THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 333 January 2005

Forthcoming Society Meetings

2005

Friday 25 February
London
S. Lauritzen
E. Thompson
(Mary Cartwright Lecture)
[*page 5*]

Wednesday 18 May
Birmingham
Midlands Regional Meeting

Friday 17 June
London
R. Jozsa
(Naylor Lecture)

Friday 8 July
York
Northern Regional Meeting

Monday 5 September
Bristol
South West & South Wales Regional Meeting

Friday 18 November
London
Annual General Meeting

COUNCIL DIARY

19 November 2004

The November Council meeting precedes the AGM and is therefore shorter than usual. So it was especially unfortunate that the 8 o'clock train from York was cancelled and the next train delayed, so that the Diarist missed the first 30 minutes. He arrived in the middle of discussion about the LMS contribution to the presentation that the Council for Mathematical Sciences (CMS) was going to make at a meeting with EPSRC a few days later. This matter had been on the agenda at the last Council meeting, and was a follow-up to the recommendations of the International Review of Mathematics (IRM). The Review had been conducted by CMS (at EPSRC's request) and would, we hoped, be used to justify more funding for mathematics. To the disappointment of the Council, the initial EPSRC Action Plan failed to address many of the pressing problems identified in the IRM report. The LMS draft highlighted a number of points raised in the report, and proposed concentrating on two specific initiatives. First, to ensure the competitiveness of the UK PhD in Mathematics by making it a four-year course, but not at the cost of reduced numbers. Second, to provide more time for high-quality research, by increasing the number and flexibility of fellowships. Council regards such initiatives as crucial to maintaining the excellence of mathematics in the UK.

Another change that will affect the funding of mathematics is Full Economic Costing (FEC). This is an attempt to end universities having to subsidise research, but while desirable and indeed long sought, the actual implementation appears likely to be complex and overblown. Ironically, this would have a negative impact on the time available for research. It was felt that the needs of mathematics were once again being dominated by those of the big sciences. Mathematics is very much at a disadvantage and even when the potential is there, it is often overlooked. Small isolated departments make a vital contribution to the health of mathematics in regions throughout the UK, but are at a real disadvantage in applying for large grants.

Acutely aware of the connection with the preceding discussions, Council then turned to a report of yet

another Mathematics Department in trouble and found it could do little to help.

The Treasurer's annual report contained no dramatic surprises but the accounts were healthier than had been feared, and the publishing results were very encouraging. This is good news for the Society's activities which rely very much on the income that publishing generates. The efforts of the staff in achieving this satisfactory position during a difficult period were singled out for well-deserved praise.

The LMS is invited to make nominations to a number of bodies, including the RAE panels. At this meeting names were proposed for the EPSRC Strategic Advisory Team, as well as the high-level panels, TOP and UP. The Society is also the adhering body to the International Mathematical Union (IMU) for the UK, and as such it is invited to make nominations to its many committees. We were asked for nominations for the Nominating Committees of the IMU and the International Commission on Mathematical Instruction (ICMI); the selection process for the committees seemed to be rather arcane, perhaps to avoid an infinite sequence of nominating bodies.

The next item of business was an Interim Report arising from the Framework Study Initiative. Since the setting up of a joint IMA and LMS Working Group a few years ago, the two Societies have enjoyed close and harmonious relations, cooperating effectively in educational and other matters of mutual interest. The success of the collaboration and recognition of common interests in an increasingly difficult environment led to a proposal that the relationship between the two societies be reviewed fundamentally. The IMA and LMS Councils agreed to this proposal and established the Framework Study Initiative, in which a group of people from each Society investigated how the current relationship between the two societies might develop. An Interim Report had been produced, setting out the various ways that this development might take place within the constraints of charity and commercial law. It was emphasized that the Interim Report was intended to set out in general terms the different possible models, ranging from continuing on the present lines to a completely merged single body. It was meant to provide information and not to make any recommendations. The report began by outlining the history of the two Societies and their principal functions, before going on to describe various models. It provoked a lengthy and thoughtful discussion, with some of the problems mathematics is currently encountering very much in mind. It became clear that considerable reflection on the report would be needed, as well as some more information. Council agreed to return to the matter at its next meeting.

The meeting closed with a series of reports from various Officers and Committees, followed by an exodus to the Chemistry Auditorium, UCL, where the business of the AGM was efficiently conducted. Prizes were awarded and then we heard two fascinating lectures on mathematical physics. David Olive spoke first on increasing synergy (or 'connectivity' in EPSRC terminology) between mathematics and physics. The second lecture on infinite dimensional symmetry was the Presidential Address of Peter Goddard, who came back from Princeton to give it. After a well-attended and enjoyable reception at De Morgan House, there was the Annual Dinner in the York Room at the nearby Bonnington Hotel.

On a personal note, this was my last Council meeting. The four years I spent on it were interesting, busy and something of an eye-opener. The LMS has grown into a large organisation which, nevertheless, retains the dedication and loyalty of its staff, something which the Society can be proud of as well as grateful for. It is served well by its Council who work devotedly for no financial reward to support mathematics and to secure its future in increasingly difficult times.

Maurice Dodson

Note from the General Secretary

The part of the meeting that Maurice Dodson missed was mainly devoted to routine matters. One item that will be of interest to members was that Council has agreed to allow the (anonymised) results of its Single Transferable Vote elections to be used for research purposes. In theory, this will enable anyone to check that the procedure has been carried out correctly. Details will be announced in due course.

The Council wishes to record its thanks to Maurice Dodson, and his predecessor as Diarist, Sarah Rees, for their valuable contribution to making the deliberations of Council more accessible to members.

Norman Biggs

TREASURER'S REPORT TO THE AGM 2004

In the financial year 1 September 2003 to 31 August 2004, the Fixed Assets of the Society increased in value from £9.8M to £10.2M, reflecting a continuing recovery in the value of the Society's equities. During the year, Council decided to replace Credit Suisse as fund managers by Morgan Stanley.

The Building and Development Reserve Fund is unchanged over the year at £500,000; the Printing and Publication Reserve Fund rose from £1.14M to £1.20M, following the repayment of part of the start-up costs of the journal *Compositio*. Other reserve funds are used to hold gifts and bequests (£23K, unchanged on last year), and to meet the costs of grants that have been awarded but not yet claimed (£46K). Council has completed a review of the purposes of its reserve funds, and will consider their actual level during the coming months.

It has been another good year for the Society's publishing activities, with a total surplus just short of £700K. It has been customary at this point to make apologetic remarks disclaiming excessive profit-taking. At a time when the spotlight is on scientific publishing, I would prefer instead to

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acknowledge the essential role that the publications' surplus plays in enabling the Society to support mathematical activity in the United Kingdom, and to congratulate the Publisher, Susan Hezlet, for the energetic and forward-looking way in which she pursues the Society's interests.

The total spent on grants, subscriptions, and prizes fell from £365K to £347K; expenditure on management and administration rose from £542K to £603K - much of the rise being due to exceptional costs on building and maintenance at De Morgan House.

Ordinary membership fell slightly from 2369 to 2344; associate membership rose from 138 to 153. Subscription income rose from £52K to £57K.

Once again, there are no dramatic changes to report, but again the Society should take note of the extent to which it relies on its publishing activities for its financial health; and on the crucial contribution of Susan Oakes, Peter Cooper and Ephrem Belay, who manage our financial affairs with extraordinary efficiency and care.

N.M.J. Woodhouse
Treasurer

ANNUAL LMS SUBSCRIPTION 2004-05

The Society is appreciative of those members who have paid their 2004-05 subscriptions. May we remind those who have not yet paid, that subscriptions were due on 1 November 2004. Prompt payment ensures continuity of publications and avoids the need for time-consuming reminders. The Society reserves the right to discontinue the supply of periodicals and the *Newsletter* to members whose subscription remains unpaid by **31 January 2005**. The methods of payment are either by a sterling cheque drawn on a UK bank; a US$ cheque drawn on a US bank, direct debit or credit card. If you have misplaced your renewal of subscription form, contact the LMS office (email: membership@lms.ac.uk; tel: 020 7637 3686; fax: 020 7323 3655).

Individual members 2004-05 rates:

Subscriptions	**£**	**US$**
Ordinary	33.00	66.00
Reciprocity	16.50	33.00
Associate	8.25	16.50
European Mathematical Society (additional)	16.00	32.00
Publications		
Bulletin Volume 37	33.00	66.00
Journal Volumes 71 & 72	66.00	132.00
Proceedings Volumes 90 & 91	66.00	132.00
JCM (electronic) Volume 8	free	free
Nonlinearity Volume 18 – except North America	47.00	
– North America		118.00
Journal of Applied Probability Volume 42	43.00	86.00
Math. Proc. Camb. Phil. Society Volumes 137 & 138	88.00	176.00
Journal of the European Mathematical Society Volume 7	32.00	64.00

LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT LECTURE

Friday 25 February 2005

**Chemistry Auditorium, Christopher Ingold Building,
University College London, 20 Gordon Street, London WC1**

3.30 – 4.30 **Professor Steffen Lauritzen (Oxford University)**
A pedigree perspective of local computation

4.30 – 5.00 **Tea**

5.00 – 6.00 **Mary Cartwright Lecture**
Professor Elizabeth Thompson
(University of Washington, Seattle)
Relatedness, genome sharing, and the detection of genes

The talks by Elizabeth Thompson and Steffen Lauritzen are concerned with the genetic analysis of large pedigrees. A pedigree, defined as a full specification of family relationships between a group of individuals, is naturally represented by a directed graph. Almost every problem associated with pedigree analysis involves a difficult computation, but algorithms for so-called local computation on graphs allow feasible calculations to be done, and this is the topic of the first talk. The second talk focuses on genome sharing arising from pedigree relationships, and on using the dependence in sharing at different loci on a common chromosome to infer linkage of a trait to a set of marker loci. A new way to assess the evidence for linkage from unobserved genome sharing will be discussed.

A reception will be held at De Morgan House at 6.15 pm with a dinner afterwards at Poons Restaurant, 50 Woburn Place, London WC1 at 7.15 pm. The cost will be £25.00 per person, inclusive of wine. Those wishing to attend should inform The Administrator, Susan M. Oakes, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS, enclosing a cheque payable to the 'London Mathematical Society' to arrive no later than **Monday 21 February**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the Society meeting. Requests for support, including an estimate of expenses, may be addressed to the Programme Secretary at the Society (web: www.lms.ac.uk; email: grants@lms.ac.uk).

