THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 302

March 2002

FORTHCOMING SOCIETY MEETINGS Wednesday 5 June 2002 – Liverpool Northern Regional Meeting Algebraic Geometry, Knot Theory and Related Areas Friday 21 June 2002 – London Professor A.R. Its (Hardy Lecture), J Marklof Wednesday 23 October 2002 - London The Four-colour Problem Joint meeting with the British Society for the History of Mathematics Friday 22 November 2002 - London Annual General Meeting J.T. Stuart (Presidential Address), J.D. Gibbon

COUNCIL DIARY 18 January 2002

There were a number of new faces at January's Council, the first since the AGM and annual elections. These elections were the third since the LMS reformed its electoral practices, introducing real competition for places on Council and election by single transferable vote. So enough time has passed that we are starting to have a feel for how this is all working out. John Pym explained to us the details of our particular system. On the ballot paper, each voter puts the candidates into a ranked order (possibly with ties). Then an initial overall ranked list is produced based on the number of first preference votes assigned to each candidate. Candidates with more than an initial quota of votes are automatically elected and their surplus votes reallocated to candidates ranked next below them on individual ballot papers. If iteration of this procedure fails to elect enough representatives the lowest ranked candidate's votes are also redistributed, and that candidate is eliminated. The process can be proved to converge after a number of iterations, and in this year's elections, which featured 11 candidates for 6 members-at-large of Council, it produced an answer after (only) 20 iterations, electing precisely the six candidates who occupied positions 1 to 6 in the initial ranked list. Of course the calculation can be and is computerised.

The Publisher announced at the meeting that the web-based publications tracking database is about to go on line. Authors, referees and editors will all now have appropriate read access. So, for instance, an author will easily be able to check the progress of a submitted paper. (A trial version is available on the web (http://www.lms.ac.uk:8080/dummy/au thorreport), to be tested by the author

'pooh', with password 'ppteorkr', article reference number 31,4159 and version number 2.) The publisher also reported on negotiations with Professor Bernd Wegner at the TU-Berlin, on the inclusion of back issues of the Society's journals into the historical searchable archive ERAM (Electronic Research Archive for Mathematics). The ERAM project, which is funded by the Deutsche Forschungsgemeinschaft, started with the digitisation of Jahrbuch über die Fortschritte der Mathematik (1868-1943), but is now expanding with the plan to digitise most of the major mathematical journals.

Council received a report on the annual meeting between representatives of EPSRC and the IMA, LMS, RSS and ORS. EPSRC reported a success rate of 57% by number for responsive mode proposals in the two and a half-year period ending June 2001. However, the success rate for proposals ranked by panels was only 30%, while that for the very popular fast stream programme was around 70%. Some concern was expressed that a very high and increasing proportion of EPSRC funds was being siphoned into fast stream and other special initiatives, with only a very small budget remaining to fund other proposals. There had also been some discussion with EPSRC over the brevity of PhD training in the UK, which had the effect that our less broadly trained PhD graduates were not able to compete on equal terms in the job market with those from overseas. The penalty imposed by EPSRC on departments whose students do not complete within 4 years discouraged any extension of training beyond 3 years. EPSRC was open to further discussion on this subject.

The LMS has also been negotiating a new contract with EPSRC over the shared funding of its short instructional courses for postgraduates. The courses aim to provide training in fundamental areas of mathematics, including areas which are central but not currently well represented in the UK. They bring together around 60 students from all over the UK for about a week at a time, into an intensive environment with both lecture courses and less formal tutorials. They have been hugely successful, and it is clear that they have stimulated interaction and a sense of community between students. It is expected that 5 courses a year will run in the three-year period 2003-5 currently under discussion.

The Education Committee brought Council's attention to proposed new QAA requirements for the MMath, which it interprets as requiring that fourth year students on the MMath would not take courses also taken by students on 3 year degrees. Such a development could well have the effect of killing off many MMath degrees. Council agreed that this matter should be raised at the next meeting for the Council of the Mathematical Sciences, with a view to looking for common ground with other sciences.

Sarah Rees

LETTER TO THE EDITOR

Dear Editor,

Further to Brian Davies' letter about G.H. Hardy's attitude to applications of mathematics, I recollect addressing the Society in 1945 on the work of SR17 in the Ministry of Supply. I took special pleasure in the fact that Hardy heard me describe the applications of Galois field theory to experimental design, which had been made in SR17 by Robin Plackett and Peter Burman. Hardy made no comment, but I wondered whether he might revise his opinion expressed in his "Mathematicians Apology" that mathematics in its applications was almost always trivial.

George A. Barnard

[The lecture entitled "Some applications of modern higher algebra to engineering statistics" was given at the Society's meeting on Thursday 1 March 1945, the day on which G.A. Barnard was admitted as a member of the LMS.]

HARDY FELLOW TIMETABLE 2002

Professor Alexander Its, of Indiana University-Purdue University, will be visiting the UK as Hardy Fellow from March to July this year. During his stay, he will be visiting various institutions, as in the table below. There has been more demand for visits than can be accommodated: it is hoped that Members of the Society will find the opportunity to hear Professor Its when he is speaking at a neighbouring University. Further details about each talk can be obtained from the local host.

