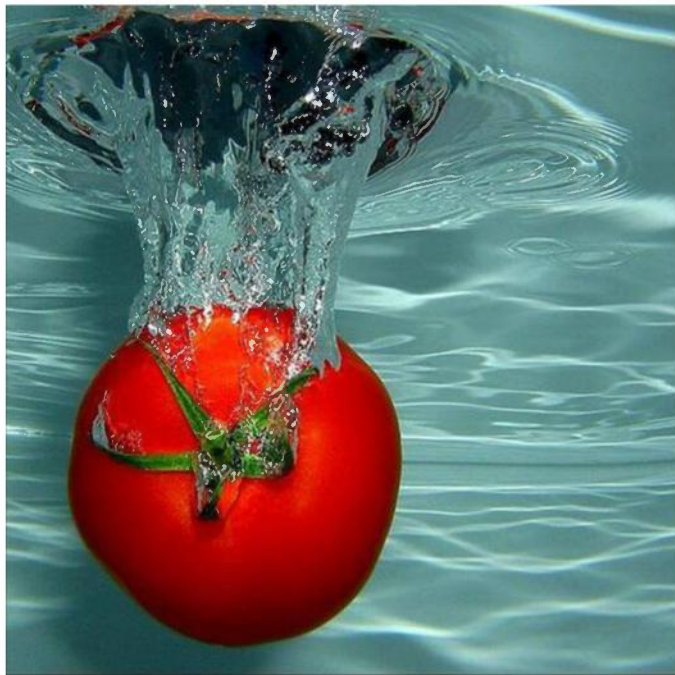

THE BRITISH SOCIETY OF RHEOLOGY

<http://www.bsr.org.uk>



Rheology

Bulletin

ISSN-1469-4999

VOL 48 No 3 2007

THE BRITISH SOCIETY OF RHEOLOGY

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THE BRITISH SOCIETY OF RHEOLOGY



BSR BULLETIN
2007, Vol. 48, No. 3

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ISSN 1469-4999

EDITORIAL

SUBMISSIONS TO THE BULLETIN

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

The next copy date will be in December 2007 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

Continuing our “fruity” theme, here we have a tomato entering a fluid! A little too much dressing perhaps?

We are always looking for appropriate colour or black and white pictures for the front cover of the Bulletin and Rheology Abstracts (preferably of a rheological nature!). Please contact either Bogdan Dobraszczyk (Bulletin Editor, b.dobraszczyk@reading.ac.uk) or Nick Hudson (Abstracts Editor and Publications Manager, n.e.hudson@strath.ac.uk). Contributions are always welcome!

BSR NEWS

British Society of Rheology 66th Annual General Meeting Lake Vyrnwy, April 2007

Report by outgoing President, Professor Malcolm Mackley

The BSR has maintained its momentum for yet another year. It is particularly pleasing to see that the BSR has reintroduced National Meetings to its activities and these included a successful December 2006 Winter Meetings on Biorheology and biomedical applications at Manchester University organised by Dr Xue-Feng Yuan. In addition, over the past year, Dr Jason Stokes has masterminded Non Newtonian Club Meetings that have been both popular and useful at a regional level.

The BSR website is now fully functioning and both Prof Mike Webster and Dr Jon Harvey are to be thanked for setting up a power portal for the BSR to use now and in the future. Dr Derek Bell has also ensured that the BSR adds financial value from the site by securing advertising on both the web and other BSR publications. Bogdan Dobraszczyk has done a brilliant job in maintaining both interest and content in the BSR Bulletin and we are all very grateful for his contribution. Prof Ken Walters has now stepped down as guest editor of Rheology reviews and Prof Roland Keunings has kindly agreed to take over. Prof Walters has ensured the Reviews have a high academic standing and we feel we are in safe hands with the new editor. Dr. David Binding ensures that the reviews appear in a timely and orderly way and Dr. Nick Hudson masterminds Rheology abstracts and paper circulation to members. Dr Phil James is continuing the good work of his predecessor, Prof Webster in ensuring that membership numbers are kept up scratch.

Overall the BSR remains well managed with a Corinthian spirit, by a small band of dedicated rheologists. It is particularly pleasing to see a new generation of Rheologists being involved in the running of the BSR, namely Drs Jason Stokes, Helen Wilson and Xue-Feng Yuan. The BSR is in a reasonable financial state, but the subject and its participants are continuously evolving and therefore the BSR need to continuously reposition itself in an ever and faster changing landscape than in the past.

Malcolm Mackley April 1st 2007



Prof Mackley (retiring President) & Prof Banfill-(incoming President) at Lake Vyrnwy April 2007

BSR President's Commentary

Professor Phil Banfill, President of the British Society of Rheology 2007-09

I'm very honoured to have been invited to be President of the Society for the next two years and look forward to being able serve in a role that has been filled by many far more eminent rheologists than I. The fact that I could be listed with so many of my scientific heroes still seems totally remarkable to me.

Born in Sussex, I studied chemistry at Southampton University and graduated in 1972, being fortunate to get a job at Associated Octel in Ellesmere Port, working on lead anti-knock compounds for petrol. However, I had always been interested in buildings and after two years I moved to work on a PhD in the Department of Building Engineering at Liverpool University. My eventual topic was the use of waste materials in concrete (a subject that is still topical 30 years later!) and that was when I first encountered rheology, because the particular material I was studying included a lot of very fine particles, which, according to conventional wisdom, would increase the amount of water required to enable the concrete to be

handled and moulded to shape. The problem with that is that the strength and durability of the product are impaired by increasing the water content and concrete performance is basically a compromise.

In 1976 I met Geoff Tattersall of Sheffield University who was interested in applying rheology to fresh concrete (i.e in the period before it sets and goes hard) and that started a collaboration that resulted in a joint book in 1983 and many east-west journeys between Liverpool and Sheffield. He introduced me to rheology and to the BSR, first as an abstractor for Rheology Abstracts and later as a Council member, but by this time I was a lecturer at Liverpool University with interests at the meeting point of chemistry of cement, rheology of fresh mixes in general and the effects of a new generation of rheology improvers for concrete. In the technology of concrete I came to know such diverse materials as fly ash, blastfurnace slag, oilwell cements, microsilica, metakaolin, bentonite, gypsum and high alumina cement, as well as lecturing on materials to civil engineering, building and architecture students.

In 1995 I was appointed to a chair in the Department of Building Engineering and Surveying at Heriot-Watt University, Edinburgh, and that brought me into contact with people interested in historic buildings and their conservation. Since much damage had been done to Scottish masonry buildings by repairing them with cement mortar, there was a move to re-establish the use of lime binders, which had become obsolete. I got involved in the Scottish Lime Centre Trust, with a research project based on a full size experimental lime kiln, and am now a Trustee. At Heriot-Watt we set up a successful MSc in building Conservation, which I now coordinate, and we liaise over educational matters with professional institutions as well as statutory bodies, like Historic Scotland, and charities. In passing, I'm possibly the only rheologist who is a member of the Chartered Institute of Building.

After rheology and building conservation the third part of my academic life is now energy in buildings and I manage projects exploring ways in which the energy consumption, and consequent CO₂ emissions, from existing buildings can be reduced to help mitigate the changes in our climate. Housing is responsible for 27% of the UK's CO₂ emissions, with non-domestic buildings contributing almost as much again, so we all have a part to play in this.

