THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 367 February 2008

Society Meetings and Events

2008

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Midlands Regional Meeting, Birmingham

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Hardy Lecture London

Monday 15 September
SW & South Wales Regional Meeting Swansea

Monday 15 September
Computer Science Day London

Friday 21 November
AGM, London

12–13 December
Joint Meeting with the Edinburgh Mathematical Society Edinburgh

MATHEMATICS POLICY ROUND-UP

In early January, Makhan Singh took up his post as the new project manager for the *more maths grads* project, exploring ways of increasing the numbers taking mathematics-related undergraduate courses. Makhan has a wealth of experience that will help him to take the project forwards. In particular, he has valuable project management skills and has worked in other Widening Participation projects so he has a full and practical appreciation of what more maths grads is aiming to achieve. Originally training as an engineer, Makhan has also spent time as a classroom teacher. Makhan takes over from Helen Orr who left the project in September; he will be based at the University of Birmingham.

The Mathematics Promotion Network, run by the Mathematics Promotion Unit, held a New Year Drinks Party in January. This was an opportunity for those working in promoting mathematics to meet and exchange news, as well as introducing Makhan to the community.

The Council for the Mathematical Sciences (CMS) responded to the HEFCE consultation on Withdrawal of Funding for Equivalent or Lower Qualifications (ELQs). The response focused on the fact that studying even relatively small amounts of mathematics can be highly beneficial, and that the policy generally goes against the Leitch agenda on lifelong learning and skills. It said, "We would suggest that national needs would be best met by regarding a much greater number of part-time mathematics ELQ students as exempt (or at least eligible for some degree of support via a targeted allocation) than just those studying for a full (second) degree programme with substantial mathematical content. The sums involved would be very small as a proportion of the total mathematics spend, but would have a substantial impact on take-up of the opportunities for valuable retraining and upskilling. Compensating for the deficiencies of the past will take many years to remedy." The CMS also contributed to the Select Committee inquiry on the same topic.

The CMS is working with the Centre for Science Education (CSE) at Sheffield Hallam University on the mathematics elements of a project to highlight careers in science, technology, engineering and mathematics (STEM). The CSE won a contract from the Department for Children, Schools and Families to create a programme of support and guidance aimed at increasing the number of young people continuing their study of STEM subjects post-16,

by showing the wide range of careers available through the study of STEM subjects. The main elements are, first, to lead a campaign to promote STEM careers awareness among students, parents, teachers and information and advice guidance professionals. Second, making available high quality information about STEM careers, linked to subject and qualification choice, from the beginning of Key Stage 3 through a variety of agents including subject teachers.

December saw the release of several reports on the state of mathematics in UK schools. Professor Julian Williams from Manchester University concluded that pupils plateau in mathematics between the ages of 11 and 14. A study produced by the Organisation for Economic Co-operation and Development found that UK secondary school students have slipped down an international league table of reading and mathematics standards. The UK's performance in mathematics was placed 24th in the world, compared with eighth in 2000. The Royal Society produced a state of the nation report entitled *The UK's Science and Mathematics Teaching Workforce* which found that there was little reliable data on the numbers of teachers in the UK, adding that schools and colleges faced "acute problems … in maintaining a strong science and mathematics teaching force". In particular, it found that the number of unfilled vacancies for mathematics teachers was higher than for any other subject.

Caroline Davis
Mathematics Policy and Promotion Officer

NEW YEAR HONOURS LIST

Dr Peter M. Neumann, Tutor in Mathematics, Queen's College, Oxford and lately Chairman of the UK Mathematics Trust, received an OBE for his services to education.

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LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT MEETING

Friday 8 February 2008, 4.30 pm

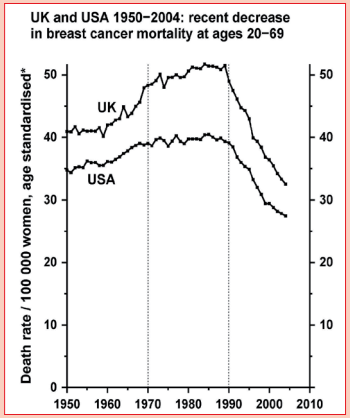
Oxford University Museum of Natural History
Parks Road, Oxford OX1 3PW

Mathematics of medicine: breast cancer treatment and prevention

Sir Richard Peto FRS (Oxford)

Mary Cartwright Lecture
Valerie Beral FRS (Oxford)

Valerie Beral and Richard Peto will describe worldwide evidence on the causes and treatment of breast cancer. The evidence comes from large-scale collaborations, where hundreds of researchers from around the world meet regularly in Oxford and contribute, for central review and analysis, information on hundreds of thousands of women with breast cancer. The findings from these international collaborations have changed clinical practice over the last two decades. Consequently, large reductions in mortality from breast cancer are being seen.



There will be tea before the meeting from 4 pm at the Museum.
The meeting will start at 4.30 pm with a short business meeting of the Society, to which all are welcome.

After the meeting a reception will be held at the Mathematical Institute from 6.30 pm to 7.30 pm. The reception will be followed by a dinner at Carluccio's at a cost of £26 per person, inclusive of wine. Those wishing to attend the dinner should inform Susan Oakes (susan.oakes@lms.ac.uk) no later than **Monday 4 February**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting.
Contact Isabelle Robinson (isabelle.robinson@lms.ac.uk) for further information.

THE CMS DIARY
Autumn 2007

The Council for the Mathematical Sciences met in De Morgan House on 12 November.

Those who have followed the development of the CMS in recent years will know that the Council has for some time been considering how its membership can be enhanced to reflect better the mathematical sciences in the UK as a whole, both in terms of subject breadth and geographic representation. To this end, the CMS has welcomed representatives of the Operational Research Society (ORS) and the Edinburgh Mathematical Society (EMS) to its meetings in 2007, and has been working with them to develop a model for formalising their position.

The subject was considered in detail over the summer by each of the Founder Members, and with the approval of the IMA, LMS and RSS, the Council for the Mathematical Sciences agreed to offer Membership to the ORS and the EMS. The CMS looks forward to building on the societies' expertise in issues faced by the mathematical sciences in Scotland and in representing Operational Research.

Regular readers of this diary will recall that some of the more recent meetings have been dominated by education issues. The Council reaffirmed that its core remit is issues affecting the mathematical sciences in UK higher education, research, business, industry and the public sector. In matters of mathematics education in schools and colleges, its wish is to work as a complement to the Advisory Committee on Mathematics Education (ACME) supporting and enhancing ACME's stance from the perspective of CMS's core audiences. CMS reviewed its own plan of work and agreed that proactive engagement with Chief Scientists in various government departments was a key activity for 2008.

The meeting noted the results of the first annual CMS-HoDoMS survey of the health of mathematical sciences departments. The level of response to the survey was pleasing, and the Council is grateful to those who replied. The aim of the survey is, over several years, to monitor and respond to trends as they emerge and produce robust information to inform policy statements and activities. Departments' comments on their overall health were diverse, ranging from 'very healthy and expanding' and 'small but vibrant' to 'very hard pressed' and even 'critical'. The 2007 survey has recently been distributed – all departments are encouraged to respond to help us create as full a picture as possible.

The Higher Education Funding Council for England (HEFCE) has recently launched consultations on proposals to withdraw funding for 'Equivalent or Lower Qualifications' and on the assessment and funding of higher education research post-2008 in the form of 'metrics'. The CMS has assembled working groups to engage with both of these issues – submissions will appear on the CMS website as they are made.

The CMS will meet Professor David Delpy, the new Chief Executive of the Engineering and Physical Sciences Research Council, on 17 January 2008. Matters to be considered are likely to include the role of mathematics within EPSRC's focus on strategic themes and the impact of the Comprehensive Spending Review and any resulting effects on the mathematical sciences programme budget.

Martin Smith
CMS Secretariat

RECRUIT A COLLEAGUE

Do you know a colleague who is not a member of the London Mathematical Society? Why not invite them to join? An application form can be found on the website at www.lms.ac.uk/contact/app_membership.html. The more who join the Society, the stronger it will become, and more can be done for the advancement, dissemination and promotion of mathematical knowledge.

IMA-LMS NEXT STEP INITIATIVE REPORT

There was a meeting of the NSI group on 10 December when a draft outline structure of the report to be presented to the two Councils of the LMS and the IMA was agreed. The group intends to produce this final report by March, though much work will be needed to meet that deadline.