Date	Venue	Host	Lecture
Tuesday 12 March	Oxford	Dr N.M.J. Woodhouse (nwoodh@maths.ox.ac.uk	The Riemann-Hilbert)Approach to the Distribution functions of Random Matrix Theory
Friday 19 April	Brunel	Professor Y.V. Fyodorov (mastyvf@brunel.ac.uk)	The Riemann-Hilbert method for Random Matrices
Friday 22 M ar ch April	Lough- borough	Professor A.P. Veselov (a.p.veselov@lboro.ac.uk)	The Riemann-Hilbert Approach to the Distribution functions of Random Matrix Theory
Wednesday 24 April	Cambridge	Professor A.S. Fokas (tf227@damtp.cam.ac.uk)	Asymptotics of orthogonal polynomials, the Riemann- Hilbert Problem and universality in matrix models
Tuesday 30 April	Bristol	Dr J. Marklof (j.marklof@bristol.ac.uk)	Asymptotics of orthogonal polynomials, the Riemann- Hilbert Problem and universality in matrix models
w/e 17 May	Kent at Canterbury	Professor P.A. Clarkson (p.a.clarkson@ukc.ac.uk)	ТВА
Friday 24 May	Edinburgh Mathematical Society	Dr P. Heywood (philip@maths.ed.ac.uk)	Asymptotics of orthogonal polynomials, the Riemann- Hilbert Problem and universality in matrix models
Friday 21 June	London	London Mathematical Society (lms@lms.ac.uk)	TBA
Friday 28 June	Leeds	Dr V.B. Kuznetsov (vadim@amsta.leeds.ac.uk)	The Riemann-Hilbert approach in Random Matrix Theory

LONDON MATHEMATICAL SOCIETY NORTHERN REGIONAL MEETING

ALGEBRAIC GEOMETRY, KNOT THEORY AND RELATED TOPICS

Wednesday 5 June 2002, Liverpool University

Professor Lou Kauffman (University of Illinois at Chicago) Does the Jones polynomial detect knots?

Professor János Kollár (Princeton University) What are the simplest algbraic varieties?

The meeting will take place on Wednesday afternoon and will be followed by an LMS sponsored workshop on Knot Theory and Algebraic Geometry from Thursday 6 - Saturday 8 June.

For further details contact Professor Peter Giblin (tel: 0151 794 4053/4043, e-mail: pjgiblin@liv.ac.uk)

There are limited funds available to contribute in part to the expenses of members of the Society or research students attend the meeting. Requests for support may be addressed to the Meetings & Membership Secretary, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (e-mail: grants@lms.ac.uk). Requests should include an estimate of expenses and a very brief *curriculum vitae;* research students should include brief letters of endorsement from their supervisors.

BRITISH WOMEN IN MATHEMATICS DAY 9 January 2002

The British Women in Mathematics Day has become an approximately annual fixture. This year the meeting was again fully funded by the LMS, and specifically aimed at encouraging women at each stage of a mathematical career to continue in the field. The morning session consisted of three half-hour lectures by experienced women mathematicians, each of whom in a different way conveyed something of the nature of the mathematics they are concerned with, and of how their own career had developed. Alice Miller (Glasgow) described how, after a PhD and postdoctoral work in pure mathematics and a period of child raising, she had returned to mathematics with a Daphne Jackson fellowship which had allowed her to move into a new field, computer science, applying model-checking to analyse the logical consistency of distributed systems, in particular in the field of telecommunications. She explained the key methodology, showing the underlying mathematical principles involved. 'Maths in the City' was the title of the second talk. by Susanne Mischke, who described the transition from a PhD in pure mathematics into working in a financial environment where a variety of mathematical problems would be thrown at one; a clear impression was given that the mathematical expertise acquired by working for a PhD enabled one effectively (and profitably) to provide useful answers. In the third talk Reidun Twarock (City University) gave a lucid and enlightening exposition on the topic 'New Symmetries for Quasicrystals and Fullerenes', bringing in ideas from number theory and projective geometry and ending with a model of nesting Fullerene layers which agreed well with experiment. Between them the lectures built a picture of careers of rewarding and active mathematics.

After lunch four PhD students spoke on their work. Their ability to convey nontrivial mathematics clearly was impressive, and they provided us with a most interesting afternoon. Christine Currie (Southampton) described epidemiological modelling of TB and HIV for the World Health Organisation; her analysis suggesting that death rates could be most effectively reduced by treating the TB to which many HIV patients succumb. Anne Porter (Bristol) described the effects of entrained air on violent wave impact, illustrating her work with reference to sea defences. Jennifer Siggers (Cambridge) explained her work nonlinear dynamics of targets and spirals in Rayleigh-Benard convection, showing how predicted pattern formation was experimentally verified. Elizabeth Mann (Oxford) led us from a simple mechanical model to higher-dimensional topological invariants.

Comments made by participants suggest that women students and postdocs, who often have few female colleagues, found the day gave a valuable opportunity to meet with others similarly placed. One participant reported that 'it was so interesting to hear about topics others are researching. Also, it is nice to meet more people in a similar position and also find out the route older people had taken to get where they are. Will there be a similar thing organised next year? I hope so!' Another wrote on the back of her expense form that the day had persuaded her to pursue a career in mathematics.

> Dr F.A. Rogers Kings College London

LONDON MATHEMATICAL SOCIETY POPULAR LECTURES 2002

Dr Helen Mason (Cambridge) Our Dynamic Sun

Dr John Sylvester (Kings College London) Geometry Ancient and Modern

STRATHCLYDE UNIVERSITY Thursday 20 June. Commences at 2.00 pm, refreshments at 3.00 pm, ends at 4.30 pm. Enquiries to Professor A. McBride or Dr A. Ramage, Department of Mathematics, Strathclyde University, Livingstone Tower, 26 Richmond Street, Glasgow G1 1XH (tel: 0141 548 3647/3801, e-mails: a.c.mcbride@strath.ac.uk, a.ramage@strath.ac.uk).

LEEDS UNIVERSITY Thursday 27 June. Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm. Enquires to Dr R.B.J.T. Allenby, School of Mathematics, University of Leeds, Leeds LS2 9JT (tel: 0113 233 5122, e-mail: pmt6ra@leeds.ac.uk).

INSTITUTE OF EDUCATION, LONDON Wednesday 3 July. Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission with ticket. Apply by 28 June to Miss L. Taylor, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (tel: 020 7637 3686, e-mail: taylor@lms.ac.uk). A stamped addressed envelope would be appreciated.

MEETING OF THE UK-REPUBLIC OF IRELAND SECTION OF SIAM University of Leeds, 11 January 2002

This was the regular yearly meeting of this SIAM section, one of SIAM's overseas Sections, previous January meetings having been held at UMIST, Imperial College and Strathclyde University.