Finally, back to rheology - I am still involved in rheology research - cement, fibre-reinforced composites, grouts for civil engineering purposes, lime mortars, chemistry - and over half of my 110 publications are in this area. Within the British Society of Rheology I have been a member since 1979, I was on Council continuously from 1988 to 2003, serving as Bulletin editor from 1990 to 1994 and Secretary from 1998 to 2002, and served under eight Presidents. I bring plenty of experience of the workings of the Society to the role but since then much progress towards an electronic, rather than paper-based, organisation has been made and I

look forward to the new challenges that that brings. As an applied rheologist I am pleased by the way the Society's links with the Non-Newtonian Club have developed recently and as a member of different European networks I have been following the development of the European Society of Rheology with interest. I look forward to serving you all in the next couple of years and taking the opportunity to cement a few relationships.

Phil Banfill
June 2007

British Society of Rheology Newsletter 2007

The British Society of Rheology has continued its success by increasing its membership to over 500 members. The BSR has reintroduced national meetings to its activities and these included a successful Winter Meeting held in December 2006 at the Manchester Interdisciplinary Biocentre, School of Chemical Engineering and Analytical Science, The University of Manchester on the theme of ***Dynamics of Biofluids and Biomaterials***; this meeting provided an excellent opportunity to explore the frontiers of research on dynamics of biofluids and biomaterials from molecular to cellular and tissue length scales and on micro-fabrication of biomaterials, (see Rheology Bulletin 2007, vol. 48, no. 2: <http://innfm.swan.ac.uk/bsr/database/Bulletins//48/Issue%202%20.pdf>) for more details.

In April 2007 the INNFM held a meeting at Lake Vyrnwy, mid Wales, on the more speculative theme “***Whither Rheology?***”, with lectures by D V Boger, Igor Emri, A J Giacomini, J C Hyun, D F James, T C B McLeish, J Mewis, J R A Pearson, T N Phillips, R I Tanner and M H Wagner. The annual award for 2006 was presented to Dr. Oliver Harlen of the University of Leeds. His award lecture, on matching numerics to experiments in extensional flows, was given at the Biofluids meeting in Manchester. The annual Vernon Harrison Doctoral Award (for the most distinguished UK PhD thesis in rheology) was presented to Dr. Joel Miller of the University of Cambridge. He received his award for his thesis on shear-flow instabilities of viscoelastic fluids, and gave his award lecture at Lake Vyrnwy.

The next BSR Midwinter meeting will be held at Imperial College London on 10-11 December 2007, on the theme of ***The Rheology of Foams and Emulsions***. For more information, please contact Simon Cox: foams@aber.ac.uk. The BSR/INNFM Spring meeting on the theme of ***Complex Flows of Complex Fluids*** will be held at the University of Liverpool on 17-19 March 2008. The conference will commence at 12 noon on Monday March 17th and finish at lunchtime on Wednesday March 19th 2008. The conference is being held in Liverpool to coincide with the city

being awarded the title European City of Culture 2008. Distinguished scientists who have already agreed to give plenary lectures include: A N Beris (Delaware, USA), J Cooper-White (Queensland, Australia), G G Fuller (Stanford, USA), O G Harlen (Leeds, UK), R Keunings (Leuven, Belgium), G H McKinley (MIT, USA), S J Muller (UC Berkeley, USA), J R A Pearson (Cambridge, UK), R I Tanner (Sydney, Australia), M H Wagner (Berlin, Germany). We envisage sessions devoted to, amongst others, micro-fluidic flows, purely-elastic and inertio-elastic instabilities and turbulence in non-Newtonian liquids. Those wishing to present lectures should contact Professor M P Escudier: escudier@liv.ac.uk. Hotel bookings and registration matters should be addressed to Dr R J Poole: robpoole@liv.ac.uk.

The BSR held its 66th AGM at the Lake Vyrnwy meeting, and the past president, Professor Malcolm Mackley handed over to the new president, Professor Phil Banfill of Heriot-Watt University, Edinburgh.

It was particularly pleasing to see a new generation of rheologists being involved in the running of the BSR, namely Drs Jason Stokes, Helen Wilson and Xue-Feng Yuan. The BSR has taken on responsibility for the Non Newtonian Club, after many years in the capable hands of Steve Beckett of Nestle. The Non-Newtonian Club is a forum for informal presentations of rheological topics of interest academic and industry-based scientists, as well as young scientists, presenting on a range of topics that involve rheology in a relatively informal and friendly environment. Several meetings have been held at the University of Reading, the University of West England, Bristol, and Jason Stokes has masterminded 2 meetings, the first on June 6th 2006 at the University of Nottingham, hosted by Dr. Karen M. Steel in the School of Chemical, Environmental and Mining Engineering and the second to take place at the University of Oxford, hosted by Dr. Peter Martin in the Department of Engineering Science on June 19th 2007.

The BSR website continues to be very successful (<http://www.bsr.org.uk>) and contains news of forthcoming meetings and reports from past meetings, on-line Rheology Reviews and Rheology Abstracts, past issues of the Rheology Bulletin, and the popular 80th Birthday Celebration Essays of Karl Weissenberg.

Vernon Harrison Award 2006 Citation: Joel C. Miller

The Vernon Harrison Doctoral Prize is awarded annually by the BSR for the best thesis on any subject in rheology, successfully defended at a British university in the previous 12 months. For the year September 2005 – September 2006, there were four candidates, and the winner was Dr. Joel C. Miller of the University of Cambridge (supervised by Professors Mike Proctor and John Rallison). Joel was presented with his award by BSR President Professor Malcolm Mackley at the INNFM meeting “Whither Rheology?” held at Lake Vyrnwy in April 2007. As part of the presentation, he gave a talk explaining some of the content of his thesis.



Joel Miller (left) at Lake Vyrnwy April 2007

The title of Joel's talk (and his thesis) was “Shear flow instabilities in viscoelastic fluids” and he told a remarkable tale of both hard work and good luck. His original intention was to start from the relatively well-worked field of interfacial instabilities in shear flow of the Oldroyd-B fluid, find a nice set of critical parameters and then carry out weakly nonlinear stability analysis beyond the linear stability carried out in the past by the likes of me. While he was searching around parameter space, though, he started to find instabilities where none had been

predicted before. He gave us a beautiful exposition of exactly why all the earlier researchers (myself included) had missed these instabilities, and left us with one or two unanswered questions as well.

First, a bit of background. There is a standard method in the applied maths/physics community of studying interfacial instabilities: you start from a steady base flow, with a flat interface, in a pipe or channel of infinite length. Then add a small perturbation to the fluid velocity, to the interface position, to the stress, the pressure and any other variables in the problem. Linearise the resulting system in the small quantities, and then take a Fourier transform in the flow direction and in time. The result is a one-dimensional system of equations with two new parameters: k , the wavenumber of interest along the channel, and ω , the wavespeed, which also contains the growth (or decay) rate in time. Solving this system for a given wavenumber yields a growth (or decay) rate, and so instabilities can be predicted.

