
THE BRITISH SOCIETY OF RHEOLOGY



BSR BULLETIN

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EDITORIAL

Well, I hope I am Y2K compliant. I'm not actually sure if I've even been Y1K999 compliant but there you go...

A slightly delayed issue of 42(2) but with lots of announcements and a bang up-to-date Conference & Course diary. We also (at last!) have the reports relating to the Isaac Newton Institute Meeting, which have been promised for at least three back issues of the *Bulletin*. Many thanks go to Nick Hudson for organising these.

Bulletins tend to be like buses – nothing for ages then two come along at once. Volume 42(3) (European Edition) will be along shortly, after which normal service will be resumed.

It remains for me to wish you all a very Merry Christmas and a Happy & Peaceful New Year.

Paul Doody

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, WordPerfect, ASCII, RTF, PDF) but always provide a contact name, address, eMail, or telephone number in case of problems.



Copy date for next (European) Bulletin is 15 February 2000. Copy date for next British edition is 15 June 2000. Please add these dates to your diaries! By the way, the intention (if not always the act...) is to publish in March, July, and November and, as always, all contributions gratefully received.

Late copy can sometimes be accommodated however the facilities of the BSR and ESR web sites may also be appropriate. Please contact Editor for details.

COVER ILLUSTRATION

The cover illustration on this edition shows freshly mixed concrete emerging from a vertical pipe apparatus when vibrated. When unvibrated, it conforms to the Bingham model, but vibration overcomes the yield stress.

I'd like to remind everyone that suggestions for Black & White or colour pictures (preferably of a rheological nature!) are welcomed by myself (Bulletin Editor) or Nick Hudson (Abstracts Editor). Suggestions are always welcome!

BSR NEWS

PRESIDENT'S REPORT 1998/9

1998/1999 has been an eventful year for BSR. It started with a very successful symposium entitled "Partners in Rheology" held in the fine Yorkshire town of Ilkley and organised by Prof. T.C.M. (Tom) McCleish and his colleagues of the University of Leeds. It was clear from the programme that Tom had used his considerable influence and charm to engage an impressive set of speakers, also to persuade people from a very diverse range of backgrounds to attend (have you yet to meet for the first time a BSR member who has not started the conversation by saying "of course I am not really a rheologist..."? - I have not !). The result was a lively and most informative meeting. A report on it has appeared in the Bulletin and on the web-site, although if you view the latter I would strongly advise you to select the text-only option on your browser since, to my regret, some rather unsavoury photographs have somehow found their way onto the page in question. If you do not already use it by the way I would strongly encourage you to visit the BSR web-site. It contains up-to-the minute information on the doings of the Society and many useful links - the URL is <http://www.ncl.ac.uk/rheology/bsr/index.html>. The webmaster is Prof. Chris Petrie of the University of Newcastle-upon-Tyne. Council and BSR are most grateful to Chris for producing and maintaining such a well-designed and informative site for us.

The Ilkley meeting was what the Society is all about to my mind. BSR can and does provide a range of services to members but, a full programme of scientific meetings is core and Council is determined to ensure that the standard set by Ilkley and by the specialist one-day meetings organised so ably by Dr Mackley is maintained. Further details of recent and forthcoming meetings can be found in the Hon. Secretary's report, on the web site and elsewhere in the Bulletin. One does not need to be a member of Council in order to propose and organise a BSR meeting, provided that is that certain criteria are fulfilled, and so if you would like to run a conference or workshop under the banner of the BSR please contact us with your suggestions. Joint meetings with other societies and networks are encouraged since they increase the potential audience and enliven the discussion. We will also continue to bring meetings run by others to the attention of members where we think it is appropriate to do so, as we did with UWINFM's symposium on "Rheometry" held in the Spring.

It was my doubtful privilege at Ilkley to chair the Society's first EGM. An EGM was necessary because the AGM held in September 1998 was deemed inquorate. A number of substantial changes were proposed at the EGM and some further resolutions are to be made at the 1999 AGM. The aims of the various changes proposed, details of which are available to you in the various agenda and minutes, were to put the Society on a firm financial footing; to make the accounts of the Society transparent and easily read by both Council and membership; to simplify the management and control of the various services to members and to ensure that the Society complies with the requirements and guidelines of the Charities' Commission.

The measure that will impact most on the membership is the introduction of an additional charge for personal copies of "Rheology Abstracts", which will now cost £15 to those members electing to take it. At the moment the "Abstracts" are only available in hard-copy, but, this will change and we hope soon to make "Rheology Abstracts" available in two alternative and cheaper formats - on CD-ROM and on a password-protected part of the web-site. Hard-copies will continue to be made available to those who prefer them.

Council has had a lot of work to do over the last year and I would like to thank my fellow Council members on your behalf for all the good work that they do. To thank them also for propping me up - one of the problems of being in office for only two years is that by the time one has worked out what the job is about, one is being displaced by a new kid on the block.

The next young pretender is Prof. T E R (Eirion) Jones, of the University of Plymouth. Eirion will take office in September 2000. Turning back to this year, there will be two personnel changes on Council membership - Russell Davies resigns as membership secretary and leaves Council and Oliver Harlan joins as an ordinary member. So, goodbye and thanks to Russell and welcome on board, Oliver.

It is my pleasure to finish this report by announcing that the 1999 Annual Award is to be made jointly to Prof. Robin C Ball, now of the University of Warwick, and Dr John R Melrose of the University of Cambridge in recognition of their use of computer simulations to solve fundamental problems in suspension rheology. The presentation will be made at University of Wales at Aberystwyth on Wednesday 15 December, where they will give a lecture on their joint work. Other events on that afternoon include a formal opening of the newly re-sited Scott-Blair Collection by Prof. Sir Sam Edwards and a talk on the life and work of Prof. Scott-Blair to be given by Howard Barnes. All are welcome to attend, but please notify Prof. Ken Walters, of your intentions, especially if you require lunch prior. Further details of the day are to be found on the web-site.

Richard Buscall
BSR President

BSR ANNUAL AWARD 1998 / 99 **Dr D R Oliver**

Ralph Oliver will be known to many members of the BSR as he has been one of its most loyal supporters over the last thirty years. Throughout his academic career at Birmingham University, Ralph has been a consistent and vocal supporter of sound pragmatic rheology. He and his research students have made a number of notable contributions to the Engineering Science of Rheology and he has also enlivened endless rheology meetings by keeping people on their toes both in terms of sensible science and clear presentation.

Ralph is essentially a "Birmingham man" and he wore his Birmingham dialect with pride. His first, second and third degrees came from Birmingham and many of the Chemical Engineering students at Birmingham will testify to his clear style of lecture presentation. Ralph's research contributions can be thought of as being either in the area of Rheology or Chemical Engineering. His work was essentially practical but always of a high scientific quality.

My own first encounter with Ralph was in the 1970's and concerned his own "baby", the triple jet. This was an ingenious device for generating extensional flows. Ralph was one of the pioneers of extensional flow and this element of his work has stayed with him for much of his career.

His association and friendship with John Hutton, Ken Walters and Jim Ferguson is legendary within BSR circles and it was inevitable that by mixing with these people an element of his work would involve experiments on lubrication and squeeze films and perhaps it is for this work that he is best known to BSR members. I however, recently came across work by Ralph in a quite different area on Heat Transfer enhancement using certain inserts and discovered that he has done very elegant experimental work here, with very clearly written papers. Knowing the man, I was also confident that the data would be right!

Ralph's contribution over the years to the BSR has been substantial. He has been a Council member for nearly all his academic career. He has been Abstracts Editor and Treasurer and I had the privilege of serving on Council whilst he was President of the BSR. Ralph's style was pure Birmingham. Candid and to the point. Meetings were efficient and fair.

In recent years Ralph's interests have moved to various other fields. He has been involved in ceramic paste extrusion and has extended some of the pioneering work in the field of another BSR stalwart John Benbow. In terms of "other interests" Ralph has had a long love affair with tennis. He has played at Wimbledon and been Warwickshire Mens' Captain; so be warned if he invites you to a game, you stand a very good chance of losing. He does however have less well known interests. A couple of years ago I carried out with him one of the many PhD vivas that he has done over the years. In the corner of his office was a remarkable blue structure which he told me was his own designed and built box, hang glider. I was amazed and somewhat concerned for his safety. I have since seen Ralph alive and well and can only assume that the device either flies or he realised that the venture was one experiment too far. Ralph is clearly still of an independent mind and also clearly is a very deserving recipient of the 1998 BSR award.

Malcolm Mackley



D R Oliver receiving his award

Here are the minutes of the 58th AGM which were omitted from the last printed *Bulletin* (but were enclosed as a loose flyer). They were considered at the 59th AGM in London on September 20th, a notice of which was contained within the last issue of the *Bulletin*.

**Minutes of the 58th Annual General Meeting
Department of Chemical Engineering, University of Cambridge, Cambridge
on Monday, September 21st 1998, starting at 5.00 pm.**

1. Present

The President, The Hon. Secretary and 19 members.

2. Apologies

Received from J. Gearing, P. Doody.

3. Minutes of the 57th AGM

These were proposed as a true and accurate record and signed by the President.

4. Matters arising

There were none.

5. Reports of the Officers

5.1. President

Professor Peter Townsend reported that the past year had seen discussions on the future of the Society which had shown a clear preference from the membership for Conferences and scientific meetings such as the present one. Equally Council was acting on pleas from members for a more modern society by improving our publications, establishing a website, exploring CD-ROM publication of Rheology Abstracts and liaising with the European Society of Rheology. He was pleased to note the Annual Awards for 1997 to Dr Rhodri Williams and for 1998 to Dr Ralph Oliver, together with a special award to Peter Anderson for notable service to the Society. A sad event this year was the death at 63 of Professor Jim Ferguson. He concluded his outgoing report by thanking the Council members for their efforts and support over his term of office.

5.2. Hon Treasurer

Dr Mike Webster presented accounts for the past year and noted that there had been a loss of over £17000, the first for over five years, and that this was mainly due to a deficit on publications of about £12000. The essence of the problem was that costs were higher because of the better quality and larger number of pages in Rheology Abstracts, while circulation had decreased. It was noted that Dr Nick Hudson, as Publications Manager, was in the process of producing a business plan, which might involve two-tier membership for those who do and those who do not want Rheology Abstracts. After extensive and animated discussion it was proposed by Professor Tom McLeish and supported unanimously from the floor that an Extraordinary General Meeting be held in December 1998 to discuss the Council's business plan and revised membership subscriptions.

