physics at the University of Cambridge, UK, and chair of the *Soft Matter* editorial board. ‘The importance of *Soft Matter* is that it will provide an interdisciplinary platform for the exchange of information, thereby promoting interaction of the different soft matter communities.’ [Steiner himself has worked in chemistry and materials as well as physics departments, and is therefore a prime example of how multidisciplinary this subject really is.]

Submissions are being sought for *Soft Matter*, within a wide scope that includes such topics as bulk soft assemblies (polymers, colloids, etc), soft nanotechnology and self-assembly, biological aspects of soft matter, surfaces and interfaces, and theory, modelling, and simulation of soft systems. Soft matter is a broad term with applications in many parts of science.

‘Soft matter pervades our world’ says Peter Gregory, managing director of RSC Publishing. ‘From biological systems, through washing powders, medical formulations, plastics, and paints to modern TV and computer screens. Methods of designing, producing and controlling these materials will underpin the technological developments of the future.’

Soft Matter will appear monthly in print and online in the *Journal of Materials Chemistry*. There will also be free access for subscribers to *PCCP* and *Organic & Biomolecular Chemistry* to ensure that the "soft" message reaches as interdisciplinary an audience as possible. www.softmatter.org

CONFERENCES & MEETINGS

RHEOLOGY OF SOFT MATTER: RIDEAL LECTURE AND SUPPORTING SYMPOSIUM

SCI International Headquarters , 14/15 Belgrave Square , London

5th April 2005

Organised by: SCI Colloid and Surface Chemistry Group RSC Colloid
and Interface Science Group

Rheology of Soft Matter

What is soft matter? We are! ...at least in part. As are other materials made of colloids, polymers and surfactants, such as: membranes, liquid crystals, soft interfaces, complex fluids, gels, and pastes. Soft matter has properties between those of simple liquids and solids, and is easily deformable by external stresses, electric or magnetic fields, or even thermal fluctuations. Mesoscopic structure and dynamics determine the rheological properties, and hence function, of soft materials. For synthetic materials, rheology can be critical to performance during manufacture or in the operation of the final product. Many industries use soft materials, including: adhesives, agrochemical, biotechnology, construction, cosmetic, electronics, food, household goods, imaging, oil, packaging, paint, pharmaceuticals, and printing.

The Rideal Lecturer - James W Goodwin

Jim is co-founder and Managing Director of Interfacial Dynamics Corporation. For 30 years until 1996, Jim led research at Bristol University on the rheology of many types of soft matter and on interparticle forces, and was Deputy Director of the Bristol Colloid Centre. He has published about 100 articles on topics such as the preparation of polymer colloids, the rheology of clays, latexes, blood, self-associating polymers and microgels as well as particle scattering and the influence of nutrition on multiple sclerosis. Jim has also edited three books on colloidal systems and is co-author of the textbook *Rheology for Chemists*. His latest book, *Colloids and Interfaces with Surfactants and Polymers – An Introduction* was published in 2004.

Scientific Organising Committee Andrew Howe, Kodak Ltd R&D Brian Vincent, University of Bristol

PROGRAMME

Organised by the SCI Colloid and Surface Chemistry Group and RSC Colloid and Interface Science Group Tuesday 5 April 2005 SCI,14/15 Belgrave Square, London, UK

- 13.30 Registration and Coffee
- 13.50 AGMs of Colloid Groups of SCI and RSC
- 14.00 **Emulsion Polymerisation using Zwitterionic Surfactant Stabilisers**
Paul Reynolds, Bristol Colloid Centre, UK
- 14.30 **Nanotechnology in Aspic - Colloid Science in Photography** Andrew
Howe, Kodak Ltd R&D, UK
- 15.00 **Understanding the Rheology of Steric Stabilised Systems** Paul
Luckham, Imperial College of Science Technology and Medicine, UK
- 15.30 Tea
- 16.00 **From Mud to Worms ... the Rheology and Colloid Science of Oil
Recovery** Geoff Maitland, Schlumberger Cambridge Research
Laboratory, UK
- 16.30 **Adventures in Psychorheology**, Roy Hughes, Bristol Colloid Centre,
UK
- 17.00 **Use of Inulin (Polyfructose) based Surfactants in Emulsion
Polymerisation** Tharwat F Tadros, Consultant, UK
- 17.30 Wine Reception
- 18.00 **The Rideal Lecture: The Rheological Challenges of Soft Matter** Jim
Goodwin, Interfacial Dynamics Corporation, USA
- 19.00 Conference Dinner (tickets only)

To download the full programme for this event go to:

