
THE BRITISH SOCIETY OF RHEOLOGY



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Hon Editor:

Dr Bogdan Dobraszczyk
School of Food Biosciences, The University of
Reading, Whiteknights, Reading RG6 6AP, UK
b.dobraszczyk@reading.ac.uk

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EDITORIAL

From the President...

The focus of your Council in 2003 was to improve the service to the membership through investment in an extensive upgrade of the Society's website, the introduction of on-line membership and subscription facilities, electronic access to our publications and regular e-mail updates on forthcoming events and rheology news. We hope that these changes are now having a beneficial impact on the membership and welcome feedback and suggestions for continued improvement. If you are not a regular user of our website, I would encourage you to check it out and to submit relevant information and links for inclusion. In particular, the webmasters and the publication editors are always on the lookout for fascinating rheological images, so please let us have yours.

This year we are turning our attention to how we can sustain and improve the Society's role in the encouragement of Rheology through presentation and debate of topical issues. With the advent of annual European Society of Rheology meetings, alongside the four-yearly International Congress, the national societies need to adapt their role in the conference arena and focus on areas and formats not necessarily covered by these large meetings. The BSR sees its role to encourage grass-roots rheology in the UK, especially amongst young scientists, to promote interactions across the academic-industry interface and to provide a forum for focused debate of emerging topics in rheology. We are firming up on a pattern of meetings built around an annual Winter Meeting in December, centred on one or two major themes, alongside close links to the regular Spring Meeting of our colleagues at the University of Wales Institute for Non-Newtonian Fluid Mechanics, with a few one-day meetings interspersed between these two regular conferences.

Details of this December's meeting in Swansea are given elsewhere in this Bulletin and we look forward to seeing many of you at this event. It will feature the award of our Gold Medal to Professor David Boger and the 2003-4 Annual Award to Professor John Rallison, as also announced elsewhere in this issue, and promises to be a special conference. It will also feature the second award of the Vernon Harrison Annual Doctoral Prize, with presentations by the finalists. This recent initiative by the Society is an excellent way to encourage and reward excellence in research by young rheologists and I urge all PhD supervisors of students completing their PhDs in the last year to consider nominating strong candidates for this award. Details of how and when to apply are given on page 65

To encourage academic-industry links, the BSR has agreed to take over the coordination of the highly successful Non-Newtonian Club, run as an informal rheology discussion group for many years by Dr Steve Beckett of Nestle plc. We intend to maintain the low-cost, informal, one-day format of these meetings and hope to make them available to a wider audience of applied rheologists. They provide an excellent forum for presenting work in progress, raising key needs and concerns, and discussing unresolved practical and modelling issues that may be inhibited at more formal conferences. Details of forthcoming NNC events are included elsewhere in the Bulletin. Alongside these, we plan to run one focused workshop-type event in early summer or the autumn. Anthony Pearson made suggestions along these lines in the last issue of the Bulletin and Gerry Meeten proposes a more interactive mechanism for choosing topics in his Letter to the Editor on page 72. Your Council welcomes these suggestions and initiatives and plans to build on them

As I write this, final preparations for the International Congress are well underway and rheologists from across the world will be meeting in Seoul to discuss the latest advances in this fascinating area of science in which we share an interest. I hope that the BSR can succeed in its aim to act as a bridge between the exciting international scene and the wealth of ideas and needs circulating within the UK rheology community. Membership of the BSR should be mutually beneficial, so let me end with two examples of how we can help each other. Students should not be inhibited from attending rheology meetings to learn and present their research, yet applications for our Student Travel Bursaries are strangely rare...this is another way in which the Society can help. Our ability to help in this and other ways depends on the strength of our membership; we are always looking for new members, so if you can introduce one or two colleagues to the Society, we can both reach a wider audience and become more effective in our role. So if you know anyone who would benefit from the BSR, please direct them to our website today!

On the people front, I am pleased to announce that Professor Malcolm Mackley of the Department of Chemical Engineering, Cambridge University, has accepted the Council's nomination to be the next President of the Society, from the spring of 2005. I would like to thank Oliver Harlen for the excellent job he has done as Bulletin Editor and his commitment to the Society. This is Bogdan Dobraszczyk's first issue as his successor; we wish him well in the role and I know that he will welcome articles, letters, suggestions and (printable) material of all kinds to make this publication as informative and useful as possible.

Geoff Maitland

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 is fixed at 15th October 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 photograph shows a representative electron microscope picture of a sample of 2 wt.% dibenzylidene sorbitol (DBS) in an amorphous poly (propylene oxide) matrix. It clearly reveals the strongly interconnected network which is build up by DBS fibers. It is evident that the DBS fibers are very flexible as loops can be observed. The several micrometer long fibers have a diameter of approximately 10 nm. Taken from the paper “Rheological Properties of Nanofibrillar Skeleton Structures Embedded in Polymer Melts.”, by Chr. Friedrich, M. Fahrländer, and A. Blumen. (University Freiburg, Materials Research Centre (FMF), Stefan-Meier-Strasse 21, 79104 Freiburg im Breisgau, Germany), and published as Proceedings of the XIIIth ICR, Cambridge, UK (2000) 1-200 to 1-202

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

Death of a Past President - Dr W Mervyn Jones

The BSR Council is sad to announce the death, on Monday 16th August, 2004, of Dr W M Jones, President of the BSR from 1978 until 1980. For many years Mervyn was Custodian of the Scott Blair Collection held at the University of Wales Aberystwyth, where he was a Reader in the Department of Physics. He will be sadly missed by his many friends and colleagues.