5.3. Hon Secretary

Dr Geoff Brownsey reported on the success of the Young Rheologists Workshop being held to coincide with this meeting and the establishment of a website committee to oversee the Society's presence on the Internet, but remarked on the apparent lack of interest from students since the Society's Scott Blair Scholarship remains unfilled. He concluded by thanking Council members for the hard work and support over his term of office.

5.4. Membership Secretary

Professor Russell Davies reported that 22 new members had joined over the year, mostly resident outside the UK. With a loss of two members, this brought the total membership to 625.

5.5 Bulletin Editor

In the absence of Dr Paul Doody it was noted that the appearance of the Bulletin made it an attractive publication.

5.6 Abstracts Editor/ Publications Manager

Dr Nick Hudson reported that Rheology Abstracts was now covering much more literature and was much increased in size. He noted that about one-third of the circulation went overseas. It was suggested from the floor that Council members should take every opportunity to ask members whether the Society's publications are what the members want.

6. Matters raised by Council

Previously circulated proposals for changes to the constitution were discussed but the meeting did not meet the quorum requirements as stated in clause 7(d) so no decisions could be reached.

7. Election of Officers

7.1. President

Dr Richard Buscall was duly elected as President for the period 1998-2000 and took the chair for the rest of the meeting.

7.2 Officers and Council members

Since the number of nominations equalled the number of vacancies the Council for 1998-1999 was duly elected as follows:

Hon. Secretary
Hon. Treasurer
Membership Secretary
Bulletin Editor
Abstracts Editor

Professor Phil Banfill
Dr Mike Webster
Professor Russell Davies
Dr Paul Doody
Dr Nick Hudson

Ordinary Members of Council

Mr Derek Bell
Mr Tom Dovey
Dr Malcolm Mackley

Dr Geoff Brownsey
Mr John Gearing
Dr Rhodri Williams

8. Any other business

8.1. Professor Tony Pearson reported on an IUTAM meeting, which he had attended as the Society's representative. As he is also a member of the organising committee for the International Congress on Rheology in 2000, he had been able to ensure that there was no overlap in the topics. The International Committee on Rheology (which meets only at each International Congress) had previously represented the national rheology societies but the formation of the European Society had changed that and the European Society is now the channel between the British Society and the International Committee.

8.2. Professor Jan Mewis informed the meeting that the next European Conference would be held in Erlangen, Germany, in September 2002.

There being no further business the President, Dr Richard Buscall, thanked the members present, Professor Peter Townsend as outgoing President and Dr Geoff Brownsey as outgoing Secretary and the meeting closed at 6.15 pm.

PFG Banfill
Hon Secretary
July 29th 1999

R Buscall
President



JIM FERGUSON MEMORIAL FUND

Following the Memorial Lecture at the University of Strathclyde earlier this year, a Memorial Fund dedicated to the memory of Jim Ferguson was established.

This Fund has been set up to finance prizes to students for perceived excellence in particular areas of their studies. These prizes will typically amount to at least £150 in any year. The Fund was started with a balance of £1000. In order to continue the Fund into perpetuity, further contributions need to be made in order to secure the capital. The Fund will be managed by the University of Strathclyde Alumni Association, and the trustees will be found from the Ferguson family and the Department of Pure & Applied Chemistry.

If you wish to make a contribution, then please send a cheque, made out to "The University of Strathclyde Foundation", to Nick Hudson at the address below. These contributions will be collated and forwarded to the Alumni Office. Confidentiality will be respected. Alternatively (or in addition) you may wish to Covenant some money either monthly or yearly. This has the advantage that the Alumni Office can claim back the tax paid. Forms for this can be obtained, again through Nick Hudson.



To: Dr N E Hudson
Dept of Pure & Applied Chemistry
University of Strathclyde
295 Cathedral Street
GLASGOW G1 1XL UK

Please find enclosed a cheque for _____
as a contribution to the Jim Ferguson Memorial Fund.

I [require / do not require] a receipt.

I [require / do not require] information on Covenanting to the Fund.

From: _____
Address: _____

EUROPEAN NEWS

THE "eurorheo" MAILBASE LIST

This electronic mailing list is run on behalf of the European Society of Rheology and the rheological community worldwide.

If you are interested in joining the list, you need to have an electronic mail address. You may join either by sending an e-mail message with just two lines:

*join eurorheo firstname lastname
stop*

to the address

mailbase@mailbase.ac.uk

with "firstname" and "lastname" replaced by your own first and last names, or by filling in your name and e-mail address on the web page <http://www.mailbase.ac.uk/lists/eurorheo/join.html>

In either case, you will get an e-mail message asking you to confirm that you wish to join the list. This prevents anyone else from joining you to the list. When you join you are sent instructions about using the list (and leaving it). You can also find these on the ESR web pages (see below).

You may be interested to know that the list now has 371 members. Messages seem mainly to be about job openings and about conferences. In the last three months (October-December 1999) there have been 23 messages to the list, with 15 advertising job openings (both academic and industrial) and 5 giving information about conferences.

One thing about which list members may need reminding:

To send a message to the list use the e-mail address

eurorheo@mailbase.ac.uk

Since the list is moderated, this does not go directly to the list but comes to me (and any other list moderator - at present Manfred Wagner is the other). It does NOT speed things up if you send the e-mail directly to me - in fact, if I am away it will delay it since Manfred will not see it.

You may also be interested to know that I have started a "jobs" page at <http://www.ncl.ac.uk/rheology/bsr/jobs.html> and (when I have time) I am happy to add items to this. One link there is to the archives of this Mailbase list, where the messages I mentioned above can be inspected. Messages are kept in this archive for 2 years (which is a long time for a job advert).

I hope you find the list useful and I welcome any comments and suggestions.

Chris Petrie

Professor of Non-Newtonian Fluid Mechanics and Rheology webmaster

E-mail: Chris.Petrie@newcastle.ac.uk

ESR web pages: <http://www.ncl.ac.uk/rheology/esr/>

Eurorheo list web pages: <http://www.mailbase.ac.uk/lists/eurorheo/>

CONFERENCE REPORTS

THE ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

The following reports are from the Isaac Newton Institute for Mathematical Sciences symposium held from January to June 1996. These reports were originally due for inclusion in various back issues of the *Bulletin* but had been delayed. They are reprinted here with the kind permission of Institute's Director, Professor Keith Moffatt

PROGRAMME 15: DYNAMICS OF COMPLEX FLUIDS - JANUARY TO JUNE 1996

Report from the Organisers: TCB McLeish (Leeds); JRA Pearson (Cambridge); K Walters (Aberystwyth)

(Permission to reproduce this article from the Institute's Annual Report for 1995/96 has been kindly given by the Institute's Director, Professor Keith Moffatt.)

Introduction and Objectives

Many fluids of industrial, biological and environmental importance (e.g. molten plastics, salad dressings, whole blood, synovial fluid, clay and cement slurries, and volcanic lava) respond in a complicated fashion when deformed. The reasons for this complexity can be traced back to their molecular structure, which may itself be very elaborate, to microscopic supramolecular structures into which they assemble themselves, and to the fluid mechanical forces that act between molecules and structures.

Many theories and explanations for their behaviour have been developed, using the techniques of statistical mechanics, thermodynamics and continuum mechanics. However many of these theories only cover part of this complex behaviour and are not readily applicable to industrial, medical or geomechanical problems, where quantitative predictions are required.

The key concept for constitutive behaviour is a mathematical model embodying physical insight into the behaviour of a particular material. Covering the full range of behaviour of most systems involves modelling on a wide range of length and time scales. Much of the difficulty experienced in seeking complete explanations of behaviour is connected with passage from smaller to larger length scales; in embedding the rheological equation of state into the conservation equations governing mass, momentum and energy. Most of the mathematical problems that arise involve non-linear differential, integro-differential and integral equations: a full range of analytical and numerical techniques has to be employed to obtain solutions.

The aim of the Programme was to bring together experts in all these approaches; to confront the assumptions of one group with the predictions of another; to discover what underlying problems were preventing progress and whether an extension of conventional approaches could overcome this; to widen the horizons of all.

Organisation

Invitations were sent in 1994 to leaders in the field all over the world to spend from 3 to 6 months at the Institute. Some were prevented by other commitments from making other than short visits, but the response from all was very enthusiastic. Several suggested other younger invitees. As a result a very broad and balanced representation of specialities and backgrounds was achieved.

To encourage concentration on particular topics over shorter periods, a skeleton structure was agreed, which had obvious advantages for short-term visitors wishing to be brought up-to-date in specific areas. The sequence chosen was:

January - Polymeric systems

February - Surfactants and liquid crystals

March - Colloids

April/May - Constitutive modelling and boundary-value problems

May/June - Computational issues

The idea was to start with particular materials, emphasising their constitutive properties, rheological behaviour and associated problems. Molecular and structural theories would be to the fore. This was to be followed by consideration of more generic, continuum mechanical theories, suitable for description of complex flows of complex fluids. The last phase was intended to cover the solution of continuum flow (boundary value) problems by analytical and computational means, revisiting the individual materials insofar as computational issues arise in predicting their constitutive behaviour from structural models.

This proved to be helpful; fortunately this arrangement was not intended to be exclusive and so some activity continued throughout on all topics.

Frequent seminars (sometimes 4 in a week), both formal and very informal, were arranged and attended by most participants in residence. These ensured that short-term visitors rapidly made their presence and interests felt. Much of the detailed personal work done by participants during the Programme stemmed from issues raised at seminars.

Most significant in determining attendance was the choice of workshops, meetings and study groups that were advertised in advance. Much care was given to issuing special invitations to workers on the fringe of the subject whose approaches and insights would be valuable to core participants and vice-versa. Again, we had a remarkably enthusiastic response. The restriction to about 100 proved a positive advantage.

Much use has been made of the www and e-mail and special thanks are due to CJS Petrie in this context; he also organised a one-day symposium in Celebration of A Complex Fluid Career, that of one of the organisers (JRAP).

Meetings

Workshop on Unresolved Experimental Dilemmas (8-12 January)

This meeting was intended to provide "food for thought", to describe new observations and phenomena that could usefully be investigated theoretically. It proved to be outstandingly successful in that it provided the basis for much of the new work carried out, and influenced the subjects discussed in seminars, throughout the Programme. It had a strong international flavour, but was fully representative of U.K. work. A poster session was necessary to accommodate all presentations. The proceedings will appear in the Journal of non-Newtonian Fluid Mechanics.