LONDON MATHEMATICAL SOCIETY

2004-05 COUNCIL

As a result of the annual election, membership of the Council is the following:

President	Professor F.C. Kirwan FRS (Oxford)
Vice-Presidents	Professor M.R. Bridson (Imperial College London)
	Professor A.G. Chetwynd (Lancaster)
Treasurer	Dr N.M.J. Woodhouse (Oxford)
General Secretary	Professor N.L. Biggs (LSE)
Programme Secretary	Dr S.A. Huggett (Plymouth)
Publications Secretary	Professor J. Howie FRSE (Heriot-Watt)
Education Secretary	Dr W.B. Stewart (Oxford)
Members-at-Large	Professor I.D. Abrahams (Manchester)
	Professor C.J. Budd (Bath)
	Dr R.D. Camina (Cambridge)
	Professor R.T. Curtis (Librarian) (Birmingham)
	Professor H.G. Dales (Leeds)
	Dr P.J. Davies (Strathclyde)
	Professor A.M. Etheridge (Oxford)
	Professor K.J. Falconer FRSE (St Andrews)
	Professor F.P. Kelly FRS (Cambridge)
	Sir John Kingman FRS (Isaac Newton Institute)
	Dr F.A. Rogers (King's College London)
	Dr N.C. Snaith (Bristol)

EPSRC MATHEMATICAL SCIENCES PROGRAMME STRATEGIC ADVISORY TEAM

The Maths SAT met for the seventh time on 12 October 2004 at Polaris House, Swindon. There was a full agenda with the theme of developing strategic options for the future, following the International Reviews of Mathematics and Operational Research and the consideration of the Programme's research and training portfolio by EPSRC's Technical Opportunities and User Panels. The meeting began with a discussion of doctoral training. Some members of the SAT were pleasantly surprised to find out that EPSRC has increased the funding announced through the Doctoral Training Accounts (DTA) by 17% to increase the average length of the PhD to 3.5 years for October 2004 starts. The general consensus was that:

- In response to the International Review of Mathematics, the UK should move towards a 4-year PhD programme in the mathematical sciences to enable depth and breadth of training. There would be concentration of training resources if there was no increase in budget;
- In order to achieve this structural change, departments need to be sure that they will not be disadvantaged if they move to this model;
- There is potential for the student to do some paid teaching in a balanced research programme;
- EPSRC should work with the learned societies to promulgate this structural change and in developing the current suite of broadening courses.

The SAT also discussed the procedure for allocating doctoral training resources in the Mathematical Sciences Programme. The process was felt to be broadly appropriate with the more serious, structural issues being the issue that needs to be addressed.

The Mathematical Sciences Programme wishes to use its Doctoral Training Grants (DTG) allocations process to reflect the quality and level of research activity within departments, strategic priorities and particularly the quality and breadth of PhD training provision in response to the International Reviews. The mathematics community can take advantage of the additional funding period to develop PhD programmes with a broader base, and universities can pool DTA resources to provide taught courses for PhD students on a regional or national basis. The Programme would wish to reward departments that develop their PhD programmes through an increase in their DTG allocations. We will also be looking for other ways in which we can encourage universities to make changes that will improve the quality of the UK PhD in the mathematical sciences. The recent regional meetings have offered a number of suggestions as well as highlighting some real barriers to this kind of structural change. EPSRC will be taking this on board and working with other bodies as we determine our strategy over the coming months.

There was a short discussion of the Review of OR in which SAT members highlighted issues raised within this review that were common with the International Review of Mathematics, e.g. the significant overlap with some of the issues raised in Statistics and at the interface with Computer Science. EPSRC will be looking at its support for OR across all of its Programmes as we formulate our response to this Review and we will be meeting representatives from the Operational Research Society in late November.

The feedback from the recent TOP and UP meetings was relayed to the SAT. Council's advisory panels had looked at reviews of the research and training portfolios of all EPSRC Programmes and the contribution each is making to delivering EPSRC's strategic objectives. The main issues raised were:

- High quality programme but the research quality is not consistent across the portfolio;
- Connectivity - there is still more to do, particularly with industry, computer science and high performance computing;
- Strong fellowship portfolio;
- Age profile across the mathematical sciences is a concern, but especially in statistics and OR;
- Concerns over the quality of PhD training, with no strong correlation to research grant funding and with many departments having small Doctoral Training allocations;
- Public Engagement - need to keep up the good work.

The SAT discussed these comments, particularly those regarding connectivity with other disciplines and industry. It highlighted the role of EPSRC in facilitating collaboration and the importance of providing resources to ensure that mathematicians are supported as part of a research team from beginning to end of interdisciplinary projects.

The main issues for the Programme for the development of future strategy were felt to be:

- *Training* – improving the quality of the UK PhD and providing interdisciplinary training opportunities e.g. summer schools;
- *Responsive mode* – retaining the emphasis on responsive mode because of its importance for supporting high quality, curiosity driven research;
- *Managed programmes* – reducing the number of managed activities and having a strategy of a smaller number of highly focused activities, maintaining the quality of the funded proposals;
- *Fellowships* – suggested changes to the EPSRC-wide fellowship schemes and specific ideas for discipline/industry-hopping opportunities.

cont'd

The Programme will be taking the views of the SAT into account as we develop the strategy for the next business plan, covering the financial years 2006-08. An important input to that strategy will be the outputs from our recent series of regional meetings. We would like to thank everyone who took time out to help us with this – more than 120 of you did so. As always, the Programme would be happy to receive feedback from the community on any important issues. In particular, you could help us make the case for the relevance and impact of mathematical sciences research if you know of:

- Cases where mathematical sciences research has had an impact on people's everyday lives, even when this comes many decades after the research was done, especially if the UK has been a key player in this research;
- Key advances that have come from research that EPSRC (or its predecessors) has supported;
- Exciting challenges in mathematics, statistics and operational research for the future – both applied and 'core' parts of the discipline – what are the big unanswered problems?

Examples can be sent to any of the programme team (email firstname.lastname @epsrc.ac.uk). Many of you will know that I will be on maternity leave from January 2005 - in my absence the Programme will be in the capable hands of Anne Farrow and Peter Hedges.

Dr Annette Bramley
EPSRC Programme Manager,
Mathematical Sciences

SUCCESSFUL LAUNCH OF MATHS CAREERS WEBSITE

The new Council for the Mathematical Sciences (CMS) careers initiative website www.mathscareers.org.uk was officially launched by Professor Celia Hoyles OBE, the Government's newly appointed Chief Advisor for Mathematics, on Wednesday 24 November. The launch, held at the Royal Statistical Society headquarters in London, was the focus of a careers showcase, which included talks given by Louise Webber, Senior Manager of Statistical Programming at Covance, and Rob Eastaway, Maths Consultant and Author.

Following Rob Eastaway's talk on *How to be a Mathematician and not be avoided at parties*, Professor Hoyles launched the new website, speaking about the importance of mathematics and its central position in so many areas of work, as well as her own role in supporting the central role of mathematics education. A presentation of the new website was then given by Helen Joyce, its chief editor, who spoke about the website's creation, aims, and future development. Professor Andy Grieve, Chairman of the CMS, spoke about the continuing role of the CMS in the promotion of mathematics and future work to be undertaken by the careers initiative.

Following the launch, a reception was held at the Royal Statistical Society, allowing guests to mingle with the speakers. Special guests from the Science Council and DfES were present, along with a host of representatives from schools, colleges, educational organisations and the mathematical community. The Mathscareers website 'went live' from this time and is available online for use by students, teachers, parents, careers advisors and employers with an interest in the use of mathematics in careers.

Helen Joyce Andy Grieve Celia Hoyles

LONG-STANDING MEMBERS

The following is a list of mathematicians who have completed fifty years or more of membership of the London Mathematical Society, with their date of election.

12/12/1929	Wright, E.M.	17/11/1949	Northcott, D.G.
13/12/1934	Meyler, D.S.	15/12/1949	Godwin, H.J.
16/12/1937	Pitt, H.R.	19/01/1950	Shepherdson, J.C.
08/02/1940	Kendall, D.G.	16/02/1950	Lehner, J.
09/05/1940	Willmore, T.J.	23/03/1950	Ponting, F.W.
17/12/1940	Good, I.J.	15/06/1950	Ackroyd, R.T.
17/03/1943	Dyson, F.J.	14/12/1950	Patterson, E.M.
15/06/1944	Williams, A.E.	19/04/1951	Chen, D.L.C.
25/01/1945	Collard, K.	17/05/1951	Roth, K.F.
25/01/1945	Ollerenshaw, K.	14/06/1951	Jackson, M.
17/05/1945	Henstock, R.	14/06/1951	Ledermann, W.
28/06/1945	Tropper, A.M.	20/12/1951	Dowker, Y.N.
13/12/1945	Rogers, C.A.	20/12/1951	Herszberg, J.
25/04/1946	Goldie, A.W.	17/01/1952	Boyd, A.V.
25/04/1946	Rothman, M.	17/01/1952	Wilson, D.H.
23/05/1946	Huppert, E.L.	14/02/1952	Utz, W.R.
23/05/1946	Rees, D.	15/02/1952	Shephard, G.C.
19/12/1946	Higman, G.	20/03/1952	Bonsall, F.F.
19/12/1946	Ruston, A.F.	20/03/1952	Swinnerton-Dyer, H.P.F.
16/01/1947	Macbeath, A.M.	20/11/1952	Knight, A.J.
20/02/1947	Hay, G.E.	18/12/1952	Reeve, J.E.
20/03/1947	Hayman, W.K.	18/06/1953	Marstrand, J.M.
22/05/1947	Ghaffari, A.	18/06/1953	Rayner, M.E.
19/06/1947	Cassels, J.W.S.	17/12/1953	Gruenberg, K.W.
27/11/1947	Hilton, P.J.	17/12/1953	Ringrose, J.R.
18/03/1948	Burkill, H.	17/12/1953	Samet, P.A.
18/03/1948	Isaacs, G.L.	21/01/1954	Zeeman, E.C.
18/03/1948	Reade, M.O.	18/02/1954	Cohen, D.E.
17/06/1948	Bateman, P.T.	18/02/1954	James, I.M.
18/11/1948	Mullender, P.	17/06/1954	Taylor, S.J.
13/12/1948	Fishel, B.	25/11/1954	Amson, J.C.
20/01/1949	Borwein, D.	25/11/1954	Halberstam, H.
17/03/1949	Kilmister, C.W.	16/12/1954	Preston, G.B.
28/04/1949	Austin, M.C.		

DEADLINES REMINDER

14 January	Polya, Senior Whitehead, Berwick and Whitehead Prizes nominations
31 January	LMS annual subscription payments (final deadline)
4 February	Cecil King Travel Scholarship applications
25 February	Royal Commission Research Fellowship applications

DfES SEEKS PROTECTION FOR KEY SUBJECTS IN UNIVERSITIES

Charles Clarke, the Secretary of State for Education and Skills, has written to the Higher Education Funding Council for England (HEFCE) seeking advice on how to protect higher education courses of national strategic importance, including Mathematics. He has asked HEFCE to report back on whether intervention is necessary to protect these subjects.