Charles Goldie, LMS
Charles Evans, IMA

Comments sought

The NSI group is developing a model that if implemented would lead to the replacement of both the Institute of Mathematics and its Applications and the London Mathematical Society by a new society.

As this work progresses, members are invited to send views directly to the group and can be assured that all comments received will be brought to the attention of the group at its next meeting. Although the NSI group does not guarantee to reply to all messages it may on occasion choose to do so. The email address to use is nsicontact@btinternet.com.

LMS INVITED LECTURE 2008

Professor Andrei Okounkov
Random Surfaces

7–11 April 2008

The 2008 LMS Invited Lectures will be given by Professor Andrei Okounkov (Princeton) on Random Surfaces. The Lectures will take place at the Institute for Mathematical Sciences, Imperial College London from 7 to 11 April.

There will also be lectures by Nekrasov, Szendröi and others.
For further information contact Richard Thomas (richard.thomas@imperial.ac.uk) or visit the website www.ma.ic.ac.uk/~rpwt/LMS.html.

NEW CHAIR FOR ACME: PROFESSOR ADRIAN SMITH FRS

The Advisory Committee for Mathematics Education (ACME) is delighted to announce that Professor Adrian Smith, FRS has taken over ACME Chair from Sir Peter Williams, FREng, FRS, from 1 January 2008. Professor Smith has replaced Professor John McWhirter, FREng, FRS, who had to withdraw.

Professor Adrian Smith is the Principal of Queen Mary, University of London. Previously he was at Imperial College, London, where he was Head of the Mathematics Department, Chairman of the Board of Imperial College Consultants and a member of the Management and Planning Group. Adrian is currently a member of the governing body of the London Business School, is Deputy Vice-Chancellor of the University of London and the Treasurer for *Universities UK*. He served on the Advisory Committee to the UK Government Office for National Statistics from 1996-1998; from 1991-1998 he was Statistical Advisor to the Nuclear Waste Inspectorate for the UK; and from 1982 to 1987 was adviser on Operational Analysis for the Ministry of Defence. He has also worked with the UK Higher Education Funding Council and the Engineering and Physical Sciences Research Council. He chaired the Post-14 Mathematics Inquiry which reported in 2004. He has been President of the Royal Statistical Society and was elected a Fellow of the Royal Society in 2001.

VISIT OF DR I. LOSEV

Dr Ivan Losev (Belarusian State University) will be visiting the mathematics departments at Manchester, Warwick, Edinburgh and York from 1 to 29 February. His research area is Lie theory and geometric invariant theory. The current plan is for Dr Losev to visit the University of Manchester from 1 to 12 February, Warwick from 12 to 18 February, Edinburgh from 18 to 24 February and York from 24 to 29 February. He will give lectures at all four venues. Contact Alexander Premet (sashap@maths.man.ac.uk) nearer the time for the dates of the lectures. The visit is supported by an LMS Scheme 2 grant.

LONDON MATHEMATICAL SOCIETY
NORTHERN REGIONAL MEETING

Room G.107, Alan Turing Building
University of Manchester

Monday 31 March 2008

2.30 Opening of the meeting

Michael Field (University of Houston)
Rates of mixing for flows

3.45 Tea

4.30 Ursula Hamenstädt (Universität Bonn)
Bowen's construction for the Teichmüller flow

6.30 Dinner at the Tai Pan Restaurant

For further details or to reserve a place at the dinner, which costs £25, including drinks, email Richard Sharp (sharp@maths.man.ac.uk).

The meeting will be followed by a workshop from 1 to 4 April on *Ergodic Theory and Geometry*. For further detail visit the website www.maths.man.ac.uk/~sharp/etg.html or email Richard Sharp (sharp@maths.man.ac.uk) or Mark Pollicott (m.pollicott@warwick.ac.uk).

There are funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting and workshop. Requests for support, including an estimate of expenses, may be addressed to Richard Sharp (email above).

LMS HARDY LECTURER 2008

The 2008 LMS Hardy Lecturer is Professor Samuel Weinberger (University of Chicago and Hebrew University). During his visit to the UK he will give talks at Edinburgh, Liverpool and Durham followed by the Hardy Lecture at the Society meeting in London on Friday 4 July. Professor Weinberger will give the following lectures:

- Edinburgh, Monday 23 June: *Playing the Novikov game*
  contact Tom Lenagan (T.Lenagan@ed.ac.uk)
- Liverpool, Wednesday 25 June: *Applications of quantitative topology*
  contact Peter Giblin (pjgiblin@liverpool.ac.uk)
- Durham, Monday 30 June: *Topological methods for the analysis of large data sets*
  contact Michael Farber (Michael.Farber@durham.ac.uk)
- London, Friday 4 July: *Complexity, entropy and variational problems*
  contact Susan Oakes (susan.oakes@lms.ac.uk)

Professor Béla Bollobás (Cambridge) the 2007 LMS Whitehead Prize Winner is the second speaker at the London meeting. There will also be a programme of events that day especially for graduate students.

The names given are the local organisers from whom further information can be obtained. The Liverpool meeting is in collaboration with Manchester (Nige.Ray@manchester.ac.uk). For general enquiries contact Stephen Huggett, LMS Programme Secretary.

LMS INVITED LECTURES SERIES

The Programme Committee will be considering proposals for the 2009 Invited Lectures at its meeting on 21 February 2008. Proposals are now invited from any member who, in addition to suggesting a topic and lecturer, would be prepared to organize the meeting at the member's own institution or a suitable conference centre. A grant is given to the host department to support attendance at the lectures.

The Society's Invited Lectures series consists of meetings at which a single speaker gives a course of about ten expository lectures, examining some subject in depth, over a five day period (Monday to Friday) during a University vacation. The meetings are residential and open to all interested. It is intended that the texts of the lectures given in the series shall be published. In addition to full expenses, the lecturer is offered a fee of £1,250 for giving the course and a further fee of £1,500 on delivery of the text in a form suitable for publication.

Enquiries about the Invited Lectures should be directed to the Programme Secretary at the Society (grants@lms.ac.uk). The deadline for the submission of a proposal is **Friday 15 February**. Previous lecturers:

D. Zagier (1998)
A. Mielke (1999)
B. Dubrovin (2000)
T. Goodwillie (2001)
P. van Moerbeke (2002)
M. Fukushima (2003)
M.W. Davis (2004)
M.F. Singer (2006)
D. Ben-Zvi (2007)

The 2008 Invited Lectures will be given by Andrew Okounkov (Princeton) from 7 to 11 April 2008 at the Institute for Mathematical Sciences, Imperial College London. For further information contact Richard Thomas (richard.thomas@imperial.ac.uk).

WOMEN IN MATHEMATICS DAY 2008

The next Women in Mathematics Day will be held on **Friday 25 April** at De Morgan House. Sessions will include talks by practising women mathematicians in a variety of appointments and at different career stages.

The organisers would be very grateful if all members could encourage women mathematicians, particularly students (including final year undergraduates) and those at an early stage in their career, to attend this meeting. It is hoped that an opportunity to see women who are active and successful in mathematics, and to meet them informally, will be beneficial. Feedback from previous meetings has shown that participants find this useful. While this is an occasion particularly for women active in mathematics to get together, men are certainly not excluded.

Any postgraduates, postdocs or research assistants interested in giving a talk or presenting a poster during the afternoon session should contact Dr Jennifer Scott (j.a.scott@rl.ac.uk) by **22 February**.

Programme

10.30-11.00	**Registration and coffee**
11.00-13.00	**Morning Session**
11.00-11.40	Hilary Ockendon (Oxford) *Spinning and weaving through Industrial Mathematics*
11.40-12.20	Alicia Kim (Bath) *To optimise or not to optimise: An engineer's perspective*
12.20-13.00	Gianne Derks (Surrey) *Stability of localised waves and fronts*
13.00-14.20	**Lunch and Poster Session (starting 13.30)**
14.20-16.00	**Afternoon Session** Postgraduate/Postdoc speakers
16.00-16.30	**Tea and end of Poster Session**

Followed by a meal for those able to stay.

New this year: to encourage high quality posters, a £50 book token will be awarded for the poster that is judged to be the WiM Day Best Poster 2008.

Limited funds are available to help with the travel costs of students attending the event. Further details are available from Isabelle Robinson at the Society (contact details below).

To register please contact Isabelle Robinson, Administrative Officer (email: isabelle.robinson@lms.ac.uk).
The day is free for students and £5 for all others – payable on the day.