The Vernon Harrison Annual Doctoral Prize

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 2004 award. The prize will be £500, an illuminated certificate and a copy of Rheology Reviews 2004. 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 1st September 2003 and 31st August 2004 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 to be held at the University of Swansea on 15th/16th December 2004. 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 2003-4 Award should be sent **by September 30th 2004** to the Secretary:

Professor Tim Phillips
School of Mathematics
Cardiff University
P.O. Box No. 926
Cardiff CF24 4YH
United Kingdom

Tel: +44 (0)29 2087 4194
Fax: +44 (0)29 2087 4199
E-mail: PhillipsTN@cardiff.ac.uk

The George W. Scott Blair Award For Outstanding Research In Rheology And Texture

The G.W. Scott Blair award is presented annually by the Rheology Division of the American Association of Cereal Chemists to recognize scientists who have demonstrated outstanding ability in research in the area of rheology and texture as related to cereal based products. This year it is being awarded to **Dr. Bogdan Dobraszczyk** for his work on the rheology of gluten polymers in relation to breadmaking. It will be awarded at the Annual Meeting of the American Association of Cereal Chemists on September 22nd in San Diego, and will be accompanied by a lecture at the Rheology Symposium: Large deformation extensional rheology of doughs and polymer molecular structure-function relationships in gluten in relation to baking quality.

Bingham Medal Award

Christopher W. Macosko has been selected as the 57th recipient of the Bingham Medal of The Society of Rheology. Macosko, professor of Chemical Engineering and Materials at the University of Minnesota, is internationally recognised in the field of reactive polymer rheology.

65th Birthday Seminar for Prof. Carreau!

On November 5, 2004 top rheologists from all over the world gather in Montréal to participate in **Prof. Pierre J. Carreau's** 65th birthday seminar.

The Seminar will be held at the prestigious Fairmount Le Reine Elizabeth Hotel, in the heart of the lively city of Montreal. For this event, we have put together an impressive program, with presentations from:

Prof. Jean-François Agassant, École Nat. Supérieure des Mines de Paris
Prof. Ken Walters, University of Wales
Prof. Donald G. Baird, Virginia Polytechnic Inst. And State University
Prof. A. Jeffrey Giacomin, University of Wisconsin-Madison
Prof. Morton M. Denn, Levich Institute (CUNY)
Prof. Henning H. Winter, University of Massachusetts Amherst
Prof. R. Byron Bird, University of Wisconsin-Madison
Prof. Gareth H. McKinley, Massachusetts Institute of Technology

The seminar brochure and registration form can be downloaded at:

<http://www.polymtl.ca/gch/rheo2004/PJCflyer-final.pdf>

British Society of Rheology Awards

The Council are pleased to announce the following awards:

Gold Medal

The Society's Gold Medal has been awarded to **Professor David V Boger**, Department of Chemical and Biomolecular Engineering, University of Melbourne, Australia. This is in recognition of his outstanding contributions to furthering the science and engineering of rheology over several decades, particularly in the areas of complex particulate systems, fluid elasticity and the application of rheology to significant industrial problems.

Annual Award

The Annual Award for 2003-4 has been made to **Dr John M. Rallison**, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, for his significant contributions to the theory of complex fluid rheology and in particular to the growth of non-Newtonian Fluid Mechanics.

Distinguished Service Award

In recognition of the outstanding service he has given to the Society over many years, on Council and as an Officer, the Distinguished Service Award has been made to **Dr Geoff J Brownsey** of the Institute of Food Research, Norwich Laboratory.

The awards will be presented at the Winter Meeting of the British Society of Rheology, to be held at the University of Swansea on 15th/16th December 2004. Full citations describing the achievements of our award winners will be published in the Bulletin after the award ceremonies. Our heartiest congratulations go to David, John and Geoff.

COMMENTARY ON 311th BSR COUNCIL MEETING

The meeting was held at 9.00am on Monday, 4th April at Hoole Hall Hotel, Chester. The hotel boasts five acres of shady lawns and shrubberies, a haha and a floating staircase. Due to inclement weather I couldn't verify the garden features and as my room was on the ground floor I can't be sure that they've managed to fix the stairs yet. The hotel provided very good meeting facilities and, in fact, has a history that includes some very high risk experimental fluid dynamics. In 1793 the ownership of the hotel passed to a certain Thomas Baldwin, who was a distinguished pioneer balloonist.

The Council meeting was sandwiched between a Sunday gathering of eminent European rheologists, discussing European postgraduate courses in rheology, and a three day INNF (Institute of Non-Newtonian Fluid Mechanics) conference, beginning on the Monday afternoon. The INNF conference theme was Industrial Rheology and it also celebrated the 60th birthdays of Professor Howard Barnes and Dr Martin Laun.