NATO-ASI on Theoretical Challenges in Complex Fluids (24 March- 4 April)

This remarkable workshop drew a particularly high-calibre team of lecturers from seven countries and a full complement of students from over 15 countries, both within and without NATO. The large NATO grant to cover lecturers expenses and student bursaries was "pump-primed" with generous funding of £3000 from the BSR, which enabled extra UK participants to attend. The principle aim was to present an overview of current molecular and microstructural theories of complex fluids, focussing particularly

on entangled polymers, colloids, surfactants and liquid crystals, and trying to point out similarities and differences in approach. Close link with experiments was ensured by incorporating an experimental presentation at each stage of the workshop. The gentle pace of four lectures per day allowed extended discussion periods, which were particularly memorable for their high creative quality. Several research projects can be traced back to the ASI. A full social programme, both formal and informal supported the atmosphere of international co-operation.

The full lecture texts of the ASI have just been published as "Theoretical Challenges in the Dynamics of Complex Fluids", edited by Tom McLeish, Dordrecht: Kluwer, ASI series E Applied Sciences vol. 336 (1997) ISBN 0-7923-4607-6.

Euroconference on Constitutive Relations and their Application to Complex Flow Problems (15-19 April)

This workshop covered continuum models for bulk behaviour of viscoelastic fluids (mainly polymeric systems), liquid crystals, foams, emulsions, suspensions and granular media. Models based on Brownian dynamics and various meso-scale structures were described. Special attention was given to near boundary effects that at a continuum level appear as boundary (interfacial) conditions. Examples of the solution of boundary-value problems by analytical or computational methods were given.

Joint INIMS/DSM Symposium on Rheology/Chain Structure Relationships in Polymers (14-15 May)

This symposium brought together a large number of industrial and academic workers, the latter mainly composed of participants on the Programme. It was a useful opportunity for the former to explain the interests and constraints of industry and for the latter to explain how their models could be useful. A separate report on this Symposium follows.

Three other associated or jointly organised meetings took place outside the Institute.

Royal Society of Chemistry Colloid and Interface Science Group Conference on Colloidal Aspects of Complex Fluids (Cavendish Laboratory 26-28 March)

Drilling Fluids Workshop (Schlumberger Cambridge Research 11-12 April)

The Royal Society - Unilever Indo - UK Forum on Dynamics of Complex Fluids (Cavendish Laboratory 24-28 June)

This provided a suitable finale for the Programme. Session topics included polymers, self-assembled systems, particulate dispersions, visco-plasticity and complex flows, and this reflected the spread of interests of the Programme. There was a deliberate emphasis on computer simulations. The proceedings will be published by Imperial College Press.

Participation

The Programme attracted over 70 participants of whom a core of 20 spent over 3 months at the Institute. They ranged from recently retired Professors to research students and young post-doctoral workers. The Americas, Europe, Asia and Australasia were all represented; special funding facilitated the participation of several eastern Europeans whose characteristic broadly based ways of thinking about shared problems provided a welcome stimulus.

Participants came from a range of disciplines in the physical sciences, engineering and mathematics, but in practice had no difficulty in sharing the common language of traditional applied mathematics and

mechanics. There were differences in emphasis and objectives: some concentrated on the characterisation and modification of materials, some on their behaviour in industrial processes, while some were most concerned with mathematical niceties. The extent to which everybody sought to appreciate the interests of others was most gratifying.

Achievements

Because of the very wide spread of interests and activities, this report on the achievements of the Programme has inevitably to be a rather personal account. Speaking to other participants made clear to us all that everybody has benefited significantly from the chance to work in a lively environment and many have carried away with them a range of ideas and problems to pursue in the future. Each of us has our own list of those moments when the significance of some part of other people's work dawned on us. Not surprisingly, these moments sometimes came during the re-presentation of earlier work, the importance of which had been heightened by investigations that are more recent. Advances were evolutionary rather than revolutionary.

Polymer melts

Most early work on modelling the rheology of polymer melts was based on long flexible chains of equal length. Only more recently have the effects of branches been systematically and rigorously included; significant developments occurred during the course of this programme, much of it provided by UK workers. Polymers now come as stars, combs and pom-poms, each with its own constitutive relation cast in the style of the celebrated Doi-Edwards equation. Polydispersity has been included. It is not clear what consequences these new ideas will have for process modelling.

Fibre spinning experiments based on screw extrusion and carried out over a range of temperatures, output rates and spin-line lengths, for both linear and branched polyethylene, were shown to exhibit remarkable similarity, leading to a single grand master curve for each material. This unexpected result led to a re-examination of the predictions of existing model equations and suggested potential simplifications of these models. It was noted that axial stresses dominated in both die and free fibre and that die swell appeared to be representable as a discontinuity linking two kinematically distinct flows (one a non-uniform extensional flow, the other a non-uniform simple shear flow). Velocity profiles were consistent with the simple notion of a purely elastic region followed by a strongly viscous region.

Polymer solutions

These continue to be the favoured system for much experimental work, particularly because they often show constant shear viscosity in uniform steady simple shear flow. Observations have been compared with a series of visco-elastic models which come equally from continuum mechanics and statistical mechanics; these include the Upper Convected Maxwell model, the Oldroyd (8-constant) model, the FENE (finite extension non-linear dumbbell) and FENE-P models, the Phan Thien-Tanner and Giesekus models; the simplest forms of these models relate to mono-disperse systems (polymer chains of equal length) though addition of contributions to the stress tensor allow for poly-dispersity.

It has long been known that uniaxial or biaxial extensional flow provide unique and sensitive tests of rheological models; recent experiments reported during the programme have enabled far more sensitive comparisons to be undertaken; significant improvements in understanding the relations between elastic and viscous behaviour in extensional flow were described (see above); a consistent explanation of the apparent success of single-mode (relaxation time) models in matching experimental observations in multi-mode systems was put forward. Increases in computing power have allowed far more detailed simulations (described below) to be undertaken, even for the apparently simple case of uniaxial extensional flow. These have helped to explain the prediction of paradoxically short lengths for the "fully extended" dumbbells in the FENE models.

Singularities, asymptotics, change of type, instability

The mathematical richness of solutions to the sets of elliptic/hyperbolic equations describing the slow flow of Maxwell-type fluids formed a notable, even if limited, part of the programme. The re-entrant corner flow problem, linked to stress boundary-layers on the smooth solid surfaces forming the corner, is now basically resolved; the significance of change-of-type within the flow fields is now commonly recognised and its consequences satisfactorily allowed for in simulations of seemingly "innocuous" flows, e.g. past a sphere or cylinder. Detailed prediction of lip vortices for converging flows is now largely satisfactory.

Equally fascinating have been the recent studies of instability (symmetry breaking, bifurcation, Hadamard instability) in flow and material behaviour, several of which were presented during the programme. For a generation brought up on Newtonian liquids, described by two constitutive parameters (density and viscosity), with inertial non-linearities providing the cause of instability and secondary flow, the effect of visco-elastic non-linearities can be counter-intuitive and more complex. The purely visco-elastic analogue of Taylor-Couette instability, for example, which has been analysed through the first bifurcation into the weakly non-linear regime, was shown to provide a rich range of further instabilities.

Of particular interest were the many cases of flows involving deformable interfaces, many of which were carefully re-examined. Draw resonance in fibre spinning, drop formation due to Rayleigh instability and the associated persistence of thin filaments formed during drop growth or plate separation, rolling up of interfaces during co-extrusion along tubes or channels (as in lubricated transport along pipes), effects of heat and mass transfer on otherwise static systems, and fingering or "printer's ink" (flow under rollers) instability were all revisited. The asymptotics of fibre rupture using long-wave approximations, which can be significantly altered by elasticity, proved to be a very topical issue. Apparent slip at solid or deformable boundaries provided another rich topic. Diffusive and other boundary-layer effects on a structural length scale lead to complex constitutive description for the boundary conditions applied at the continuum level, and strike conventional fluid mechanicians, brought up on the no-slip condition and Prandtl boundary-layer theory, as alien and almost indecently empirical. For colloid scientists and biologists, it is almost the reverse: for them the interfaces are the source of material behaviour and organic diversity.

Granular media

Here one problem dominated attention during the programme: that of predicting the stress state within a pile of grains resting in limiting equilibrium after being formed by pouring or by collapse of a supported column on release. Are there simple physical guiding principles, which remove the need for details elasto-visco-plastic description? Or is conventional application of continuum deformation theory for homogeneous bodies, with full tensor constitutive models, the best way forward? What role can be played by (ensemble averaging of) discrete grain computations? This particular example illustrated just how varied are the ways of seeking scientific insight and making engineering predictions, at the highest professional level, a lesson not lost on even the most experienced workers.

The role of computation

The most important question addressed in this context concerned the need for continuum constitutive relations when undertaking quantitative calculations for stress and velocity fields, assuming that molecular and meso-scale descriptions of material behaviour exist. The answer would seem to be that hugely parallel (or repetitive) simple calculations for individual fluid elements can be undertaken for a statistical ensemble almost as easily as can those for discretised forms of continuum representations; furthermore that there is more flexibility in introducing variations into the elemental constitutive models

than in making equivalent changes in the continuum constitutive models. This of course raises the further question of how accurate the elemental models are in the first case, and whether such averaged calculations will provide the sort of generic results on results on material flow behaviour that are the outstanding successes of rational mechanics.

Successful calculations, predicting drag reduction for polymer solutions and providing detailed velocity and stress fields for unidirectional flow in pipes, were reported at the Euroconference. This extension of direct modelling of turbulence near transition was a major achievement. Also remarkable were some of the molecular dynamical and Brownian dynamical calculations reported for non-Newtonian fluids, emulsions and suspensions.

No specific attributions have been given above so as to emphasise the collective nature of the Programme. The interested reader can readily deduce the authors of much of the work described by reference to the titles and abstracts of talks given at the several meetings and seminars organised in connection with the Programme.

JRA Pearson

Further information about the Institute may be obtained from:

Ann Cartwright
Institute Administrator
Isaac Newton Institute
20 Clarkson Rd
Cambridge, CB3 0EH, U.K.