NEWS FROM IMU

Marcelo Viana
Executive Committee Member

The IMU aims to promote and represent Mathematics at the global scale, in a world where mathematicians move and collaborate freely across national borders. In the past, substantial work and diplomatic skill were employed to try and bring to the Union's fold countries separated by world political tensions, and establish IMU as the truly international body it now is. In retrospect, progress has been remarkable, particularly dealing with the most developed countries.

But much has yet to be done for the IMU to achieve comparable presence in the developing world. The 2006 General Assembly (GA), held at Santiago de Compostela, recommended that the role of IMU in support of Mathematics in the developing world be enhanced and expanded. This is a different kind of challenge, and one that is very much on the mind of the Executive Committee. A number of initiatives are currently under way to address it.

In line with the report presented at the GA 2006 by the Developing Countries Strategy Group (DCSG), a Committee for Developing Countries (CDC) has been created with the mission to devise new initiatives of the IMU in developing and economically disadvantaged countries, to search for funding to support the corresponding activities, and to establish institutional partnerships with scientific organizations with common goals. The CDC is to continue and further develop the programs that have been previously run by the Commission for Development and Exchange and by DCSG.

The EC is actively promoting applications for membership of new countries, from all regions of the globe, possibly as Associate Members of the IMU – see item below. The EC is also strongly committed to continued improvement of geographical balance in the Union's activities, aiming for a more correct representation of mathematicians working in developing countries in all the Union's activities, both from the organizational and the academic point of view.

Associate Members of IMU

At its 15th General Assembly in August 2006 at Santiago de Compostela, Spain the IMU introduced Associate Members as new type of IMU membership. In contrast to ordinary membership an Associate Member does not need independent scientific activity. It is assumed that an Associate Member is determined to develop its mathematical landscape and has the will to become an IMU Member after four to eight years of associate membership. Ecuador and Kyrgyzstan have just become associate members of IMU. For more information visit: www.mathunion.org/Members/Associate.html.

Ramanujan Prize

Jorge Lauret (38) of the Universidad Nacional de Córdoba in Argentina is the winner of the 2007 Srinivasa Ramanujan Prize. The Ramanujan Prize was established at the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, to honour young mathematicians who have conducted outstanding research in developing countries. The Ramanujan Prize is supported by the Norwegian Academy of Science and Letters through the Abel Fund, with the cooperation of the International Mathematical Union. For more information visit: www.abelprisen.no/en.

Bolyai Prize

On 30 September 2007, László Lovász, current president of the International Mathematical Union, received the Bolyai Prize which is given by a private foundation, founded by five Hungarian enterpreneurs who wanted to honour scientific achievements of Hungarian scholars, scientists, and - through the example of the awardees - to encourage young people to pursue a career in research.

The above items are taken from the 26th issue of the IMU electronic newsletter IMU Net (see www.mathunion.org/Publications/Newsletter)

MATHEMATICAL SOCIETY OF JAPAN

2007 Prizes

The 2007 *Autumn Prize,* the *Geometry Prizes* and *Analysis Prize* of the Mathematical Society of Japan (MSJ) were awarded at the Annual Meeting of the MSJ in Tohoku University in September 2007.

The Autumn Prize was awarded to Tadahisa Funaki, Professor of University of Tokyo, for his outstanding contribution to stochastic analysis on large scale interacting systems, in particular, on the Ginzburg–Landau $\nabla\phi$ intersurface model and the low temperature limit of interacting Brownian particles. The Autumn Prize of MSJ is awarded to an individual who has made outstanding contributions within the past five years to Mathematics in the highest and broadest sense.

The Geometry Prizes were awarded to Shigeyuki Morita, Professor of University of Tokyo, and Kenichi Yoshikawa, Associate Professor of University of Tokyo. The award to S. Morita was made in recognition of his fundamental research work on mapping class groups, in particular, his discovery of the Mumford-Morita-Miller characteristic classes, which resolves the structure of the stable cohomology algebra of mapping class groups. The award to K. Yoshikawa was given for his outstanding research work on the Ray-Singer analytic torsion and its behaviour on various moduli spaces, which derives, for instance, a geometric construction of Borcherds modular forms for the moduli space of K3 surfaces.

The Analysis Prizes have been awarded to Shigeki Aida, Professor of Osaka University, for his contributions to stochastic analysis in infinite dimensional spaces with special reference to his work on functional inequalities, symmetric diffusion processes, and semi-classical limits, to Toshiaki Hishida, Associate Professor of Niigata University, for his contributions to the new developments in Fujita-Kato theory for the Navier-Stokes equations and in particular for his work on Navier-Stokes flows in aperture domains and around rotating bodies, and to Takeshi Hirai, Professor Emeritus of Kyoto University, for his contributions to the representation theory of infinite symmetric groups with special reference to his work on irreducible representations of infinite symmetric groups.

FIFTH EUROPEAN CONGRESS OF MATHEMATICS

Travel grants

Council has set aside a sum of money to be used for making grants to mathematicians based in the UK who wish to attend the Fifth European Congress of Mathematics, Amsterdam, 14–18 July 2008 (www.5ecm.nl). The Society would particularly like to support those mathematicians at an early stage in their career.

People who are eligible are expected to make an application to the Royal Society: Royal Society grants are made to applicants presenting their own paper or poster or chairing a session. The deadline for applications to the Royal Society is **5 March 2007**. Information and application forms can be found on the website www.royalsociety.org.

People who are not eligible for a Royal Society grant may apply to the London Mathematical Society for a grant, on forms obtainable from the LMS (susan.oakes@lms.ac.uk). Applications should be sent to Susan Oakes, The Administrator, London Mathematical Society, to arrive before **Wednesday 12 March 2008**. They will be considered by a Council Committee and the outcome will be made known to the applicant before the end of March.

The London Mathematical Society

Cecil King Travel Scholarship

The London Mathematical Society annually awards a £5000 Cecil King Travel Scholarship in Mathematics, to a young mathematician of outstanding promise. The Scholarship is awarded to support a period of study or research abroad, typically for a period of three months.

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. A shortlist of applicants will be selected for interview.

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

Applications should be made using the form available on the Society's website (www.lms.ac.uk/activities/cecil_king/index.html) or from Isabelle Robinson at the Society (isabelle.robinson@lms.ac.uk). The closing date for applications is **Friday 22 February 2008**. It is expected that interviews will take place in London in late April or early May.

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.

ROYAL SOCIETY INTERNATIONAL GRANTS

The Royal Society's International grants programme enables high calibre UK scientists to initiate collaborations, develop new skills and experience and exchange ideas with the world's leading researchers. For all the schemes, the UK-based scientist must apply.

Short Visits
This programme aims to support new and ongoing international collaborations by providing mobility grants for visits lasting between one week and 12 weeks to support UK scientists hosting a visiting overseas scientist, or making a visit to an overseas scientist. Various countries covered (see website for details). Quarterly deadlines. (international.shortvisits@ royalsoc.ac.uk)

Joint Projects
This programme is designed to enable international collaboration by providing researchers with a small mobility grant to cover travel, subsistence and research expenses for up to two years. The collaboration should be based on a single project including two teams or individuals: one based in the UK and the other based outside the UK. A relationship between both parties should already be established prior to making an application. The collaboration should involve bilateral visits between the UK and the country with which the overseas collaborator is based. Various countries covered (see website for details). Quarterly deadlines. (international.jointprojects@royalsoc.ac.uk)

Incoming Fellowships
The Society offers incoming Fellowships to allow outstanding postdoctoral scientists from various countries to undertake high quality research in the UK. The award covers subsistence, research and travel expenses. Various countries covered. (international.fellowships@royalsoc.ac.uk)

Conference Grants
This scheme supports UK based scientists to present their own paper/poster or chair a session at an overseas conference, where conference participation is the main or sole purpose of visit. The objectives of the scheme are to enable scientists to disseminate research findings, establish collaborations and build international reputations. Awards cover flight, conference fees and subsistence costs for up to 10 days. All countries covered. Quarterly deadlines. (conference.grants@royalsoc.ac.uk)

South Africa–UK Science Networks
This scheme is intended to initiate and encourage 'bottom-up' networking to develop new and enduring partnerships between UK and South African scientists, through one-to-one visits and workshop meetings. This scheme is funded by the Department for Innovation, Universities and Skills. See website for deadlines.