The Secretary of State has pinpointed mathematics as a key subject of importance both to employers in growing areas of the UK economy and for maintaining the UK's science base and ensuring national productivity. He has shown concern about the current downward trend in numbers of mathematics graduates throughout the UK and whether there will be enough future graduates to help our economy and society thrive.

Readers of the *Newsletter* will recall that, during the summer, the three CMS presidents met the Secretary of State and discussed their joint concern at the erosion of the maths base in universities and the supply of mathematically skilled people and the amongst other issues.

The LMS has warmly welcomed the Secretary of State's letter to HEFCE. It urges HEFCE to consider the particular nature of the mathematical sciences and to recognise, via funding, the highly labour-intensive nature of training in mathematics. It points out that mathematically-skilled people are needed at all levels and cannot be provided solely by a few institutions. The number of institutions offering Mathematics courses has already decreased by 9% between 1995 and 2001. Any intervention must ensure that courses are more widely accessible and the funding regime must make this wider access financially feasible, for example by creating mathematical bursaries to encourage more students to study mathematical sciences.

ROYAL COMMISSION FOR THE EXHIBITION OF 1851

Research Fellowship

The scheme of 1851 Research Fellowships is intended to give a few young scientists or engineers of exceptional promise the opportunity for conducting research for a further period of two years. Approximately six awards are made each year.

Candidates in science subjects must normally be in possession of a PhD degree, or in the final stages of their PhD studies, which must be successfully completed before the provisional award of a Fellowship will be confirmed. Candidates offering engineering do not have to be in possession of a PhD, but must be of at least PhD standard.

The Fellowships are open to candidates in any of the physical or biological sciences, in mathematics, in applied science, or in any branch of engineering. Candidates in mathematics, (including applied mathematics) and the pure sciences who wish to transfer into engineering or a branch of applied science are particularly encouraged to apply.

The Fellowship stipend payable in 2005 is £21,700 for the first year, and £22,800 for the second year. In addition a London Weighting of £2,134 per annum is payable in appropriate cases.

A candidate must be British or a citizen of the British Commonwealth or of the Republics of Ireland or Pakistan, and should preferably be less than thirty years old on 1 March 2005.

Candidates must be recommended by Professors or Heads of Departments of Universities or other Institutions of equivalent status in the United Kingdom. Even if the candidate comes from outside the UK, and intends to work abroad, the recommendation must still be made by a UK Institution.

Recommendations made on the prescribed forms must be received on or before **25 February 2005**. Appointments to the Fellowship will be made during June 2005. The full regulations, and application form, can be found at: www.royalcommission1851.org.uk/res_fellow.html.

PHILIP LEVERHULME PRIZES 2004

The Leverhulme Trustees are pleased to announce the results of the 2004 competition for the Philip Leverhulme Prizes. The Prizes were established to recognise the outstanding research achievements of young scholars of distinction and promise based in UK institutions; they commemorate the late Third Viscount Leverhulme, who died in 2000. The fields of research covered by the 2004 awards were: Anthropology; Earth, Ocean and Atmospheric Sciences; Economics; Mathematics and Statistics; and Medieval, Early Modern and Modern History. The Mathematics and Statistics Prizewinners were the following.

- Dr Stephen Brooks (Statistical Laboratory, University of Cambridge) for his work on statistics
- Dr Darren Crowdy (Department of Mathematics, Imperial College London) for his work on applied complex analysis and fluid dynamics
- Dr Matthew Keeling (Mathematics Institute, University of Warwick) for his work on mathematical biology
- Dr Jens Marklof (School of Mathematics, University of Bristol) for his work on quantum chaos
- Dr Vladimir Markovic (Mathematics Institute, University of Warwick) for his work on geometry/analysis
- Dr Richard Thomas (Department of Mathematics, Imperial College London) for his work on algebraic geometry, the geometry of Calabi-Yau manifolds and string theory

Details about this and other Leverhulme schemes can be found on the website (www.leverhulme.ac.uk).

MARIE CURIE EXCELLENCE CHAIR

Professor Bob Nichol, who recently joined the Institue of Cosmology & Gravitation at the University of Portsmouth, has been awarded a Marie Curie Excellence Chair. The MC Excellence Chairs are the top individual research grants available from the European Commission. They are intended to support world-class researchers and to encourage them to continue their careers in Europe. Bob joined the University of Portsmouth from Carnegie Mellon University in the USA. He won the Chair with a proposal called ASTROSTAT - Statistical Data Mining in Astrophysics. The Chair funds his salary for three years while he works on the ASTROSTAT programme at Portsmouth. In addition, Bob also won a Marie Curie International Reintegration Grant, which will fund a postdoctoral researcher to assist him with his research.

IMU DEVELOPING COUNTRIES STRATEGY GROUP

The first meeting of the International Mathematical Union's (IMU) Developing Countries Strategy Group (DCSG) was held at the International Centre for Theoretical Physics (ICTP) in Trieste, Italy, on October 16–17. The group, with representation from the Executive Committee of the IMU, the IMU's Commission on Development and Exchanges, the International Commission on Mathematical Instruction (ICMI), and ICTP itself, is responding to a call from IMU President, John Ball, to increase the organization's attention to the needs of mathematics and mathematicians in the many countries of the world which do not have the national development or resources necessary for official IMU membership. DCSG immediately

moved to engage mathematical needs and opportunities in the developing world on the basis of a US$50,000 start-up grant from the Norwegian Abel Fund, with the possibility of subsequent additional Norwegian support. DCSG also moved to gather information about activities of regional and national mathematical societies in support of mathematics in the developing world. Former CDE member Jean-Pierre Gossez is coordinating the information gathering in Europe and will serve as DCSG's European liaison. Offers of cooperation were received from the Mathematical Society of Spain, the London Mathematical Society, and the European Mathematical Society (EMS), as well as from the International Council of Industrial and Applied Mathematics (ICIAM). CIMPA, EMS, and ICIAM sent observers to the DCSG meeting to present the activities and interests of their organizations in developing countries.

The first order of DCSG business was to move to support the African Mathematics Millennium Science Initiative (AMMSI), focused on sub-Saharan Africa. AMMSI is one of two recent mathematical initiatives in Africa, the other being the newly founded African Institute of Mathematical Sciences (AIMS) near Cape Town, South Africa. DCSG authorized US$25,000 for AMMSI partially to match a US$75,000 Mellon Foundation grant. The funds will underwrite the first year of AMMSI operation, in which it will pilot programmes of assistantships for graduate students at selected PhD programmes on the African continent, as well as a programme of intensive courses at those centres by highly qualified visiting professors. The AIMS and AMMSI initiatives met in Nairobi, Kenya, in late June, to form a coalition in support of mathematical development on the African continent. AIMS brings graduate students from all over Africa to its Cape Town institute for one year of intensive training and exposure to opportunities in research in the mathematical sciences. AMMSI-supported graduate programmes will rotate advanced students through the AIMS. Together the two groups will work with DCSG to create a web-based Clearinghouse for African Mathematics, which will be based at ICTP and be guided by DCSG member and ICTP Head of Mathematics Lê Dung Trang.

DCSG also agreed to support the efforts of France's CIMPA to rebuild the mathematical infrastructure in Cambodia, with prospects of cooperation from Vietnam and other countries in Southeast Asia, several of whom have considerable mathematical resources. A small exploratory support of US$5000 was given this year, with the prospect of more support in future years. The International Council of Mathematics Instruction (ICMI) is represented in the DCSG by its Vice President Michèle Artigue. DCSG approved US$6000 to support the circulation in Africa of the international mathematics exhibition *Experiencing Mathematics* developed in cooperation with ICMI and being exhibited internationally under ICMI auspices. Sustained funding for the continuation of these efforts must come from the international mathematical community itself, particularly the adhering bodies and national societies in developed countries. Jacob Palis, former IMU President and DCSG member, will lead a DCSG campaign to encourage national mathematical societies in developed countries to incorporate a 'donation to developing country' check-off box on annual membership renewal forms.

Further information about the IMU's Developing Country Strategy Group can be obtained from the group's Administrative Secretary, Ms. Sharon Laurenti (cde@ictp.trieste.it)

ICM 2006

22-30 August 2006, Madrid

Short communications and posters
Registered participants will have the opportunity to present their mathematical work in the form of a short communication, a poster, or a contribution on mathematical software. Each short communication will last 20 minutes, including discussion. The Local Program Committee plans to organize a poster competition inside each scientific section. Submission of abstracts will start on 1 January 2006. Abstracts submitted after **30 March 2006**, will not be considered. The Local Program Committee will notify authors of acceptance/rejection of their contribution before 30 May 2006. Further information on the organization of short communications, posters, and mathematical software sessions, as well as the instructions on how to prepare an abstract, will be posted on the ICM website (www.icm2006.org) by the end of 2005.

Travel grants and support for local expenses
IMU and the Organizing Committee will award a limited number of travel grants to active young research mathematicians from developing and economically disadvantaged countries, and to senior mathematicians from developing and economically disadvantaged countries (not necessarily members of IMU) to enable them to attend ICM 2006.

ICM 2006 – PROCEEDINGS

The Proceedings of the ICM 2006 will be published by the European Mathematical Society Publishing House. The European Mathematical Society does some of its work through committees of volunteers. The *Committee on Raising Public Awareness of Mathematics* grew out of Mathematics Year 2000 activities and is lucky to have Vagn Lundsgaard Hansen as its enthusiastic chair.

In 2002 the committee ran a competition for popular articles about mathematics which eventually elicited a good number of high quality entries and led to republication of the prizewinning article in the *EMS Newsletter*. The winner was Nuno Crato, who has since become President of the Portuguese Mathematical Society. The committee is repeating the exercise. It is offering prizes for articles in either of two categories: an article for the 'educated layman' which should appear in a journal which specializes in presenting maths/science to readers; or an article for everyone, which should appear in a newspaper or general interest journal. The closing date is **1 August 2005**. Further details can be found on the web (www.emis.de). Of course, I can give no guarantee that a UK winner of this competition would become President of either the LMS or the Edinburgh Mathematical Society.

David Salinger
EMS Publicity Officer

VISIT OF PROFESSOR T. GRAMCHEV

Professor T. Gramchev will be visiting Imperial College London from 27 January – 9 February, supported by a Scheme 2 LMS grant. He will be speaking at the London Analysis seminar on 3 February. Professor Gramchev is one of the leading experts working in partial differential equations and dynamical systems. His interests involve the important interplay between analytic methods from PDEs and dynamical systems. His recent work on the solvability and properties of systems of hyperbolic PDEs are of particular interest. This work was essentially the first one to treat several aspects of systems developing Jordan blocks. Whilst in the UK he will be giving lectures at the universities of Edinburgh and Bristol. For further information contact Dr Michael Ruzhansky (email: ruzh@ic.ac.uk).