I had heard rumours that BSR Council Meetings had been known to run on a little and so was intrigued to see that, according to the final item in the minutes of the previous Council meeting, the current meeting was scheduled to run from 9.00am – 12.30am. Allocating fifteen and a half hours is one way to avoid over-running. The intended length of the meeting was, of course, three and a half hours but that allowed little latitude for monologues, irrelevancies or extended breaks. There was no need to worry. The chair, and BSR President, Geoff Maitland, set the tone by starting the meeting one minute early and began by explaining that we had a large agenda to get through and that he had allocated set times to each item. This explanation took 25 seconds and so we began the meeting proper still just ahead of schedule.

Apologies, and welcomes for the two new council members, were briskly dealt with and we were on to matters arising. This is not the place to detail every agenda item but I recall David Binding (or Mr Blinding, as the receptionist referred to him when I enquired the previous evening about who had booked in) explaining that he had procured a suitable cabinet with funds from the Vernon Harrison Bequest and that the cabinet could be installed at Aberystwyth subject to the removal of a blackboard. Good to hear that progressive teaching methods are alive and well at Aber!

Council members enthusiastically agreed that the BSR should support the continuation of the Non-Newtonian Club by helping to co-ordinate and arrange its meetings.

The next agenda item concerned the 2004 edition (the second volume) of Rheology Reviews and how best to promote its sales, and those of the first volume. The entrepreneurial talents of Council members were evident judging from the range of suggestions put forward and a summary of proposal will be produced in due course. It was stressed that Rheology Reviews provide an accessible, readable overview of selected topics written by acknowledged experts and as such the reviews are unique, represent excellent value for money and should appeal to the whole range of those working in rheology. It also became clear that no member of Council would be able to leave the meeting without either buying at least one copy or promising, on pain of having their expenses cut, to buy one in the very near future.

Forty five minutes gone and 5 minutes ahead of schedule – perhaps there will be time for a coffee break after all.

Jon Harvey, together with Mike Webster, then described their work on the upgrading of the BSR website. If you haven't looked at it (unlikely in view of the number of recorded hits) then please do so – it contains a wealth of information. However, to maintain its impact, work on the site needs to continue and funds will need to be devoted to this. As a consequence, income will need to be generated through the site and the BSR webmaster (Chris Petrie) and Derek Bell will coordinate this activity. These important items deserved their thorough discussion but, by the time they were finished, we were behind schedule and so the coffee/comfort break was one of the shortest on record.

Reports by Officers next – 8 reports @ 5 minutes each. Luckily one Officer was absent and this saved a precious 5 minute allocation. Each Officer gave an update of their particular area of responsibility and all wished the new Bulletin Editor (Bogdan Dobraszczyk) well. Mike Webster's spreadsheet summarising his work on membership statistics required the use of (only) four colours and provided a comprehensive overview of the last four years' data. It appears that subscription records are now under control – a state of affairs that has surprisingly been brought about by the use of entirely legal means.

Nick Hudson and Gary Tucker ended the Officers' reports with an update on publication dates for the Bulletin and Rheology Abstracts.

The remaining items – Awards, Doctoral Prize Competition and Future Scientific Meetings – were each properly discussed and business was completed by 12.46pm, representing just under an 8% overshoot and completely destroying the rumours of long meetings.

This was my first Council meeting and while it came as no surprise to be asked to write a commentary (inside information from a former President) I was struck by the very efficient and thorough way the experienced Council members dealt with the issues. There was plenty to think about on the train journey home – and, of course, a copy of Rheology Reviews 2004 to read too.

Phil James



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Letter to the Editor

Dear Bogdan,

I write to reflect on a recent letter from Anthony Pearson in Rheol. Bull. 46(2) 2003. He argues for the selection of more specific topics for BSR conferences, rather than all-embracing ones typical of recent meetings. He proposed two nice examples, each with a clear theme, and of sufficient breadth to encompass a satisfying range of scientific activity. This letter is not a reply to Anthony's, but a response in which I propose a process to choose conference topics and to ensure a supply of papers as follows:

- (i) The BSR Council decide a provisional date and venue for the conference.
- (ii) The BSR website is used to obtain conference topic proposals from members.
- (iii) BSR Conference Organisers consider the proposals and choose a popular topic.
- (iv) The Organisers approach proposers of a chosen topic to obtain conference papers.

This process not only will empower and involve members, but also would be a means to connect a conference topic with potential contributors. The BSR website should of course make clear that suggesting a topic may imply possible future commitment! I cannot judge the ease or otherwise of implementation, but it seems to be closely in line with the request for constructive feedback from members, in the BSR Website Development Report of Mike Webster and Jonathon Harvey, also in Rheol. Bull. 46(2) 2003.

On the related issue of members' interests, older BSR members may recall a useful booklet once issued to membership every few years that listed members by name, address, and by particular rheological interest. This booklet seems long-defunct, but could (or should) its purpose be revived by access to these data from the BSR Website?

Gerry Meeten

Rheology Reviews 2004

Published by the British Society of Rheology.