Ghana/Tanzania–UK Science Networks
The Society extended its regional focus from South Africa to Ghana and Tanzania following the joint science academies' G8 statement on Science and Technology for Africa Development in 2005. This scheme provides support for short thematic workshops (5 days) or one-week exploratory visits, either in the UK or in Ghana/Tanzania. It is part of a wider effort to assist the science communities of Ghana and Tanzania and their Higher Education Institutions (HEI) in their efforts to undertake cutting edge research and provide high quality training. (international.networks@royalsoc.ac.uk)

ICSU Business Meeting Grants
The Society runs two schemes to support attendance at meetings of international scientific unions and other ICSU family organisations on ICSU family business. The business meeting grants scheme is open to all UK based office-holders and members of ICSU family organisations. Applications are made on paper (forms available on the website) and paid retrospectively upon production of valid invoices/receipts and a report of the meeting. There are four deadlines a year in March, June, October and December. (international.policy@royalsoc.ac.uk)

ICSU Delegate Grants
This scheme is normally open only to members of the Society's Scientific Unions Committee, who can apply to support attendance at a meeting of their ICSU international scientific union as the chief Royal Society delegate. It is also open to the main UK representatives of other ICSU family organisations. As above, applications are made on paper and paid retrospectively on production of valid invoices/receipts and a report of the meeting. Applications can be made all year round but must be received at least four weeks before the meeting. (international.policy@royalsoc.ac.uk)

ROYAL SOCIETY ROSALIND FRANKLIN AWARD 2008

Invitation to Nominate

The Royal Society Rosalind Franklin Award is designed to promote women in science, engineering and technology (SET) and is funded by the Department for Innovation, Universities and Skills (DIUS).

The award, consisting of a medal and £30,000, is made annually to an individual for an outstanding contribution to any area of SET. As part of the nomination process nominees are asked to put forward a proposal for a project that would raise the profile of women in SET in their host institution and/or field of expertise in the UK. The recipient of the award will be expected to spend a proportion of the £30,000 award fund on implementing their project. The recipient will also be asked to deliver a lecture at the Society.

There are no restrictions on the age of nominees, but it is anticipated that the award will be made to someone in their mid-career and actively involved in scientific research. Nominations are welcomed for both women and men.

For full details of the award and guidelines for nomination, including the online nomination forms, visit royalsociety.org/franklin. Closing date for nominations: **Monday 25 February 2008**. Details of all medals and awards can be found at royalsociety.org/awards.

KARL GRUENBERG MEMORIAL MEETING

A half-day conference will be held at Queen Mary, University of London during the afternoon of Thursday 13 March in honour of the late Emeritus Professor Karl Gruenberg. This will be followed by a celebration of Karl's life in the early evening.

Further details will be posted on the School of Mathematical Sciences website (www.maths.qmul.ac.uk). Queries can be addressed to Dr DJ Collins at d.j.collins@qmul.ac.uk.

KCL OPEN DAY

King's College London is holding a Postgraduate Open Day on Friday 15 February. Research degrees are offered in *Analysis and Partial Differential Operators*, *Number Theory*, *Geometric Lie Theory*, *Disordered Systems and Neural Networks*, *Theoretical Physics* and *Financial Mathematics and Applied Probability*. Taught MSc programmes are offered in Pure Mathematics, Mathematical Physics, Financial Mathematics, Information Processing and Neural Networks and Theoretical Physics.

Further information contact Miss Rebecca Cullen, Postgraduate Administrator, Mathematics Department, King's College London, Strand, London WC2R 2LS (tel: 020 7848 2107, email: pg.maths@kcl.ac.uk, website www.mth.kcl.ac.uk/ postgraduate/openday2008).

MANCHESTER 1824

The University of Manchester

50th British Applied Mathematics Colloquium

31 March – 3 April 2008

Plenary Speakers

Alan Champneys (Bristol)
Ray Goldstein (Cambridge)
Paul Steinhardt (Princeton)
Alistair Fitt (Southampton)
Paul Martin (Colorado Sch. Mines)
Endre Süli (Oxford)

Public Engagement Lecture

Tom Mullin (Manchester)

Minisymposia

Asymptotics Beyond All Orders
Experimental Fluids
Homogenisation/Multiscale Methods in Solid Mechanics
Industrial Mathematics
Rheology of Complex Systems
BAMC: The First Fifty Years
Fluid Mechanics of Climate Change
Inverse Problems
Violent Flows with Free Surfaces

Participation is open to researchers in all areas of applied and applicable mathematics. The Colloquium will be broad in scope and, while still providing a forum for the subjects in which British applied mathematics traditionally has strength, will seek to identify and highlight developing areas. We particularly encourage active involvement from younger researchers (postdocs and PhD students).

As this will be the 50th BAMC we hope to make it a little special! We will be including a general-interest lecture in the programme, a couple of historical activities, and will be running an outreach day for year 12/13 (sixth-form) school students on Tuesday 1st April.

http://www.maths.manchester.ac.uk/bamc/ (registration/booking)

60th British Mathematical Colloquium

Plenary speakers

Richard Hamilton (Columbia)
Tony Joseph (Weizmann Inst.)
Hugh Montgomery (Ann Arbor)
Stanislaw Smirnov (Geneva)
Akshay Venkatesh (Courant Inst.)

Public Lecturer

Chris Budd (Bath)

History of Maths Lecturer

Edmund Robertson (St Andrews)

Morning speakers

★ Anton Cox (City)
★ John Cremona (Warwick)
★ Patrick Dorey (Durham)
★ Jonathan Sherratt (Heriot-Watt)
★ Ivan Smith (Cambridge)
★ Nina Snaith (Bristol)
★ Catharina Stroppel (Glasgow)
★ Peter Symonds (Manchester)
★ Roger Tribe (Warwick)
★ Franco Vivaldi (Queen Mary)
★ Michael Weiss (Aberdeen)
★ Jim Wright (Edinburgh)

Splinter Sessions

⊙ Algebras
⊙ Dynamical systems
⊙ Functional analysis
⊙ Geometry
⊙ Groups & representations
⊙ History of maths
⊙ Mathematical biology
⊙ Mathematical physics
⊙ Number theory
⊙ Random matrices
⊙ Semigroups
⊙ Stochastic analysis
⊙ Topology

Special sessions:

Differential Geometry & Geometric Analysis
Number Theory

Postgraduate Conference

Special events:

Walter Ledermann at 97
LMS/IMA merger forum

University of York

25–28 March, 2008

Supported by:

London Mathematical Society
Edinburgh Mathematical Society
EPSRC

http://maths.york.ac.uk/bmc (registration/booking)

GEOMETRIC ANALYSIS, ELASTICITY AND PDEs

A workshop on *Geometric Analysis, Elasticity and PDEs*, on the 60th birthday of John Ball, will be held from 23 to 27 June at the Maxwell Institute and Department of Mathematics, Heriot-Watt University, Edinburgh. The meeting is directed by a scientific committee co-chaired by Professors Jerry Bona of Illinois and Jerry Marsden of CalTech.

The workshop will concentrate on modern aspects of PDE using analytical and geometric methods, including recent developments in the calculus of variations, systems of conservation laws, and transport equations. A number of applications will be considered, such as continuum mechanics, especially nonlinear elasticity, the structure of materials, and biomaterials. The speakers at the workshop are of the highest international calibre, ranging from two Fields Medalists to outstanding young researchers. The workshop is part of the activities of the Maxwell Institute Centre for Analysis and Nonlinear PDEs (www.maxwell.ac.uk/PDEs/index.html) and is also supported by EPSRC through the International Centre for Mathematical Sciences. Details of the meeting can be viewed at www.icms.org.uk/workshops/pde.

ALGEBRAIC STRUCTURES IN GEOMETRY AND PHYSICS

This workshop will take place in the Department of Mathematics, University of Leicester, from 21 to 25 July. Its focus will be on new developments in algebraic geometry, topology and homological algebra inspired by the ideas coming from theoretical physics. The relevant topics include: operads and operadic algebras, differential graded and derived categories, Calabi-Yau manifolds and algebras, topological conformal field theories, noncommutative geometry. The following people have provisionally accepted an invitation to deliver a talk.

- A. Bondal (Moscow)
- T. Bridgeland (Sheffield)
- J. Chuang (Bristol)
- V. Ginzburg (Chicago)
- B. Keller (Paris 7)
- S. Merkulov (Stockholm)
- B. Tsygan (Northwestern)
- U. Tillmann (Oxford)
- A. Voronov (Minnesota)
- M. Weiss (Aberdeen)

Prospective participants are invited to contact Andrey Lazarev (al179@le.ac.uk). The workshop is supported by any LMS conference grant and the University of Leicester. For further details visit the website www2.le.ac.uk/departments/mathematics/extranet/conferences/alg_struct08.