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 75 symposia to date, in a wide range of mathematical disciplines. In 2005 there will be two Durham Symposia, both supported by EPSRC.

Geometry, conformal field theory and string theory (organisers: P. Bowcock, P.E. Dorey* and K. Wendland) 22 July – 1 August
Operator theory and spectral analysis (organisers: B. Davies, Y. Safarov and E. Shargorodsky*) 2 – 12 August

Further information may be obtained from the organisers marked * at the following email addresses: p.e.dorey@durham.ac.uk and eugene.shargorodsky@kcl.ac.uk

The most recent symposia have been:

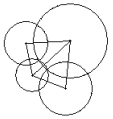
2004 *Mathematical genetics* (R. Griffiths, G. McVean)
2004 *L-Functions and Galois representations* (D. Burns, K. Buzzard, J. Nekovář)
2004 *Topological solitons and their applications* (L. Brizhik, R.S. Ward, W.J. Zakrzewski)
2003 *Geometry and cohomology in group theory* (M. Bridson, P.H. Kropholler, I. Leary)
2003 *New developments and applications in rapid fluid flows* (J. Gajjar, P. Hall, F. Smith)
2003 *Markov chains – algorithms, applications and theory* (L. Goldberg, W. Kendall, A. Stuart)

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 (www.lms.ac.uk/activities/research_meet_com/) or the Durham website (www.maths.dur.ac.uk/events/Meetings/LMS/).

This latter website contains information about all previous and forthcoming symposia including, in many cases, a list of participants, abstracts of talks, and a symposium photograph. As a pilot, videos of the talks of the Topological Solitons symposium are available – members' feedback on this innovation would be welcome.

The LMS Research Meetings Committee welcomes ideas for symposia for 2007 and later, from potential organisers and others, who should contact the Chairman of the Committee, Professor A.J. Scholl (a.j.scholl@dpmms.cam.ac.uk).

POSTGRADUATE COMBINATORIAL CONFERENCE



The 16th annual Postgraduate Combinatorial Conference will be held at the University of Oxford, 21 – 23 March. This conference is for research students in all branches of discrete mathematics, allowing them to meet and discuss their research in an informal environment. It will also have talks by the following invited speakers:

- Keith Edwards (University of Dundee)
- Ben Green (Trinity College, Cambridge)
- Joel Spencer (New York University)

Subjects likely to be covered at the conference include graph theory, design theory, coding theory, cryptography, partial orders, extremal set theory, theoretical computer science and model theory.

Visit the website for further details (www.maths.ox.ac.uk/~pcc2005). Registration is not yet open, but be sure to mark the date in your calendar. If you have any questions about the conference feel free to send an email to pcc2005@maths.ox.ac.uk. The conference is organised under the auspices of the British Combinatorial Committee and is supported by an LMS conference grant.

COMBINATORICS MEETING

The seventh annual one-day Meeting in Combinatorics at University College London will be held on Wednesday 2 February. The meeting will take place in Room 500 of the Department of Mathematics, with talks starting at 11 am and coffee available beforehand from 10.30 a.m. This year's speakers will include Jeff Steif, Stephan Thomasse, Dominic Welsh and Gunter Ziegler.

Anyone who is interested is welcome to attend. There may be funds available to contribute to the expenses of research students who wish to attend the meeting. For further information please contact Alex Scott (email: scott@math.ucl.ac.uk, tel: 0207 679 2128) or visit www.ucl.ac.uk/Mathematics, where a full programme will be available shortly. Support by the LMS and the British Combinatorial Committee is gratefully acknowledged.

POSTGRADUATE OPEN DAY

King's College London is holding a Postgraduate Open Day in Mathematics on Friday 18 February. Research degrees are offered in Analysis and Partial Differential Operators, Number Theory, Geometric Lie Theory, Disordered Systems and Neural Networks, and Financial Mathematics and Applied Probability. Taught MSc programmes exist in Pure Mathematics and Mathematical Physics. More specialised MSc degrees are offered in Financial Mathematics, Information Processing and Neural Networks and Theoretical Physics.

Provisional programme:

- Brief address by the Head of Department, Professor Andrew Pressley
- Talk on Analysis and Partial Differential Operators
- Talk on Number Theory
- Presentation of MSc and PhD programmes in Theoretical Physics
- Presentation of MSc and PhD programmes in Financial Mathematics and Applied Probability
- Presentation of MSc and PhD programmes in Information Processing, Disordered Systems and Neural Networks.
- Panel Discussion *Doing an MSc, MPhil or PhD at King's*
- Tea and informal discussion

Interviews (for PhD candidates), further meetings with MSc applicants and discussions with current postgraduate students will take place throughout the day. For copies of the registration form and further information please contact: Miss Rebecca Cullen, Postgraduate Secretary, Mathematics Department, King's College London, Strand, London WC2R 2LS (tel: 020 7848 2107, email: pg.maths@kcl.ac.uk) or visit the website at www.mth.kcl.ac.uk/postgraduate/openday2005/.

Applications for taught masters and research degrees may be submitted at any time using the forms available on our website or from the above address. However, those PhD candidates who wish to arrange an interview during the Open Day are strongly encouraged to submit their application no later than **Friday 28 January**.

PANDA

The next one-day meeting in the Patterns, Nonlinear Dynamics and Applications (PANDA) series, funded by the LMS under Scheme 3, will take place in DAMTP, University of Cambridge, on Tuesday 18 January. There will be two hour-long pedagogical talks given by Mark Roberts (Surrey) and Peter Hydon (Surrey), and up to four shorter presentations. Research students and post-docs are warmly encouraged to attend, and there are funds to cover travel expenses. More details are available at www.damtp.cam.ac.uk/user/jhd1002/panda or contact Jon Dawes (J.H.P.Dawes@damtp.cam.ac.uk).

YORKSHIRE AND DURHAM GEOMETRY DAY

The second Yorkshire and Durham Geometry Day will be held at the School of Mathematics, University of Leeds on Friday 7 January.

Further information contact Martin Speight (speight@maths.leeds.ac.uk) or visit the website (www.maths.leeds.ac.uk/pure/geometry/ydgd/dgday.html). Yorkshire and Durham Geometry Days are a joint seminar series of the Universities of Durham, Leeds and York, supported by a Scheme 3 LMS grant.

RESEARCH IN PROGRESS 2005

The British Society for the History of Mathematics is holding a meeting on Research in Progress 2005 on Saturday 26 February at The Queen's College, Oxford from 10:30 am – 5.00 pm. The speakers are:

- Abhilasha Aggarwal (Middlesex) *Surveyor-Generals to India from 1800 to 1880*
- June Barrow-Green (Open University) *From research in progress to progress in research*
- Charles Care (Warwick) *Embodying the calculus: planimeters and analogue computing*
- Joao Caramalho Domingues (Middesex) *The calculus according to S.F. Lacroix*
- Chris Donohue (Portsmouth) *British computing in the 1940s*
- Heather Murray (Open University) *Plücker's geometrical models*
- Johanna Pejlare (Uppsala) *Torsten Brodén and the principles of geometry*
- Harry Sitters (Amsterdam): *Cardinael and early seventeenth-century Dutch geometry*
- Denise Sumpter (Imperial): *Theon of Alexandria*
- Benjamin Wardhaugh (Oxford) *Pitch pictured: visual representations of musical pitch in the seventeenth century*

Registration fee is £15 for BSHM members and £18 for non-members, including lunch, tea, coffee. A registration form which should be printed and sent to the organiser is now available from the BSHM website (www.bshm.org). The deadline for registration is **22 February**. For further information contact the organizer: Jackie Stedall, The Queen's College, Oxford (stedall@queens.ox.ac.uk).

MATHEMATICAL NEUROSCIENCE MEETING

A meeting on Mathematical Neuroscience will be held at the Royal Society of Edinburgh (22 George Street) starting at 9 am on Monday 21 March and finishing at 5 pm on Wednesday 23 March. The goal of this meeting is to provide an overview of the current state of research in Mathematical Neuroscience both to those already working in the field and to those who are considering moving into it. The workshop will focus on neural networks and their properties. Several major themes will be addressed: Oscillations, Waves, Patterns, Development, and Information Processing.

In addition to invited speakers the schedule will allow for a number of contributed talks and poster presentations. Anyone interested in making such a presentation should contact one of the organisers. The Invited Speakers are:

- Peter Ashwin (Exeter) *Computation on networks of cluster states*
- Carson Chow (Bethesda) *The dynamics of localized pulses in spiking neuronal networks*
- Jack Cowan (Chicago) *Stochastic neurodynamics*
- Steve Cox (Houston) *Channel localization from dual potential recordings*
- Gustavo Deco (Barcelona) *Cross-temporal and cross-modal integration in the prefrontal cortex: The role of fluctuations in neurodynamics*
- Michael Hausser (UCL) *Relationships between structure and function in single neurons*
- Carlo Laing (Massey) *Spiral waves in neural field equations*
- Markus Owen (Nottingham) *Bumps, breathers, and waves in a model neural network with spike frequency adaptation*
- Ras Petersen (Manchester) *Neural coding of tactile stimuli: white noise analysis of neurons in primary somatosensory cortex*
- David Pinto (Pittsburgh) *Epsilon in neuroscience: the dangers of going to extremes*
- John Rinzel (New York) *tba*
- Jonathan Rubin (Pittsburgh) *The dynamic range of bursting in a network of conditional pacemaker cells*
- John Terry (Loughborough) *Bifurcations to seizure states in a model of neural activity*
- Bill Troy Pittsburgh) *Waves in a Wilson-Cowan type neural problem*
- David Willshaw (Edinburgh) *tba*
- Alice Yew (Surrey) *Modelling signal transduction and adaptation in olfactory receptor neurons*

The meeting will be organised under the auspices of the International Centre for Mathematical Sciences. The aim is to bring to together a number of researchers from the disciplines of applied mathematics and computational neuroscience to foster an environment for the exchange of ideas and the pursuit of collaborative research. The organisers are Dr Stephen Coombes (Nottingham) and Dr Gabriel Lord (Heriot-Watt).

Registration closes on **Monday 7 February** and may close earlier if numbers exceed the capacity of around 60. The meeting is supported by the EPSRC, LMS, the ICIAM 99 Fund and the Leverhulme Trust Theoretical Neuroscience Network. Some financial support is available, in particular for PhD students and post-docs. Further details of this meeting and how to register may be found at www.icms.org.uk/meetings/2005/neuro/index.html.