T: +44 (0)1223 335981 F: +44 (0)1223 330508 E: A.Cartwright@newton.cam.ac.uk

RHEOLOGY / CHAIN STRUCTURE RELATIONSHIPS IN POLYMERS

T.C.B. McLeish, M. Van-Gurp and M. Kroeger

(published in modified form in Appl. Rheol. 6 (1996) 133-136)

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As part of the six-month programme "Dynamics of Complex Fluids" (DCF) the two day conference entitled "Rheology/Chain Structure Relationships in Polymers" was held at the Isaac Newton Institute (INI), Cambridge from May 14-15, 1996. DSM Research in the person of Dr. Marnix van Gurp organized in conjunction with the INI a focussed symposium on the links between polymer chain structure, and the macroscopic rheology of melts and concentrated solutions. DSM also supported the conference financially, boding well for industrial-academic links in the area! Bringing together academic, but especially industrial scientists, experimentalists and theoreticians, subjects covered included tailored branching and polydispersity, as well as rheology as a characteriser of chain structure.

A major aspect of programmes at the Newton Institute is an emphasis on those which cut across the traditional boundaries of disciplines to bring together research workers with very different backgrounds and expertise. This conference on the interplay between rheology and chain structure in polymers, beside 6 other conferences or workshops, proved to be an example.

The excitement of the conference was the interaction between the goals and methods of industrial and academic scientists. The revolution in PE catalysis may well afford us undreamed-of control of molecular structure in polymers on a large scale. This suddenly makes the model branched materials of the academic programme and possibly the associated theories more relevant. The behaviour of new branched polymers presented by R. Koopmans (Dow Benelux) was especially exciting. Some connections could be made with a new model for the rheology of a class of branched polymers based on the tube model, which has been the subject of work by T. McLeish (Leeds) and R. Larson (AT&T Bell)

during the 6-month programme. It exhibits the classic phenomena of extensional and shear rheology of branched polymers. An interesting contribution was made to the conference by the Nobel Prizewinner P.G. de Gennes (EPCSI Paris). He conjectured during a discussion period that flow through nano-pore filters might be an effective analytical tool for long-chain branching. The day following the conference he presented the ensuing paper at the INI.

In his keynote lecture W.W. Graessley from Princeton University showed that molecular theories, evolved from the reptation and tube ideas, now describe model systems convincingly enough to encourage their extension to some of the structural complexities presented by commercial polymers. His talk touched upon three of them - chain length distribution, long chain branching and species mixtures - while also offering some views about the chain and matrix roles and flow-induced changes in the matrix structure. The other keynote lecture was held by H.M. Laun (BASF AG). He opened the discussion on 'analytic rheology of polymer melts in industry'. Obviously, it is not possible to gain information on the structural parameters from solely rheological measurements if all of the structural parameters are variable. He gave some routes to increase the 'quality of understanding' rheological results, how to avoid pitfalls and when to use rheological techniques in reproducing structure. He proposed to pay further attention to the interplay between branching structure, compliance and shape of viscosity function.

The remaining 16 talks were split into three sessions: Experimental methods, New structures and New theories.

In the session 'Experimental methods' M. Wagner (Stuttgart) showed that Rheotens-mastercurves allow a direct and quantitative assessment of the drawability of polymer melts under actual processing conditions. His findings were based on tests of several polyethylenes (PE) with different degrees of long-chain branching and different polydispersity. Starting from a modified version of the original formula of Briedis and Fایتel'son, E. Luccelli (Enichem) obtained three parameters, one of them reflecting the influence of branching separately from those of the molecular-weight distribution, by comparing with experimental values of the dynamic viscosity of low-density PE. With a quite unusual rheometer, the Chopin Alveograph, B. Dobraszczyk (RHM Technology) realized flow conditions close to those experienced during baking. He observed strain hardening which is critical in determining the limit bubble expansion or the 'dough bubble failure strain'. S. Cobianco (Eniricerche) quantified the effect of base oil structures on the rheology at low temperatures. P. Ehrecke (Stuttgart) compared measurements of stress relaxation after double-step shear experiments for diverse polymer melts with predictions of a temporary junction network model. That model accounts for irreversibility of network strands due to disentanglement during deformation.

The session 'New Structures' was started by R. Koopmanns in showing examples on the complexity of the molecular mixtures of PE and the limits of analytical tools. He demonstrated the capabilities of structure control using metallocene catalyst technology and its consequences for the rheological properties. R. Larson presented the 'pom-pom model', an novel approach to predict the dynamics and rheology of branched polymers. The constitutive formulation itself, arising out of molecular ideas, explains past rheological anomalies in the classical description of long chain branched polymers. P. Dvornik (Michigan) showed that polyamidoamine dendrimers are high molecular weight Newtonian polymers. R. Wimberger-Friedl (Philips Research) concentrated on the chain stiffness of spiro-copolycarbonates and M. van Gurp reported the synthesis of controlled branched architectures. Some unusual rheological features were encountered, possibly caused by small amounts of extremely long branched molecules.

The last session on 'New Theories' was opened by T. McLeish. In particular, illustrated by computer simulations he showed that the linear response of long chain branched polymers is a combination of the reptation of linear chains and the fluctuation of branched chains and showed how this could explain some of the results on star-polymers presented by W.W. Graessley. In his talk P.G. de Gennes introduced some ideas about artificial muscles and their contraction speed but, with a smile, he characterized his investigations as of 'no industrial relevance'. D. Mead (Michigan) outlined an

empirical approach to derive mixing rules based on generic structure of a mixing rule. The mixing rule relates physical properties of polymers to their underlying molecular weight distribution. Finally M. Kroeger (Berlin) reported results from nonequilibrium molecular dynamics computer simulations on the rheology and structure of linear wormlike micelles. These show great promise as model materials for testing molecular theories of polymer dynamics. He presented a definition of entanglements based on the microscopic geometry of linear polymer chains. A poster session completed the program.

Following the presentations an open discussion focused on the interface between academic and industrial polymer rheology. R. Koopmanns (Dow) believed that there are a number of very important issues in physics of polymers which still need to be addressed, such as instabilities during flow and the processes at the interface between polymers and metals or polymer/polymer. He called for a closer collaboration between universities and industry and proposed the supervisors of PhD students to select topics which are at least related to problems which occur in industrial processes to increase the students ability - or chance - to change to industry later. In another contribution M. Wagner (Stuttgart) discussed the role of universities for the education of students in a broad range of fields. He commended the INI for accepting the participation of physical chemists, which reflects an understanding of exact natural sciences. Constructive propositions were given and discussed, e.g. the establishment of research centres supported by industry.

During the two day conference there was plenty of time for more discussions. It seemed that all enjoyed the pleasant surroundings of the Isaac Newton Institute in the ancient university town of Cambridge.

BOOK REVIEW

Physical Testing of Polymers

ed. Roger Brown, pub. Marcel Dekker, 1999

In the latest edition (available through RAPRA in the UK (www.rapra.net)), the number of pages has increased to 845, with 32 chapters, and 20 contributing authors – quite a monster! It replaces the much slimmer edition, which is approximately 20 years old and at £150, is quite reasonable compared to other tomes, and covers several years work for the contributing authors.

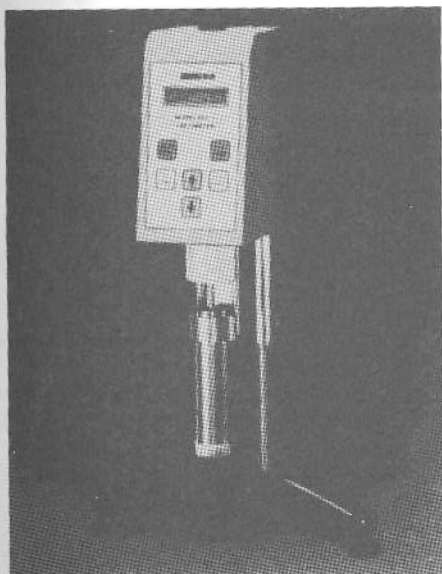
The chapter on DMA / DMAT is written by the reviewer and covers the history, principles, T and frequency effects, and the applicability of the technique in food, metals, glass, bone, and explosives applications. Further detail is given with respect to polymers, coatings, composites, and foams. Chapters on thermal conductivity, diffusivity and specific heat are covered by David Hands (Consultant, ex RAPRA). There is a chapter on permeability also. Graham Sims has contributed a chapter on the needs of composites – and he is chairing the working party that is working on the calibration of DMTAs for composite materials. Other chapters cover foams, coated fabrics, textiles, weathering, adhesion, electrical, and optical properties.

Ivan James puts testing into perspective and has a chapter on friction, whilst Alan Veith from Akron gives a very full chapter on all the statistical nuances that should be considered, as well as descriptions of repeatability and reproducibility *etc.*

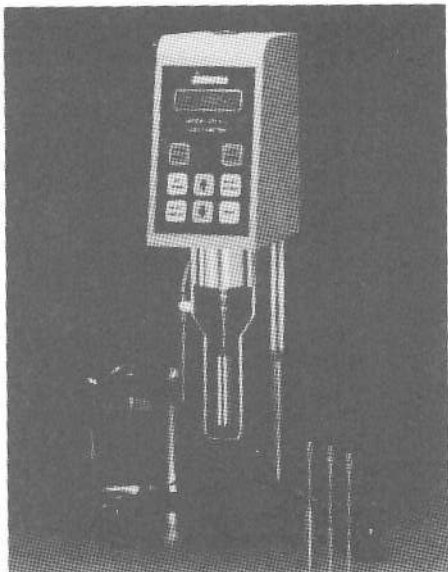
Paul Ashworth describes the various ISO bodies and committees, whilst sample preparation and conditioning are covered by Freddy Boey and Steve Hawley. This includes an interesting table showing the time to equilibrate polymer samples of different sizes and aspect ratios to a whole range of temperatures. Brown himself covers creep, fatigue, wear, mass, density, dimensions, strength, environment and lifetime prediction, and the effects of temperature. NDT is covered by Xavier Gros from Bruges in France.