NEW HORIZONS IN TORIC TOPOLOGY

A conference on *New Horizons in Toric Topology* (NHTT008) will take place at MIMS, University of Manchester from 7 July to 11 July. Toric topology came of age at a successful international meeting in Osaka during May/June 2006, and is now recognized as a genuine subdiscipline of algebraic topology; it combines areas such as cobordism theory, equivariant topology, homotopy theory, model category theory, and simplicial topology in a novel manner. Much of the input and motivation, however, has been from external sources, such as algebraic geometry, the theory of arrangements, convex geometry, algebraic combinatorics, and symplectic geometry. Our goal for the meeting is to stimulate a further flow of ideas in both directions, and encourage experts to consider how advances in toric topology might feed back into their own fields. This will help to bring the subject to maturity.

The programme of the conference will be built around two keynote lectures per day during the first and last two days. On Wednesday 9 July, Professor Sergei Novikov has agreed to contribute the 2008 Adams Lecture, and to formally open the Frank Adams Seminar Room in MIMS; a member of Frank's family expects to be in attendance. Four of the keynote speakers are topologists with a wide spread of interests, and four are experts in relevant external areas.

For further details see the website www.mims.manchester.ac.uk/events/workshops/NHTT08/. The conference is partially funded by an LMS grant.

The conference will be preceded by a workshop on *New Directions in Toric Topology* (supported by MIMS) from 4 to 5 July, and has been awarded the status of Satellite Meeting to the 5th ECM in Amsterdam, which takes place the following week.

MATHEMATICAL NEUROSCIENCE

This three-day conference, to be held at the Royal Society of Edinburgh from 17 to 19 March, will provide an overview of the current state of research in mathematical approaches to neuroscience, bringing together both physical and life scientists. Drawing together the field in this way will allow for a critical discussion of the relevant experimental facts and of various mathematical methods and techniques that have been successfully applied to date. Importantly, it will draw attention to, and help develop, those pieces of mathematical theory which are likely to be relevant to future studies of the brain.

The meeting will consist of invited speakers and registered participants though will be limited to 75 people. The schedule will allow for a number of poster presentations. The invited speakers are:

- Pete Ashwin (University of Exeter)
- Wyeth Bair (University of Oxford)
- Paul Bressloff (University of Utah)
- Rodica Curtu (University of Brasov)
- Brent Doiron (University of Pittsburgh)
- Gaute Einevoll (Norwegian University of Life Sciences)
- William Kath (Northwestern University)
- David Liley (Swinburne University of Technology)
- David Pinto (University of Rochester)
- Mark van Rossum (University of Edinburgh)
- Simon Schultz (Imperial College, London)
- Piotr Suffczynski (University of Warsaw)
- David Terman (University of Ohio)
- Henry Tuckwell (Max Planck Institute)
- Andre Longtin (University of Ottawa) (tbc)

The registration fee for the conference is £50.00. A one-day training workshop for PhD students and post-docs entitled *An introduction to Mathematical Neuroscience* will also take place prior to the meeting on 16 March. Some financial assistance is available to assist graduate students who attend **both** the training workshop and the conference.

The scientific organisers are Professor Stephen Coombes (University of Nottingham) and Dr Yulia Timofeeva (University of Warwick). The training workshop organiser is Dr Mark van Rossum (University of Edinburgh). Further details of this meeting, including how to register, may be found at www.icms.org.uk/workshops/mathneuro. Enquiries should be addressed to Irene Moore (irene.moore@icms.org.uk).

THE FIELDS INSTITUTE

The following upcoming programmes are scheduled at the Fields Institute, Toronto:

- *New trends in harmonic analysis*
  January–June 2008
- *Arithmetic geometry, hyperbolic geometry and related topics*
  September–December 2008
- *O-minimal structures and real analytic geometry*
  Winter/Spring 2009
- *Financial mathematics*
  Winter/Spring 2010

See www.fields.utoronto.ca/programs/scientific for links to these and other events. To be informed of upcoming Scientific Activities subscribe to the mailing list at www.fields.utoronto.ca/maillist.

GEOMETRIC AND ANALYTIC METHODS IN GROUP THEORY

A meeting on *Geometric and Analytic Methods in Group Theory* will be held on 15 February at the University of Southampton. The speakers will include:

- Alain Valette (Neuchâtel)
- Pierre-Emmanuel Caprace (IHES)
- Dessislava Kochloukova (University of Campinas, Brazil)

This meeting is supported by an LMS Scheme 3 grant, and applications for financial support for attendance by PhD students are warmly welcomed. Contact Professor Graham Niblo (G.A.Niblo@soton.ac.uk) for details. Further details of the meeting will be published at www.personal.soton.ac.uk/gan/Scheme3.html.

UNDERSTANDING CELLULAR CALCIUM SIGNALS

Following the successful Calcium meeting in 2006, there will be another workshop on *Understanding Cellular Calcium Signals* at the Cripps Hall Library, University of Nottingham on 4 April. The one-day event aims at bridging the gap between experimentalists and theoreticians working on various aspects of the intriguing dynamics of cellular Calcium. Invited speakers are:

- Martin Falcke
  (Hahn-Meitner Institute, Berlin)
  Hierarchic modelling of intracellular Ca2+ oscillations
- Llewelyn Roderick
  (Molecular Signalling, Babraham Institute, Cambridge)
  Nuclear inositol 1,4,5-trisphosphate-induced Ca2+ signals control cardiac hypertrophy
- Krasimira Tsaneva (Mathematics, Bristol)
  Calcium regulation of spontaneous and receptor-controlled electrical activity in pituitary somatotrophs
- Helen Kennedy
  (Neuroscience, Bristol)
  Calcium signals at the efferent synapse of developing inner hair cells
- Yulia Timofeeva
  (Computer Science, Warwick)
  Calcium and electrical signalling in neural cells
- John Love
  (Plant Sciences, Exeter)
  Non-invasive calcium imaging in plant cells, tissues and organs

Please note that the number of participants will be limited to around 50 and that there will be no registration fee. Places will be assigned on a first come – first serve basis. Email Rüdiger Thul (ruediger.thul@nottingham.ac.uk) to register. For further details visit the website www.maths.nottingham.ac.uk/personal/rt/workshop08.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

WALL BOUNDED SHEAR FLOWS: TRANSITION & TURBULENCE

8–12 September 2008

in association with the Newton Institute programme entitled
The Nature of High Reynolds Number Turbulence
(26 August to 19 December 2008)

Workshop Organisers: Peter Davidson (Cambridge), Rich Kerswell (Bristol), Hassan Nagib (Illinois Institute of Technology), Tim Nickels (Cambridge) and Katepalli Sreenivasan (ICTP)

Themes will include:

- Shear flow as a dynamical system
- Spatiotemporal dynamics of transition
- The role of coherent structures
- Near-wall and outer scale interactions
- Scaling and universality
- The importance of flow geometry

Speakers will include:

- Ron Adrian (Arizona)
- Jean-Marc Chomaz (Paris)
- Bruno Eckhardt (Marburg)
- Dan Henningson (Stockholm)
- Javier Jimenez (Madrid)
- Shigeo Kida (Kyoto)
- John Kim (Los Angeles)
- Paul Manneville (Paris)
- Ivan Marusic (Melbourne)
- Charles Meneveau (Baltimore)
- Tom Mullin (Manchester)
- Lex Smits (Princeton)
- Fabian Waleffe (Madison)

Further information and application forms are available from the web at: www.newton.cam.ac.uk/programmes/HRT/hrtw01.html. Completed application forms should be sent to Tracey Andrew, Programme & Conference Secretary, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH or via email to: t.andrew@newton.cam.ac.uk.

Closing date for the receipt of applications is 16 May 2008.

RECORDS OF PROCEEDINGS AT MEETINGS

ANNUAL GENERAL MEETING

held on Friday 23 November 2007 at University College London. About 75 members and visitors were present for all or part of the meeting.

The meeting began at 3:15 pm, with the President, Professor J.F. TOLAND, FRS, FRSE, in the Chair. Members who had not yet voted were invited to hand their ballot papers to Professor A.R. Camina and Professor P.T. Saunders, the Scrutineers.

Copies of the *Annual Report on Activities* of the Society were made available and the President invited questions.