Edited by David M Binding and Ken Walters



**7 substantial reviews by
internationally renowned
rheologists**

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Over 680 references

Following the successful launch in 2003 of the first issue of Rheology Reviews, we are pleased to announce the second issue 'Rheology Reviews 2004' containing 7 substantial reviews in 223 pages and incorporating over 680 references. This second issue contains reviews of the following areas: Failure and recovery processes in polymer melts (Yogesh M Joshi and Morton M Denn), the rheology of food dispersions (Crispulo Gallegos, José M Franco and Pedro Partal), micro-macro simulation using models based on kinetic theory (Roland Keunings), the dynamics of liquid drops (Stefano Guido and Francesco Greco), drag reduction in turbulent flow of polymer solutions (Michael D Graham), breakup of non-Newtonian liquid jets (Michael Renardy) and flow past spheres and bubbles (Bruce Caswell, Octavio Manero and Baltasar Mena)

Rheology Reviews is now also available in searchable format on CD.

ORDER FORM To: Dr. David M Binding, Institute of Mathematical and Physical Sciences, University of Wales Aberystwyth, Ceredigion, Wales, SY23 3BZ, UK
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** Purchases may be made on-line. For details, please visit the BSR web site:

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

Information on costs correct at April 1st, 2004. For details of payment by bank transfer, other currencies and bulk discounts, please e-mail David Binding at dmb@aber.ac.uk.

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The University of Wales Aberystwyth,
Penglais,
Aberystwyth,
Ceredigion,
SY23 3BZ, United Kingdom

Tel: 44 (0)1970 622750
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**Food Research at the Department of Mechanical Engineering,
Imperial College London.**

Dr M.N. Charalambides
London SW7 2AZ

This report summarises briefly the research work of the Food Technology Group in the Mechanical Engineering Department of Imperial College London. The aim of our group's research is to answer the current need in the food industry for control and optimisation in processing as well as in food quality. We perform rheological studies for a wide range of foods – cheese, dough, apples, bread, meat, gels and chocolate. The key to our approach is that accurate mechanical characterisation is paramount for successful evaluation of texture. The importance of our work is highlighted by the universal belief that texture is what determines the processability of the food product. Texture also influences greatly the consumer's perception of food quality.

Mechanical Characterisation:

An important part of our work is the development of experimental methodologies to ensure accurate measurements for stress, strain and fracture toughness. We have studied the mechanical response of foods under various loading conditions, including uni-axial compression¹, uni-axial tension, bubble inflation^{2,3} and cutting with wire and/or blade⁴. In uniaxial compression, we have determined suitable lubricants that eliminate frictional effects as well as analytical methods for estimation of the coefficient of friction from un-lubricated test data. In uni-axial tensile tests, we developed ways of ensuring that uniform deformation is obtained, even for very soft materials such as dough. In the bubble inflation test (Figure 1), we have demonstrated the shortcomings of the usual data analysis and developed novel measurement techniques for the bubble thickness. Finally in the cutting tests, we have developed simple mathematical models for the calculation of the fracture toughness. The latter property distinguishes between brittle, 'crumbly' foods and tough, 'rubbery' foods.

Material Modelling:

Using the extensive database outlined above, we then calibrated non linear viscoelastic material models that are able to predict the food's mechanical response under more complex loading conditions⁵. Under a step strain relaxation test, the stress, $\sigma(\varepsilon, t)$, is given by the product of separable strain dependent and time dependent functions, $\sigma_0(\varepsilon)$ and $g(t)$ respectively:

$$\sigma(\varepsilon, t) = \sigma_0(\varepsilon)g(t) \quad (1)$$

The function $g(t)$ is represented by the Prony series:

$$g(t) = g_\infty + \sum_{i=1}^N g_i \exp\left(-\frac{t}{\tau_i}\right) \quad (2)$$

where τ_i are time constants and g_∞ and g_i are dimensionless constants such that:

$$g_\infty + \sum_{i=1}^N g_i = 1. \quad (3)$$

The function $\sigma_0(\varepsilon)$ gives the instantaneous stress response of the material and is based on rubber elasticity. The latter implies that stresses are calculated by partial differentiation of a hyperelastic potential, U , such as the one given below for the classical Mooney Rivlin law:

$$U = C_{10}(\lambda_1^2 + \lambda_2^2 + \lambda_3^2 - 3) + C_{01}(\lambda_1^{-2} + \lambda_2^{-2} + \lambda_3^{-2} - 3) \quad (4)$$

where C_{10} and C_{01} are material constants and λ_1, λ_2 and λ_3 are the three principal stretch ratios. Knowing the parameters in equations (2) and (4) and using the Leaderman form of the convolution integral allows calculations to be made of $\sigma(t)$ as a function of strain history or the stress-strain curves at specified strain rates:

$$\sigma(t) = \int_0^t g(t-\tau) \frac{df(\varepsilon)}{d\tau} d\tau \quad (5)$$

Conversely, the solution of equation (5) can be used to back calculate the material parameters from experimental stress-strain data obtained at constant strain rates and/or from stress relaxation data. Note that depending on the chosen form of the function $f(\varepsilon)$, an analytical solution of (5) is not always possible. In the latter case, numerical approximations were used⁶.