John Gearing

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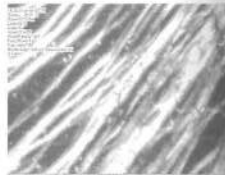
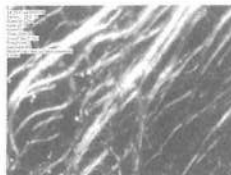
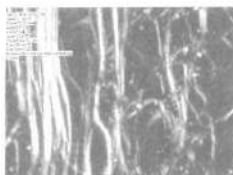
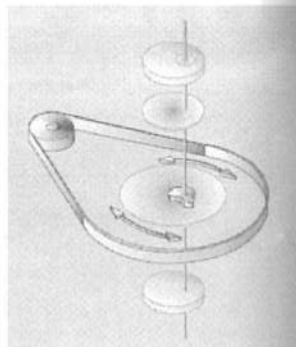
The Linkam CSS 450 Optical Shearing System

is a microscope mounted system which allows flowing liquids to be observed while they are under controlled temperature and flow conditions. The CSS 450 shear cell can be fitted to almost any standard optical microscope and can then be used to study the flow behaviour under different temperatures of a wide range of fluids for example suspensions, blood, polymer blends, emulsions, liquid crystals, cosmetics and some foods.

The system consists of two quartz windows where the separation of the windows can be controlled with micron precision between 10 and 2500mm, the speed of change of the gap setting can also be set by the user. The bottom window is attached to a disc which rotates against the fixed top window under the control of a stepper motor to give steady or sinusoidal oscillation.

Each window is in close thermal contact with a silver heating block and temperatures of up to 450 C can be achieved using any heating rate from 0.01 C/min to 30 C/min. with temperature stability and accuracy of ± 0.2 C. The entire system is PC controlled using LinkSys software, in addition to this an interfacing framegrabber package known as RTVMS allows temperature and shear data to be saved with the corresponding image is also available.

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Sequential images of hexagonal phase surfactant under varying shear rates

Linkam Scientific Instruments Ltd

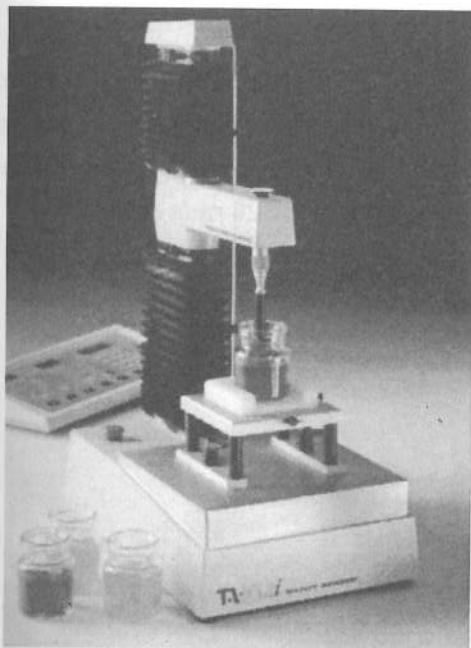
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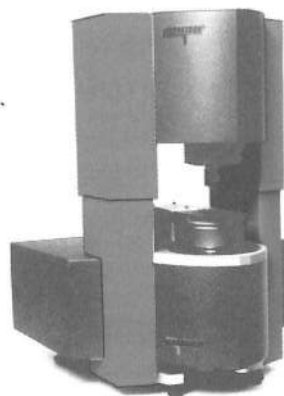
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BSR ANNOUNCEMENTS

11TH INTERNATIONAL CONFERENCE ON DEFORMATION, YIELD AND FRACTURE OF POLYMERS

10-13 April 2000

Churchill College, Cambridge, UK

Co-ordinated by the Polymer Industry Division of
The Institute of Materials,



in association with the Polymer Physics Group of
The Institute of Physics,

Institute of **Physics**

The British Society of Rheology,



& The Royal Society of Chemistry



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The Churchill conferences on deformation, yield and fracture of polymers, held triennially since 1970, have established this event as the leading conference on its subject worldwide. The 2000 conference reviews the latest advances in: polymer fracture; polymer fatigue; deformation in crystalline polymers, amorphous polymers and special materials; molecular and micromechanical modelling and new experimental techniques.

Please contact, for more information:

Eleanor Tipton, Conferences and Events (C008), IOM Communications Ltd, 1 Carlton House Terrace, London SW1Y 5DB

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Info: www.materials.org.uk

XIII INTERNATIONAL CONGRESS ON RHEOLOGY

20-25th August, 2000

Cambridge, UK



Rheology 2000 is being organised by the British Society of Rheology on behalf of the European Society of Rheology. It will be held in the city of Cambridge, one of the most beautiful cities in the United Kingdom. The Congress will be located in the University of Cambridge and the Congress Office will be based at Robinson College.

The opening ceremony will include the award of the ESR Weissenberg Medal as well as the award of the BSR Gold Medal and the announcement of the recipient of the Society of Rheology Bingham Medal.

The scientific program will comprise four plenary lectures, a number of keynote lectures, technical presentations and poster sessions. An equipment exhibition is also planned. The bulk of the scientific programme will take the form of a series of minisymposia. Prospective contributors to the Congress are invited to send their contributions directly to the relevant minisymposia organisers (names and addresses may be found at the congress web site). Alternatively, contributions can be sent to the Congress Administrator, Dr D M Binding.

Full social and accompanying persons programmes have been arranged. Details of these and extensive additional information, updated regularly, is to be found on the Congress Web site:

<http://abbey4.swan.ac.uk/rheology2000/>

CALL FOR PAPERS

Authors are invited to submit an abstract (not exceeding 300 words) to one of the minisymposia organisers or to the Congress Administrator. Authors will be notified of acceptance by 31 January 2000. The camera-ready manuscript will be due by 30 April 2000.

Congress Administrator:

Dr D M Binding

Department of Mathematics, University of Wales

Aberystwyth SY23 3BZ UK

Tel: 44 (0) 1970 622775

Fax: 44 (0) 1970 622777

E-mail: rheology2000@aber.ac.uk or dmb@aber.ac.uk

ROYAL SOCIETY OF CHEMISTRY - FARADAY DIVISION
Colloid and Interface Science Group
AND
BRITISH SOCIETY OF RHEOLOGY

Joint Conference Incorporating BSR AGM

**THE RHEOLOGICAL ASPECTS OF
SURFACTANT BASED SYSTEMS**

Arrival for lunch on Monday 18th September 2000

Depart late on Tuesday 19th September

at Collingwood College, University of Durham, Durham, UK

CALL FOR PAPERS

In September 2000 the CISG and BSR are holding a joint research conference to discuss all aspects of rheological behaviour of surfactant based systems, both of scientific and industrial interest. Experimental and theoretical contributions relating to the rheological properties of many mesoscopic phases of the surfactants, both in binary and tertiary systems, in emulsions, the interfacial rheology of surfactant based systems and their influence on the rheology of more complex systems, such as associating polymers, will all be welcomed.

Anyone wishing to attend the conference and present a paper should complete the tear-off slip below (photocopy acceptable) and return it as soon as possible to:

**Dr. R. Ettelaie, Colloid, Interface and Rheology Group, ICI Wilton Centre
P. O. Box 90, Wilton, Middlesbrough, Cleveland, TS90 8JE**

Tel: +(44) 1642 437882, Fax: +(44) 1642 437344, E-mail: rammile_ettelaie@ici.com

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I am interested in attending the conference

I Would like to present a Paper/Poster entitled

The RSC is registered charity number 207890

The BSR is registered charity number 249967

ANNOUNCEMENTS

Polymers in Colloidal Systems

9 May 2000

SCI, 14/15 Belgrave Square
London SW1X 8PS

Polymers play a key role in the formation, stability and properties of colloidal suspensions in a wide range of industries. In this meeting, internationally recognised experts in the subject will present an overview of different aspects of the science controlling the interaction of polymers and colloids. In addition to details of the authors' latest research findings, the presentations will include an element of advanced teaching. The meeting is intended to be of interest to all colloid and polymer scientists. We hope that it will be particularly useful to those who are working in the area but have not had extensive academic training in this field. It would also be of use to Ph.D. students and Post-doctoral researchers working in this area.

Provisional Programme*

10:00-10:25

10:30-11:15 Prof. Martien Cohen Stuart
Wageningen

11:15-12:00 Prof. Terence Cosgrove
Bristol University

12:00-12:45 Prof. Brian Vincent
Bristol University

14:00-14:45 Dr. Richard Buscall
ICI

14:45-15:30 Dr. Malcolm Faers
Agrevo

16:00-16:45 Prof. Eric Dickinson
Leeds University

16:45-17:30 Dr. Tharwat Tadros
Consultant

Coffee & registration

Introduction and overview

Adsorbed polymers

Non-Adsorbed polymers

Lunch

Rheology of colloid/polymer systems

Formulation

Tea

Biopolymers (proteins and polysaccharides)

Non-aqueous suspensions

* These are the general subject areas the speakers have agreed to cover, not the titles of the lectures.

Organisers:

Paul Luckham (Imperial College) and Andrew Howe (Kodak European R&D), on behalf of the Colloid and Surface Chemistry Group of the SCI.

For information on registration, please contact Deborah at the SCI Conference Office:

deborah@chemind.demon.co.uk

Tel: 0171-598-1563

Members	£95
Non-members	£140
Students/retired	£35

FRC 2000 - COMPOSITES FOR THE MILLENNIUM
EIGHTH INTERNATIONAL CONFERENCE ON FIBRE REINFORCED COMPOSITES
13th - 15th September 2000
University of Newcastle upon Tyne

FIRST ANNOUNCEMENT and CALL FOR PAPERS

Use the online form at <http://www.ncl.ac.uk/~nccme/frc2000.htm> to register early!

The 2½ day FRC meetings, which occupy a unique place in the composites calendar, bring together the latest developments in all areas of composite materials engineering and serve as a forum for discussion. The series has proved invaluable to industry and to researchers wishing to stay abreast of the latest research and developments. In addition, those planning to enter the composites field have used FRC to gain a snapshot of the current state of the art. Several European and international organisations now send delegates on a regular basis.

FRC brings together key personnel from all sectors of the composites field, including end-users, manufacturers, designers, materials and equipment suppliers, as well of course as researchers and graduate trainees. The focused structure, which is a little different from many other large international conferences, is specially designed to promote interaction between the delegates on both formal and informal levels. This enhanced delegate interaction has proved in many cases to be almost as important as the formal content of the meeting.

The formal sessions will comprise well-prepared, refereed presentations by speakers from industry and academia, along with a poster session. These will be supported by formal published proceedings in a high quality bound volume (with ISBN, satisfying research assessment criteria for refereed conference publications).

Exhibition

An exhibition will complement the presentations and posters. Companies interested in participation should indicate this as soon as possible on the attached form. There will also be opportunities for companies to sponsor parts of the social programme.