The Treasurer, Professor N.M.J. Woodhouse, presented his annual report. Messrs Kingston Smith were re-appointed as auditors for 2007/08.

Seven people were elected to Ordinary Membership: A.N. Bartholomew, R. Clifford, N.P. Dirr, C. Drutu, S. Gerke, S. Gutierrez de Gracia, H. Khudaverdian and six were elected to Associate Membership: N. Brannstrom, E. Hanbury, V. Kontis, S.M. Prendiville, E.R. Vaughan, J. Zhao. Three members signed the book and were admitted to the Society.

The President, on Council's behalf, presented certificates to the 2007 Society Prizewinners: De Morgan Medal: Professor Bryan Birch; Senior Whitehead Prize: Professor Béla Bollobás; Naylor Prize and Lectureship in Applied Mathematics: Professor Michael Green; Whitehead Prizes: Dr Nikolay Nikolov, Dr Oliver Riordan, Dr Ivan Smith and Dr Catharina Stroppel.

The General Secretary outlined the purpose of proposed changes to the By-Laws and reported one minor change in words. Members approved the changes.

Professor Michael Struwe gave a lecture entitled *Geometric energy quantization*.

After tea, Professor Saunders announced the results of the ballot. The following Officers and Members of the Council were elected: President: E.B. Davies; Vice Presidents: D.G. Larman, F.A. Rogers; Treasurer: N.M.J. Woodhouse; General Secretary: C.M. Goldie; Programme Secretary: S.A. Huggett; Publications Secretary: K.J. Falconer; Education Secretary: C.J. Budd; Members-at-Large of Council for two years: J.E. Barrow-Green, S.N. Chandler-Wilde, P.J. Davies, I.G. Gordon, A. Laptev, B.J. Totaro. Council membership is completed by the following who were elected for two-year terms in 2006: A. Borovik, D.E. Buck, H.G. Dales, R.M. Thomas, A.J. Wilkie, E. Winstanley. The following members were elected to the Nominating Committee: C.A. Hobbs, M. Reid.

The newly-elected President, Professor E.B. DAVIES, FRS, took the Chair. The retiring President, Professor J.F. Toland, FRS, FRSE, then gave his Presidential address on *Skating on thin ice.*

After the meeting, a reception was held at De Morgan House, followed by the Annual Dinner, which was held at the Hotel Russell and attended by 83 people.

LMS ANNUAL GENERAL MEETING

Friday 23 November 2003

A large audience attended two very different but equally impressive talks. The first one was given by Professor Michael Struwe who spoke on geometric energy quantisation. The earliest example of geometric energy quantisation is probably the so-called bubbling phenomenon for harmonic maps discovered and studied by J. Sacks and K. Uhlenbeck (1981). Their key observation was that the lack of compactness is caused by concentration of energy at isolated points and that a rescaling near these points of concentration – the blow-up analysis – leads to nonconstant harmonic maps from a 2-sphere, usually referred to as *bubbles*.

The speaker used two famous problems to explain the main ideas of this beautiful part of mathematics: Rellich's conjecture on H-surfaces and the Yamabe problem. The former asserts that for any simple closed rectifiable curve in three-dimensional Euclidean space and for any real number H with the modulus smaller than a certain constant depending on the curve there are at least two geometrically distinct constant mean curvature H surfaces spanning the curve and yielding the same orientation on it. A sharp result on the existence of such a surface, the so-called 'small' solution, was published in 1970 by S. Hildebrandt, who improved earlier results by E. Heinz and H. Werner. The proof of the existence of another H-surface, the so-called 'large' solution, requires the use of the Mountain Pass Theorem in a situation where the Palais-Smale condition may fail at a certain critical level. This is a typical variational problem with a lack of compactness which requires a careful analysis of possible defects of strong convergence – bubbles. These difficulties were overcome by the speaker and by H. Brezis and J.M. Coron who proved Rellich's conjecture in the early 1980s.

The Yamabe problem is the assertion that for any compact smooth Riemannian manifold of dimension greater than or equal to 3 there exists a metric which is conformal to the

J. Toland B. Birch B. Bollabás C. Stroppel N. Nikolov M. Green I. Smith O. Riordan

Prize Winners 2007

original one and which has a constant scalar curvature. H. Yamabe attempted to solve this problem in 1960, but his proof contained a gap. The proof was repaired by N. Trudinger in 1968 under a restrictive assumption on the manifold. This assumption was removed by T. Aubin in 1976 for manifolds of dimension greater than or equal to 6. The more difficult case of dimensions 3, 4 and 5 was settled in 1984 by R. Schoen who used the positive mass theorem of general relativity proved by him and S.-T. Yau. A different approach to the Yamabe problem was introduced by R.S. Hamilton who suggested considering the heat flow for the Yamabe energy. Recent papers by H. Schwetlick and M. Struwe (2003) and S. Brendle (2005) contain a detailed blow-up analysis of concentration on spherical bubbles for the Yamabe flow and a proof of its global convergence to a constant scalar curvature metric for manifolds of dimensions 3, 4 and 5. The Yamabe problem is another example of a variational problem where loss of compactness happens at quantised energy levels determined by the energy of bubbles. Struwe's global compactness result for problems involving limiting nonlinearities (1984) gives a microscopic description of concentration with no unaccounted energy loss.

The final part of the talk was a brief review of other results on geometric energy quantisation and related fields including

- concentration-compactness (P.-L. Lions);
- pseudo-holomorphic curves (M. Gromov);
- bubbling for harmonic maps (T.H. Parker; J. Qing and G. Tian);
- blow-up analysis for semi-linear elliptic equations involving exponential (H. Brezis and F. Merle; Y. Li and I. Shafrir) and critical square-exponential (Adimurthi, O. Druet, F. Robert, M. Struwe) nonlinearities;
- Q-curvature (M. Struwe and A. Malchiodi; O. Druet, E. Hebey, F. Robert);
- multivortex solutions in Chern-Simons gauge theory and mean field equations (M. Struwe and G. Tarantello; W. Ding, J. Jost, J. Li and G. Wang); and
- the Willmore flow (E. Kuwert and R. Schätzle).

The talk ended with a list of open problems.

Retiring President J.F. Toland hands over the Presidential Badge to newly-elected President E.B. Davies.

The title of Professor John Toland's presidential address was *Skating on thin ice* and many felt that was an excellent metaphor for the presidency of the LMS. The speaker confirmed that that was indeed one of the reasons for choosing the title and started his talk by showing a picture of Sir Henry Raeburn's painting *Reverend Robert Walker Skating on Duddington Loch* which is kept in the National Gallery of Scotland. Continuing on a light note he mentioned the paper *Skating on Thin Ice* published in 1916 in the *Philosophical Magazine* by Sir Alfred George Greenhill who was the President of the LMS in 1890-1892 and the first British plenary speaker at an International Congress of Mathematicians (1904). This introduction prepared the audience for the main topic of the talk – a mathematical study of steady two-dimensional periodic waves on an infinitely deep irrotational fluid moving under the influence of gravity and bounded above by a heavy, frictionless, thin elastic sheet.

The latter can be thought of as a sheet of ice, hence the title of the talk! The corresponding mathematical model is a geometric free-boundary problem: to find a non-self-intersecting curve in the plane which is the zero contour of a harmonic function and at which the normal derivative of the same harmonic function is a prescribed function of the curvature, altitude and slope of the curve. This problem can be reduced with the help of a conformal mapping to finding critical points of a Lagrangian with a non-affine constraint. The latter leads to a difficulty not entirely unrelated to those discussed in the first talk, namely to the loss of compactness: the weak limit of a maximising sequence might not be a maximiser as it may fail to satisfy the constraint. This difficulty can be overcome by reduction to a saddle-point problem for a modified functional. The technical tools involved in the analysis include the Hilbert transform and the Hardy spaces on the unit disk. The main result is the existence of a smooth solution of the free-boundary problem under suitable restrictions on the stored energy function.