<http://www.soci.org/SCI/events/writeups/2004/pdf/ev620.pdf>

Prices: SCI/RSC/BSR/BCC Members GB£35.00

Non-Members GB£80.00

SCI/RSC/BSR/BCC Student GB£15.00
Members

Non-Member Students GB£30.00

Retired Members GB£25.00

Conference dinner GB£30.00

For more information, please contact:

Jacqui Maguire , T: + 44 (0)20 7598 1562 , F: + 44 (0)20 7235 7743 , E-mail:
jacqui.maguire@soci.org

**UNIVERSITY OF WALES
INSTITUTE OF NON-NEWTONIAN FLUID MECHANICS**

CONFERENCE ON “EXTENSIONAL FLOW”

Lake Vyrnwy Hotel, Mid Wales

March 21-23, 2005

Programme

The conference will commence at 12 noon on Monday March 21st 2005 and finish at lunchtime on Wednesday March 23rd 2005.

The theme of the Conference will be “Extensional Flow”. Distinguished rheologists who have already agreed to give plenary lectures include D G Baird (Virginia), D M Binding (UWA), D F James (Toronto), O Hassager (Lyngby), R Keunings (Louvain-la-Neuve), H M Laun (BASF), G H McKinley (MIT), J Maia (Guimaraes), S Muller (Berkeley), J Odell (Bristol), C J S Petrie (Newcastle), T Sridhar (Monash), M H Wagner (Berlin), P R Williams (UWS).

Venue

The meeting will be held at the Lake Vyrnwy Hotel near the village of Llanwddyn in Mid Wales. The hotel is situated in a 24,000 acre country estate with magnificent views overlooking the lake and the Berwyn mountains. It offers excellent accommodation with full conference facilities.

Costs

The total cost of the meeting (with meals and accommodation from Monday lunch to Wednesday breakfast) will be £350. Accompanying persons sharing a room with a participant will be charged £100.

Organizers

The meeting will be organized by Dr G W Roberts and Professor K Walters FRS on behalf of the UWINNFM. Those wishing to present lectures should contact Professor Walters (kew@aber.ac.uk). Hotel bookings and registration matters should be addressed to Dr Roberts (g.w.roberts@bangor.ac.uk).

REGISTRATION

Participants should return this form no later than 20th February 2005. Prospective speakers should send a 200 word Abstract to Professor Walters, no later than February 1st, 2005.

Block letters throughout please

Title.....

Surname.....

Forename(s).....

Organization.....

Full address.....

Tel Fax Email

I wish to attend the conference and I enclose a cheque for £350 made payable to the University of Wales Institute of Non-Newtonian Fluid Mechanics.

I shall be accompanied by and I enclose a cheque for £100 made payable to the University of Wales Institute of Non-Newtonian Fluid Mechanics.

I wish to present a paper and will provide an Abstract by the deadline.

Please return this form to:

Dr Gareth W Roberts
School of Informatics
University of Wales Bangor
Dean Street, Bangor
Gwynedd LL57 1UT, UK

Tel: 351151 x 2480
Fax: 01248 383663
Email: g.w.roberts@bangor.ac.uk

The 4th Pacific Rim Conference on Rheology (PRCR4)
Purple Mountain Hotel, Shanghai, China, August 7-11, 2005
<http://www.prcr4.org.cn/>

January 15, 2005: Pre-registration and Submission of abstract

February 28, 2005: Notification of acceptance

April 30, 2005: Full paper due

Organized by Chinese Society of Rheology (CSR) * TOPICS

1. Constitutive Theory, New Theoretical Approaches
2. Multi-level Structural Modelling and Numerical Methods of Complex Fluids
3. Non-Newtonian Fluid Mechanics and Computational Rheology
4. Rheometry, Optical Methods and Novel Techniques.
5. Polymer Melts, Multi-phase Polymer, Composite and Nanocomposite Melts
6. Polymer solution & Gels
7. Suspensions, Emulsions & Foams
8. Electro-magneto-rheology , High-tech Materials, Micro Fluidics
9. Rheology of Solids, Composites and Bodies with Defects
10. Systems with Sub-micron Structuring and Liquid Crystals
11. Rheology in Material Processing
12. Rheology for Mining, Rock, Soil and the Other Engineering Fields
13. Food, Cosmetics and Biomaterials Rheology
14. Other topics on Rheology

*** CALL FOR PAPERS**

Authors are invited to submit abstracts (each not exceeding 300 words) to Conference Secretariat to arrive not later than January 15, 2005.