ATLANTIC ASSOCIATION SUMMER SCHOOL

The fourth annual Atlantic Association for Research in the Mathematical Sciences (AARMS) Summer School of Mathematics will be held at Dalhousie University, Halifax, NS, Canada, from 17 July to 14 August. The Summer School is intended for graduate students and promising undergraduates from all parts of the world. Each participant is expected to register for two of the courses. Each course consists of four 60-minute lectures and two 90-minute problem session per week. These are Dalhousie University graduate courses and it is possible to transfer credit. The courses offered are the following:

- Heinz Bauschke (University of Guelph) *Convexity and fixed point algorithms in Hilbert space*
- Daniel Klain (University of Massachusetts at Lowell) *Integral geometry of convex bodies and polyhedra*
- Wolfgang Runggaldier (Università degli Studi di Padova) *The mathematics of finance*
- Bruce Smith (Dalhousie University) *Mathematical statistics*

For further information contact Professor Tony Thompson at Dalhousie (tony@mathstat.dal.ca).

POSTGRADUATE GENERAL SKILLS TRAINING

One of the outcomes of the Roberts Report is that the Research Councils have started providing extra money to fund 'training and development in general skills' for their PhD students and contract research staff. Funds are of the order of £800 per PhD student per year for those students who started in the 2003/04 academic year or later, and guidance is provided on how they can be used in [1, annex 1]. Annex 2 of [1] provides a list of the generic skills that research students are expected to have acquired by the end of a PhD. These are listed under the main headings: research management; personal effectiveness; communication skills; networking and teamworking; and career management.

The training money provided by the Research Councils is given directly to universities, rather than being rolled into the PhD funding allocations for individual departments. Each university is meant to determine how best to use these funds [2, Section 5], and is expected to account for how they have used them in a single annual report to the Research Councils [3]. Some universities are providing general staff-development type courses for all their postgraduates, but such non-subject specific training is not necessarily very useful for mathematicians.

It may not be possible or practical for individual mathematics departments to provide appropriate courses for their students, but this could be done collectively by several depart-

ments. I thought that it might be useful to others contemplating doing this to describe a programme of generic skills training that has begun this year for Scottish-based mathematics and statistics PhD students. It is being run as a joint venture between the Edinburgh Mathematical Society (EMS) and the International Centre for Mathematical Sciences (ICMS). For the first two years ICMS is providing the organisation and venue free of charge, and the EMS has given a grant to cover catering costs and speakers' expenses: departments pay the travel expenses for their own students.

There have been two events so far, one for first year PhD students, and the other for those in their second year or later. Both appeared to be successful, with a combined attendance of 69 maths/stats students from seven Scottish universities. Topics covered at these sessions included mathematically-targetted IT skills (linux/unix and LaTeX), practical teaching skills (taking tutorials and marking), communication skills (how to give a mathematics research talk), and others that are important for beginning and carrying out research (what a mathematics PhD involves; using bibliographic databases). Feedback from students has been positive, and many also valued and enjoyed the opportunity to meet maths/stats PhD students from other universities. We are currently planning another two sessions for Spring 2005, and further information on these will be available from the web at www.icms.org.uk/meetings/2004/pgcourses/.

Individual departments can supplement and/or assess the training provided by EMS/ICMS in whatever way they think appropriate (some institutions require students to obtain a certain number of 'postgraduate credits' before they can be awarded a PhD). This could include students: writing an annual report on, or being interviewed about, their research; giving a research talk; attending research seminars or conferences; or reflecting on and discussing what they have learnt with their supervisor or peers. This type of approach to skills training appears to be welcomed by the Research Councils: [1 annex 1] states 'The councils are also keen to encourage innovative approaches and institutional collaboration, e.g. on a regional basis and would emphasise that these funds are for personal skills development broadly defined and need not be confined to formal courses'.

The aim of the EMS/ICMS sessions is to provide skills training that both students and their departments will find useful. Departments will not be charged for the first two years to enable them to decide whether they are willing to pay for what is on offer and, if so, to give them time to get their institutions to release centrally managed Roberts training funds in future years. The Research Councils explicitly allow for this possibility: 'It is expected that the student will be able to exert some choice over the training provided through application of these funds. If they so wish, the students should be able to choose training outside their host institution' [2]. These sentences also appear (in a slightly modified form) in the more recent document [4].

References

[1] Implementation of the Roberts Report on the supply of scientists and engineers in the UK. Available from www.esrc.ac.uk/esrccontent/DownloadDocs/roberts1.doc

[2] Doctoral training account frequently asked questions. Available from the EPSRC website (www.epsrc.ac.uk) by following the links: Postgraduate Training > Doctoral Training Accounts > Doctoral Training Accounts Frequently Asked Questions

[3] Letter to HEIs on Roberts skills training payments and monitoring. Available from www.grad.ac.uk/downloads/roberts_letter_oct_04.pdf

[4] DTG conditions for 2004. Available from the EPSRC website (www.epsrc.ac.uk) by following the links: Postgraduate Training > Doctoral Training Accounts > Doctoral Training Grant Conditions

Penny Davies
University of Strathclyde

RECORDS OF PROCEEDINGS AT MEETINGS

ANNUAL GENERAL MEETING

held on *Friday 19 November 2004* at University College London. About 90 members and visitors were present for all or part of the meeting.

The meeting began at 3:15 pm, with the President, Professor F.C. KIRWAN, FRS, in the Chair. Members who had not yet voted were invited to hand their ballot papers to Dr D.J. Collins and Professor P.T. Saunders, the Scrutineers.

The Treasurer, Professor N.M.J. Woodhouse, presented his annual report, which is published in the *Newsletter*. Messrs Baker Tilly were appointed as auditors for 2004/05.

Sixteen people were elected to Ordinary Membership: M. Breuning, D.W. Brookes, S. Dantchev, N.J. Elder, J. Fine, S. Huczynska, D. Kahrobaei, G.F. Kendall, G.D. Lythe, R. Mamon, Z. Qian, M.S. Saeed, R.J. Turner, R.N. Turner, H.J. Wilson, A.C. Yew; eight people were elected to Associate Membership: B. Afshari, J.D. Bradley, L. Cereceda, C.D. Hollings, B. Houlding, M.K. Price, N. Venkov, M. Wemyss.

The President, on Council's behalf, presented certificates to the 2004 Society Prizewinners: De Morgan Medal: Sir Roger Penrose; Senior Berwick Prize: Professor B. Zilber; Naylor Prize: Professor R.O. Jozsa; Fröhlich Prize: Dr I. Grojnowski; Whitehead Prizes: Professor M. Ainsworth, Dr V. Markovic, Dr R. Thomas, Professor U.L. Tillmann.

Professor D.I. Olive gave a lecture entitled *Unified theories and the increasing synergy between mathematics and physics*.

After tea, Dr Collins announced the results of the ballot. The following Officers and Members of the Council were elected: President: F.C. Kirwan; Vice Presidents: A.G. Chetwynd, M.R. Bridson; Treasurer: N.M.J. Woodhouse; General Secretary: N.L. Biggs; Programme Secretary: S.A. Huggett; Publications Secretary: J. Howie; Education Secretary: W.B. Stewart; Members-at-Large of Council for two years: I.D. Abrahams, H.G. Dales, K.J. Falconer; F.P. Kelly; F.A. Rogers; N.C. Snaith. Council membership is completed by the following who were elected for two-year terms in 2003: C.J. Budd, R.D. Camina, R.T. Curtis, P.J. Davies, A.M. Etheridge, J.F.C. Kingman. The following member was elected to the Nominating Committee: S.E. Rees.

Professor P. Goddard, President 2002/03, gave his deferred Presidential Address on *Infinite dimensional symmetry*.

After the meeting, a reception was held at De Morgan House, followed by the Annual Dinner, which was held at the Bonnington Hotel, and attended by 79 people.

LMS ANNUAL GENERAL MEETING

Friday 19 November 2004

The Annual General Meeting of the London Mathematical Society was held on Friday 19 November 2004 in the Chemistry Auditorium at University College London. The President, Frances Kirwan, opened the meeting, and invited the Treasurer to summarize his annual report. The auditors were reappointed. The election of several new members was approved, and the President formally admitted three members to the Society. The Society's 2004 De Morgan Medallist and other Prizewinners were then awarded their medal and prize certificates, to the acclaim of the 90 or so attending.

The President introduced Professor David I. Olive of University of Wales Swansea, who spoke on *Unified theories and the increasing synergy between mathematics and physics*. He reviewed mathematical developments since the time of Einstein's work on gravitation which underpin the standard model of elementary particle physics. Professor Olive's thesis is that Hermann Weyl played a pivotal role. He promoted general relativity very early, and discovered a local 'gauge' invariance when the metric tensor is coupled to electromagnetism. This invariance under rescaling of space-time measuring gauges is mathematically equivalent to local conformal invariance. Einstein dismissed this, as it conflicts with the fixed sizes and spectral frequencies of atoms. However, London and Weyl revived the idea in the context of quantum theory, where there is invariance under a local phase change of the wavefunction provided the electromagnetic potential undergoes a transformation essentially the same as in the earlier 'regauging'. The name 'gauge transformation' has stuck, although there is no change of scale any more.

The new gauge invariance occurs in all theories of matter coupled to electromagnetism, and is associated with electric charge conservation. More subtly, it relates to Dirac's work on magnetic monopoles and electric charge quantisation, and to the Aharonov-Bohm effect. Weyl made a major contribution to our understanding of symmetry in quantum mechanics, but it was Yang and Mills, and Shaw, who saw how to extend the gauge invariance to a local non-abelian symmetry. Yang-Mills theory is the basis for the standard model of all the elementary particles, including electrons, neutrinos, quarks and the W and Z gauge bosons. The Higgs mechanism, consistent with gauge invariance, appears to explain the masses of the various particles.

Professor Olive concluded with remarks on 'anomalies', the subtle symmetry-breaking phenomena that occur in quantum theories, even when symmetry is present in the classical limit. Some anomalies are related to the Atiyah-Singer index theorem. Another relates to the scale invariance originally considered by Weyl, which is classically present in Yang-Mills theory with massless quarks, but broken in the quantised theory. This leads to the appearance of a scale, the proton radius, and quark interactions become weak at separations much shorter than this.

After tea, Dr Collins announced the result of

2004 Society Prize Winners with the LMS President

the ballot for the LMS Council (see page 6). The President then introduced the second speaker, Professor Peter Goddard, the immediate past-president of the society. Professor Goddard had resigned after one year in office when appointed Director of the Institute for Advanced Study in Princeton. He noted that previously, De Morgan, Whittaker and Collingwood had been one-year presidents, but nevertheless thanked the President for her readiness to take over earlier than expected.