Following the meeting, many members and guests enjoyed the traditional drinks reception at De Morgan House and the Annual Dinner at a nearby hotel

Eugene Shargorodsky
King's College London

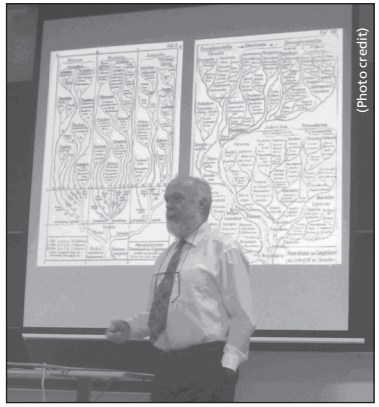
SPITALFIELDS DAY

A Spitalfields Day, *Yggdrasil: Reconstructing the Tree of Life*, took place at the Isaac Newton Institute (INI) on 6 December 2007. This event was organized in conjunction with the INI's four-month programme in Phylogenetics, with participants drawn from INI fellows, undergraduate and graduate students, and other visitors. *Yggdrasil*, the World Tree in Norse mythology, provides a vivid image for the mathematical field which seeks to uncover evolutionary relationships from biological data, such as DNA or protein sequences.

"While we're working on the secret of life, Dr Helmholz, there, is trying to unravel its meaning."

The meeting opened with an introduction by Ben Garling, former Officer and Executive Secretary of the LMS, who explained the history and tradition of Spitalfields Days. Then four internationally renowned speakers gave expository lectures highlighting different aspects of phylogenetics.

The first talk, by biologist Peter Lockhart of Massey University (NZ), introduced the problem of inferring phylogenetic trees for chloroplasts, emphasizing the mathematical and biological difficulties of modeling the process of evolution in such organelles. This was followed by computer scientist Tandy Warnow's (University of Texas, USA) talk on computational issues in phylogenetics, which highlighted


(Photo credit)

Andreas Dress, of The CAS–MPG Partner Institute for Computational Biology in Shanghai, discusses the Tree of LIfe.


(Photo credit)

Participants discuss the talks

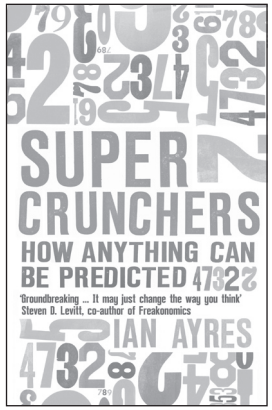
connections between graph theory and combinatorics and methods of phylogenetic tree reconstruction.

After lively conversation over tea, University of Alaska (USA) mathematician John Rhodes spoke on the use of algebraic geometry for theoretical analysis of phylogenetic models. The final speaker of the day, Andreas Dress, Director of the CAS-MPG Partner Institute for Computational Biology in Shanghai, discussed the role of models in phylogenetics, illustrating his points with memorable analogies. He further drew attention to some of the combinatorial aspects of current research projects in this area, including the tight span of metric spaces.

After the pleasant and informative talks, participants enjoyed a glass of wine and the opportunity to discuss further the day's events.

Elizabeth Allman (University of Alaska)
Vincent Moulton (University of East Anglia)

REVIEWS



Super Crunchers: How Anything Can Be Predicted by Ian Ayres, John Murray, 2007, pp 272, hardcover £16.99, ISBN 0-719-564638. Audio book, Hodder Murray, 2007, ISBN 0-719-524622.

How do you choose the best title for your new book? Which stocks and shares should you purchase in order to guarantee the best return? Can a disease be diagnosed by a computer? Is it possible to know that you have bought your airline ticket at the lowest price? The answer to all these questions, and more, is super crunching.

Super crunching is the new way for businesses to make decisions based on recognising patterns in past data rather than through intuition and personal experience. For example, instead of choosing a wine by taste it is possible to construct an algorithm that will decide which year is most likely to produce an exceptional vintage. One such algorithm has been based on winter rainfall, average growing season temperature and harvest rainfall. Mathematically speaking it is not hard to see that, when formulated correctly, this approach will often produce good results. Similar algorithms have been designed to predict which films will become tomorrow's blockbusters and which trading rules to use when investing in the stock market. Obviously mathematical modelling, statistical analysis and data mining have been around for a long time but what makes super crunching super new is the enormous quantity of past data that can now be analysed in a comparatively short space of time.

When faced with the decision concerning choice of book title, the author, lawyer and economist Professor Ian Ayres conducted a randomised trial. He took the three prospective titles: 'The End of Intuition', 'Why Data-Driven Decision Making is the New Way to be Smart' and 'Super Crunchers' and set up a test on Google. Within days he established that people searching for topics linked to data mining were more likely to click on adverts for 'Super Crunchers' than either of the other two titles; possibly an unsurprising result. Thus 'Super Crunchers' has been the product of super crunching.

The initial chapters are jam-packed with examples of research that the author has carried out using these randomised trials to form predictions. They are described in such a way that could not fail to excite anyone who has an interest in predicting outcomes. The beauty of this book is that it doesn't need to go into detail concerning the different algorithms and statistical processes used by the modern generation of data miners but rather it explains the concepts surrounding the problem, in ways that can be easily understood. Personally I would have appreciated a little bit more mathematical content but I am sure that's missing the point. We seem to live in a very anti-statistical society: newspaper reports continually misinterpret statistics and the general public seems loath to use them in any meaningful way. Now we have a book devoted to statistical analysis that hardly mentions it!

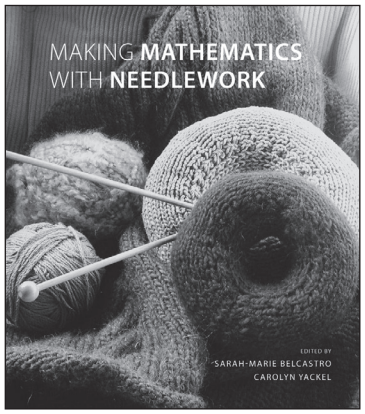
Only in the final chapter are standard deviations and means mentioned and this is merely in the context of a heart-warming anecdote concerning Ayres' nine-year-old daughter, Anna, who appears to use them unprompted in order to make informed decisions. Surely this provokes the response 'If a nine-year-old can understand this, then so can I'.

As the examples progress they become more political and concern areas such as education, health and insurance. It is clear that without appropriate guidelines the wrong questions can be asked and data mining can be used to back up erroneous claims. One claim that Ayres cites in some detail is the assertion that more guns lead to less crime and he goes into some detail as to why this research failed to find the correct answer. Finally the rather more negative aspects of data mining are touched upon - is our every move being watched and evaluated and where will this lead? The reader is left with a mixture of emotions - amazement at the scope of these fairly simple, logical algorithms and randomised tests yet distinct uneasiness at the Orwellian nightmare we seem to be heading into.

Noel-Ann Bradshaw
University of Greenwich

Making Mathematics with Needlework edited by Sarah-Marie Belcastro and Carolyn Yackel, AK Peters Ltd, 2007, pp 200, hardcover US$30, ISBN 978-1-56881-331-8.

As an artist working within a computing and maths department I am probably the perfect customer for this book, combining as I do a flair for needlework and clothes design and a more than passing interest in maths. Because of the mix of disciplines, however, I initially feared I might be its only customer. Each chapter is a combination of a mathematical paper and a corresponding needlework project with additional teaching ideas; the maths is written by and for mathematicians, the project for craftspeople: how many of us are there who are at home in both worlds?



Choosing a chapter at random, entitled "only two knit stitches can create a torus", I seize needles and wool and start reading. A seemingly oblique overview about the problems of being a left handed knitter develops into a set of questions about the different possible ways of constructing a knit stitch. Slowly this becomes the 'mathematics' section (but warned by the subheading 'mathematics' I know to put that hat on). Initially it is hard to shrug off the 'knitter' in me who baulks at a seemingly over-complicated explanation of what can be demonstrated in moments with needles and wool, but I am soon charmed by the way that the laying out in mathematical terms of a process I know by heart can inspire a confident sense of knowledge. The support of previous practical experience is so strong that when invited to "pick up yarn and knitting needles in order to verify the following observations" I feel no need to do so. This supports the claim of the book that practical exercises with thread and fabric construction can provide an education in visualising mathematical ideas and the possibilities of geometrical shapes. I'm afraid my fascination was more in terms of enjoying the comprehensive mathematical descriptions of processes I've enjoyed and explored for years.