The Meeting was chaired by the Section President, David Parker, of Edinburgh University. There were five lectures, each on a different field of Applied Mathematics. All five speakers are members of the LMS!

Tom Manteuffel, President of SIAM, had been invited to give a lecture, but unfortunately he was prevented from attending by illness; Nick Higham 'stood in' at short notice. Moreover, Jonathan Keating also was prevented by illness from lecturing, and was replaced by his colleague from Bristol, Jens Marklof. Both replacements were excellent choices!

Brian Sleeman (University of Leeds) spoke first on 'Mathematical Modelling of Tumour Angiogenesis'. He emphasised the way in which the development of a tumour requires a blood supply, and this led him to a description of the evolution of the endothelium by means of a non-linear diffusive process. The concept of the 'starving of the capillary network' by a protease inhibitor was discussed also, with the theoretical predictions showing some agreement with experiment.

(University Nick Higham of Manchester) lectured on 'How to Detect and Destroy Definiteness of Generalised and Quadratic Eigenvalue Problems'. Such discussions relate to manv mechanical systems, and involve and Positive Hermitian Definite Matrices. For the guadratic eigenvalue problem, the speaker introduced a separation into hyperbolic and elliptic forms, dependent on the three matrices in the problem, explaining that the terms 'hyperbolic' and 'elliptic' are not precisely analogous to other usages.

The topic of Jens Marklof (University

of Bristol) was that of 'Pseudo-Random Numbers, Spectra and Waves'. This discussion related to quantum phenomena but can be relevant elsewhere; the spacing between eigenvalues of a pseudo-differential operator was described in relation to the eigenvalues of a random matrix and in relation to the zeros of the Riemann zeta-function. Thus a strong connection between purer and more applied areas of mathematics was exposed.

John Willis (University of Cambridge) described 'Crack Front Waves and Related Phenomena', waves which can travel in a material at a typical speed of 1 km/s. Introducing a spatial perturbation of the front, the speaker exposed the evolution of the front for the general 3-D case and especially for the situation of the perturbation being restricted to the plane of the crack front. Interesting properties of the eigenvalues emerged.

John Gibbon (Imperial College) took as his subject the 'Evidence for singularity formation in a class of stretched solutions of the 3D Euler equations and the equations of ideal MHD'. This is very topical and may be related to the evolution of fluid flows towards a turbulent state. Taking particular 3-D structures in an infinite domain, the speaker exposed the nature of the singularity that developed in a finite time from a given initial state of flow. Good relationship with the work of others was shown. including that of Peter Constantin.

The quality of each of the five lectures was extremely high, and very good discussions followed. The Secretary of the UK-Republic of Ireland Section of SIAM, Peter Jimack (University of Leeds), and his colleagues, David Parker and Ivan Graham (Bath University) are to be congratulated on producing an excellent programme and a fine meeting.

J.T. Stuart, President



G. Allaire

Shape Optimization by the Homogenization Method

This book provides an introduction to the theory and numerical developments of the homogenization method. Its main features are: a comprehensive presentation of homogenization theory; an introduction to the theory of two-phase composite materials; a detailed treatment of structural optimization by using homogenization; a complete discussion of the resulting numerical algorithms with many documented test problems.

2002. XV, 456 pp. 54 figs. (Applied Mathematical Sciences. Vol. 146) Hardcover € 84,95; £ 59,50; sFr 141,-ISBN 0-387-95298-5

S. Torquato

Random Heterogeneous Materials

Microstructure and Macroscopic Properties

The book is divided into two parts. Part I deals with the quantitative characterization of the microstructure of heterogeneous via theoretical, computer-simulation and imaging techniques. Part II treats a wide variety of effective properties of heterogeneous materials and how they are linked to the microstructure.

2002. XXI, 701 pp. 218 figs. (Interdisciplinary Applied Mathematics. Vol. 16) Hardcover **€ 79,95**; £ 56,-; sFr 132,50 ISBN 0-387-95167-9

A. Jensen, A. Cour-Harbo

Ripples in Mathematics

The Discrete Wavelet Transform

2001. IX, 246 pp. Softcover € 37,95; £ 26,50; sFr 63,-ISBN 3-540-41662-5

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W. Cheney

Analysis for Applied Mathematics

Applied Mathematics

The Variety of

This well-written book treats various practical methods for solving problems such as differential equations, boundary value problems, and integral equations. Pragmatic approaches to difficult equations are presented, including the Galerkin method, the method of iteration, Newton's method, projection techniques, and homotopy methods.

2001. VIII, 444 pp. 27 figs. (Graduate Texts in Mathematics. Vol. 208) Hardcover € 54,95; £ 38,50; sFr 91,-ISBN 0-387-95779-9

P.J. Schmid, D.S. Henningson

Stability and Transition in Shear Flows

A detailed look at some of the more modern issues of hydrodynamic stability, including transient growth, eigenvalue spectra, secondary instability. It presents analytical results and numerical simulations, linear and selected nonlinear stability methods.

2001. XIII, 556 pp. 222 figs. (Applied Mathematical Sciences. Vol. 142) Hardcover € 84,95; £ 59,50; sFr 141,-ISBN 0-87-98985-4

J.-B. Hiriart-Urruty, C. Lemaréchal

Fundamentals of Convex Analysis

This book is an abridged version of the two volumes "Convex Analysis and Minimization Algorithms I and II" (Grundlehren der mathematischen Wissenschaften Vol. 305 and 306). It presents an introduction to the basic concepts in convex analysis and a study of convex minimization problems.