Applications:

We have validated our material models by simulating two common food processes -dough sheeting (Figure 2) and cheese cutting (Figure 3)- using a commercially available finite element numerical analysis package (ABAQUS)⁴. The simulations have enabled predictions of various important processing parameters such as rolling forces and cutting loads, material deformation/recovery and crack formation/propagation. We compared our simulation predictions with our experimental data and a good agreement was observed (Figures 4 and 5). The experimental data for dough sheeting were obtained in our lab, by using our small scale rolling rig which was designed and built in-house (Figure 6). Our good results from our numerical work, highlight the potential use of computer simulation as a diagnostic tool in food processing. This would eliminate the need for extensive large scale experimental investigations which are time consuming and costly.

Other areas of research include the development of on-line indentation techniques for use in product quality control⁷, the relationship between sensory evaluation and mechanical characterisation⁸, the experimental and numerical investigation of dough extrusion and the scratch indentation of soft foods.

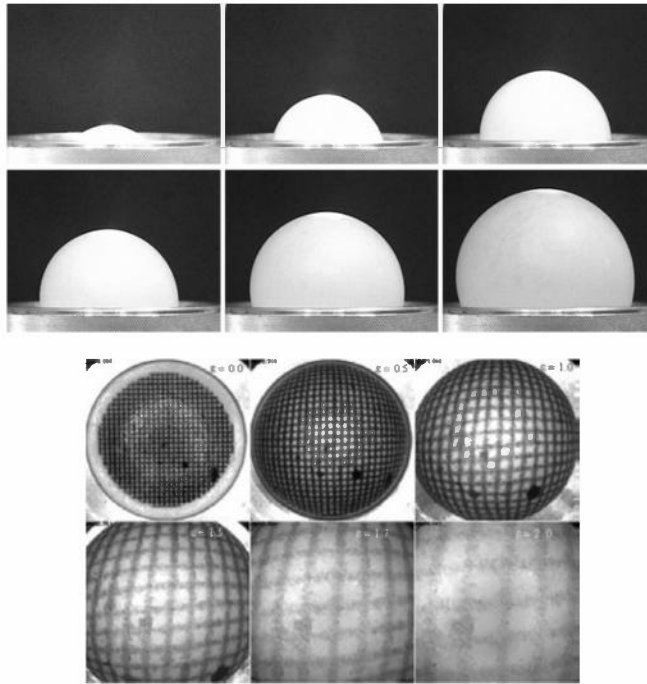


Figure 1: Measuring the bubble deformation during the dough inflation test.

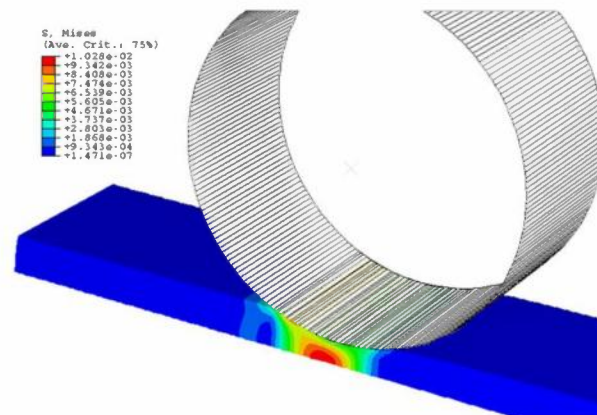


Figure 2: Finite Element simulation of the rolling process.

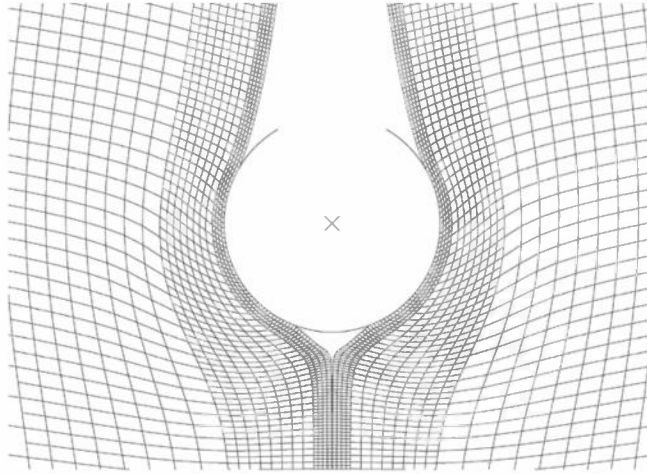


Figure 3: Simulating the crack propagation during the wire cutting process of cheese.