*** FOR MORE INFORMATION**

Please visit the Conference Website <http://www.prcr4.org.cn> or contact Conference Chair: Prof. Yingshe Luo via ysluo@prcr4.org.cn or mysluo@xtu.edu.cn

**Colloidal Assembly: Fundamentals, Novel Approaches, and
Emerging Applications**
ACS Spring Meeting, March 13-17, 2005,
San Diego, CA

Division of Colloid and Surface Chemistry Symposium organizers:

Michael A. Bevan (TAMU), mabevan@tamu.edu

Jennifer A. Lewis (UIUC), jalewis@uiuc.edu

The American Chemical Society Colloids and Surfaces Division will be sponsoring a symposium at the Spring 2005 ACS meeting in San Diego entitled "Colloidal Assembly: Fundamentals, Novel Approaches, and Emerging Applications". The core focus of the symposium will be fundamentals, methods, and applications related to the creation and properties of novel materials based on colloidal building blocks. The symposium will provide a forum for communicating new insights into colloidal interactions, novel approaches for colloidal assembly, and progress towards emerging technological application of multi-dimensional colloidal assemblies. Strong contributions are expected from theoretical, computational, and experimental groups.

Confirmed invited speakers include Paul Alivisatos, Paul Braun, Frank Caruso, Kenneth Dawson, Sharon Glotzer, Dan Hammer, Kenneth Schweizer, Alfons van Blaaderen, and Dave Weitz.

To submit an abstract and title, please visit: <http://oasys.acs.org/>

"Dynamics in Complex Fluids" **ACS Spring Meeting, March 13-17, 2005, San Diego, CA**

Symposium organizers:

Surita Bhatia, University of Massachusetts

Mike Solomon, University of Michigan

The aim of this symposium is to highlight recent discoveries of the multiple ways in which complex fluid dynamics impact the process of colloidal and nanoparticle assembly. Subtopics of the symposium include: (1) gelation and jamming in complex fluids; (2) associating polymers; (3) microrheology and dynamics in viscoelastic fluids; (4) field-assisted assembly of colloidal materials; (5) assembly for biomaterials, encapsulation and delivery applications. We seek contributions of experimental, simulation and theoretical work.

Confirmed invited speakers include:

Dr. Jack Douglas, NIST

Dr. Dimitris Vlassopoulos, FORTH

To submit an abstract and title, please visit:

<http://oasys.acs.org/>

INDUSTRY NEWS

Malvern appoints new product manager for rheology systems

Malvern Instruments (Malvern, UK) has appointed Stephen Carrington to the position of product manager for the company's rheology systems. The appointment reflects Malvern's continuing development and expansion of the company's team of rheology specialists. Malvern added rheological properties measurement to its product portfolio twelve months ago with the acquisition of Bohlin Instruments and is committed to delivering excellent technical and applications support worldwide.

Stephen Carrington has a degree in chemistry and polymer science and his PhD thesis focused on 'The extensional flow of polymer solutions'. He joins Malvern from MicroRheology Ltd, a company that he co-founded as a spin out from the Physics Department at the University of Bristol. He brings to this new role extensive scientific and technical expertise in the field of rheology as well as recent business experience. As product manager Stephen will be based at Malvern's headquarters in the UK and as part of the worldwide team will be responsible for the definition and instigation of new product development programmes for Malvern's rheometry products. In addition he will work with territory experts to identify growth opportunities to maximize worldwide sales of rheometry products.

Distinguished scientist joins Malvern Instruments rheology team

Dr. Charles (Chuck) Rohn has joined the Malvern Instruments rheology products team in the US. As Applications Consultant, Chuck brings a wealth of experience and expertise in rheological measurement. Since Malvern's acquisition of Bohlin Instruments in November 2003, the company's portfolio has included rheological property measurement, adding to its world-renowned range of particle characterization systems. Chuck's appointment reflects Malvern's commitment to providing excellent technical and applications support for all its customers in this increasingly important area of material characterization.

Chuck Rohn has a distinguished and extensive background in rheological measurement, having held senior positions at both Bohlin Instruments and Rheometrics, as well as running international consulting firm Rohn and Associates. He has a substantial body of published research in the fields of rheology, dynamic mechanical analysis and thermal analysis.

Author of the book 'Analytical Polymer Rheology', Chuck's particular area of research is the relationship between the structure and processing properties of plastics and coatings. For several years he taught in the area of plastics technology and currently delivers courses in applied rheology at Pittcon, Kent State and MIT. He has recently been made a fellow of the Society of Plastics Engineers in recognition of his contributions in this field.