2001. X, 259 pp. 66 figs. (Grundlehren Text Editions) Softcover € 44,95; £ 31,50; sFr 74,50 ISBN 3-540-42205-6

www.springer.delmath/



Springer

THE EUROPEAN MATHEMATICAL SOCIETY

(President Rolf Jeltsch's letter to EMS members, edited for the LMS Newsletter by David Salinger)

This year has been a great year again for mathematics in Europe and for the EMS. The establishment of the Abel prize will have a lasting impact for Europe and the rest of the world: the EMS thanks our Norwegian colleagues for being able to help with the creation of this important prize.

Another major event was the founding of our EMS publishing house. Its managing director, Thomas Hintermann, has started work. The objective is to offer mathematicians a fine service at reasonable prices. It is hoped that we can start a few journals in 2004 and other publications even sooner.

Two big events showed the presence of EMS in the world of Applied Mathematics. In May we had a brainstorming weekend in Berlingen. Switzerland, on Applied Mathematics in Europe. The result was the 'Berlingen Declaration' (see http://www.math. ethz.ch/EMIS/ems-general.html#org). The other event was the Berlin EMS-SIAM conference on 'Applied Mathematics in our Changing World' which was attended by over 400 people from 36 European and 6 other countries.

Our summer schools in St. Petersburg and Prague were well attended. In Malta and Rome, the EMS lecturer, Michele Vergne, spoke on 'Convex Polytopes'. In November, we mounted a Diderot Mathematical forum on 'Mathematics and Communication', simultaneously in Helsinki, Eindhoven and Lausanne.

The Reference Levels project (on mathematical attainment by the age of 16) was successfully completed, with a presentation meeting in Luxemburg. We shall meet the EU's Department for Education in Brussels to discuss how best to proceed. Turning to the future, I am happy to report that the Executive Committee will nominate Sir John Kingman (Isaac Newton Institute, Cambridge) for the Presidency and Helge Holden (Trondheim) for the Secretaryship.

We are holding another meeting in Berlingen, in April. We shall focus on our publishing house and on projects that we plan for the 6th Framework Programme of the EU. One arises from Portuguese Mathematical the Society's suggestion that the EMS organize more meetings, especially jointly with its corporate member societies. (We already plan such an event, with both French mathematical societies, SMF and SMAI, on 10-13 February 2003 in Nice, and a second that year, with the Societa Portuguesa de Matematica itself in Lisbon.) We hope that, with the 6th Framework Programme, we can make a bulk application to support conferences. We also hope to use this Framework to support two 'infrastructure' projects. These concern the databank 'Zentralblatt MATH' and the digitizing of old mathematical articles in an electronically searchable way.

We shall continue to try to push the EU's 6th Framework Program in a direction that makes it flexible enough for mathematicians to use it easily and successfully.

This year will be my last as Society President. One of my aims has been to increase the individual membership of the EMS. Please help me, by joining yourself or by persuading a colleague to join this active and healthy mathematical society^{*}.

*You can join through the LMS (mem bership@lms.ac.uk).

LMS INVITED LECTURE SERIES

27 June - 2 July 2002

Professor Pierre van Moerbeke (Université de Louvain/Brandeis University)

RANDOM MATRICES, RANDOM PERMUTATIONS AND INTEGRABLE LATTICES

The 2002 LMS Invited Lectures will be given at the Department of Applied Mathematics, University of Leeds. This series is held annually: a single speaker gives a course of 10 expository lectures, examining an important topic in depth, over a five day period. In the 2002 programme in Leeds there will be two lectures by Professor van Moerbeke every morning. The associated afternoon sessions will consist of two invited lectures to complement the course (further details will be announced later on).

The following intimately related questions will be discussed:

- What is the distribution of the eigenvalues of a random matrix, having a certain symmetry conditions to guarantee the reality of the spectrum? That distribution is given by matrix integrals. When the size of the matrix gets large, they get replaced by Fredholm determinants. What about universality of the distribution in the limit? What are the differential equations governing these distributions? These problems have their origin in the study of energy levels of heavy nuclei (Wigner, Dyson).
- What are the statistics of the length of the longest increasing sequence in random permutations or random words (Ulam's problem)? These questions apply to models of interface growth, polymers in random environments, first passage percolation problem, "dimer" configurations and non-intersecting Brownian motions.
- Integrals over groups and symmetric spaces (or over their tangent spaces) lead to a variety of interesting matrix models, which satisfy non-linear differential equations. As a striking feature, the coefficients of the (perturbative) expansions have combinatorial or topological quantities, and can be computed recursively. Such integrals originate in the works of Feynman, 't Hooft, Bessis-Itzykson-Zuber and Witten, in the context of string theory.
- The sample canonical correlation coefficients (maximum likelihood estimates) for the canonical correlation coefficients of two Gaussian populations are the test statistic for the statistical independence of two populations. The distribution of these sample canonical correlation coefficients relate to interesting non-linear differential equations. This work goes back to statisticians, like Hotelling, James and Constantine.
- The four problems above and their "time"-perturbations are all solutions to integrable equations or lattices. In the large size limit, the matrix integrals are replaced by Fredholm determinants and are solutions to the Korteweg-de Vries equation. In the finite case, the matrix integrals are solutions to' the Toda lattice, and to two new integrable lattices, the Pfaff and Toeplitz lattices. It is fair to say that matrix integrals point the way to new integrable systems, but also to new combinatorial and probabilistic questions!

All mathematicians interested in the topic are welcome to attend the lectures, although the total number of participants may be limited. There is a registration fee of £30, payable by **15 April 2002**. The registration fee will be waived for doctoral students. Limited funds are available to support participants. Priority will be given to research students and mathematicians who would benefit from attending the lectures, but who would otherwise be prevented from attending by financial constraints.

Accommodation will be in the Charles Morris Hall at the University of Leeds. A number of single, standard bedrooms have been reserved. The costs are: bed and breakfast: £24 + VAT per night; dinner, bed and breakfast: £36.50 + VAT per night; full board: £44.50 + VAT per night. For further details, contact the organiser Vadim Kuznetsov (vadim@maths.leeds.ac.uk), or visit the website (http://maths.leeds.ac.uk/~vadim/LMS_course.htm), which also contains a registration form.