Professor Goddard spoke on *Infinite-dimensional symmetry*. The principal example is conformal symmetry in two dimensions, a powerful tool for solving the 1+1 dimensional wave equation and also the nonlinear Liouville equation. The orbits of the symmetry group are so large that all solutions can be constructed from one or two elementary ones. In modern theoretical physics the conformal and related groups occur naturally in string theory. String theory emerged from Veneziano's construction of two-particle quantum scattering amplitudes with physically desirable pole structure. The poles originally were intended to correspond to the apparently infinite sequence of particles (hadrons) observed experimentally in the 1960s. An investigation of the physical forces responsible for the particle scattering through 'factorization' of the Veneziano amplitude into vertex operators led to the discovery that the particles could be interpreted as quantum excitations of a single object, a relativistic string. The conformal invariance is the symmetry of the classical string worldsheet in space-time. In the quantum theory, the conformal Lie algebra is replaced by its central extension, the Virasoro algebra. There are further algebraic structures, the creation and annihilation operators for the infinite number of string excitations, the operators representing, for example, energy and momentum, and the vertex operator algebra. Making a completely consistent quantum string theory, with no imaginary mass particles and no ghosts (states of negative probability) is non-trivial. The resulting mathematics relates to some of the most interesting examples of infinite-dimensional Lie groups and algebras, their automorphism groups being some of the largest sporadic simple groups.

Peter Goddard, Frances Kirwan, David Olive

String theory has moved on from its beginning as a theory of hadrons, because consistent theories have a massless tensor particle that can be interpreted as a graviton. So string theory is now believed to be a quantum theory of matter and gravity. However, in its bosonic form it seems to make sense only in 25+1 dimensions, and in its supersymmetric version, only in 9+1 dimensions. The search continues for natural mechanisms to separate the 3+1 dimensions we experience from the remaining, possibly compact dimensions. Professor Goddard concluded by mentioning how Virasoro symmetry is relevant in other areas of physics, notably statistical mechanical models in two dimensions like the Ising and Potts models. The central charge parameter plays a fundamental role in distinguishing these.

Following the meeting, many members enjoyed the traditional drinks reception at De Morgan House, and the Annual Dinner at the Bonnington Hotel.

Nicholas Manton
DAMTP, University of Cambridge

DEVELOPMENTS IN QUANTITATIVE FINANCE

Spitalfields Day

The Isaac Newton Institute will be holding a programme *Developments in Quantitative Finance* from January to July 2005. There will be a special week, 7 – 11 March, devoted to Risk Management, organised by Professors Philippe Artzner (Strasbourg) and Paul Embrechts (ETH Zürich). This week will bring together a number of prominent academics in this developing area.

Thursday 10 March has been designated as a Spitalfields Day devoted to risk management of hedge funds and alternative investments, with speakers and attendees from both academia and the finance industry. One goal is exploring the potential role of mathematics in this topical and important field.

Scheduled to speak are:

- Constant Beckers (Barclays Global Investors)
- Paul Embrechts (ETH Zürich)
- William Fung (PI Asset Management)
- Stewart Hodges (Warwick Business School)
- Julien Hugonnier (Ecole des Hautes Etudes Commerciales)
- Anthony Ledford (Management Investments)
- Raman Uppal (London Business School).

For further information contact Professor Philippe Artzner, Universite Louis Pasteur (tel: +33-3-90-240-204, fax: +33-3-90-240-328, email: artzner@math.u-strasbg.fr) or visit www.newton.cam.ac.uk/ programmes/DQF/index.html.

THEATRE REVIEW

Arcadia by Tom Stoppard, Bristol Old Vic

Debauchery. Seduction. Byronic mythology. Unscrupulous historical research driven by wild academic ambition. And mathematics. Tom Stoppard's marvellous play *Arcadia* has them all, and more.

Bristol's Old Vic Theatre staged a production of Arcadia in September and October of this year. Directed by Rachel Kavanaugh and starring Loo Brearley, Blake Ritson, Amanda Harris, Hermione Guilliford, John Hodgkinson and Nicholas Burns, this was an outstanding showcase for Stoppard's linguistic and dramatic brilliance.

The play itself is split between the goings-on in an early nineteenth century English country house and modern day attempts to reconstruct those events. Septimus Hodge, a college friend of Byron's, is tutor to the precocious Thomasina Coverly. He is also involved in affairs with several women in the household, including the head of the household, Lady Croom. His philandering brings him into conflict in particular with Ezra Chater, the husband of one of the women he has been involved with. Present day historian Hannah Jarvis is researching into life in the household. She is joined by a rival, Bernard Nightingale, who develops the theory that Byron, while a guest in the house, killed Chater in a duel. Nightingale sees this as the explanation for Byron's well-documented sudden flight abroad. Excited by wild ambition, Nightingale interprets various clues he discovers at the house to be evidence in support of his claims.

If this were all, then *Arcadia* would be just another rollicking drama, albeit one with dazzling dialogue and brilliant word play of the kind Tom Stoppard is famous for. What makes

the play unusual, however, is that the plot is intertwined with mathematics and science, and in particular with ideas from chaos theory and thermodynamics. These appear at two different levels. First, various characters in the play discuss and debate them. Thomasina is presented as having discovered key ideas relating to deterministic chaos, fractals, exponential growth of errors, mixing, the second law of thermodynamics and entropy, the difference between irreversibility and time-reversal symmetry, iterated algorithms, and applications to population dynamics. But she dies, tragically, before she can publish her insights. Instead, her thoughts are reconstructed from her private papers by Valentine Coverly, a present-day member of her family with an interest in science and mathematics. He programs a computer to plot the iterated maps Thomasina wrote about, and sees that she anticipated many of the key developments in complexity theory. It seems to me that chaos, unpredictability and entropy also underpin many of the dramatic events portrayed in the play. Bernard Nightingale's attempts to reconstruct history from imperfect initial data (incomplete evidence) lead him to conclusions that are completely incorrect – Byron did not fight Chater in a duel; in fact, Chater challenged Hodge to a duel, but Hodge talked his way out of the fight. This may be taken as an example of small errors growing to the extent that they render accurate prediction impossible, and also as an example of irreversibility in a situation that is, in principle, time-reversal symmetric. Moreover, the way in which sexual intrigue causes the various relationships, initially ordered by manners and etiquette, to degenerate may be thought of as an allegory of the role played by entropy in the growth of disorder from order, as described by the second law of thermodynamics.

Interestingly, I know from personal experience how hard Rachel Kavanaugh and her cast worked to understand the mathematics and science underlying the play, because they asked me to give them a tutorial. Talking to a group of knowledge-hungry actors about these subjects was certainly a curious experience – they were passionately interested to hear about the background and history of chaos theory, as well as to have the mathematics explained to them. It was then fascinating to see them use this information to analyze and deconstruct the play. The cast was so keen to pursue this that they demanded a second session focusing on fractals. I took along my colleague Andrew Burbanks, who has thought a good deal about art and mathematics and about public understanding of science. It is hard for many of us to remember our feelings on first seeing fractals and on realizing how such magnificent complexity can arise from simple equations. Most of the cast had not been exposed to this before, and one glance at Andrew's pictures put much of Stoppard's text into context, for example his description of the Mandelbrot set and discussions in the play about how a complex and unpredictable world can emerge from simple Laws of Nature.

The Department felt that this was a good opportunity to experiment with how we expose our new undergraduates to mathematics, so we persuaded the University to buy enough tickets to allow us to take all of our first-year students to see the play. At the very least, we hope that this will encourage them to see mathematics as connected to other subjects, even arts subjects, rather than isolated from them.

After one of the performances the Department invited the cast back for a party. Usually our parties are over by 10 pm, so to have one that only started at 11 pm was something of a novelty. And while we might have been able to teach the cast something about mathematics, it was quite clear that they had a good deal to teach most (but not all!) of the mathematicians about partying.

The play is marvellous, the production was brilliant, and the cast … were a lot of fun!

Jon Keating
School of Mathematics, University of Bristol

THE NATURE OF PROOF

The Nature of Mathematical Proof was a two-day Scientific Discussion meeting held by the Royal Society on the 18-19 October 2004. The meeting was organized by Professors Alan Bundy, Donald MacKenzie, Angus Macintyre and Sir Michael Atiyah, and brought Computer Scientists and working Mathematicians together under the topic of proofs in mathematics. The proceedings of the meeting will be published in volume 363 of the *Philosophical Transactions of the Royal Society* (Series A) this May.

The first day consisted of four talks and ended with a panel meeting. Professor MacKenzie opened with a talk entitled *Computing and the cultures of proving*. After first noting that there a distinction between proofs about computers (automata theory) and proofs using a computer (proof assistant software) of which the latter has only recently emerged in the 1950s, MacKenzie argued that a tension has arisen over what exactly is a proof. Is it a social process where a paper has to convince the referees of a journal of its correctness or is it a mechanical process drained of semantic meaning and human intuition? Dr Richard Lipton (a last minute substitute for Professor Richard A DeMillo) carried on the theme with *Social processes and mathematical proof in mathematics & computing: A quarter-century perspective* touching on the point that programs can be formally specified and so correct programs can be seen as theorems whilst arguing for the supremacy of the 'social processes' in accepting proofs and the inability of computer proofs to take part in these processes. Professor Henk Barendregt (substituting for Professor Michael J.C. Gordon) opened the afternoon session with a robust defence of why proofs by computers are needed (*The challenge of computer mathematics*). Outlining the difference between a romantic proof (understood by a human mind) and a cool proof (verified by machine), he pointed out that the latter possessed properties of being pedantic, non-ambiguous, reliable, and repeatable. In turn, this meant that cool proofs can be classified into ephemeral or petrified proofs. Ephemeral proofs are proofs where the emphasis is on computing the proof, while in petrified proofs the emphasis is on the ontology of the proof. The last talk of the day was by Professor Bundy (*What is a Proof?*). Here, he argued that schematic proofs explained the structure of some historic proofs better than Hilbertian proofs and that they explained how persistent errors could arise - illustrating his argument with an example taken from [1]. The panel discussion was fielded by Dr Rod Chapman, Dr Lipton, and Professors Cliff Jones and Ursula Martin; and took open floor questions on *Formal versus rigorous proof for verification*.