I've heard it said that an applied mathematician is someone who works in dimensionless units. Joel proceeded to show us that a good applied mathematician is someone who knows how to choose the right dimensionless units! Simply rescaling all lengths with the channel width, though tempting, is just not good enough in this problem. There are three natural lengthscales: the channel width and the wavelength are obvious, but another is the *distance a fluid element travels in one relaxation time*. Three lengthscales means, of course, three possible longest lengths; when I'd studied the problem as John Rallison's PhD student, seeing only the first two lengthscales, I'd only spotted two orderings: long and short waves (all relative to the channel width). We had guessed that, if both long and short waves were stable, the whole flow would be stable. This is where Joel's luck came in – he ran a standard-looking case where both the long and short modes were known to be stable, and was surprised to discover a region of unstable waves somewhere in the middle! Further investigation led to the classification of what he calls *narrow-core* modes, which occur when there are interfaces close to the centreline of a channel flow which interact with one another.

Joel's other major discovery were what he calls *fast-flow* modes, which arise when the relaxation lengthscale is the longest lengthscale in the problem. This instability isn't entirely new: it matches up with Yuriko Renardy's short-wave instability in Couette flow, from 1985; but it was generally accepted that we knew, loosely, the mechanism. The true long-wave instability has a mechanism that is genuinely understood, in which the jump in normal stress across the interface (in the base flow) is exposed by the tilting of the interface, and drives all the rest of the perturbation flow. We thought the short wave mechanism was similar. As a result, everyone thought we could safely ignore very short waves because the addition of surface tension (which flattens very short crinkles on the interface very effectively) would kill the instability. We were wrong. Joel has showed that even in the presence of infinite surface tension, these fast-flow modes are still unstable. The

mechanism survives even if the interface is held completely flat! And there we have the question he left us all to ponder (possibly for some years): what can the mechanism of this instability be, if the presence of the interface is required but the interface can't move?

Joel's work is not purely analytical, but supported by very careful numerical work: it is an exceptionally strong thesis and a rounded piece of work which thoroughly deserves this award.

Helen Wilson.

BSR Travel Bursary Report – 4th Annual European Rheology Congress Naples, Italy 12-14th April 2007

The 4th Annual European Rheology Conference (AERC) was held in Naples, Italy, from 12-14th April 2007. The meeting attracted over 400 delegates representing 38 different countries, which set the tone of a truly international event. The conference featured 3 plenary lectures together with 11 keynote presentations and 235 oral contributions as part of the 12 symposia.

The opening plenary lecture was delivered by Professor Thomas C.B. McLeish, who was presented with the Weissenberg award 2007 by Prof. Giuseppe (Pino) Marrucci. With his talk Thomas set the challenges that rheologists will face when studying molecular rheology, a field bridging fundamental science and application. Understating molecular dynamics might lead to the “pleasure of being wrong” regarding what has been discovered at a macroscopic scale, reported Professor McLeish.

Many research areas were covered in the conference Symposia, ranging from ‘nanocomposites, colloids and suspensions’ to ‘industrial rheology and processing’. The talks which I attended were mostly in the ‘solid, glass and granular materials’ symposium, where I had the opportunity to present my research work on biaxial extension of granular suspensions. I proposed an innovative theoretical approach to study the rheology of highly filled suspensions. The model is a basic modification of the Herschel-Bulkley model, including a dependence of both yield stress and consistency coefficient on the strain rate at the onset of flow. Similar behaviour in yielding conditions was observed by Prof. D’Amore [Second University of Naples (SUN), Italy] for glassy polymers. In the same symposium, I

was delighted to hear the keynote lecture given by Dr. Pouliquen (CNRS-Universite' de Provence, Marseille, France) who gave an insight into the different flow regimes, *i.e.* viscous and frictional, arising during the flow of dense rigid grains. A visco-plastic model including a frictional law proved effective in predicting experimental results. I found that several analogies could be drawn with the rheology of dense granular suspensions.

In addition to insight and new research ideas gained through networking with top rheologists, I benefitted considerably from several one-to-one conversations discussing my experimental work and the interpretation of my results. The conference also presented an excellent opportunity to spend a few days in the warm, relaxing, and sunny city of Naples.

I am most grateful to BSR for providing funding which allowed me to attend the conference.

Salvatore Mascia
Department of Chemical Engineering
University of Cambridge

BSR Student Travel Bursaries

The 301st Council Meeting established the principle that student travel grants have the objective of encouraging students to disseminate their research. Applicants for a student travel bursary must be a member, may be working worldwide and presenting research at a conference, by paper or poster. The grant will be made on receipt of a report on the event.

The British Society of Rheology wishes to establish a transparent mechanism for the award of travel bursaries and to solicit applications from its student membership. Travel bursaries are available to student members of the Society to present their research at a conference that contains a strong rheological element, in situations where no other sources of funding are available to cover the whole cost of the meeting. Suitable conferences include the International Congress of Rheology, the Annual European Rheology Conference and conferences organized by the Society.

The closing dates for consideration of the award of a travel bursary are 31st March and 31st October with successful applicants notified by 30th April and 30th November, respectively. Applicants should include in their submission the name and location of the conference, the title, authors and abstract of the paper submitted to the conference, a breakdown of the projected costs of attending the meeting and a supporting letter from their research supervisor. The support of the British Society of Rheology should be mentioned in the conference presentation. The Society's logo may be used for this purpose. Payment of the bursary will be made on receipt of a report on the conference. The conference report will be published in the Bulletin of the Society.

Applications for a travel bursary should be sent to the Secretary:

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Report on International Workshop on Numerical Method for Non-Newtonian Flows, Rhodes 6-10th June 2007

This scientific meeting was the 15th in the series of International Workshop on Numerical Method for Non-Newtonian Flows. Venues of past workshops were held in rotation between North American and European countries. This is the first time the meeting took place in Greece, on the island of Rhodes, between 6th–10th June 2007. The objective of the workshop was to bring together researchers at the forefront of computational and experimental Non-Newtonian fluid mechanics and rheology to discuss challenges, recent progress and future directions in modelling and simulation of Non-Newtonian flows. The details of the workshop, the programme, and the abstracts can be found on the workshop website at: <http://www.complexfluids.ethz.ch/cgi-bin/CONF/d>.

Prof. Evan Mitsoulis, of the National Technical University of Athens, Greece, chaired the workshop. Overall, at the meeting, there was a plenary lecture, 47 oral presentations, and 10 poster sessions. Oral presentations were divided into seven topics as follow;

1. Viscoplastic Suspensions (4 papers)
2. Multiscale Modelling and Molecular Simulations (9 papers)
3. Viscoplastic Fluids – Modelling and Simulations (6 papers)
4. Viscoelastic Flow Instabilities (9 papers)
5. Viscoelastic Fluids – Modelling and Simulations (9 papers)
6. Complex Materials: Experiments and Modelling (6 papers)
7. Turbulence in Complex Fluids (4 papers).

The opening session was chaired by Prof. Evan Mitsoulis. It started by an outstanding plenary lecture presented by Prof. Roger Tanner on “the changing face of computational rheology”. This was followed by 4 presentations relating to the first workshop topic.

On the second day of the meeting, topic 2 was addressed in the morning and topic 3 in the afternoon. Presentations related to topic 4 were presented in the morning of the third day, with the poster session in the afternoon. In the evening an enjoyable excursion to Lindos was organised. The fourth day focused on topic 5 and 6 and the final day on topic 7.