COMBINATORICS AND SET THEORY

There will be a one-day meeting on Combinatorics and Set Theory on Wednesday 4 April at the LMS Building, De Morgan House, Russell Square, London WC1, as part of the series 'Set Theory and its Neighbours'. The meeting will start at 11 am with the first talk at 11.30 am. The speakers will include:

- Imre Leader (Cambridge)
- Charles Morgan (UCL)
- Greg Piper (East Anglia)
- Rene Schipperus (Vienna)

Further information is available via the webpage (http://www.ucl.ac.uk/~ucah cjm/stn.html), or from Charles Morgan (charles.morgan@ucl.ac.uk). The meeting is kept fairly relaxed, allowing plenty of opportunity for informal discussion. The organisers welcome and encourage anyone to participate. There may be some financial support for graduate students - contact Charles Morgan for details. The organisers are very grateful to the LMS for allowing them to use De Morgan House as a venue, and to the LMS for their financial support.

LMS DURHAM RESEARCH SYMPOSIA

The LMS Research Meeting Committee is responsible for the planning of the LMS Durham Symposia, which have been running successfully each July/August since 1974, with over 70 symposia to date, in a wide range of mathematical disciplines. In 2002 there will be three Durham Symposia:

- 1 11 July: Representations of Finite Groups and Related Algebras (organisers: G.R. Robinson, K. Erdmann, J.C. Rickard)
- 15 25 July: Computational Methods for Wave Propagation in Direct Scattering (organisers: M. Ainsworth, P.J. Davies, D.B. Duncan, P.A. Martin, B.P. Rynne)
- 29 July 8 August: Astrophysical Fluid Mechanics (organisers: A.M. Soward, N.O. Weiss, D.W. Hughes, C.A. Jones)

The most recent symposia have been:

2001

Combustion Theory (J. Brindley, J.W. Dold, V. Galaktionov, A.C. McIntosh) Groups, Geometry and Combinatorics (A. Ivanov, M. Liebeck, J. Saxl) Special Structures in Differential Geometry (N.J. Hitchin, S.M. Salamon, A.F. Swann) **2000**

Computational Number Theory (H. Cohen, J.E. Cremona, N.P. Smart) Geometric Integration (C.J. Budd, A. Iserles, E. Mansfield) K-theory and Analysis (J. Brodzki, J.R. Hunton, R. Plymen)

Detailed proposals for symposia are made at least two years ahead. For each symposium an application is made to EPSRC for a substantial research grant, to cover the subsistence costs of all invited participants, and some travel. Considerable assistance is available in preparing the scientific and financial case for the proposals, and in the running of the symposium itself. More information about Durham Symposia is available on the LMS website (http://www.lms.ac.uk/activities/research meet com/).

The LMS Research Meetings Committee welcomes ideas for symposia for 2004 and later, from potential organisers and others, who should contact the Chair of the Committee, Professor A.J. Scholl (a.j.scholl@dpmms.cam.ac.uk). Proposals for symposia to take place in 2004 should be made as soon as possible.

JUNIOR MEMBERSHIP OF THE ISAAC NEWTON INSTITUTE

The Newton Institute is the UK's national research institute for the mathematical sciences. Its programmes and workshops can be of particular interest and importance for young researchers, and the Institute therefore operates a scheme for Junior Membership of the Newton Institute.

To be eligible, you must be either a Research Student or a Post-doc within 5 years of having received your PhD (with appropriate allowance for career breaks), studying or working in a UK University or similar research institution. Junior Members receive regular advance notification by e-mail of programmes, workshops, conferences and other Institute events, and in particular detailed information about workshops of an instructional or general nature. They can apply for Junior Member grants to support their involvement in Institute activities, including subsistence and travel expenses and/or workshop registration fees. Further details and an online application form are available from the web (http://www.newton.cam.ac.uk/junior.h tml).

DR GWENDOLEN M. MURPHY

Dr Gwendolen M. Murphy, who was a member of the London Mathematical Society from 15 June 1979 to 10 January 2001, died on 23 October 2001, aged 67.

SCHOOL OF MATHEMATICS

Lectureship in Mathematics



The appointment is initially for five years and should begin by 1 September 2002.

The salary will be on the Lecturer B scale, $\pounds 25,455$ to $\pounds 32,537$ per annum plus USS benefits.

For informal discussions please contact the Dean of the School of Mathematics, Dr Gareth Janacek (01603 592849, e-mail: G.Janacek@uea.ac.uk) or Professor Jean-Marc Vanden-Broeck (e-mail: J.Vanden-Broeck@uea.ac.uk).

Information about the School can be found on the World Wide Web at (http://www.mth.uea.ac.uk).

Further details and an application form should be obtained from the Personnel Office, University of East Anglia, Norwich, NR4 7TJ (answerphone: 01603 593493, E-mail: Personnel@uea.ac.uk), to be returned by 12 April 2002. Please quote reference number AC398.

UEA is committed to excellence in education and research

DYNAMICS WITH SYMMETRY TWO-DAY MEETING

This two-day meeting will bring together two LMS-funded networks: PANDA (Patterns, Nonlinear Dynamics and Applications) and the Nonlinear Pennine Triangle, and will be held on Monday and Tuesday 25-26 March 2002, in the Department of Applied Mathematics, University of Leeds. These networks are affiliated with the Leeds Centre for Nonlinear Studies.

There will be two pedagogical lectures, aimed at research students, on the topic of 'Dynamics with Symmetry' by Rebecca Hoyle (Surrey) and Alastair Rucklidge (Leeds), a review of experimental convection by Mike Thurlow (Manchester), followed by shorter contributions. Speakers will include: Konstantin Blyuss (Surrey), David Chillingworth (Southampton), Tom Mullin (Manchester), Sarah Pollicott (Nottingham), Carl Tipton (Manchester), Matt Lees (Manchester), Bjoern Hof (Manchester). Offers of additional contributions are welcome.