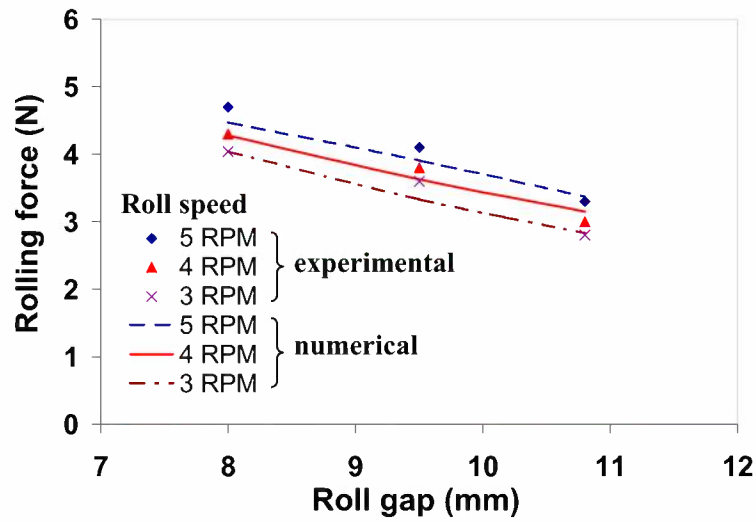


Figure 4: Comparison between experimental data and numerical predictions for rolling force (roll diameter=50 mm, dough entry thickness=16 mm, dough width=53 mm).

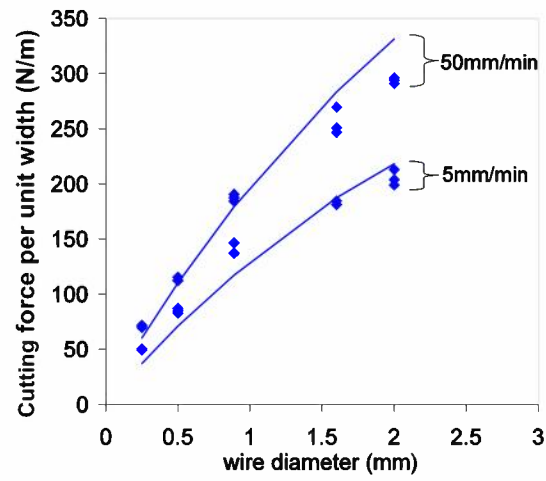


Figure 5: Comparison between experimental data and numerical predictions for wire cutting force. Markers are experimental data; lines are finite element predictions.



Figure 6: Small scale rig to study the rolling process of dough.

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- ⁶ SM Goh, MN Charalambides and JG Williams, "Determination of the constitutive constants of non-linear viscoelastic materials", *Mechanics of Time Dependent Materials*, in press.
- ⁷ SM Goh, MN Charalambides and JG Williams, "Characterisation of non-linear viscoelastic foods via the indentation technique", *Rheologica Acta*, in press.
- ⁸ SM Goh, MN Charalambides and JG Williams, "Mechanical properties and sensory texture assessment of cheeses", *Journal of Texture Studies* 34, (2003), 181-201.

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.

CONFERENCES & MEETINGS

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).

CONFERENCE ON “EXTENSIONAL FLOW”

Lake Vyrnwy Hotel, Mid Wales

March 21-23, 2005

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

BSR WINTER MEETING

The BSR Winter Meeting will be held at the School of Engineering, University of Wales Swansea on the 15th/16th December 2004. The meeting will be hosted by the new multidisciplinary Nanotechnology Research Centre, and will be a joint meeting of the British Society of Rheology, University of Wales Institute of Non-Newtonian Fluid Mechanics, and the Particulate Technology Subject group of the IChemE. Sessions will include talks on Particulate Rheology, Nanorheology and Flow Instabilities, recent advances in numerical simulation of flows, rheometry & other experimental methods. The BSR will make the following awards at the meeting: the 2003 Annual Award to Dr John Rallison and the 2004 Gold Award to Professor David Boger. David Boger will present a talk on 'The Rheology of Particulates' and John Rallison will talk on 'Singularities in Non-Newtonian Flows'. In addition, the BSR will present Dr Geoff Brownsey with the Distinguished Service Award. The Vernon Harrison Annual Doctorate Prize will also be presented, together with presentations by finalists.

Further details from Professor Mike Webster: m.f.webster@swansea.ac.uk, or Professor Rhodri Williams: p.r.williams@swansea.ac.uk. Registration details will be sent out by e-mail and posted on the BSR website

INDUSTRY NEWS

New Rheometer from Anton Paar

Anton Paar are pleased to announce the launch of their new Physica MCR rheometer series. Everything about the series is new, from the casting to the motor. The new MCR series also incorporates many innovations, which will be of great benefit to rheometer users worldwide.

High Efficiency Motor - A unique synchronous motor provides the new MCR series with the most efficient rheometer drive in the marketplace. Offering the widest torque range, faster response times plus exceptional performance in both controlled rate and controlled stress this motor is a must for the serious rheologist.

ToolmasterTM - The revolutionary ToolmasterTM represents the first completely automatic measuring geometry recognition system, and also provides automatic configuration for environmental systems. Transponder chips can now be incorporated into all Physica accessories such that they are instantly recognised by the software when attached to the instrument. All information

relevant to the accessory can be stored on the transponder chip removing completely one of the most common sources of error for rheometer users (e.g forgetting to tell the software that you have changed from a 50mm cone to a 25mm cone).

TruGap™ - Another innovative feature that enables independent and accurate validation of the measurement gap. An inductive system allows the gap to be continuously monitored and independently adjusted at all times. TruGap™ eliminates all gap related errors caused by normal forces and thermal expansion (of both the measuring geometries and the instrument casting).