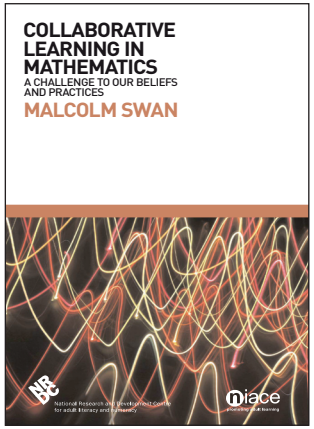
I won't pretend that the maths is easy. The support of a friendly mathematician would be a bonus at several moments, but the craft sections offer the constant reassurance of a practical viewpoint. We are offered the chance to make: a Möbius quilt, a bi-directional hat (Diophantine equations), a Sierpinski shawl (self-similar crochet), a torus, a symmetries sampler, algebraic socks, Fortunatus's purse, a pillow of braid equivalence, a Holbeinian graph (graph theory of Blackwork embroidery) and (last but not least) hyperbolic pants! I plan to make them all, but I think the publisher is lucky in my streak of craft-based curiosity. Perhaps the real market for this book is a particular moment in education when the application of maths to real world problems can become a fascination.

When I read that it grew out of the American Mathematical Society Special Session in *Mathematics and Mathematics Education in Fiber Arts* held in 2005 in Atlanta, Georgia, the structure and content of the book seem a natural and inevitable consequence of their purposes. It was still hard to decide who amongst my friends might have liked it as a Christmas present.

Alison Cross,
University of Greenwich
and practising artist

Collaborative Learning in Mathematics: a challenge to our beliefs and practices by Malcolm Swan, National Institute of Adult Continuing Education, paperback £24.95 978, ISBN 981 1 86201 311 7, hardback £44.95, ISBN 978 1 86201 316 2.

Some years ago I attended a session on mathematics education at a British Mathematical Colloquium. One of the questions put to the panel came from a PhD student, who said that she was hoping subsequently to become an academic in a university maths department, and asked how she could get training in teaching while working on her PhD. As I recall, the chair's response was something like "Why would someone who wanted to become an academic be interested in teaching?"



Well, of course university mathematicians are interested in teaching (and the advent of the National Student Survey can only increase that interest). But much of the educational literature is generic and mathematics seems to be different from other subjects. This provocative new book by a specialist in mathematics education examines how one learns mathematics, showing (through illustrative examples, including video clips on the accompanying CD-ROM) how mathematical pedagogy can be learner-centred rather than teacher-centred, and emphasising the value of collaborative discussion. Its focus is at GCSE level, but there is much that is worth considering at all levels. Swan discusses research about teachers' and learners' attitudes to mathematics: when I took some of the questionnaires he discusses into an undergraduate class, the result was the liveliest and most productive discussion I've ever experienced with mathematics students, as they argued about how they learn mathematics and how the different approaches they had experienced had helped their learning.

This very readable book has led me to appraise and question how I teach, and I feel that I and my students have benefited considerably as a result. I cannot recommend this book too highly.

Tony Mann
University of Greenwich

AIRY

Regarding the 'Mathoesis' letter (January *Newsletter*) which ends with the Shakespeare, there is a story that in 1826 George Biddell Airy was appointed Lucasian Professor at Cambridge, and in 1828, Plumian Professor, with the charge of the new University Observatory. Prior to his election he had definitely told the electors that the salary proposed was not sufficient for him to undertake the responsibility of the Observatory. He followed this up by a formal application for an increase, which created not a little commotion at the time, the action being so unprecedented; and after a delay of a little over a year he obtained what he had asked for. The delay gave rise, however, to the remark of a local wit, that the University had given '*to Airy, nothing, a local habitation and a name.*'
(http://atschool.eduweb.co.uk/bookman/library/ROG/ROG04.HTM)

Tony Mann
University of Greenwich

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/newsletter/calendar.html).

FEBRUARY 2008

6 The Maths of Complex Systems, Bath (366)
6 A Millennium of Mathematical Puzzles, Gresham College Lectures, London (362)
8 LMS Mary Cartwright Lecture, Oxford (367)
15 Geometric and Analytic Methods in Group Theory Meeting, Southampton (367)
15 Edinburgh Mathematical Society Anniversary Meeting, Edinburgh (363)
15 Open Day, King's College London (367)
27 From Hilbert's Problems to the Future, Gresham College Lectures, London (362)

MARCH 2008

9-12 Mathematics and its Applications in Information Technology, Lahore, Pakistan (362)
13 Karl Gruenberg Memorial Meeting, Queen Mary, University of London (367)
14 Edinburgh Mathematical Society Meeting, Dundee (363)
17-19 Mathematical Neuroscience, Royal Society, Edinburgh (367)
25-28 BMC, York (367)
25-28 Markov-Chain Monte Carlo Methods INI Workshop, Cambridge (363)
31 LMS Northern Regional Meeting, Manchester (367)
31-4 Apr BAMC, Manchester (367)
31-4 Apr High Dimensional Statistics in Biology INI Workshop, Cambridge (363)
31-4 Apr New Scaling Limits and Other Recent Developments in Probability Conference, Warwick University (364)

APRIL 2008

4 Understanding Cellular Calcium Signals Workshop, Nottingham (367)
7-11 LMS Invited Lectures, A. Okounkov, Imperial College London (367)
7-11 Combinatorial Identities and Their Applications in Statistical Mechanics, INI Workshop, Cambridge (364)
25 Women in Mathematics Day, London (367)
25 Edinburgh Mathematical Society Meeting, Aberdeen (363)

MAY 2008

1 Cancer can give you Maths!, LMS–Gresham College Lecture, London (364)
4 400 Years of Geometry, Gresham College Lecture, London (362)
23 Edinburgh Mathematical Society Meeting, St Andrews (363)

JUNE 2008

9 LMS Midlands Regional Meeting, Birmingham
23-27 Geometric Analysis, Elasticity and PDEs Workshop, Heriot-Watt University (367)
23-27 Future Directions in High-Dimensional Data Analysis, INI Workshop, Cambridge (366)
30 – 4 Jul European Consortium for Mathematics in Industry, University College London (364)

JULY 2008

4 LMS Meeting, London
10-11 Legacy of John Crank Conference, Brunel University (366)
6-13 ICME 11, Monterrey, Mexico (362)
7-11 New Horizons in Toric Topology Conference, Manchester (367)
13 EWM/EMS Workshop, Amsterdam, The Netherlands (366)
14-18 Fifth European Congress of Mathematics, Amsterdam, The Netherlands (362)
14-25 Anderson Localization Transition Introductory Training Course, INI, Cambridge (364)
14-19 Dec Mathematics and Physics of Anderson Localization: 50 Years After, INI, Cambridge (352)
15-19 Bachelier Finance Society Fifth World Congress, London (365)
21-25 Algebraic Structures in Geometry and Physics Workshop, Leicester (367)

SEPTEMBER 2008

14-18 EUROMECH Fluid Mechanics Conference, Manchester (362)
14-19 Phenomena in High Dimensions Workshop, Lancaster University (364)
15 LMS SW & South Wales Regional Meeting, Swansea

NOVEMBER 2008

21 LMS AGM, London

DECEMBER 2008

12-13 Joint Meeting with the Edinburgh Mathematical Society, Edinburgh

APRIL 2009

6-9 BMC, Galway

AUGUST 2010

19-27 International Congress of Mathematicians 2010, Hyderabad, India (365)

On the back cover:

G. H. DARWIN

Sir George Howard Darwin, KCB, LLD Glasgow, FRS, FRAS, FCPS, MA Cambridge, Dr Nat Phil Padua, PhD Göttingen, DMath Christiana, Hon MRIA, Foreign Associate in Mechanics of the Reale Accademia dei Lincei, Hon DSc Dublin, Oxford, Cape of Good Hope and Philadelphia.

Foreign Hon Member of the American Academy of Arts and Sciences, the New York Academy of Science, the Akademie der Wissenschaften, Göttingen, the National Academy of Washington, and the Royal Society of Belgium.

Fellow of Trinity College, Cambridge; Plumian Professor of Astronomy and Experimental Philosophy in the University of Cambridge.

Royal Medallist of the Royal Society 1884, Copley Medallist 1911, Medallist RAS, Telford Medallist Institute of Civil Engineers.

Sir George Howard Darwin (1845–1912), English astronomer, was born at Down, Kent, on 9 July 1845. The second son of Charles Darwin, he was second wrangler and Smith's prizeman at Cambridge, and was elected to the professorship of astronomy and experimental philosophy at his university in 1883. His principal work was on the subject of tides, on which he became the leading authority, and on other physical questions connected with the relation of the earth and moon; the article *Tide* in the *Earth Bulletin* represented his matured researches on his special subject. He was made KCB in 1905 and died at Cambridge on 7 December 1912.

G. H. DARWIN

LMS member 1868–1912

Sir George Howard Darwin

(*biography on the inside cover*)

Hills & Saunders, Cambridge & Oxford