There were some good and interesting presentations by many research groups. The Hellenic group concentrated on the numerical simulation for industrial applications, such as die-swell, calendaring, and squeeze flow. The group lead by Prof. Raz Kupferman presented their log-transformation work to investigate highly elastic solution and instability for Oldroyd-B model through various test problems. Prof. Kupferman showed that the problem of mesh convergence on flow passing a

cylinder still exists through many numerical implementations. Prof G.W.M Peters presented an enjoyable talk on the topic of numerical simulation for damage of human brain tissue.



At the end of the workshop, Prof. Roland Keunings summarised the themes and papers presented. He concluded that topics of research were broader than during previous meeting and spanned over new research areas. This is in relation to models, physical and benchmark problems, numerical techniques, e.g. finite element, finite volume, stochastic, particle methods and log-transformation form, stability analysis in both linear and non-linear form. However, as Prof. Roland Keunings stated, there are still areas in numerical simulation relating to mesh convergence, stability and accuracy which need more attention from the research community. The general feeling was that the conference and its setting were enjoyed by all.

Bumroong Puangkird

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Kupferman & Alves at Rhodes June 2007

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.

Karl Weissenberg - The 80th Birthday Celebration Essays

Some years ago one of our members, Professor John Harris, arranged for a number of eminent scientists to write essays on various aspects of Karl Weissenberg's scientific career in honour of his 80th birthday. This was subsequently published. The executors and family of the late John Harris have asked that these essays now be made available to the rheological community as a whole, and the BSR are glad to be the agents for this. The essays are being published in forthcoming issues of the BSR Bulletin.

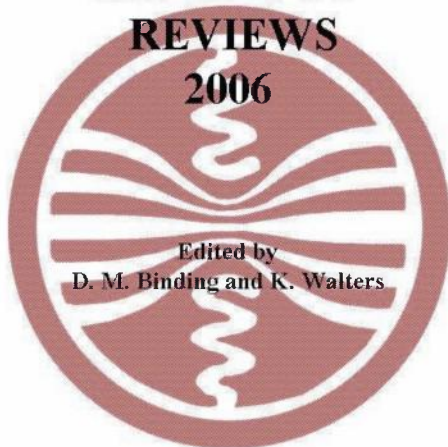
Karl Weissenberg was born in Vienna in 1893 and studied at the Universities of Vienna, Berlin and Jena studying mathematics as his main subject. He later became Professor of Physics in the University of Berlin and has also held a variety of Professorships at other Universities. He has made fundamental contributions in both Crystallography and Rheology during a long and active scientific career.

This volume contains a collection of contributions by a number of well known scientific authors which gives the most comprehensive account available up to the present time of the range and depth of the scientific work of Weissenberg and locates his places in the development of both Crystallography and Rheology.

To view the Essays in full, visit:

<http://innfm.swan.ac.uk/bsr/weissenburg/contents.htm>

RHEOLOGY REVIEWS 2006



Edited by
D. M. Binding and K. Walters

The field of rheology is extremely broad and continues to grow rapidly. With applications in almost every walk of life, important work is published in a very large number of journals and other media. Although modern computer-based technology enables the location of relevant studies satisfying certain criteria, it cannot determine the importance, or indeed, the significance of the studies. For this, it is necessary to tap the knowledge and experience of the world's most prominent specialists in rheology. This publication aims to achieve this.

We are pleased to announce the 2006 issue of 'Rheology Reviews containing 6 substantial reviews and incorporating over 1000 references in 290 pages. This issue contains reviews of the following areas: The rheology of high aspect ratio nano-particle filled liquids (D W Litchfield & D G Baird); Rheology of fresh cement and concrete (P F G Banfill); Instabilities in extensional deformation polymer processing (H W Jung & J C Hyun); Molecular dynamics simulation and its application to nano-rheology (A Jabbarzadeh & R I Tanner); The rheology of worm-like micellar fluids (V J Anderson, J R A Pearson & E S Boek); Rheometry for blood coagulation studies (P A Evans, K Hawkins & P R Williams).

Purchases may be made on-line. For details, please visit the BSR web site:
<http://www.bsr.org.uk/>

British Society of Rheology Midwinter Meeting
Royal School of Mines, Imperial College London
10-11th December 2007

The Rheology of Foams and Emulsions

This year's BSR Midwinter Meeting will be held at Imperial College London. The subject is the Rheology of Foams and Emulsions, with the aim of show-casing the best and most topical work on foams, emulsions and related high-interface systems. The meeting will run from lunchtime on Monday (lunch provided) until lunchtime on Tuesday.

Keynote speakers include Prof. Denis Weaire (School of Physics, Trinity College Dublin), Prof. Jan Cilliers (Department of Earth Science and Engineering, Imperial College), Dr. Phillippe Marmottant (Laboratoire Spectrometrie Physique, Grenoble) and Dr. Pete Wilde (Institute for Food Research, Norwich). The BSR Annual Award and Vernon Harrison PhD Prize will also be presented during the meeting.

Contributions are now solicited for oral and poster presentation. Oral presentations will be allocated 20 minutes including time for questions. Poster presentations will be viewable throughout the meeting. Please send a title and an abstract of no more than 250 words to Simon Cox at the address below by 12th October, stating your preference for oral/poster presentation.

A registration form and poster are available at <http://innfm.swan.ac.uk/bsr/frontend/meetings.asp>. A reduced conference fee is offered to delegates booking before 1st November.

Meeting Contact:

Dr. Simon Cox,
Institute of Mathematical & Physical Sciences
The University of Wales Aberystwyth
Penglais, Aberystwyth
Ceredigion, SY23 3BZ
United Kingdom
Email: sxc@aber.ac.uk



**The British
Society of Rheology**

*Midwinter meeting
Monday 10th and
Tuesday 11th December
Imperial College London*

The Rheology of Foams and Emulsions

Keynote speakers:

J.J. Cilliers (Imperial)

Flowing Froths: how bubbles float the world economy

P. Marmottant (Grenoble)

Foam Microfluidics

P.J. Wilde (Norwich)

*Manipulating the Interface to Control
Emulsion Rheology and Microstructure*

with an after-dinner speech by

D. Weaire (Dublin)

Organisers:

S.J. Cox (Aberystwyth)

S. Neethling (Imperial)

H.J. Wilson (UCL)

For further details contact Simon Cox (sxc@aber.ac.uk)
or see <http://innfin.swan.ac.uk/bsr/frontend/meetings.asp>

CNT@Cambridge 2007

A Mini-Symposium on
The Science and Application of Carbon Nanotubes

Date: Friday 30 Nov 2007

Time: 9.00 – 18.00

Venue: Churchill College, University of Cambridge

Keynote Speakers

Prof. Gehan Amaratunga

*Head of Electronics, Power and Energy Conversion Group,
Engineering Department, University of Cambridge, UK*

Prof. Christian Bailly

*Unité de Physique et de Chimie des Hauts Polymères,
Université Catholique de Louvain, Belgium*

Prof. Francisco Chinesta

Director, Laboratory of Mechanics of Systems and Processes, CNRS ENSAM, France

Dr. James Elliot

University Lecturer, Department of Materials Science and Metallurgy, University of Cambridge, UK

Prof. Kostas Kostarelos

Chair in Nanomedicine and Deputy Head, Centre for Drug Delivery Research, University of London, UK

Prof. Malcolm Mackley

Group Leader, Polymer-Fluids Group, Department of Chemical Engineering, University of Cambridge, UK

Prof. Bill Milne

*Head of Electrical Division and Director of Centre for Advanced Photonics and Electronics,
Engineering Department, University of Cambridge, UK*