Post-doctoral researchers and research students are warmly encouraged to attend. Further details, including abstracts, travel information and maps, can be found on the web (http:// www.maths.leeds.ac.uk/~alastair/ 02_lms/). For further details, contact Alastair Rucklidge (A.M.Rucklidge@ leeds.ac.uk).



INSTITUT DES HAUTES ÉTUDES SCIENTIFIQUES

Post-doctoral Fellowships

The Institut des Hautes Etudes Scientifiques (IHES), an international research institute based near Paris (France), whose activity has been so far focused on Mathematics and Theoretical Physics, has started a new research activity at the interface of these disciplines with genetics and molecular biology. One of its aims is to contribute to the analysis and design of biological experiments by developing new tools to represent and study biological data.

The Institute offers two two-year post-doctoral positions for PhDs having a background in mathematics, computer science, biophysics, biology and/or biochemistry, with special interests in one of the following topics: biophysics of macromolecules, macromolecular networks, sequence analysis, molecular evolution and phylogenetic trees, databases and data-mining, architecture of high-throughput experiments, pattern recognition, as well as in related areas.

Applications should be sent before **30 April 2002** to Mme Helga DERNOIS, Institut des Hautes Études Scientifiques, 35 route de Chartres, F 91440 - Bures-sur-Yvette, France (e-mail: dernois@ihes.fr).

The decision will be taken by 30 May 2002.

BANACH ALGEBRAS AND THEIR APPLICATIONS

A conference on Banach Algebras and their Applications will be held from 27 July to 9 August 2003 at Edmonton, Alberta. This conference is the sixteenth in a series of conferences on Banach algebras that started in 1974 in Los Angeles. It is expected that most specialists in Banach algebras as well as leading mathematicians from related areas will attend this conference. In the past, these conferences have always led to fruitful interaction between the participants, and this tradition is expected to continue.

In addition to the regular conference programme consisting of one hour and half hour talks by the participants, five workshops on the following topics are planned, each of which will be chaired by an internationally recognized specialist in the respective area:

 Banach algebras in harmonic analysis (to be held in the honour of Eberhard Kaniuth on the occasion of his retirement). Chair: Anthony To-Ming Lau (Edmonton, Canada)

- Banach algebras in operator theory. Chair: Michael M. Neumann (Starkville, USA)
- Banach algebras and operator spaces. Chair: Zhong-Jin Ruan (Urbana-Champaign, USA)
- K-theory of Banach algebras. Chair: Joachim Cuntz (Münster, Germany)
- Topological homology. Chair: Alexander Ya. Helemskii (Moscow, Russia)

Each workshop will occupy two afternoons. The Chairs are completely free to decide on the format of their workshops. The organisers are Anthony To-Ming Lau and Volker Runde. For more detailed information, including a list of invited speakers, see the conference website (http://www.math.ualberta.ca/~ba03/).



ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

A NATO Advanced Study Institute

AXIOMATIC, ENRICHED & MOTIVIC HOMOTOPY THEORY 9 - 20 September 2002

Organising Committee NATO ASI directors: J.P.C. Greenlees (Sheffield), I.B. Zhukov (St Petersburg)

Other Organisers P. Goerss (Northwestern), J.F. Jardine (Western Ontario), F. Morel (Jussieu), V.P. Snaith (Southampton)

Theme Axiomatic, enriched and motivic homotopy theory, and its recent applications in topology, geometry, algebraic K theory and arithmetic. This will include localization, the homotopy theory of diagrams, obstruction theory for structured ring spectra, homotopy theory of algebraic theories, topological cyclic cohomology, abstract and simplicial homotopy theory, operads, A1 homotopy theory, mixed motives, algebraic cobordism, algebraic K theory and the algebra of structured spectra.

Keynote Speakers

- Carlsson, G. (Stanford University, USA)
- Dwyer, W.G. (University of Notre Dame, USA)
- Jardine, R. (University of Western Ontario, Canada)
- Goerss, P.G. (Northwestern University, USA)
- Levine, M. (Northeastern University, USA)
- Madsen, I. (Aarhus University, Denmark)
- May, J.P. (University of Chicago, USA)
- McClure, J.E. (Purdue University, USA)
- Morel, F. (Institut de Mathématiques Jussieu, France)
- Panin, I. (Steklov Mathematical Institute, Russia)
- Rost, M. (Regensburg University, Germany)
- Schwede, S. (University of Bielefeld, Germany)
- Smirnov, V.A. (Moscow State University, Russia)
- Smith, J. (Purdue University, USA)
- Snaith, V.P. (Southampton University, UK)
- Vishik, A. (Steklov Institute of Mathematics, Russia)

The conference will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Wolfson Court. The workshop package costs £715 and includes accommodation, breakfast and dinner from dinner on Sunday 8 September until breakfast on Saturday 21 September 2002, and lunch and refreshments during the days that lectures take place. Limited financial support may be available for those from NATO, Partner countries and Mediterranean Dialogue countries. Numbers will be restricted to about 80 participants. Further information and applications forms are available on the web (http://www.newton.cam.ac.uk/programs/NST/nstw01.html). Completed application forms should be sent to Tracey Andrew, Isaac Newton Institute for Mathematical Sciences, 20 Clarkson Road, Cambridge CB3 0EH, or via e-mail (t.andrew@newton. cam.ac.uk). Closing date for the receipt of applications is **30 April 2002**.

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ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES K-THEORY AND ARITHMETIC

30 September - 4 October 2002

Organisers: S. Lichtenbaum (Brown), V.P. Snaith (Southampton)

This workshop will concentrate on the aspects of the interplay between algebraic Ktheory, arithmetic and algebraic geometry. Particular emphasis will be placed upon applications of the recently developed homotopy theory of geometric and motivic categories. In addition to lectures on current results, a number of expository lectures will be scheduled to provide researchers and graduate students in related areas with an opportunity to learn about these new techniques. Topics of current interest in this area include: Beilinson-Soulé conjectures, Bloch-Kato conjecture, Beilinson-Borel regulators, Kato-Parshin-Saito higher class field theory, Lichtenbaum-Quillen conjecture, Milnor Ktheory, motivic cohomology, Brumer-Coates-Sinnott conjectures, polylogarithms and special values of L-functions.