Scope of the Conference

The organising committee now invites offers of papers and expressions of interest. Papers accepted for oral and poster presentation will receive equal emphasis in the proceedings. Submissions should be in the form of a one page abstract.

All topics relevant to the processing, properties and applications of fibre reinforced composites will be welcomed. Areas of particular interest include:

- New Materials Developments
- Improved Processing Science and Technology
- Expanding Areas of Application
- Critical Properties

Cost-effectiveness

The organisers are aware of the increasing costs of conference participation. Our aim, with FRC, is to provide a very well-organised, focused and cost-effective meeting that will meet the needs of delegates from diverse backgrounds. The delegate fee will be competitive with other composites conferences.

Abstract Submission Schedule and Further Information

The formal closing date for abstracts will be 10th January 2000. However, early abstract submission and expressions of interest are strongly encouraged, as this will greatly assist the organisers in planning the

most effective programme. Presentations and papers should be in English and at least one author from each paper will be expected to attend the conference as a delegate. E-mail submission is welcomed using WORD for Windows.

Provisional Key Dates and Deadlines:

- 10 January 2000 Deadline for receipt of Abstracts for Review
- 10 February 2000 Invitations to submit camera ready paper
- 10 March 2000 Preliminary Programme mailed
- 10 May 2000 Deadline for receipt of papers and author registration
- 10 June 2000 Deadline for Early Registration

Location

The University of Newcastle upon Tyne is situated in the centre of a vibrant and historic city in the North East of England with excellent air connections, including frequent connecting flights from London and Amsterdam. The city is three hours by rail from London. There are several places of interest within 2 hours by road or rail, including the historic cities of Edinburgh, Durham and York and areas of outstanding beauty including the Lake District, the North East Coast and Yorkshire. The conference organisers will be pleased to advise delegates on travel, tourism or activities for accompanying persons.

Contact for further information:

Louise Blackburn
Conference Organiser
Conference Design Consultants
Tel: +44-191-284-7590
Fax: +44-191-285-6993

RHEOLOGIE ET INNOVATION

23 – 25 October 2000

Grenoble, France

In autumn 2000 the 35th Annual General Meeting of the "Groupe Francais de Rheologie" (GFR) will be held in Grenoble from 23 to 25 October in concert with the Greek and Italian Societies of Rheology. Nadia EL KISSI (Laboratoire de Rheologie) is coordinating the organization.

The topic is " Rheologie et innovation" with three sets of themes privileged right now:

-Assessments and Challenges

To give a progress report on the recent developments and to discuss the scientific stakes, in the field of rheology.

-New materials and techniques

To cross the techniques of characterization, recent or diverted of their first destination, and new materials, to obtain remarkable advances

-Rheology and society

To federate competences of the scientists working in different fields, since from health to environment, from car industry to cosmetics, every field of science and life is concerned.

The deadline for submitting abstracts is March 31, 2000. More information can be found on the conference website at the following address: <http://rheologie.ujf-grenoble.fr>

Additional inquiries can be obtained through gfr2000@ujf-grenoble.fr

2ND INTERNATIONAL SYMPOSIUM ON FOOD RHEOLOGY AND STRUCTURE

March 12 - 16, 2000

Zürich, Switzerland

SECOND CIRCULAR

The second International Symposium on Food Rheology and Structure intends to bring experts from rheology and food structure research areas together for a synergistic exchange of ideas. The symposium will include sessions on food related topics such as biopolymers, gels, interfaces, emulsions, solid and semi-solid food, dough, confectionary, dairy products and multiphase systems.

Rheometry/structure and numerical methods together with microscopic methods will complete the topics of the symposium. Three plenary and 11 keynote lectures will introduce the different themes covered by the individual sessions. About 15 companies will take part in the exhibition of rheological and structure analytical instruments, and a poster session is also included in the program.

Invited Speakers:

A M Hermansson (SIK, Sweden)
M Kulicke (Universität Hamburg, Germany)
E J Windhab (ETH Zürich, Switzerland)
E Dickinson (University of Leeds, UK)
L Choplin (GEMICO, France)
P T Callaghan (Massey University, New Zealand)
K Feigl (Michigan Technological University, USA)
C Gallegos (Universidad de Huelva, Spain)
P Lillford (Unilever Research Colworth, UK)
M G Marangoni (University of Guelph, Canada)
H C Öttinger (ETH Zürich, Switzerland)
P Schurtenberger (Université Fribourg, Switzerland)
T van Vliet (Wageningen University, The Netherlands)
H Watzke (Nestlé Research Center, Switzerland)

For detailed information on the preliminary scientific and social program including the poster session and round tables discussion, for up-dates, the scientific exhibition and to register for the symposium please visit our web-site at:

<http://www.isfrs.ethz.ch>

Registration

If the registration via WWW is not possible, contact the symposium's office at:

Institute of Food Science

Laboratory of Food Engineering

ISFRS 2000

LFO E19

ETH Zurich

8092 Zurich, Switzerland

Fax: +41.1.632.1155

secretary@isfrs.ethz.ch

50TH CANADIAN CHEMICAL ENGINEERING CONFERENCE
SYMPOSIUM ON RHEOLOGY

October 15-18, 2000
Montreal, Canada

CALL FOR ABSTRACTS

The Canadian Rheology Group and the Groupe Francais de Rheologie are soliciting ABSTRACTS for presentation at the Symposium on Rheology organized within the 50th Canadian Chemical Engineering Conference to be held in Montreal, October 15-18, 2000. Sessions on Fundamental and Applied Rheology, Polymer Solutions, Polymer Blends and Composites, Emulsions, Suspensions, Instrumentation, Numerical Simulations etc. will be organised.

Abstracts, in English or French, should have a minimum of 200 and a maximum of 500 words and should include the title, the names of the authors and the authors affiliation(s). The abstracts should be submitted by e-mail to one of the symposium co-chairs. Other instructions will shortly be available on the website of the Conference (<http://csche2000.ca>).

Symposium co-chairs are

CANADA

Prof. Abdellatif Ait-Kadi
Departement de genie chimique
Universite Laval - Pav. Pouliot
Ste-Foy (Que.) - G1K 7P4
aitkadi@gch.ulaval.ca

Dr. Danielle Boils
Member of Research Staff,
Materials Characterisation
Xerox Research Centre of Canada
2660 Speakman Drive
Mississauga, Ont, L5K 2L1
daniele.boils-boissier@crt.xerox.com

Prof. Savvas G. Hatzikiriakos
Department of Chemical Engineering
The University of British Columbia
2216 Main Mall
Vancouver, BC, V6T 1Z4
hatzikir@unixg.ubc.ca

FRANCE

Jacques Bouton
RHEO s.a.
99 route de Versailles
91160 CHAMPLAN
bouton@rheo.fr

Prof. Jean-Louis Chevalier
ENSSPICAM
Universite d'Aix Marseille
13397 MARSEILLE Cedex 13
bencini@spi-chim.u-3mrs.fr

Prof. Claude Wolff
Laboratoire Materiaux Macromoleculaires
CNAM - 292 rue Saint Martin
75141 PARIS Cedex 03
wolff@cnam.fr

The deadline for submitting abstracts is February 15, 2000. Acceptance of papers will be based on the submitted abstracts. Notifications of acceptance will be mailed to authors by May, 2000. More information on the CSChE-48 meeting can be found on the conference website at the following address
<http://csche2000.ca/>

SENSIBLE EXPERIMENT IN MATERIALS SCIENCE

*April-May 2000
Odessa, Ukraine*

The Scientific Council on Computational Materials Science of INTERNATIONAL ACADEMY OF ENGINEERING (Moscow) invites you to take part in the 39th international seminar on modelling and optimization of composites MOC'39 – "SENSIBLE EXPERIMENT IN MATERIALS SCIENCE"

Chairman

Professor Vitaly VOZNESENSKY, D.Sc.

Main Topics

- * Optimization of Materials and Structures
- * Design of Experiment in Rheology (theory and practice)
- * Modern Instruments and Measuring Systems
- * Computational Experiments in Materials Science
- * Experimental Information and Proof of Materials Science Hypotheses

Deadlines

January 31, 2000 - last day for Organizers to receive the extended abstracts

February 10, 2000 - acceptance notification

March 1, 2000 - transfer of collected volume for printing

Working languages are Russian, Ukrainian, and ENGLISH.

Organizing Committee Address

Professor Vitaly Voznesensky
PO Box 76, Main Post Office,
ODESSA, 65000, UKRAINE
vav@paco.net

For information

Dr. Sergey Krovyakov (MOC'38 secretary)
sergey@ses.intes.odessa.ua

Extended abstracts will be published, as received (reduced will be page size). The abstract should occupy FULL 170 X 250 mm field at 1 or 2 or 3 pages. On the upper area of 45 mm height at the 1st page place heading, initials and surnames of authors, city, and country. Use Times New Roman 12-14 and high quality printer. Figures should be without captions.

Please, send 3 paper copies of each extended abstract (in rigid envelope) and its electronic copy, via e-mail as RTF-file attachment or as Word-file on 3.5' disk (along with paper copies). In covering letter, please, give the information about ALL the authors: surname, name, scientific degree, organization and position, ADDRESS, E-MAIL, PHONE, FAX.