New Rheoplus Software - RheoManager incorporates over 200 application specific templates for those that are new to rheology or new to our software. Users of Microsoft Office will instantly recognize many of the features in RheoPlus and will be able to use it intuitively. A LIMS-SAP module means that results can be automatically saved in an external database. No other rheometer software can offer the power or the flexibility that is incorporated within RheoPlus.

Ethernet Connection - Rheoplus is the first rheometer software to provide both serial and Ethernet interfaces for the instrument. The Ethernet communication facilitates faster data transfer and also permits users to control the instrument via a network or the Internet. (For example one of our application specialists could help out a user that was new to rheology from a remote location, or a service engineer could perform diagnostic tests remotely).

Widest Range of Accessories - The new MCR retains the modularity of the old series with a vast array of accessories available, including 18 different temperature control options covering a range of -150°C to 1000°C. Other innovative options include the patented peltier cover and peltier cylinders, plus a wide range of rheoptical accessories (e.g. SALS), 3 UV cells, a 300bar pressure cell and an Interfacial accessory capable of transforming the MCR from a bulk rheometer to a surface rheometer.

The new MCR series has been designed in cooperation with high level rheologists and feedback from Anton Paar customers. The result is a series of instruments produced to the highest level of technical perfection, which can be tailored to meet the special needs of individual customers. For further information or to arrange a demonstration please contact Steve Goodyer at Anton Paar Ltd. Tel:01992 514730, email: goodyer.s@anton-paar.com, <http://www.anton-paar.com>

New Employee at Anton Paar Ltd.

In anticipation of the increased sales that will be generated by the new MCR series Anton Paar Ltd. have recruited an additional salesman, Mr Steve Smith. Steve has more than 10 years experience in the rheometry industry, having originally joined Carri-Med in the early nineties. He has spent the last 7 years working as export manager for a Swedish manufacturer and is looking forward to serving Anton Paar customers in the UK.

“During my first week with the company I visited the Anton Paar HQ and was extremely impressed with everything that I saw” commented Steve. “Anton Paar have taken the manufacture of rheometers to a new level. The range and quality of the instruments and accessories manufactured by Anton Paar is extraordinary, and is sure to appeal to all rheometer users in the UK”.

New UK distributor for Reologica

Meritics Ltd are pleased to announce that they have been appointed the exclusive UK sales and service representative for the Reologica Instruments range of rheometers and viscometers. The range includes the ViscoTech, StressTech and Dynalayer rheometers.

Meritics are also UK distributors for the Beckman Coulter range of particle characterisation instrumentation, the MTS range of high concentration particle sizers, POLA image analysis and the CISA range of sieves and sieve shakers.

contact info :-

Meritics Ltd
PO Box 2
Flockton
Wakefield
W. Yorks WF4 4YE

North of Birmingham Tel : 01924 849 990
North of Birmingham Fax : 01924 849 991
Birmingham and South Tel : 01582 704 807
Birmingham and South Fax : 01582 659 865
E-mail: info@meritics.com

Expanded facilities for Malvern UK

Building work has started at the headquarters of Freeman Technology (Malvern, UK) to expand the company's administrative, manufacturing and customer facilities.

Freeman Technology provides instruments that measure and classify the flow properties of powders and are being widely adopted throughout many different industries. This latest expansion reflects the company's rapid growth and continuing success in global markets, including Europe, the Americas and Japan.

Freeman Technology enjoys a rural location within easy reach of the major UK centres of London and Birmingham. The new facilities will result from the restoration of 400-year old buildings. Completion of the building work is expected during this summer.

Reg Freeman, managing director of Freeman Technology, commented:

"The new facilities will expand our R&D, production and customer support and at the same time provide a superb working environment. We will soon be expanding the team and are in the process of recruiting additional sales, support and engineering personnel. Providing quality instruments and backing these with excellent customer service and support is the cornerstone of our business as we move into markets throughout the world."

Freeman Technology provides instruments that measure and classify the flow properties of powders. Freeman Technology's patented FT4 Powder Rheometer aids formulation of new materials; helps to optimise handling and processing and can provide quality control standards that lead to real productivity and quality gains.

Traditionally, such measurements have presented a difficult challenge, but now the FT4 provides comprehensive data on powder flow properties. The FT4 is a significant development from the successful FT3 and, like its predecessor, the new instrument uses Freeman's patented technology to provide comprehensive data on powder flow properties. In the FT4, an embedded high-specification processor eliminates the need for an external PC. Networking capabilities mean users can access powder flowability data remotely as well as carrying out analysis in the laboratory, and a universal bus provides serial, automated daisy chaining of accessories. The FT4 also features a digital control system and new digital data acquisition system for force, torque and position measurement,

providing improved control, greater speed range and enhanced sensitivity. For more information visit the company's website at www.freemantech.co.uk

News from Gearing Scientific Ltd

Thermal conductivity of LIQUIDS in the range 0.1 to 10Watts/metre.°K

Many of you know that for several years we have been testing the thermal conductivity properties of solid and semi solid materials and also foams and vacuum panels. Some new developments by LaserComp Inc and Gearing Scientific Ltd mean that we can now test liquids reasonably well. Using a heat flow meter with 750 to 800ml of liquid contained in a sealed poly bag we have obtained the correct value for water and several other chemicals (0.6W/m.K for water). However this is far too much for many researchers who only have a few millilitres of valuable or new material to play with.