New control and analysis software for Malvern Bohlin rheometers

Malvern Instruments has launched a new software version for its range of Malvern Bohlin rheometers. Version 6.40 incorporates many significant new features, including more flexible data analysis setup and automation, and a completely new test type. The new multi-wave test mode involves the application of multiple frequencies for faster testing and is especially useful for studying rapidly changing systems such as thermosetting resins or the gelation of foodstuffs.

A number of new analysis routines have been built into the software, including a new template wizard, improved model fitting capabilities, Time Temperature Superposition (TTS) analysis, and new data manipulation routines. The software also features extended language support with English, French, German and Spanish language versions available as standard, and the capacity for reconfiguration to support most major European languages.

With the new Template Wizard set-up and storage of analysis routines is easy, and operators can add multiple analyses to the menus for easy re-use. Fewer than five mouse clicks are needed to perform an analysis.

Improved model fitting facilities allow automation of fitting and result reporting on test completion, a function that can be enhanced by automated determination of the best fit from a user-defined list of rheological models. An advanced simplex algorithm is used to optimize convergence to the best model fit to the data.

A complete implementation of Time Temperature Superposition (TTS) analysis is available for application to any selected variable. Calculation of WLF and Arrhenius constants is included in the TTS analysis package, as is calculation of extrapolated viscoelastic properties at any frequency and temperature. Additionally, an automated peak and valley determination wizard for any variable is included in the standard package together with statistical analysis of

data sets Multiple data smoothing methods are also available, including Floating mean average, Savitsky Golay, Polynomial and Fast Fourier transform.

Further information about the new software and the complete range of Malvern Bohlin rheometers is available on www.malvern.co.uk.

NEW - fully automated powder flow testing using Freeman Technology's FT4 Powder Rheometer

Freeman Technology has launched the first in a new range of 'plug and play' accessories that will fully automate powder flow testing on the company's FT4 Powder Rheometer.

The FT4 is used in a wide range of manufacturing industries including pharmaceuticals and fine chemicals, ceramics, powder coatings, toners and personal products. Its applications range from optimising new formulations and improving the efficiency of the manufacturing processes to the establishment of QC criteria for raw materials, intermediates and final product.

The new automated aeration accessory for the FT4 allows the flow properties of powders to be measured at different levels of aeration to determine how flowability depends on the amount of entrained air. Its full automation eliminates the need for operator intervention, thus removing the major source of measurement variation and error.

This important advance has been made possible by the recent development at Freeman of a highly sophisticated universal control card that provides a seamless interface between the instrument, the accessory and the user. Users of the FT4 Powder Rheometer will be able to add a series of accessories that streamline powder assessment, bringing closer Freeman's goal of providing the powder processing market with a universal powder testing solution.

In a further development towards this goal, Freeman recently added fully automated shear testing capabilities to the FT4, broadening its applications. The shear cell allows users to accurately and reproducibly assess powders in terms of shear strength, providing information that is additional and complementary to the dynamic flowability data generated in a standard FT4 measurement. www.freemantech.co.uk

New Address for Camtel Ltd.

After 12 happy years at our offices in Royston, Hertfordshire it is time to say goodbye as we have outgrown the space. We are now moving during 18-20th October to a new facility on the western side of the beautiful and historic University City of Cambridge which plays host to an increasing number of high-tech, leading edge innovative companies. Camtel is proud to be joining them.

We have been fortunate to find larger premises in a picturesque village within a short distance of Cambridge whilst still having excellent access to all major road/rail networks should you wish to visit us. International visitors will find us conveniently located for London Heathrow, Stansted and Luton Airports.

Camtel Ltd - Solutions for Surface Science

2-3 Avenue Business Park, Brockley Road, Elsworth, Cambs, CB3 8EY, UK

Tel: +44 (0)1954 267949

Fax: +44 (0)1954 267362

E-mail: info@camtel.co.uk

Web: www.camtel.co.uk

CONFERENCE DIARY

You are also advised to visit the BSR home pages where an extensive list of conferences is maintained by Chris Petrie: <http://www.bsr.org.uk/>