Ms. Ottilia Saxl

CEO, Institute of Nanotechnology, UK

Prof. Eugene Terentjev

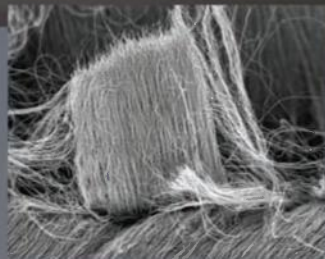
Cavendish Laboratory, University of Cambridge, UK

Prof. Mark Welland

*Director of the Interdisciplinary Research Collaboration in Nanotechnology, Nanoscience Centre,
University of Cambridge, UK*

Prof. Alan Windle

*Group Leader, Macromolecular Materials Laboratory, Department of Materials Science and Metallurgy,
University of Cambridge, UK*



Registration Website: <http://cnt-cam2007.co.uk/>

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INSTITUTION OF MECHANICAL ENGINEERS FOOD ENGINEERING COMMITTEE

The Application of Rheology in Food Process Engineering 15th November 2007

Institution of Mechanical Engineers, 1 Birdcage Walk, London SW1H 9JJ

The use of rheological methods is very common in the Food industry and is an important tool for evaluating a product in terms of processability or quality and texture. These seminars will provide examples where rheology can help the food engineer to understand the material that he/she is dealing with in terms of how it will behave under the application of load (soft solids), shear rate (liquids) or temperature.

The seminars will cover the following topics:

The behaviour of foods which are suspensions of particulates in a liquid. The way these suspensions are processed affects their structure and hence their mechanical properties.

Rheological characterisations in the biscuit industry as a means for improving/sustaining the performance and control of unit processes. Modelling for bubble growth during baking and foam flow and expansion in whipped cream.

Identification of suitable rheological methods for industrial applications in the areas of process optimisation, quality control, structure formation/stability and product screening.

Flow of soft solids during processing and the importance of wall slip in such flows in helping preserve microstructure. Methods for analysing and correcting for wall slip effects will be suggested.

Material modelling for bread dough and application to the sheeting and extrusion processes.

'Engineering' the changes required to gluten polymer structure in wheat in order to achieve better and more consistent baking performance.

The Institute of Food Science and Technology (IFST) Food Engineering group together with the Institution of Mechanical Engineers (IMechE) Food Engineering

committee operate as a joint committee relating to all matters of food engineering and allied subjects.

The event will be held at the Headquarters of the Institution of Mechanical Engineers. The day will be interspersed with refreshments of coffee, lunch and afternoon tea giving ample time for further discussions and for contacts to be made.

This event is organised by the Institute of Food Science & Technology Food Engineering Special Interest Group, on behalf of the Eastern Food Science & Technology Educational Trust (registered charity number 285743). The Eastern Food Science & Technology Educational Trust is not registered for VAT; therefore there is no VAT element included in registration fees.

PROGRAMME

9:30am to 10:00am Registration and coffee

10:00am to 10:15am Introduction to day's events by chairman (Gordon Williams, Department of Mechanical Engineering, Imperial College London)

10:15am to 10:45am Ian Wilson, Department of Chemical Engineering, University of Cambridge - Putting structure into structured products

10:45am to 11:15am Lucio Cicerelli, Materials & Process Engineering Manager, United Biscuits Corporate Technical - Applications of food rheology tests in the biscuit industry

11:15am to 11:45am Coffee

11:45am to 12:15pm Peter Martin, School of Chemical Engineering and Analytical Science, University of Manchester - The importance of wall slip effects when processing soft solid foods

12:15pm to 1:45pm Lunch

1:45pm to 2:15pm Jan Engmann, Nestlé Research Center, Switzerland - How many types of rheological measurement do we need?

2:15pm to 2:45pm Massimo Migliori, Department of Chemical Engineering and Materials, University of Calabria - Modelling support to food production: engineering approach

2.45pm to 3:15pm Afternoon tea

3:15pm to 3:45pm Maria Charalambides, Department of Mechanical Engineering, Imperial College London - Experimental and theoretical investigations of sheeting and extrusion of bread dough

3:45pm to 4.15 pm Bogdan Dobraszczyk, Department of Food Biosciences, University of Reading - Polymer molecular modelling of wheat gluten and its relationship to baking performance

4:15 pm Closing remarks

Costs

The cost: - £95 to institutional members of the IFST and IMechE £125 for non institutional members. This fee is inclusive of refreshments and attendance documentation.

Tickets will be issued upon receipt of payment by cheque which should be made payable to "The Eastern Food Science &Technology Educational Trust" and forwarded to: -

Ms Pam Cook

Imperial College London
Department of Mechanical Engineering, South Kensington Campus.
London SW7 2AZ

Tel: 0207 594 7083, Fax: 0207 594 7017

Email: p.cook@imperial.ac.uk



The Non-Newtonian Club is an informal rheology discussion group which provides low-cost, informal, one-day meetings which provide an excellent forum for industrial and academic rheologists to meet together informally to present work in progress, raising key needs and concerns, and discussing unresolved practical and modelling issues that may be inhibited at more formal conferences.

Next Non-Newtonian Club Meeting
Friday 23rd November
Unilever R&D Port Sunlight,
Quarry Road East, Bebington
CH63 3JW

If you wish to present at the meeting, please contact Jason Stokes (jason.stokes@unilever.com) asap. This includes students and other less experienced rheologists, industrial rheologists, and academics. Registration (free) for the meeting is essential; please see the website for more details.

Jason Stokes



Sensi·mojo·tivity \sen-see-mo-jo-ti-ve-te\

adj. 1. a term often associated with the performance of an AR-G2 Rheometer.

TA Instruments .redefining Rheometer performance.



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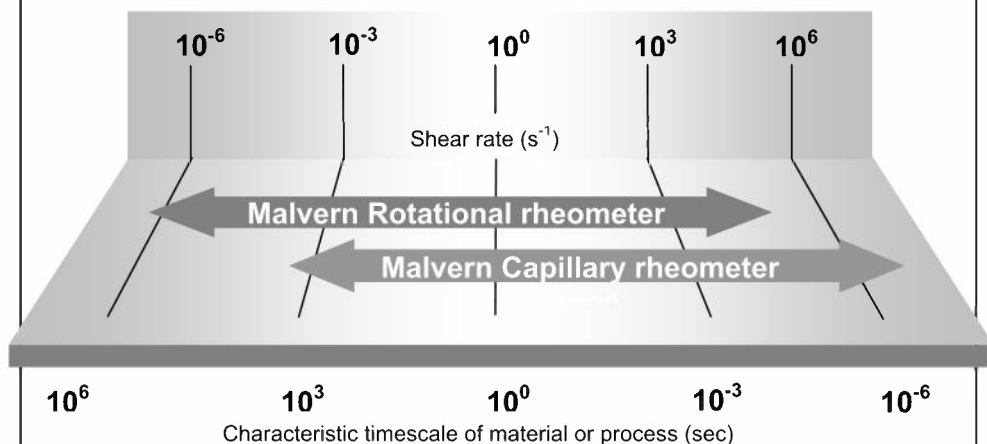
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Malvern is the only material characterisation company with specialist resources in the measurement of particle size, shape, zeta potential, molecular weight and rheology. Malvern has the understanding and expertise to advise on how these microstructural parameters influence bulk rheological properties.