- M. Ando (UIUC)
- S. Bloch (Chicago)
- D. Burns (KCL)
- G. Carlsson (Stanford)
- R. de Jeu (Durham)
- W.G. Dwyer (Notre Dame)
- H. Esnault (Essen)
- I. Fesenko (Nottingham)
- P. Goerss (Northwestern)
- J.P.C. Greenlees (Sheffield)
- M. Hanamura (Kyushu)
- L. Hesselholt (MIT)
- M. Hovey (Wesleyan)
- P. Hu (Chicago)
- A. Huber (Leipzig)
- U. Jannsen (Regensburg)
- J.F. Jardine (Western Ontario)
- B. Kahn (Paris VII)
- I. Kriz (Michigan)

- M. Levine (Northeastern)
- S. Lichtenbaum (Brown)
- I. Madsen (Aarhus)
- M. Mahowald (Northwestern)
- F. Morel (Paris VII)
- D.C. Ravenel (Rochester)
- J. Rognes (Oslo)
- M. Rost (Ohio State)
- P. Schneider (Muenster)
- A.J. Scholl (Cambridge)
- S. Schwede (Bielefeld)
- V. Snaith (Southampton)
- C. Soulé (IHES)
- N.P. Strickland (Sheffield)
- B. Totaro (Cambridge)
- V. Voevodsky (IAS)
- C. Weibel (Rutgers)
- N. Yagita (Ibaraki)

The conference will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Wolfson Court. The workshop package costs £330 and includes accommodation, breakfast and dinner from dinner on Sunday 29 September until breakfast on Saturday 5 October 2002, and lunch and refreshments during the days that lectures take place. Numbers will be restricted to about 60 participants. Further information and applications forms are available on the web (http://www.newton.cam.ac.uk/programs/NST/nstw03. html). Completed application forms should be sent to Tracey Andrew Isaac Newton Institute for Mathematical Sciences, 20 Clarkson Road, Cambridge CB3 0EH, or via email (t.andrew@newton.cam.ac.uk). The closing date for the receipt of applications is **30 April 2002**.

ENVIRONMENTAL MATHE-MATICS AND STATISTICS Discipline-hopping applications

NERC and EPSRC announce a new jointly funded £2.75 million programme in Environmental Mathematics and Statistics (EMS) over 3 years. This capacity-building initiative aims to enhance the quality and quantity of collaborations between the mathematical/statistical and life science/environmental communities. It includes NERC's aim of attracting mathematicians and statisticians to play a more active role in environmental research. and EPSRC's identification of environmental mathematics and statistics as a strategic interdisciplinary priority. It will be managed by NERC on behalf of both research councils. Both research councils will receive advice on the distribution of funds and on the selection of proposals from the programme's Steering Committee.

The programme is intended to develop rigorous mathematical and statistical reasoning and to bring them to bear on challenges in the environmental sciences. It will do so by supporting:

- 'discipline-hopping' awards for academic researchers in established positions (not postdoctoral researchers)
- postdoctoral research fellowships
- research studentships at the interdisciplinary interface
- workshops and short training courses.

The programme will not offer research grants or support for environmental engineering. Research grant applications in environmental mathematics and statistics should be made to NERC or EPSRC under their responsive mode schemes and for environmental engineering to EPSRC. Further information about the EMS programme, including its Science and Implementation Plan, is on the web (http://www.nerc.ac.uk/ funding/interdisciplinary/).

Applications are now invited from

eligible institutions in the UK for discipline-hopping awards of up to £50k for periods of 3-12 months. Discipline-hopping applications will be assessed by the programme's Steering Committee.

Discipline-hopping awards will provide support (by a period of salary buyout) for scientists in permanent academic positions who wish to gain research experience in the adjunct discipline. Applicants must demonstrate that they will establish successful collaboration with workers from the adjunct discipline either within their own or at another institution. The EMS Steering Committee particularly wishes to catalyse the physical relocation of scientists to undertake work of mutual benefit to them and collaborators in environmental science. However, the Committee does not wish to discriminate against those who are unable to relocate for personal reasons and will therefore consider applications that propose other collaborative working arrangements. Further details of the scheme's objectives, key features and guidance for completion of the application form are given in the notes for discipline-hopping applicants. Applicants should complete the RG1 2001 application form, mark it 'EMS Programme', and post to Awards & Training Section, NERC, Polaris House, North Star Avenue, Swindon, Wilts SN2 1EU to arrive no later than 17:00 on Monday 8 April 2002. Faxed copies will not be accepted.

SOUTH WEST PROBABLITY SEMINAR

The South West Probability Seminar will be held on 8 March at Bristol University. There will be a talk by Professor Y. Le Jan (Paris) at 2.15.pm on 'Brownian flows, coalescence, and noise', and a talk by Professor T.J. Lyons (Oxford) at 3.30 pm on 'The signature of a random path'. For further details contact Professor M. van den Berg (M.vandenBerg@bris.ac. uk).

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In close collaboration with the Ecole Polytechnique Fédérale de Lausanne (EPFL), the Faculty of Sciences of the University of Lausanne (UNIL) has an opening for an

assistant (tenure track) / full professorships in pure mathematics

We seek outstanding individuals in all areas of pure mathematics; for one position, applications in geometry (algebraic, arithmetic, differential, topological, etc.) are particularly encouraged.

Successful candidates must have an independent and internationally recognized research program and have interest in teaching at both undergraduate and graduate levels. Substantial start-up resources will be provided. Candidates will be selected by a joint EPFL/UNIL committee.