The second day was the turn of the Mathematicians. Professor Michael Aschbacher addressed the topic of *Highly complex proofs and implications of such proof* by spotlighting the problems arising when proofs are long and complicated (eg. the classification of finite simple groups). This raised questions like: do we need to move away from the stereotypical view

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of proofs being simple, short, and elegant? Or is it possible consistently to write error-free proof in a mathematical vernacular? Professor Paul J. Cohen then completely changed tack and tone in his talk on *Skolem and pessimism about proofs in mathematics*. Here, Cohen offered an interesting reservation about the theme of the meeting: namely, Skolem [2] pointed out that no axiom system can characterize a unique model. This means that using an axiomatic system to capture mathematics (à la Hilbert) is a futile exercise. Cohen concluded mysteriously with the assertion that all proofs are by contradiction. Proof theory is where the proof is the actual object under investigation, and Professor MacIntyre followed with a talk looking at what proof theory has to offer Mathematicians (*Mathematical significance of proof theory*). The last talk before lunch was about the experiment that the Annals of Mathematics conducted in order to review the computer parts of Tom Hales' computer-assisted proof of Kepler's sphere packing conjecture (Professor Robert D. MacPherson, *Machine computation and proof*).

The afternoon session was easier on the grey cells with Professor E. Brian Davis defending *Pluralism in mathematics*. The subject matter being referred to is the position that constructive mathematics and classical mathematics need not be feuding, but can live together in harmony. This left Sir Peter Swinnerton-Dyer to conclude the talks with a humorous rhetoric on the *Justification of mathematical statements*. Like the first day, the second day concluded with a panel discussion session consisting of three Fields Medalists (Professors Jean-Pierre Serre, Paul J. Cohen, Sir Michael Atiyah) and was chaired by Professor MacIntyre, again responding to open floor questions.

Evaluating a Scientific Meeting like this is fraught with difficulties over objective and subjective views and opinions. My own personal feelings are that the Mathematicians and Computer Scientists were sometimes talking at cross purposes. Mathematics covers a wide range of discourses (e.g. Geometry, Calculus, Algebra, Number Theory, Topology). However, for a Computer Scientist, mathematics is usually discrete mathematics and was portrayed at the meeting as being dominated by code specification/verification and mechanized term rewriting. Hence, it would have been helpful to have defined in advance what was meant by the word mathematics before going on to discuss mathematical proofs. However, having said that, overall I really enjoyed the meeting and felt very privileged to have attended it among many famous people in the audience and the many famous scientists whose portraits hung on the walls.

[1] I. Lakatos. *Proof and Refutations*. Cambridge University Press, 1999.

[2] T. Skolem. Some remarks on axiomatized set theory (1922). In J. van Heijenoort, editor, *From Frege to Gödel: A Source Book in Mathematical Logic, 1879-1931*, pages 290-301, toExcel, New York, 2000.

Nimish Shah
LMS member

MATHEMATICIANS VISITING THE UK IN 2005

Bristol University (Mathematics)

Smilanski, U. (Weizmann Institute of Science) *Applied mathematics*, Jan – Jun 05

Bristol University (Engineering Mathematics)

Yagasaki, K. (GFU University, Japan) *Discrete solitons*, 10 Apr 04 – 10 Apr 05

Brunel University

Imaizumi, J. (Tokyo University, Japan) *Operational research*, Apr 05 – Apr 06

Patkar, S.B. (Indian Institution of Technology, Bombay) *Discrete optimisation*, May – Jul 05

Cambridge University (DAMTP)

Farge, M. (Laboratoire de Météorologie Dynamique, Ecole Normale Supérieure) *Fluid dynamics*, 1 Jan – 30 Apr 05

Hashimoto, K. (University of Tokyo) *String theory, Tachyon condensation, Boundary field theory*, 1 Apr 05 – 31 Mar 06

Kevlahan, N. (McMaster University, Canada) *Fluid dynamics*, 1 Sep 04 – 30 Apr 05

Wettlaufer, J.S. (Yale University) *Fluid dynamics*, 1 Jun – 31 Dec 05

Cambridge University (DPMMS)

Alatancang (Inner Mongolia University) *Probability*, 15 Aug 04 – 14 Feb 05

Draief, M. (Université Denis Diderot) *Operational research*, Sep 04 – Jul 05

He, W. (Nanjing Normal University) *Locale theory*, 16 Sept 04 – 15 Sept 05

Komatsu, T. (Hirosaki University, Japan) *Number theory*, 11 Jan – 30 Jul 05

Liu, W. (Central South University, Changsha, Hunan) *Algebra*, 21 Oct 04 – 30 Sept 05

Markstrom, K. (Umeå, Sweden) *Combinatorics*, 1 Sept 04 – 31 Aug 05

Minda, D. (University of Cincinnati, USA) *Analysis, Geometry*, 15 Nov 04 – 15 Apr 05

Orlov, D.O. (Steklov Math. Institute) *Geometry*, May 05

Cardiff University

Chanane, B. (KFUPM, Dharan, Saudi Arabia) *Differential equations*, *Numerical analysis*, 1 Jul 04 – 1 Feb 05

Honary, T.G. (Teacher Training University, Tehran, Iran) *Functional analysis*, 23 Aug 04 – 1 Apr 05

Durham University

Chenaglou, A. (Sahand University of Technology, Iran) *String theory, Quantum field theory*, Sep 04 – Jun 05

Hussin, V. (Montreal, Canada) *Super groups and superalgebras in mechanics*, 17 Jan – 18 Mar 05

Sampaio, M. (UFMG Brazil) *Quantum field theory*, Jan 05 – Jan 06

Van Doorn, E. (Twente, Netherlands) *Probability; Birth–death processes*, 25 Apr – 24 Jun 05

Edinburgh University

Boyd, D.W. (University of British Columbia) *Number theory*, Sept 05

O'Shea, D. (Mount Holyoke College, Massachusetts) *Geometry, Computer algebra*, 1 Feb – 30 Jun 05

Rimshans, J. (University of Latvia) *Numerical analysis of PDEs*, Jan – Feb 05

Exeter University

Burylko, O. (Ukraine Academy of Sciences) *Nonlinear dynamics*, Jan – Feb 05

Heriot-Watt University

Jaworski, J.W. (Adam Mickiewicz University, Poland) *Discrete mathematic, combinatorial probabilities, random graphs, cryptology*, 26 Jul 04 – 25 Jul 05

Imperial College London

Choe, G.H. (Korea Advanced Inst of Sci & Tech) *Dynamical systems*, 10 Oct 04 – 06 Jun 05

Daskalopolous, P. (Columbia University, NY) *Partial differential equations in geometric analysis*, 7 Jul 04 – 1 Aug 05

Dupuis, N. (Centre National de la Recherche Scientifique, France) *Physics, condensed-matter theory*, 1 Sep 04 – 31 Aug 05

Tisdell, C. (University of New South Wales, Australia) *Dynamical systems*, 15 Jan – 14 Feb 05

Witt, I. (Germany) *Analysis and partial differential equations*, Apr 04 - May 05

Leeds University (Pure Mathematics)

Pirkovskii, A. (Moscow) *Functional analysis*, 1 Oct 04 – 30 Sept 05

Poliakov, M. (Moscow) *Functional analysis*, 1 Oct 04 – 30 Sept 06

Liverpool University (Division of Theoretical Physics)

Kurlin, V. (Moscow State University) *Low-dimensional topology and related algebra*, Dec 04 – Aug 06

Li, W.G. (University of Petroleum, China) *Numerical analysis*, Sept 04 - Aug 05

Linkov, A. (Russian Academy of Science) *Mathematical models of fracture*, 1 Mar – 30 Apr 05

Mishuris, G. (University of Rzeszów) *Integral equations, models of fracture*, 1 Aug 05 – 30 Jul 07

Sobczyk, K. (Polish Academy of Science) *Stochastic models of fracture*, 1 May – 30 Jun 05

Trebicky, J. (Polish Academy of Science) *Stochastic models of fracture*, 1 May – 30 Jun 05

London School of Economics
Gal, S. (University of Haifa) *Search games*, May – Jul 05
Loughborough University
Mohammed, S. (Carbondale University, Southern Illinois) 1 Mar – 31 Aug 05
Newcastle upon Tyne University
Marcantognini, S. (Institutor Venezolano) *Operator theory*, 1 Jul 04 – 30 Jun 05
Nottingham University
Semenov, Y, (National Space Agency, Ukraine), *Unsteady nonlinear hydrodynamics, free boundary problems, complex variable methods)*, 12 Jan – 17 Feb 05
Oxford University (Mathematical Institute)
Arhangelskii, A. (Ohio, USA) *Analytic topology*
Baribeau, L. (Quebec) *Functional analysis*, 1 Sep 05 – 31 Aug 06
Derakhshan, J. (Jerusalem) *Mathematical logic*, 1 Oct 04 – 30 Sep 05
Gehrke, M. (Denmark) *Algebra*, Several visits between now and July 05
Hara, K. (Japan) *Asymptotic expansion of oscillatory integrals*, 1 Oct 04 – 30 Sep 05
Harder, G. (Bonn) *Geometry*, 3-day visits each month until Easter 05
Hassan, A. (Jerusalem) *Mathematical Logic*, 1 Oct 04 – 30 Jul 05
Li, C. (China) *Mathematical biology*, 1 Oct 04 – 31 Mar 05
Ljungmann, R. (Denmark), *Topology, Geometry*, 1 Oct 04 – 30 Mar 05
Mena, F. (Portugal) *General relativity*, 1 Oct 03 – 30 Sep 05
Munoz, A. (Spain) *Differential equations*, 20 Sep 04 – 29 Feb 05
Ransford, T.J. (Quebec) *Functional analysis*, 1 Sep 05 – 31 Aug 06
Scheerlinck, N. (Belgium) *Mathematical biology*, 1 Oct 04 – 31 Mar 05
Zheng, Z. (China) *Scientific Computation*, PDE, 1 Mar 03 – 28 Feb 05
Oxford University (Statistics)
Murdoch, D. (London, Ontario) *Applied statistics, Statistical computing*, 15 Jan – 12 Feb 05 and 24 Apr – 21 May 05
Portsmouth University (Cosmology & Gravitation)
Soda, J. (Kyoto University) *Brane-world gravity*, 9 Feb – 9 Mar 05
(Mathematics)
Zahedi, R. (Sharif University, Iran) *Mathematical physics, Mathematical finance, Optimisation, Operational research*, 7 Oct 04 – 30 Apr 05
Queens University Belfast
Turnsek, A. (University of Ljubljana) *Operator theory and functional analysis*, 1 Sept 04 – 28 Feb 05
Southampton University
Ankenman, B.E. (Northwestern University, Illinois USA) *Statistics*, Oct 04 – May 05
Dean, A.M. (Ohio State University, USA) *Statistics*, Nov 04 – Feb 05
Steiner, B. (ETH, Zürich) *Pure mathematics*, Oct 04 – Sep 05
Surrey University
Lawson, J. (Trinity University, San Antonio, Texas) *Multisymplectic geometry and nonlinear partial differential equations*, 21 Mar – 4 Apr, 23 May – 1 Jul 05
Sussex University
Karadzhov, G. (Academy of Sciences, Sofia) *PDEs*, 20 Jan – 10 Feb 05
University of Wales, Swansea
Smolyanov, O.G. (Moscow State University) *Functional integration and applications*, Apr – May 05
Warwick University (Mathematics Institute)
Maeda, Y. (Keio University, Japan) *Global analysis, Differential geometry*, 1 Apr 04 – 31 May 05
Marden, A. (University of Minnesota) *Kleinian groups*, 15 May – 15 Jul 05
Tan, S.P. (Singapore) *Hyperbolic geometry*, 1 Mar – 30 Apr 05
Weiss, A. (Alberta University) *Algebra*, 20 Mar – 23 Apr 05
York University
Cherednik, I. (University of North Carolina, USA) *Double affine Hecke algebras*, 9 May – Jun 05
Pinmonti, N. (University of Trento, Italy) *Quantum gravity*, Jan – Feb 05