Visit the Malvern Instruments website to view audio visual presentations in rheology & light scattering

www.malvern.com

**INSTITUTE OF NON-NEWTONIAN FLUID MECHANICS
BRITISH SOCIETY OF RHEOLOGY, UNIVERSITY OF
LIVERPOOL**

“COMPLEX FLOWS OF COMPLEX FLUIDS”

University of Liverpool, UK

March 17-19, 2008

Programme The conference will commence at 12 noon on Monday March 17th and finish at lunchtime on Wednesday, March 19th, 2008. The theme of the Conference will be Complex Flows of Complex Fluids and is being held in Liverpool to coincide with the city being European Capital of Culture 2008. Distinguished scientists who have already agreed to give plenary lectures include; M A Alves (Porto, Portugal), A N Beris (Delaware, USA), J Cooper-White (Queensland, Australia), G G Fuller (Stanford, USA), A J Giacomin (Wisconsin, USA), O G Harlen (Leeds, UK), R Keunings (Louvain, Belgium), G H McKinley (MIT, USA), S J Muller (UC Berkeley, USA), M S N Oliveira (Porto, Portugal), P J Oliveira (Covilhã, Portugal), J R A Pearson (Cambridge, UK), F T Pinho (Minho, Portugal), R I Tanner (Sydney, Australia), M H Wagner (Berlin, Germany) and P R Williams (Swansea, UK).

We envisage sessions devoted to, amongst others, micro-fluidic flows, purely-elastic and inertio-elastic instabilities and turbulence in non-Newtonian liquids. In addition Professor K Walters FRS will give a talk about the life and work of J G Oldroyd who held the Chair of Applied Mathematics at Liverpool from 1965 until 1982. The BSR Presidential address will also be delivered at the conference.

Venue The meeting will be held on the University campus in The Foresight Centre which is housed in the former Liverpool Royal Infirmary designed by Sir Alfred Waterhouse (with advice from Florence Nightingale). One of the conference dinners will be held in the Merseyside Maritime Museum, part of the historic Albert Dock on the banks of the River Mersey. A block reservation has been made for all delegates at the Premier Travel Inn, Liverpool City Centre.

Costs The total cost of the meeting (with meals and accommodation from Monday lunch to Wednesday breakfast) will be £380. Participants registering before 20 January 2008 will receive a £30 discount on their registration fee. Accompanying persons sharing a room with a participant will be charged £100.

Organizers The meeting will be organized by Dr R J Poole and Professors M P Escudier FREng (UoL), T N Phillips (BSR) and K Walters FRS (INNFM). Queries regarding hotel bookings and registration matters should be addressed to Dr Poole (robpoole@liv.ac.uk).

CONFERENCE ON “COMPLEX FLOWS OF COMPLEX FLUIDS”

University of Liverpool, UK, March 17-19, 2008

Participants should return this form no later than 20th January 2008. Speakers should send a 200 word Abstract to Professor Escudier (escudier@liv.ac.uk) , no later than January 20th , 2008.

Block letters throughout please

Full name (including title)

Organization

.....

Full address

.....

.....

Tel

Fax

Email

☐ **Normal Registration.** I wish to attend the conference and I enclose a cheque for £380 made payable to the University of Liverpool (after 20 January 2008).

☐ **Early Registration.** I wish to attend the conference and I enclose a cheque for £350 made payable to the University of Liverpool (before 20 January 2008).

☐ I shall be accompanied by and I enclose a cheque for £100 made payable to the University of Liverpool

Please return this form to:

Dr Rob Poole

Department of Engineering University of Liverpool
Brownlow Hill, Liverpool L69 3GH, UK

Tel: +44 (0)151 7944806

Fax: +44 (0)151 7944848

Email: robpoole@liv.ac.uk

79th Annual Meeting of the Society of Rheology

**7-11 October 2007
Salt Lake City, Utah, USA**

Organiser/Contact details: Jaye Magda

Conference Website:

http://www.rheology.org/sor/annual_meeting/2007Oct/default.htm

Mechanics of Time Dependent Materials

**March 30 - April 4, 2008
Portola Plaza Hotel
Monterey, California**

We invite you to submit an abstract for the 6th international conference on Mechanics of Time-Dependent Materials, to be held at the Portola Plaza Hotel, Monterey CA, March 30 - April 4, 2008. The conference is held in coordination with the journal of the same name. (Profs. Igor Emri and Wolfgang Knauss, editors-in-chief.) The hotel overlooks beautiful Monterey Bay.

The Monterey Peninsula Airport is located 10 minutes from downtown, hotels and the Conference Center. There are five major airlines that provide over 80 arrivals and departures per day. Monterey is located on the California coast, 120 miles (200 km) south of San Francisco, 70 miles (112 km) south of San Jose and 330 miles (750 km) north of Los Angeles, all of which have international airports.

We are soliciting papers involving constitutive, time (rate)-dependent behavior of **all** materials. The time-dependent mechanical response should be non-negligible in cases involving non-mechanical fields.

Papers dealing with modeling and experimental aspects of the subject area are sought. Possible topics include, but are not limited to: characterization and modeling of behavior at multiple scales; viscoelasticity, viscoplasticity; transport, chemically and electronically active processes; multiphase and biomaterial systems; thermodynamics; shape memory; mechanics of testing; micro/nanoindentation on time-dependent materials; dynamic rate-dependent behaviors; large deformations; residual stresses; time (rate)-dependent damage and failure; polycrystalline, single crystal and nanocrystalline behaviors; multifunctional materials; mechanics of processing; design methods; environmental interactions; experimental methods and techniques; linear and non-linear time-dependent behavior; time (rate)-dependent composite materials of all

types; numerical analysis; physical aging; rheological properties; temperature, pressure, and moisture effects on time dependence; damping related topics.

The program will feature: several distinguished plenary speakers addressing a selection of the described topics; a day highlighting US and international governmental support with keynote by Dr. Janez Potocnik, Commissioner for Science and Research for the European Union; an extensive sightseeing excursion in the beautiful Monterey peninsula region.

A short/tentative abstract indicating your intent to attend must be submitted by JUNE 15, 2007. A short 3-page paper will be required if accepted. A CD proceedings of the required 3-page papers will be distributed at the event. Authors are encouraged to submit optional full-length papers as they are completed to Mechanics of Time-Dependent Materials journal. This can be done expeditiously by submitting directly to one of the conference chairs, or alternatively to the journal on-line.

A block of rooms at the conference hotel will be available for the substantially discounted price of US \$179+tax per night. A number of rooms at government rate will be available to individuals with government ID.

You are welcomed to redistribute this announcement to other distinguished researchers. We look forward to seeing you in beautiful Monterey.

Organising Committee

Richard Hall, Air Force Research Laboratory, richard.hall@wpafb.af.mil

Hongbing Lu, Oklahoma State University, hongbin@okstate.edu

H. Jerry Qi, University of Colorado, Qih@colorado.edu

Igor Emri, University of Ljubljana

Wolfgang Knauss, California Institute of Technology

Krishnaswamy Ravi-Chandar, University of Texas at Austin

Food Colloids 2008 Creating Structure, Delivering Functionality

**Le Mans, France
April 6-9, 2008**

Food Colloids 2008, is the twelfth in the series of biennial European conferences dedicated to the area of food colloids. The conference will be concerned with fundamental and applied aspects of food dispersions, emulsions, foams and gels.