Further information: Professor Jacques Thévenaz (Jacques.Thevenaz@ima.unil.ch) or Professor Eva Bayer (Eva.Bayer@epfl.ch) and look at www.unil.ch/ima and sb.epfl.ch/

Applications with mention of the expected level of the position, including *curriculum vitæ*, list of publications, statement of research interests and at least five references (including names, addresses, and email addresses), must be sent before **April 30, 2002** to the Dean of the Faculty of Sciences, UNIL, Collège Propédeutique, CH-1015 Lausanne, Switzerland.



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History of Mathematics, Volume 20; 2000; 230 pages; Hardcover; ISBN 0-8218-0872-9; List \$49; All AMS members \$39; Order code HMATH/20LMS

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Hermann Grassmann

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J. TITS HONORARY MEMBER 1993

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A fuller list of meetings and events is given in the Society's web site (http://www.lms.ac.uk/meetings/diary.html). **MARCH 2002** 27-2 July LMS Invited Lectures, Professor P. van Moerbeke, 1 North British Functional Analysis Seminar, Newcastle Leeds University (302) upon Tyne University (300) **JULY 2002** 2 Operator Theory Conference, Newcastle upon Tyne 1-6 The Teaching of Mathematics Conference, Crete, Greece University (300) (297 8 Edinburgh Mathematical Society Meeting, Dundee (296) 1-11 Representations of Finite Groups and Related Algebras, 8 South West Probability Seminar, Bristol University (302) LMS Durham Symposia, Durham University (302) 17-27 Semi-Classical and Quantum Multibody Systems 3 LMS Popular Lectures, Institute of Education, London Workshop, Warwick University (298) (302)18-22 Quantum Topology Workshop, Warwick University 7-19 Numerical Analysis Summer School, University of (300)Durham (295) 21-23 Topology and Dynamics Conference, University of 8-19 Normal Forms, Bifurcations and Finiteness Problems in Texas (301) Differential Equations SMS-NATO ASI Meeting, Université 24-28 Differential Equations LMS/EPSRC Short Course, de Montréal, Canada (298) Cambridge University (297) 8-26 Algebraic K-theory and its Applications School and 25-26 Dynamics with Symmetry Meeting, Leeds University Conference, ICTP, Italy (300) (302)15-25 Computational Methods for Wave Propagation in APRIL 2002 Direct Scattering, LMS Durham Symposia, Durham 4 Combinatorics and Set Theory Meeting, De Morgan University (302) House, LMS, London (302) 18-19 Mathematical Foundations of Computer Science and 5-6 17th British Topology Meeting, Leicester University Information Technology Conference, National University of (301) Ireland (301) 7-12 Joint BMC/BAMC, Warwick University (296) 21-26 Computation and Analytic Problems in Spectral 10 'The Problem of Primitives' Lecture, Italian Cultural Theory Workshop, University of Wales (296) 21-27 Geometry, Symmetry and Mechanics II Workshop, Institute (301) 14-20 Classical N-Body Systems and Applications Workshop, Warwick University (298) Warwick University (298) 23-2 Aug EDGE mid-term Summer School and Conference, 22-23 Astrodynamics Workshop, Surrey University (298) Edinburgh (299) 25-26 Invariant and Symmetry - Preserving Algorithms for 26-27 Meeting in honour of 65th birthday of M.S.P. N-Body Simulation Meeting, Leicester University (301) Eastham, University of Wales (296) MAY 2002 29-8 Aug Astrophysical Fluid Mechanics, LMS Durham 3 Edinburgh Mathematical Society Meeting, Aberdeen (296) Symposia, Durham University (302) 13-31 Probability Theory School and Conference, ICTP, Italy AUGUST 2002 (300) 5-15 New Directions in Dynamical Systems, Ryukoku and 17-18 Professor P. McMullen's 60th Birthday Meeting, Kyoto Universities (293) University College London 20-28 ICM2002, Beijing, China (297) 19-26 Symmetry and Perturbation Theory Conference. 21-29 Workshop on Modern Problems in Applied Probability, Sardinia, Italy (299) Heriot-Watt University (301) 24 Edinburgh Mathematical Society Meeting, Hardy Fellow 29-2 Sept Nonlinear Partial Differential Equations Lecture (302) International Conference - Theory and Approximation, City **JUNE 2002** University of Hong Kong (297) 2-8 Combinatorics 2002 Conference, Maratea, Italy (301) SEPTEMBER 2002 3-8 Abel Bicentennial Conference, University of Oslo (301) 1-9 Algebraic Hyperstructures and Applications Congress, 5 LMS Northern Regional Meeting, Liverpool University Samothraki Island, Greece (300) (302)9-20 Axionatic, Enriched and Motivic Homotopy Theory 7 Edinburgh Mathematical Society Meeting, St Andrews Conference, Isaac Newton Institute, Cambridge (302) (296)9-27 Intersection Theory and Moduli, ICTP, Italy (300) 10-16 Aarhus Topology Conference, Aarhus University (301) 30-4 Oct K-theory and Arithmetic Conference, Isaac Newton 17-21 Householder Symposium XV, Peebles Hydro Hotel, Institute, Cambridge (302) Scotland (296) OCTOBER 2002 20 LMS Popular Lectures, Strathclyde University (302) 23 BSHM/LMS Meeting, The Four-colour Problem, London 21 LMS Meeting, Hardy Lecture, London (298) NOVEMBER 2002 21-26 Symmetries and Integrability of Difference Equations, 22 LMS Annual General Meeting, London Giens, France (301) APRIL 2003 24-28 Analytic Number Theory Workshop, Max Plank 7-10 BMC, University of Birmingham (296) Institute, Bonn (288) **JULY 2003** 24-29 Topology, Geometry and Quantum Field Theory 7-11 ICIAM 2003, Sydney, Australia (298) Symposium, Oxford (300) 27-9 Aug Banach Algebras and their Applications 27 LMS Popular Lectures, Leeds University (302) Conference, Edmonton, Alberta (302) The Newsletter is published monthly except in August. 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