EPSRC

Euclidean Harmonic Analysis

LMS/EPSRC Short Course

School of Mathematics, University of Edinburgh
10–15 April 2005
Organiser: Dr James Wright

Euclidean Harmonic Analysis has its roots in the theory of Fourier series which in turn has its beginnings in the mathematical modelling of heat flow and wave propagation. Since the 1950s a programme was initiated to free the theory of Fourier series from its one-dimensional setting and develop results in higher dimensions with important applications to elliptic (and then parabolic) partial differential equations. The tools and techniques for this theory were developed throughout the 1960s and early 1970s and became powerful enough to address some fundamental questions about the Fourier transform which had been beyond the scope of previous methods. Throughout the 1970s these basic issues evolved into a coherent programme of core problems which have been pursued by a great number of mathematicians until the present day. Many new ideas and methods naturally arose during the pursuit of this programme and have now seen many interesting applications in combinatorics, number theory and nonlinear partial differential equations.

This short course is aimed at postgraduate students in mathematics and will provide an introduction to euclidean harmonic analysis, the links between central problems and applications to nonlinear partial differential equations.

Course I	*Introduction to euclidean harmonic analysis* Dr Jonathan Bennett (Birmingham University)
Course II	*Nonlinear hyperbolic partial differential equations* Dr Nikolaos Bournaveas (Edinburgh University)
Course III	*Central problems in euclidean harmonic analysis* Dr Laura Wisewell (University College London)
Course IV	*Model problems over finite fields* Professor Anthony Carbery (Edinburgh University)

The material presented will be accessible to first year research students. All courses will be supplemented by tutorials and discussions. Further information may be found at the course website: www.maths.ed.ac.uk/~wright/Harmonic.

The registration fee is £100. The accommodation costs for all UK-based research students are covered by EPSRC. Participants must pay their own travel costs. EPSRC-supported students can expect that their registration fees and travel costs will be met by their departments from the EPSRC Doctoral Training Account.

Application forms may be obtained from Isabelle Robinson, Administrative Officer, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (email: robinson@lms.ac.uk, fax: 020 7291 9978) or from the LMS website: www.lms.ac.uk/activities/research_meet_com/short_course/23_poster.html

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is Friday **18 February 2005**. Completed forms should be returned to the Administrative Officer by email, fax or post (details above).

LONDON MATHEMATICAL SOCIETY

CECIL KING TRAVEL SCHOLARSHIP

The London Mathematical Society annually awards a Cecil King Travel Scholarship in Mathematics to the value of £5,000 to a young mathematician of outstanding promise, to support a period of study or research abroad for a typical period of three months. Many mathematicians have found that such a visit has benefited both their mathematics and their career; the Society urges young mathematicians and their supervisors to consider seriously this opportunity.

The award is competitive and based on a written proposal describing the intended programme of study or research abroad and the benefits to be gained from such a visit.

Applicants should normally be nationals of the UK or Republic of Ireland, under the age of 25 years, either registered for or having recently completed a doctoral degree at a UK University.

The initial application should include:

1. a completed application form;
2. a short proposal (4 pages maximum) indicating the proposed programme of study abroad, the benefit of such an opportunity in advancing the candidate's studies, and the Institution that the candidate wishes to visit;
3. a letter of support from the applicant's Head of Department, or from his or her Research Supervisor.

Candidates selected for interview will be asked to approach the intended research institution or research leader to be visited, to confirm that a visit would indeed be welcomed if an award were made.

At the end of the Scholarship, the student will be expected to write a short report indicating the activities and benefits gained from the visit.

The Cecil King Travel Scholarship was established in 2001 by the Cecil King Memorial Fund. The award is made by the Council of the London Mathematical Society on the recommendation of the Cecil King Prize Committee, nominated by the Society's Education Committee.

Application forms for the 2005 Scholarship are available on the Society's website (www.lms.ac.uk/activities/cecil_king/index.html) or from Isabelle Robinson at the Society. Closing date for applications: **Friday 4 February 2005**.

The London Mathematical Society (ref: Cecil King/IR), De Morgan House, 57-58 Russell Square, London WC1B 4HS (tel: 020 7637 3686; email: robinson@lms.ac.uk).

Isaac Newton Institute for Mathematical Sciences

QUANTITATIVE FINANCE: DEVELOPMENTS, APPLICATIONS AND PROBLEMS

(4 – 8 July 2005)

Supported by the European Commission, Sixth Framework Programme – Marie Curie Conferences and Training Courses - MSCF-CT-2004-516558 and

NOMURA

in association with the Newton Institute programme entitled *Developments in Quantitative Finance* (24 January to 22 July 2005)

Organisers: V. Henderson (Princeton), D. Hobson (Bath), S. Pliska (Illinois), C. Rogers (Cambridge).

Theme of conference: The objective of this conference is to bring together academics from various fields, including mathematicians, but also researchers from economics and finance, together with industry practitioners, to discuss the latest developments in the theory of mathematical finance, the application of this theory to current issues facing the industry and to identify the substantive problems confronting academic researchers and finance professionals. Many individual themes within quantitative finance are covered elsewhere in the programme, and this conference will aim to promote the developments in those areas to a wider audience, whilst simultaneously providing a forum for the discussion of advances in other areas within the field.

Invited speakers: Y Ait-Sahalia (Princeton), P. Bank (Columbia), M. Baxter (Nomura), D. Becherer (Imperial), N. Branger (Frankfurt), M. Davis (Imperial), D. Duffie* (Stanford), R Frey (Leipzig), S Hodges (Warwick), L. Hughston (Kings), R. Jarrow* (Cornell), E. Jouini (Ceremade), S Kou (Columbia), D. Kramkov (Carnegie-Mellon), M. Monoyios (Brunel), P. Mykland (Chicago), E Platen (UTS) J-C Rochet (Toulouse) S. Ross (MIT) S. Shreve (Carnegie-Mellon), R Sircar (Princeton), M. Zervos (Kings).
**to be confirmed*

Location and cost: 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 conference package, costing £440, includes accommodation, breakfast and dinner from dinner on Sunday 3 July to breakfast on Saturday 9 July 2005, and lunch and refreshments during the days that lectures take place. Self-supporting participants are very welcome to apply.

Further information and applications forms are available from the web at: www.newton.cam.ac.uk/programmes/DQF/dqfw02.html. Completed application forms should be sent to Tracey Andrew, Programme and Conference Secretary, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is **28 February 2005**.

CALENDAR OF EVENTS

This calendar lists Society meetings and other events publicised in the *Newsletter*. Further information can be obtained from the appropriate LMS *Newsletter* whose number is given in brackets. A fuller list of meetings and events is given on the Society's website (www.lms.ac.uk/meetings/calendar.html).

JANUARY 2005

7 Yorkshire & Durham Geometry Day, Leeds University (333)
9-12 Geometric, Spectral & Stochastic Analysis UK-Japan Winter School, Evesham (331)
10-14 Twistor String Theory Workshop, Oxford University (329)
10-14 Lévy Processes Symposium, Manchester University (329)
13-14 J.H. Coates 60th Birthday Conference, INI, Cambridge (332)
17-20 Transport Equations & Multi-D Hyperbolic Conservation Laws Lectures, Bologna, Italy (332)
18 Patterns, Nonlinear Dynamics and Applications Meeting, Cambridge University (333)
21 Edinburgh Mathematical Society Meeting, Edinburgh University (330)
26 Winter Combinatorics Meeting, Open University (332)

FEBRUARY 2005

2 Combinatorics Meeting, University College London (333)
18 Edinburgh Mathematical Society Meeting, Edinburgh University (330)
18 Postgraduate Open Day in Mathematics, King's College London (333)
25 LMS Mary Cartwright Lecture, London (333)
26 Research in Progress Meeting, Queen's College, Oxford (333)

MARCH 2005

7-9 Research Trends in Science and Technology Conference, American University, Lebanon (330)
10 Risk Management Spitalfields Day, INI, Cambridge (333)
18 Edinburgh Mathematical Society Meeting, Aberdeen University (330)
21-23 Postgraduate Combinatorial Conference, Oxford University (333)
21-23 Mathematical Neuroscience Meeting, Royal Society of Edinburgh (333)
29-8 Apr Introduction to Recent Applications of Model Theory Conference, INI, Cambridge (330)

APRIL 2005

4-7 Mathematics 2005, Liverpool University (332)
10-15 Euclidean Harmonic Analysis LMS/EPSRC Short Course, Edinburgh University (333)
29 Edinburgh Mathematical Society Meeting, Stirling University (330)

MAY 2005

18 LMS Midlands Regional Meeting, Birmingham
20 Edinburgh Mathematical Society Meeting, St Andrews University (330)

JUNE 2005

17 LMS Meeting, London

JULY 2005

8 LMS Northern Regional Meeting, York
10-14 Mathematical Modelling and Applications International Conference (ICTMA12), City University, London (321)
10-15 British Combinatorial Conference, Durham University (329)
11-15 Inverse Problems in Engineering Conference: Theory & Practice, Cambridge University (320)
11-15 Model Theory, Algebraic & Analytic Geometry Euro Conference, INI, Cambridge (332)
17-14 Aug Atlantic Association for Research in the Mathematical Sciences Summer School, Dalhousie University, Canada (333)

ABRAM SOMOILOVITCH BESICOVITCH
DE MORGAN MEDALLIST
1950

Professor Besicovitch received the De Morgan Medal on 16 November 1950. Extract from the President's address: 'Professor Besicovitch has played a leading part in recent developments of the theory of sets of points and the theory of functions of a real variable. Among his many and important contributions to these subjects I may mention: his development of the theory of almost periodic functions; his solution of Kakeya's Problem in 1927; his investigations on linearly measurable sets of points in the plane; his work on fractional dimensional measure, by which this subject was developed out of recognition; his recent remarkable discoveries in connection with the definition of surface area.'