Dr. Tatiana Lyashenko
vav@paco.net

TDM 2000
3RD INTERNATIONAL CONFERENCE ON MECHANICS
OF TIME DEPENDENT MATERIALS
September 17-20, 2000
Erlangen, Germany

Scientific program

The intention of this conference is to discuss time-dependent properties of different materials like ceramics, metals and polymers. The following speakers will present invited keynote lectures:

Prof. Dr. A. Argon (Massachusetts Institute of Technology, Cambridge, USA):
"Physics of the rate mechanism of plastic flow in crystalline and amorphous solids"

Prof. Dr. W. Pechhold (University Ulm, Germany):
"New methods for the measurement of the dynamic-mechanical behaviour of materials"

Prof. Dr. T. Sakuma (University of Tokyo, Japan):
"Grain boundary plasticity in oxide ceramics"

Dr. R.C. Stauber (BMW, Germany):
"Materials for automotive engineering – Current applications and trends"

Minisymposium

Part of the Conference will be a Minisymposium dedicated to Prof. Dr. F.R. Schwarzl on the occasion of his 75th birthday. The following lectures will be presented:

Prof. Dr. G. Hartwig (Forschungszentrum Karlsruhe, Germany):
"Time-dependent fracture processes"

Prof. Dr. L.C.E. Struik (DSM Research, The Netherlands):
"Glass transition and related phenomena in amorphous polymers"

Prof. Dr. F.R. Schwarzl (University Erlangen-Nürnberg, Germany):
"Technical mechanics of amorphous polymers under small stresses"

Papers and posters are welcome in the areas of:

- Experimental methods and techniques
- Comparison of time-dependent properties of different materials
- Dependence of time-dependent properties on molecular structure
- Influence of external parameters like stress, deformation and temperature on the time dependence of mechanical properties of materials
- Influence of the environment on time dependence of materials
- Time-dependence of materials in industrial applications
- Constitutive equations and mathematical modeling of time-dependent material properties

Submission of abstracts

Conference papers will be selected on the basis of a one page abstract, which should be submitted until January 31, 2000 to:

Prof. Dr. H. Münstedt
Department of Materials Science
Institute of Polymer Materials

University of Erlangen-Nürnberg
Martensstraße 7
D – 91058 Erlangen, Germany
Fax: ++49 9131 8528321
TDM2000@www.uni-erlangen.de

Registration

Students DM 350,-

Delegates DM 620,-

The reduced fees given above are valid for registrations before April 30, 2000.

After this date an additional amount of DM 50,- is charged.

Dates to remember

January 31, 2000: Deadline for submission of one page abstract

March 31, 2000: Authors will be notified of the acceptance of their paper

April 30, 2000: Reduced registration fee before April 30, 2000

May 31, 2000: Final manuscript, typed in a prescribed format

Social program

The social program comprises a get-together on Sept. 17 and the conference dinner on Sept. 19 at the Atzelsberg castle near Erlangen. On the afternoon of Sept. 20 an optional excursion to the city of Bamberg, which has been selected as world cultural heritage, is being planned.

Location

The city of Erlangen is a lively University town in Central Frankonia (North Bavaria). It has about 100 000 inhabitants and is a center of important industry. Around Erlangen there are many places worthwhile visiting, for example:

- Rothenburg ob der Tauber
- Würzburg
- Munich (with the "Oktoberfest" at that time)

Accommodation

For accommodation registration cards will be enclosed to the confirmation of registration. Three categories of hotels will be offered.

For more information please contact:

Claus Gabriel

Tel: ++49 9131 8528709

or

Stefan Rettenberger

Tel: ++49 9131 8527746

Institute of Polymer Materials

Fax: ++49 9131 8528321

TDM2000@www.uni-erlangen.de

International Scientific Committee

Prof Dr H Altenbach (DE)

Prof Dr GW Ehrenstein (DE)

Prof Dr P Greil (DE)

Prof Dr K Ravi-Chandar (US)

Dr B von Bernstorff (DE)

Prof Dr JD Kaplunov (RU)

Prof Dr H Mughrabi (DE)

Prof Dr AH Cardon (BE)

Prof Dr HH Kausch (CH)

Dr G B McKenna (US)

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Prof. Dr. H. Münstedt, Chair (DE)

Prof. Dr. W.G. Knauss, Vice-Chair (US)

Prof. Dr. O. Vöhringer (DE)

Prof. Dr. I. Emri, Vice-Chair (SI)

Prof. Dr. M. Takashi, Vice-Chair (JP)

Dr. J. Kaschta (DE)

BSR MEMBERSHIP NEWS

NEW MEMBERS

Here are the details received of new members in September 1999.

UNITED KINGDOM	
Dr B P Stephens Kalon Decorative Products, Huddersfield Rd, Birstall, Batley, Yorkshire WF17 9XA <i>peta FG</i>	Mr A Swain National Starch and Chemical Ltd, Galvin Rd, Slough SL1 4DF <i>peta CDF</i> <i>Andy.Swain@nstarch.com</i>

OTHER MEMBERSHIP NEWS

OBITUARY W H BANKS, PhD.

Dr William H. Banks, a society member since 1940, and latterly an honorary member, passed away in November 1999 aged 89.

His son advises us that Dr Banks had maintained his interest in rheology long after his retirement. Indeed, he had been in the process of gathering material for a theoretical paper on pastes and emulsions as lubricants until shortly before his death.

FOUNDING / EARLY MEMBERS OF THE BSR

The BSR will be sixty years old next year. The editor would like to take this opportunity to invite any of our founding or early members, to submit a few thoughts and observations on the early days of the "Club" and its evolution into the present Society.

RECRUITMENT OPPORTUNITIES

Job Seekers are advised to check the "eurorheo" archives at <http://www.mailbase.ac.uk/lists/eurorheo/archive.html> for other employment opportunities.

'An exciting opportunity in a commercial scientific field working at the leading edge of technology'

TECHNICAL SALES SUPPORT FOR RHEOLOGICAL INSTRUMENTATION

Bohlin Instruments Ltd is one of the world's leaders in the manufacture of innovative rheological instruments and supply to all major industrial sectors and leading research establishments.

The company's success is driven by a high level of customer service and a continual growth of the group business and development of new market opportunities has led to a vacancy for a scientific person who can work effectively in a commercial environment.

Working in an established technical support team you will be at the forefront of providing an elite customer service using your technical skills and hands on knowledge. You will have a first degree or Ph.D. in a relevant science, be acquainted with the principles of rheology and have developed an understanding of the industrial applications of this exciting 'niche' market. The position will involve UK and European travel so 'clock watchers' need not apply!

A competitive salary package is offered, including a company car and relocation assistance where appropriate. If you are looking for a challenging and rewarding job opportunity please send your CV and current salary details to:

Clare Underwood, Personnel Manager, Bohlin Instruments Ltd, Corinium Centre, Cirencester, Glos GL7 1YJ

Telephone +44 (0) 1285 644407 Fax +44 (0) 1285 644386

email cju@bohlin.co.uk



BOHLIN INSTRUMENTS

Making rheology work for you

INDUSTRY NEWS

Press Release

Bohlin Instruments strengthens US operation with new appointment

Bohlin Instruments, the world's leading supplier of rheological test equipment, announces that Sean Race has been appointed as President of Bohlin Instruments Inc., Cranbury, NJ and as a director of the UK holding company, Bohlin Instruments Ltd.

Commenting on the appointment, Bohlin's group managing director, Dr Richard Hall, stated that "Sean has an impressive record of accomplishment in this marketing sector which includes the establishment of Bohlin's original US operation in 1987, prior to leaving Bohlin in 1991. Bohlin now has a very strong product range through our emphasis on new product development and we are sure that Sean's reappointment will ensure that we capitalise upon our investment".

Gearing Scientific

Gearing Scientific can now offer a wider range of thermal analyses under one-off or few-off contract testing with rapid turn-arounds. Techniques include DSC (both varieties), TGA, STA (=DSC + TGA), TGA-MS, TMA, DMA / DMTA, Thermal Conductivity of solid or foam materials (including filled plastics / composites), and GPC for molecular weight distributions of polymers up to 150°C.

For DMTA, there are also 10-day self work options available (which include full training) so that multiple analyses, or more complex detailed studies can be arranged to suit. The costs of this approach are typically less than 5% of the cost of a new piece of apparatus.

For further details, please contact Gearing Scientific at 1 Ashwell Street, Ashwell, SG7 5QF. Alternatively, find details at www.rapra.net/gearing, or e-mail gearingsci@yahoo.com.

Press Release

New software for Molecular Weight Determination available for Bohlin Rheometers

To complement a new range of polymer testing rheometers and accessories, Bohlin Instruments now offers a new software package, MWD Pro, which is interfaced with the standard Bohlin rheometer software modules.

The new software is primarily used for the simple determination of molecular weight distributions of a broad range of polymeric sample types, from conventional rheological data.

For a particular sample, MWD Pro, which is based on an "energy principle", has the advantage of requiring just one oscillatory frequency sweep at a single temperature in order to generate the sample's molecular weight distribution function. Repeat measurements at different temperatures are thus avoided. Other calculated quantities include the relaxation function and the relaxation spectrum.

CONFERENCES

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

2000	
12-16 Mar Zurich CH	2ND INTERNATIONAL SYMPOSIUM ON FOOD RHEOLOGY AND STRUCTURE Institute of Food Science, Laboratory of Food Engineering, LFO E19, ETH Zurich, 8092 Zurich, Switzerland F: +46 1 632 11 55 E: secretary@isfrs.ethz.ch
21-23 Mar Sydney AU	THE MILLENNIUM SCIENCE 2000 (INCLUDING A HALF-DAY SESSION ON RHEOLOGY) Dr Janet Paterson, Dept of Food Science & Technology, University of NSW, Sydney, NSW 2052, Australia T: +61 (0)2 9385 5355 F: +61 (0)2 9385 5931 E: j.paterson@unsw.edu.au
10-13 Apr Cambridge GB	11TH INTERNATIONAL CONFERENCE ON DEFORMATION, YIELD AND FRACTURE OF POLYMERS Eleanor Tipton, Conferences and Events (C008), IOM Communications Ltd, 1 Carlton House Terrace, London SW1Y 5DB T: +44 (0)207 451 7386 F: +44 (0)207 839 2289 E: Eleanor.Tipton@materials.org.uk Info: www.materials.org.uk
Apr-May Odessa UA	SENSIBLE EXPERIMENT IN MATERIALS SCIENCE Chairman: Prof V Voznesensky DSc, PO Box 76, Main Post Office, Odessa, 65000, Ukraine E: vav@paco.net
7-12 May Orlando, FL US	SPE-ANNUAL TECHNICAL CONFERENCE (ANTEC 2000) SPE Conference Department T: +1 203 775 0471 F: +1 203 775 8490 Info: http://www.4spe.org/
9 May London GB	POLYMERS IN COLLOIDAL SYSTEMS SCI Conference Office, 14/15 Belgrave Square, London, SW1X 8PS T: +44 (0)171 598 1563 E: deborah@chemindemon.co.uk
22-26 May Minsk BY	4TH MINSK INTERNATIONAL HEAT AND MASS TRANSFER FORUM E: igur@hmti.ac.by
11-13 Jun Bath GB	SPECIALITY CHEMICALS IN INDUSTRIAL MINERAL PROCESSING Dr D Greenhill, ECC International Ltd, Par Moor Rd, St Austell, Cornwall, UK T: +44 (0)1726 818139 F: +44 (0)1726 818031 E: dave.greenhill@ecc.co.uk
21-26 Aug Cambridge GB	RHEOLOGY 2000 - XIIITH INTERNATIONAL CONGRESS ON RHEOLOGY Organised by the BSR with the assistance of the European Society of Rheology. Chairman of the Executive Committee: Prof K Walters FRS, University of Wales, Dept of Mathematics, Penglairs, Aberystwyth, Dyfed, SY23 3BZ, Wales, UK T: +44 (0)1970 622750 F: +44 (0)1970 622777 Info: http://abbey4.swan.ac.uk/rheology2000/
13-15 Sep Newcastle GB	FRC 2000 - COMPOSITES FOR THE MILLENNIUM: EIGHTH INTERNATIONAL CONFERENCE ON FIBRE REINFORCED COMPOSITES Louise Blackburn, Conference Organiser, Conference Design Consultants T: +44 (0)191 284 7590 F: +44 (0)191 285 6993 Info: www.ncl.ac.uk/~nccme
17-20 Sep Erlangen DE	TDM 2000 - 3RD INTERNATIONAL CONFERENCE ON MECHANICS OF TIME DEPENDENT MATERIALS Claus Gabriel / Stefan Rettenberger, Institute of Polymer Materials, University of Erlangen-Nürnberg, Martensstraße 7, D-91058 Erlangen, Germany T: +49 9131 852 8709 / 7746 F: +49 9131 852 8321 E: TDM2000@www.uni-erlangen.de
18-19 Sep Durham GB	THE RHEOLOGICAL ASPECTS OF SURFACTANT BASED SYSTEMS (INCORPORATING BSR AGM) Dr R Ettelaie, Colloid, Interface & Rheology Group, ICI Wilton Centre, PO Box 90, Wilton, Middlesbrough, Cleveland, TS90 8JE T: +44 (0)1642 437882 F: +44 (0)1642 437344 E: rammle.ettelaie@ici.com