The conference will be hosted by the Polymers, Colloids and Interfaces Group at the University of Le Mans, and co-organized by the Biopolymers, Interactions and Assemblies Laboratory - INRA Nantes and INSERM U646- University of Angers.

<http://www.inra.fr/foodcolloids2008>

XVth International Congress on Rheology

**Monterey, California
August 3 to August 8, 2008**

The Society of Rheology invites you to participate in the XVth International Congress on Rheology, which will take place in Monterey, California from August 3 to August 8, 2008. The Congress convenes every four years and brings together the world's leading rheologists to present the latest advances and developments in this field.

The Congress will include opening and closing plenary lectures, fourteen keynote lectures (including the Bingham lecture) by eminent rheologists, contributed oral presentations organized into sixteen mini-symposia, and a poster session. Two short courses will be offered on the weekend before the Congress, August 2 - 3, 2008.

In addition to the technical programme, an active social programme is planned which will introduce the participants to the wonderful attractions of the coastal environs of Northern California.

<http://www.rheology.org/ICR2008/>

INDUSTRY NEWS

Anton Paar - Launch of High Throughput Rheometer (HTR)

Anton Paar is proud to present the High Throughput Rheometer (HTR). A solution that completely holds its own - a fully automated, robotically operated rheometer. Not losing an ounce of the MCR series world-renowned accuracy – yet giving customers back their entire working day.

Measuring reproducibility is key. Economy and high productivity are essential. Ease-of-use is a major plus. Anton Paar's High Throughput Rheometer meets all these wishes at once. HTR is an innovation landmark: the modern principles of high-throughput screening brought to full function on the ever-efficient MCR rheometer package.

The basic MCR setup remains as modular and customisable as ever - with the difference that HTR now performs all measuring steps automatically. In its standard setup, it processes 96 samples in a single run – working for up to 24 hours. Laboratory staff are given back the entire working day.

Consistent, uniform sample preparation is the key to reproducible measurements – as is the complete avoidance of operating errors. HTR secures this. Measuring parameters and sample data are transferred to a monitoring database, all relevant procedures are defined and stored as job lists, and HTR gets to work. Samples are identified via future-oriented 2D datamatrix codes at the bottom of each sample cup – this data is also used for the fully programmable filling procedure.

Toolmaster reliably configures the measuring system, ensuring utmost measuring precision. The Rheoplus software 'sees to it' that all measuring procedures precisely accord with the customer's pre-defined wishes. The measurements themselves are performed with concentric cylinder as well as with cone-and-plate and parallel-plate geometries – an absolute novelty in automated rheometry.

The sample preparation station and the cleaning unit can be adapted to the specific needs of the individual application. Moreover, the MCR rheometer can be equipped with different environment control systems. Thus HTR redefines high throughput rheology for a wide range of applications as different as dispersions, emulsions, coatings, gels, polymer melts, and even solid polymers, to name just a few.

The measurement data and analysis results can be transferred to a monitoring database. All Rheoplus analysis methods are available. Throughput is further

maximized by not stopping for cleaning procedures: The parallel use of 2 measuring systems allows measurements with one system whilst the other is being cleaned.

Anton Paar's High Throughput Rheometer sounds like the future – because it is. And it is here to stay: Designed to withstand the demands of continuous operation, it will still be in perfect condition long after your investment has paid off.

Claudio Filippo Joins Anton Paar Ltd.

October sees Claudio Filippo joining Anton Paar in order to support our rheometer users in the North of England. Claudio has over 5 years experience in the field of rheology and joins us from the rheology dept. at the University of Calabria. Claudio has previously specialised in the measurements of dough and chocolate, having also worked with United Biscuits during his time at University. He is looking forward to widening his horizons and to helping Anton Paar customers in the UK.

Anton Paar full service support

In keeping with the company tradition of fostering lifelong customer relationship, Anton Paar Ltd happily offers full service support to its instruments far longer than the industry norm. We can even support some instruments over twenty years old!! To satisfy our own curiosity (and maybe yours too!), let us know how old your (working) Anton Paar rheometer is. The 5 oldest rheometers in use will each win a viscosity standard traceable (worth £200 each) which checks the accuracy of your instrument. To enter, please write to steve.goodyer@anton-paar.com. Include instrument model, serial number, date of purchase (if known), date of first known use, company, your name & contact details.

Anton Paar Rheology Workshops

Our Rheology Workshop is aimed at those who are either new to rheology or those that have been involved for some time and would like to learn more about this fascinating subject. The workshop will involve seminars covering both theoretical and practical aspects of rheology as well as practical and informal sessions. The day delegate rate is only £160+vat per day and includes a free Rheology Handbook authored by course leader Thomas Mezger (retail price £70). The next workshop is 14 – 15 November 2007.

For further information or to reserve a place please call Steve Goodyer on 07971 972502, or reply to steve.goodyer@anton-paar.com

Rheomicroscopy

The rheology of a material is intrinsically linked to its' microstructure. By capturing images of a material whilst its' rheology is being measured the relationship between product rheology and microstructure can be more easily understood. Our Rheoplus software timecodes the picture / video footage so that it can be directly related to graphical data.

Simultaneous Rheology and Light/Neutron/X-Ray Scattering

Performing scattering techniques on a sample while at the same time that it is being measured on a rheometer enables the simultaneous determination of structural information and rheological data. Scattering techniques are popular for such methods as they determine average values within the sample under analysis (e.g. average interparticle distance). Small Angle Light Scattering (SALS) is performed by incorporating a class 1 laser system into a cabinet that also houses the rheometer. The cabinet makes the system intrinsically safe and it can be used in standard laboratories. The SALS system also comes with the option of a high temperature system that enables measurements to be made at up to 300 °C.

If needing to investigate submicron structures then it is necessary to revert to SAXS (X-ray scattering) or SANS (neutron scattering). As neutrons and X-rays are not the kind of thing that you find under the average laboratory bench these techniques are not so freely available. However, the CCLRC has recently had one of our MCR501 rheometers installed at ISIS (www.isis.rl.ac.uk) and have purchased both X-ray and Neutron Scattering systems. Following the opening of the Diamond Light Source on the same site last month, both SAXS and SANS experiments are now available to both industry and academia.

Malvern rheometer in continuing search for perfect silk

In work published in the journal *Polymer* (June 2007) Oxford researchers have taken an important step towards understanding why it has been impossible to artificially spin protein fibres with the superb material properties of their natural models, the silks of spiders and silkworms.

Using a Bohlin Gemini HR nano rheometer from Malvern Instruments, Chris Holland and Professor Fritz Vollrath, together with Dr Ann Terry and Dr David Porter, took unspun natural silk dope and compared it to artificial silk dope under shear forces similar to those encountered in a natural spinning duct. Optimized for the control of ultra-low torques, the Gemini HR nano is ideal for probing sensitive material structures and allowing measurement of low volume samples. The

research group discovered fundamental differences in kind, not just in degree, between the natural and artificial silk dopes.