For polymer melts we know that the NPL has an apparatus for measuring this along with PVT, but here we are talking about atmospheric pressure liquids of much lower viscosity. i.e we need to be able to use a syringe to put it through 2mm ID tubing into the new cell.

The new Fox 50 liquids cell has been designed to test just 10 to 20 mls of liquid so any researchers who have only this amount should contact us, as the first couple of samples we may be prepared to test free of charge to gain our own experience on using this new cell. The material must be fairly low viscosity, and not cure with time or heat as applied in the T range of the apparatus - 0°C to 190°C! After any free ones, the normal commercial rates will be charged! But 50% of any contract testing work can be held as a credit against purchasing your own apparatus within 12 months.

www.gearingscientific.com Tel 01462 742007 gearingsci@yahoo.com

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/>

2004

4-6 August Reykjavik, Iceland,	13th Nordic Rheology Conference, E-mail: wallevik.o@ibri.is Website: www.nordicrheologysociety.org
15-19 August Bethesda, MD USA	Polymer Networks 2004, E-mail: horkayf@mail.nih.gov Website: www.polymer.nichd.nih.gov
22-27 August Seoul Korea	The XIVth International Congress on Rheology Congress Secretariat, The Korean Society of Rheology, Room 806, New Building, The Korea Science and Technology Center 635-4, Seoul 135-703, Korea Phone: +82-2-3290-3295, +82-2-880-7410; E-mail: jchyun@grtrkr.korea.ac.kr , sjlee@snu.ac.kr ; Website: www.icr2004.or.kr
22 Sept Leuven Belgium	panta rei: Rheology and microstructure of complex systems A symposium in honour of Prof. Jan Mewis, on the occasion of his retirement. Arenberkasteel, Kasteel park Arenberg B-3001 Heverlee K.U. Leuven, more information contact : Marie-Claude.Deflem@cit.kuleuven.ac.be
27-29 Sept Montreal Canada	Polymer Films and Fibers Symposium 2004 Phone: 450-641-5238; Fax: 450-641-5105; E-Mail: sylvie.lamontagne@cnrc-nrc.gc.ca or abdellah.ajji@cnrc-nrc.gc.ca ; Website: www.reseaumateriauxquebec.ca/films-fibers2004/index-en.shtml
30 Sept Reading UK	Non-Newtonian club meeting, University of Reading. Bogdan Dobraszczyk, b.dobraszczyk@reading.ac.uk
4-5 October Baltimore, MD USA	The 5th International Symposium on Binder Rheology and Pavement Performance, Phone: 215-258-3640; E-mail: mnichols@abatech.com ; Website: www.asphalt-technology.com/sympromo.htm

2004

13-15 October Mulhouse France	39th Meeting of the French Group of Rheology Phone: 33-3-8933-6320; E-mail: gfr2004@uha.fr ; Website: www.ensitm.fr/gfr2004
21 October Lausanne Switzerland	Annual Meeting of the Polymer Group Switzerland Rheology Group , Phone: 41-1-632-1155; E-mail: peter.fischer@ilw.agrl.ethz.ch
5 November Montreal Canada	65th Birthday Seminar for Prof. Carreau , Fairmount Le Reine Elizabeth Hotel, Montreal. http://www.polymtl.ca/gch/rheo2004/PJCflyer-final.pdf
14-19 Nov Anaheim, CA USA	ASME - Advances in Materials Processing Science , Rheology and Fluid Mechanics of Non-Linear Materials, Advances in Materials Processing Science, Electric and Magnetic Phenomena at the Micro and Nano Scale Systems, International Mechanical Engineering Conference and Exhibition (IMECE), Phone: 316-978-6300; Fax: 316-978-3236; E-mail: dennis.siginer@wichita.edu ; Website: http://www.asmeconferences.org/Congress04/
15-16 Dec Swansea UK	BSR Winter Meeting , School of Engineering, University of Wales Swansea. Professor Mike Webster: m.f.webster@swansea.ac.uk , Professor Rhodri Williams: p.r.williams@swansea.ac.uk .

2005

13-17 Feb Lubbock, TX USA	76th Annual Meeting of The Society of Rheology , E-mail: w-burghardt@northwestern.edu , Website: www.rheology.org
15 March Chipping Campden UK	Non-Newtonian club meeting , Mr Gary S Tucker, Campden & Chorleywood Food Research Association, Chipping Campden UK, T: 01386 842035 F: 01386 842100 g.tucker@campden.co.uk
13-17 March San Diego, CA USA	Biological & Synthetic Macromolecules for Emerging Nanotechnologies, Polymer Chemistry Division, ACS Meeting , E-mail: sclarson@uceng.uc.edu , Website: www.acs.org
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: +44 (0)1248 351151 x 2480 Fax: +44 (0)1248 383663 Email: g.w.roberts@bangor.ac.uk