2000	
15-18 Oct Montreal CA	50TH CANADIAN CHEMICAL ENGINEERING CONFERENCE (SYMPOSIUM ON RHEOLOGY) Prof A Ait-Kadi, Dept de genie chimique, Universite Laval - Pav. Pouliquet, Ste-Foy, Quebec, Canada, G1K 7P4 E: aitkadi@gch.ulaval.ca J Bouton, RHEO SA, 99 route de Versailles, 91160 Champlain, France E: bouton@rheo.fr Info: http://csche2000.ca
11-14 Sep Sofia BG	9TH INTERNATIONAL CONFERENCE ON MECHANICS AND TECHNOLOGY OF COMPOSITE MATERIALS Central Laboratory of PhysicoChemical Mechanics - BAS, Acad. G. Bonchev Str, Block 1, 1113 Sofia, Bulgaria F: +3592 70 34 33 E: clphchm@bgcict.acad.bg
2001	
14-15 Feb Hilton Head, SC US	72ND ANNUAL MEETING OF THE SOCIETY OF RHEOLOGY Details will be added when available
14-16 May Berlin DE	GOLDEN JUBILEE MEETING OF THE DEUTSCHEN RHEOLOGISCHEN GESELLSCHAFT E: dra@bam.de
23-27 Sep Melbourne AU	6TH WORLD CONGRESS OF CHEMICAL ENGINEERING Meeting Planners, 108 Church Street, Hawthorn, Victoria 3122, Australia T: +61 (0)3 9819 3700 F: +61 (0)3 9819 5978 E: chemeng@meetingplanners.co.au Info: http://www.meetingplanners.com.au/chemeng
21-25 Oct Bethesda, MD US	73RD ANNUAL MEETING OF THE SOCIETY OF RHEOLOGY Details will be added when available.
T: Telephone; F: Facsimile; E: Email; Info: WWW URL	

COURSES

2000	
1-2 Feb Oxford GB	RHEOLOGY FOR NON-RHEOLOGISTS Gwen Thrower, AEA Technology plc, 404 Harwell, Didcot, Oxon., OX11 0RA, UK T: +44 (0)1235 432820 F: +44 (0)1235 432313 E: ukcourses@software.aeat.com Info: http://www.software.aeat.com
3 Feb Oxford GB	SLURRY RHEOLOGY IN PROCESS ENGINEERING DESIGN Gwen Thrower, AEA Technology plc, 404 Harwell, Didcot, Oxon., OX11 0RA, UK T: +44 (0)1235 432820 F: +44 (0)1235 432313 E: ukcourses@software.aeat.com Info: http://www.software.aeat.com
20 Mar Oxford GB	MIXING TECHNOLOGY Gwen Thrower, AEA Technology plc, 404 Harwell, Didcot, Oxon., OX11 0RA, UK T: +44 (0)1235 432820 F: +44 (0)1235 432313 E: ukcourses@software.aeat.com Info: http://www.software.aeat.com
21-22 Mar Oxford GB	SLURRY HANDLING: PUMPING & PIPELINES Gwen Thrower, AEA Technology plc, 404 Harwell, Didcot, Oxon., OX11 0RA, UK T: +44 (0)1235 432820 F: +44 (0)1235 432313 E: ukcourses@software.aeat.com Info: http://www.software.aeat.com
23-24 Mar Oxford GB	WET & DRY BULK SOLIDS HANDLING Gwen Thrower, AEA Technology plc, 404 Harwell, Didcot, Oxon., OX11 0RA, UK T: +44 (0)1235 432820 F: +44 (0)1235 432313 E: ukcourses@software.aeat.com Info: http://www.software.aeat.com
3-7 Apr Bristol GB	THE 2000 SPRING SCHOOL IN COLLOID SCIENCE Bristol Colloid Centre, School of Chemistry, University of Bristol, Cantocks Close, Bristol, BS8 1TS T: +44 (0)117 929 8388 F: +44 (0)117 929 3121
10-11 Apr Malmö SE	DISPERSION OF POWDERS IN LIQUIDS AND STABILIZATION OF SUSPENSIONS Calmia AB, Box 2161, SE-220 02 LUND, Sweden T: +46 46 211 00 20 F: +46 46 211 00 20 E: calmia@swipnet.se

2000	
12-13 Apr Malmö SE	GELS, GELLING, AND THICKENERS Calmia AB, Box 2161, SE-220 02 LUND, Sweden T: +46 46 211 00 20 F: +46 46 211 00 20 E: calmia@swipnet.se
19-23 Jun Maastricht NL	EUROPEAN SCHOOL ON COMPUTATIONAL RHEOLOGY Mrs. Marleen Rieken, Eindhoven University of Technology, Department of Mechanical Engineering, Bld. Whoog 0.126, P.O. Box 513, 5600 MB Eindhoven, The Netherlands T: +31 40 247 2851 F: +31 40244 7355 E: marleen@wfw.wtb.tue.nl T: Telephone; F: Facsimile; E: Email; Info: WWW URL

ONES THAT GOT AWAY...

1999	
17-28 May Caminha PT	NATO ASI ON "STRUCTURE DEVELOPMENT IN PROCESSING FOR POLYMER PROPERTY ENHANCEMENT". CONTACT: AM Cunha, Dept. Eng. Polimeros, Universidade do Minho
17 Jun Glasgow GB	MEMORIAL TRIBUTE TO PROFESSOR JIM FERGUSON. CONTACT: n.e.hudson@strath.ac.uk
27-30 Jun Zielona Góra PL	ICER'99, INTERNATIONAL CONFERENCE ON ENGINEERING RHEOLOGY. CONTACT: Professor Edward Walicki
25-28 Aug Vaals NL	XI INTERNATIONAL WORKSHOP ON NUMERICAL METHODS IN VISCOELASTIC FLOWS. CONTACT: Patrick Anderson
7-11 Sep Sanginetto IT	FIRST SOUTHERN EUROPE CONFERENCE ON RHEOLOGY. This involves the Italian, Hellenic, Portuguese, Slovenian and Spanish societies of rheology. CONTACT: rheol.conference@unicat.it or Bruno de Cindio, Chairman.
20 Sep London GB	RHEOLOGY OF BIOSYSTEMS AND AGM OF THE BRITISH SOCIETY OF RHEOLOGY. CONTACT: Dr Malcolm Mackley, University of Cambridge. T: Telephone; F: Facsimile; E: Email; Info: WWW URL

AIMS OF THE SOCIETY

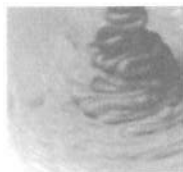
The way liquids flow and solids deform affects all aspects of life.

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.

SR5 family



The Rheometric Scientific SR5 Universal Stress Rheometer

From complex fluids to polymer melts, the Rheometric Scientific SR5 has been designed to meet the needs of today's testing laboratories. The SR5 is the latest in a series of advanced technology rheometers from Rheometric Scientific, and represents over 15 years of experience in stress rheometer design. Whether you're testing food products, coatings, pharmaceuticals, or molten polymers, there is an SR5 configuration designed to meet your needs.

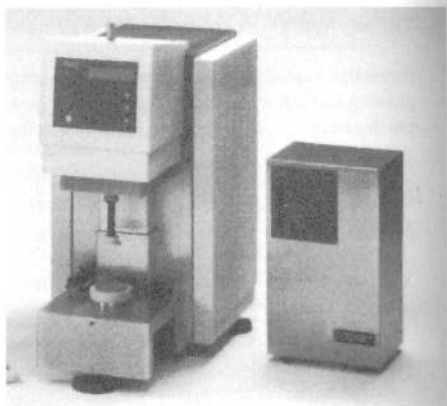
The SR5 Family

The SR5 constitutes a family of rheometers designed around a base instrument. It is intended to meet testing requirements ranging from a simple viscosity measurement to the complete characterization of complex fluids such as emulsified creams and lotions.

The SR5 Family

	PDev	Fluids	Melts	Asphalt	Thermosets
Base System	✓	✓	✓	✓	✓
Axial Control	✓	✓	✓	✓	✓
Dedicated Text Modes	All	Fluids	Melts	Asphalt	Thermosets
Basic Orchestrator	✓	✓	✓	✓	✓
Expert Orchestrator	✓				
Environmental Systems	Any	Baths & Peltier	Electric Plates	SHRP	Furnace

The rheometers in the SR5 family can be configured as dedicated testing devices for specific applications in QC or set up as a versatile rheometer for any materials laboratory application. And this is accomplished in any configuration without compromising performance.



For further information please contact
Carolyn Spillet on Tel: 01372 743386
Fax: 01372 727102