2005	
13-17 March San Diego USA	Dynamics in Complex Fluids ACS Spring Meeting, March 13-17, 2005, San Diego, CA http://oasys.acs.org/
13-17 March San Diego USA	Biological & Synthetic Macromolecules for Emerging Nanotechnologies, Polymer Chemistry Division, ACS Meeting, E-mail: sclarson@uceng.uc.edu , Website: www.acs.org
15 March Chipping Campden UK	Non-Newtonian club meeting, Mr Gary S Tucker, Campden & Chorleywood Food Research Association, Chipping Campden UK, T: 0044 (0)1386 842035 F: 0044 (0)1386 842100 g.tucker@campden.co.uk
21-23 March Lake Vyrnwy Wales	Extensional Flow, University of Wales Institute of Non-Newtonian Fluid Mechanics, Lake Vyrnwy Hotel, Mid Wales. Dr Gareth W Roberts, School of Informatics, University of Wales Bangor, Dean Street, Bangor, Gwynedd LL57 1UT, UK. Tel: 0044 (0)1248 351151 x 2480 Fax: 0044 (0)1248 383663 Email: g.w.roberts@bangor.ac.uk

2005

5 April London UK	Rheology of Soft Matter: Rideal Lecture and Supporting Symposium, SCI International Headquarters , 14/15 Belgrave Square London Jacqui Maguire , T: 0044 (0)20 7598 1562 , F: 0044 (0)20 7235 7743 , E-mail: jacqui.maguire@soci.org http://www.soci.org/SCI/events/writeups/2004/pdf/ev620.pdf
21-23 April Grenoble France	AERC 2005, 2nd Annual European Rheology Conference, Phone: 0033-4-76-82-51-72; Fax: 0033-4-76-82-51-64; E-mail: aerc2005@rheology-esr.com ; Website: www.rheology-esr.org/AERC/2005
30 May- 3 June Chongqing China	12th International Congress of Biorheology and 5th International Conference on Clinical Hemorheology
19 June Leipzig Germany	Rheology and Processing of Polymers Leipzig, Germany - W. Mielke - 0049.30.81041610 - drg@bam.de - www.drg.bam.de
19-23 June Leipzig Germany	21st Annual Meeting of the Polymer Processing Society Martin Luther University Halle-Wittenberg, Institute of Materials Science, PPS-21, Dr. L. Fiedler, D-06099 Halle (Saale), Germany. pps-21@iw.uni-halle.de
10-14 July Prague Czech	Polymer Gels and Networks, E-mail: sympo@imc.cas.cz ; Website: www.imc.cas.cz/sympo/44/micros.html
7-11 August Shanghai China	The 4th Pacific Rim Conference on Rheology (PRCR4) Purple Mountain Hotel, Shanghai, China, August 7-11, 2005 http://www.prcr4.org.cn/
23-26 August Zielona Gora Poland	3rd International Conference on Engineering Rheology Anna Walicka (fax) 0048.68.3247446 A.Walicka@ijame.uz.zgora.pl www.ijame.uz.zgora.pl/ijame_files/icer05/index.htm
16-20 Oct Vancouver Canada	77th Annual Meeting of The Society of Rheology; Website: www.rheology.org
20-23 Feb 2006 Zurich	4th International Symposium on Food Rheology and Structure (ISFRS 2006) Zurich, Switzerland - Peter Fischer - 0041.1.6321155 - secretary@isfrs.ethz.ch - www.isfrs.ethz.ch

COURSES

2005	
March 3, Sept 8, Dec 1 Crawley UK	Basic Rheology , TA Instruments rheology training courses, olivia.alsford@taeurope.co.uk
6-8 April Reading UK	Applications of Food Texture and Rheology to Bakery Products (The Science of Baking) B.J.Dobraszczyk, University of Reading, UK. T: 0044 (0)1189 318714, F: 0044 (0)1189 310080, b.dobraszczyk@reading.ac.uk http://www.aaccnet.org/continuingeducation/events/2005ScienceofBaking.htm
7-8 April	Amherst Rheology Course , Berlin, Germany - H.H. Winter - winter@ecs.umass.edu - rheology.tripod.com/ARC2005.htm
7-12 June Minneapolis, Minnesota	Annual Short Course on Rheological Measurements: Application to Polymers, Dispersions, and Processing. Course directed by Christopher W. Macosko. See http://www.cems.umn.edu/rheology for more information or contact David Giles 001-612-625-0880
7-10 June Glasgow UK	Theoretical, Experimental and Industrial Aspects of Rheology Dr Nick Hudson, Dept P&A Chemistry, University of Strathclyde, 295 Cathedral St, Glasgow, UK. T: +44 (0) 141 5482162; F: +44 (0) 141 5484822 E: n.e.hudson@strath.ac.uk
7-8 June Crawley UK	Advanced Rheology , TA Instruments rheology training courses, olivia.alsford@taeurope.co.uk

A new dimension in modularity



HAAKE MARS rheometer

- An innovative concept
- Interchangeability of components
- New level of serviceability
- And.... space, space, space for handling, customized solutions and future developments.

You will not be able to resist it!

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Understand the structure