This research builds on previous work by the Oxford group, which demonstrated that the flow characteristics of native spider and silkworm dopes are very similar despite the independent evolution of the two silks. Such convergence of the two distinct materials towards an identical flow behaviour strongly suggests that dope rheology is a key to the production of high-performance protein fibres. Native silk dope taken straight from the gland can easily be drawn into strong fibres, but the fibres from artificial dope cannot be spun into any type of serious filament without unnatural treatment using strong chemicals. Clearly, native silk dopes have the innate ability to form into a fibre, which is lost in translation when attempting to create artificial silk dope. Discovering the mechanisms behind this seemingly effortless process will be a crucial step towards the biomimetic spinning of artificial silk fibres using the animal's own technology. For further details of the research work visit: <http://www.admin.ox.ac.uk/po/070601a.shtml> and www.oxfordsilkgroup.com

Research paper reference: Holland, C., Terry, A.E., Porter, D. & Vollrath .F. Natural and Unnatural Silks. *Polymer***48**, 3388 – 3392 (2007)

Author contact: Chris Holland (University of Oxford, UK) Tel: +44 1865 271216; E-mail christopher.holland@zoo.ox.ac.uk

Celsum Workability Tester For Fresh Cement And Concrete Is Fully Controlled

Celsum Technologies has moved to the Innovation Centre at De Montfort University in Leicester. Director Roy Carter said, "We are very pleased to be at the DMU Innovation Centre. This will give us room to expand, and a platform from which to develop new products. Additionally, we are finding the business support and technical networking there to be extremely valuable."

Celsum Technologies has introduced the new version of the CTPT Two-Point Workability Tester for fresh cement and concrete and similar materials. The CTPT allows the force needed to agitate the sample over a range of speeds to be measured. From these data and with calibration, a plot of force against speed may be constructed. The slope of the resulting graph gives a measure of the viscosity or plasticity of the specimen, and the intercept with the force axis the yield or slump characteristics. The instrument may be operated manually or under computer control, with speed control allowing constant speed, speed ramps, or a "staircase"

speed program. The machine is fitted with interlocked guards, and is supplied complete with control computer and software.

Fresh cement and concrete pastes have been shown to behave as Bingham fluids, that is to say that they do not flow until a characteristic Yield Stress has been exceeded. After this yield stress, they flow in a linear manner, with the shear stress being proportional to the shear rate. The level of the yield stress and the degree of proportionality between yield stress and shear rate (ie the plastic viscosity) are functions of processing parameters such as water content, sand to cement ratio and the amount and type of aggregate present.

If these parameters could be measured for each batch of fresh concrete, a pattern could be established of which batches were acceptable and which caused problems. In the 1970s, Dr G H Tattersall, working at the Centre for Cement and Concrete at the University of Sheffield, designed a rugged machine which would establish the two characteristic parameters. We have considerably improved the machine by adding state-of-the art automation in order to eliminate some operator variables of earlier versions, and have built in full guarding to protect the operator.

The sample, of about 20 to 30 litres, is contained in a steel bucket. An impeller (of which there are several geometries) is rotated in the mix at a series of controlled speeds, and the torque required to mix at each speed is displayed on a pressure gauge and recorded electronically. A planetary drive is available to avoid problems due to cavitation. A purpose-written computer programme analyses the data and determines the characteristic Yield Stress intercept and the Slope of the torque vs speed graph.

The CTPT is available in a Laboratory version, with separate PC system. A Site version with an embedded computer and industrial display is planned. The machine may be programmed to run a "standard" test with ramped speed, or may be run at constant speed or at a series of constant speeds. The instrument is extremely useful in formulation development, quality control, troubleshooting, and for research applications.

Celsum Technologies is supplying an especially modified version of the CTPT Two Point Workability Test to the Western Australia School of Mines at Kalgoorlie University. The modified version, the CTPVT, is designed to allow the Vane Test to be carried out on materials such as shotcrete, which is used for lining tunnel walls in goldmines. They have also developed a miniature digital load cell, the MDLC, for a rig used to test the strength of the foam insulation on the Space Shuttle main external fuel tank.

Celsum Technologies has developed a novel automatic titration instrument, the FPA2 Fouling Potential Analyzer, for a major international petrochemical

company. And have supplied a modified capillary extrusion rheometer, the ACR 2100, to Gammadot Rheology and Testing Consultancy, near Shrewsbury. The instrument is capable of pressures to 2100 bars, of shear rates in excess of 1,000,000, and of temperatures to 450°C.

<http://www.celsum.com/>

CONFERENCE DIARY

2007	CONFERENCES & MEETINGS
26-28 Sept Sendai Japan	4th International Conference on Flow Dynamics & 5th International Workshop on Complex Systems Sendai International Center Sendai, Japan. Michio Tokuyama Institute of Fluid Science, Tohoku University Sendai 980-8577, Japan. T : 81 (Japan) -22-217-5327, F: 81 (Japan) -22-217-5327 IWCS2007@athena22.ifs.tohoku.ac.jp
7-11 Oct Salt Lake City, Utah USA	79th Annual Meeting of The Society of Rheology Michael Graham, E-mail: graham@engr.wisc.edu ; Daniel Klingenberg, E-mail: klingen@engr.wisc.edu http://www.rheology.org/sor/annual_meeting
15 Nov London	The Application of Rheology in Food Process Engineering Institution of Mechanical Engineers, London Tel: 0207 594 7083, Fax: 0207 594 7017 Email: p.cook@imperial.ac.uk
23 Nov London	Non-Newtonian Club Meeting Unilever R&D Port Sunlight, Quarry Road East, Bebington CH63 3JW For details contact Jason Stokes Email: jason.stokes@unilever.com
30 Nov	Science and Application of Carbon Nanotubes Churchill College, Cambridge, www.cnt-cam2007.co.uk
10-11 Dec London	The Rheology of Foams and Emulsions British Society of Rheology Midwinter Meeting Royal School of Mines, Imperial College London Dr. Simon Cox, sxc@aber.ac.uk
2008	
17-19 Mar Liverpool	Complex Flows Of Complex Fluids Institute Of Non-Newtonian Fluid Mechanics, British Society Of Rheology, University Of Liverpool, University Of Liverpool, UK Dr Rob Poole ,Department of Engineering University of Liverpool T: +44 (0)151 7944806 F: +44 (0)151 7944848 Email: robpoole@liv.ac.uk

2008	
30 Mar-4 Apr Monterey CA	Mechanics of Time Dependent Materials Portola Plaza Hotel, Monterey, California
April 6-9 Le Mans, France	Food Colloids 2008 Creating Structure, Delivering Functionality http://www.inra.fr/foodcolloids2008
2009	
15-18 Jun Zurich Switzerland	5th International Symposium on Food Rheology and Structure Zurich, Switzerland - Peter Fischer - x41-44-6325349 x41-44-6321155 - secretary@isfrs.ethz.ch - www.isfrs.ethz.ch

2007 COURSES	
16 Oct Malvern	Rheology and Particle Characterisation seminar Malvern Instruments HQ, Malvern, UK E-mail: alison.vines@malvern.com , tel. 01684 892456
14 – 15 Nov Warwickshire UK	Rheology Workshop Steve Goodyer, Anton Paar Ltd, 13, Harforde Court, John Tate Road, Hertford, SG13 7Q T: +44 (0)1992 514730; F: +44 (0)1992 514739 E: steve.goodyer@anton-paar.com
22 Nov Manchester & Crawley	Basic Rheology training course TA Instruments, Olivia.Gibson@taeurope.co.uk
2008	
22-25 Jan Glasgow UK	Process 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



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