THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 359 May 2007

Forthcoming Society Meetings

2007

Wednesday 30 May
South West and South Wales Regional Meeting, Cardiff
M. Aizenman
T. Sunada
[*page 3*]

Friday 22 June
London
A. Macintyre
H. Woodin
[*page 15*]

Wednesday 24 October
Northern Regional Meeting, Sheffield
L. Breen
A. Cattaneo

Friday 23 November
AGM, London
M. Struwe
J.F. Toland
Presidential Address

2008

Friday 8 February
Mary Cartwright Lecture

COUNCIL DIARY

16 March 2007

The March Council meeting was a rather lengthy affair, with many important matters under discussion, of strategic significance for both the Society and the wider mathematics community. Many of these items would merit a full *Newsletter* article themselves, so instead the Diarist presents a personal précis of key areas of interest to members.

A large part of the Council meeting was devoted to two of the major activities of the Society, both in terms of amounts of money and their value to the mathematical community, namely grant-giving and publishing. Council is acutely aware of how these two components of the Society's work are intertwined, since surpluses from publishing form the vast majority of the income of the Society and past surpluses the bulk of the Society's capital. The Programme Secretary reported a very large increase in the number of high quality Scheme 1 (conference support) grant applications. Accordingly, as the Programme Committee has a finite budget, it had been forced to cut the level of support for each successful application. Council agreed that a contingency fund be made available to the Programme Committee, to try and avoid too great a decline in the success rate for the remainder of the financial year, if demand continues. Council is pleased that its grant schemes are so valued by the community, but recognizes the difficult decisions that have to be made in dealing with a fixed yearly budget and unpredictable demand.

The world of academic scientific publishing is rapidly changing. Success in publishing (both in terms of financial success and the quality of its publishing output) is a priority for the Society. Council agreed that the price increases of its journals should be modest and at most in line with inflation, as its aim is to serve the mathematical community. The Publisher updated Council on a recent conference in Brussels dealing with developments in Open Access publishing, which is gathering some momentum. Council discussed the 'Brussels Declaration' arising out of this conference, one important aspect of which is that a 'one size fits all' model is not appropriate. This is a topic which is bound to come up again at future Council meetings.

There were also important matters relevant to mathematics education. First, Council was brought up to date with proposals for the new GCSEs in

mathematics, which attracted much press attention in February (see also the March *Newsletter*). Council will be keeping an eye on these matters as there is a danger of the whole 'tower' of mathematics qualifications collapsing if the foundations are not secure. Council also discussed the latest news on bringing UK degrees into line with the Bologna Process. A key issue at present is funding for the second (Masters) cycle qualifications, particularly in England. Council was reminded of the need to have in mind the whole of the UK and not just England. To quote the President-Designate, 'Scotland is frequently forgotten, but Wales is ALWAYS forgotten' (the Diarist would add Northern Ireland as well). In particular, the Scottish system seems to fit more easily into the Bologna framework than English qualifications.

Elizabeth Winstanley

NON-PRINTED NEWSLETTER

Members now have the option to receive rather a pdf or web version of the LMS *Newsletter*. Please email Susan Oakes (oakes@lms.ac.uk) if you would prefer this method. The pdf will be live only for the current month and you will be forewarned of its size. For instance, for this issue the web version is at www.lms.ac.uk/newsletter/359/359main.html and the pdf at www.lms.ac.uk/newsletter/current_issue.pdf.

You can revert back to the printed version at any stage and some mailings will be required for statutory reasons. If you are already receiving the non-printed version there is no need to respond to this article.

GENERAL MEETING

There will be a General Meeting of the Society at 3.30 pm on Friday 22 June 2007, to be held at University College London (see page 15). The business shall be:

(i) the appointment of Scrutineers;
(ii) announcement of Council's recommendation for Honorary Membership;
(iii) announcement of Prize winners for 2007.

I hope that as many members as possible will be able to attend.

Peter Cooper
Executive Secretary

LMS Newsletter

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LONDON MATHEMATICAL SOCIETY

SOUTH WEST & SOUTH WALES REGIONAL MEETING

Faculty Lecture Theatre (Room T209), Trevithick Building, Cardiff University

Wednesday 30 May 2007

3.00 pm **LMS business meeting**

Michael Aizenman (Princeton)
The curious effects of disorder on spectra of random operators

4.15 pm **Tea**

5.00 pm **Toshi Sunada** (Meija University, Japan)
Perturbation techniques in discrete geometric analysis

There will be a reception and dinner afterwards. For registration, further details and to reserve a place at the dinner see the webpage www.cs.cf.ac.uk/newton/newton2.html or contact Ms M. Mills (MillsME@cardiff.ac.uk).

The meeting will take place during a workshop from 29 May – 1 June on *Analysis on Graphs and its Applications*. The workshop will be devoted to the problems arising at the interfaces of number theory, combinatorics, discrete groups, random walk theory, fractal theory, as well as mathematical physics and spectral geometry. Particular areas addressed will include spectral theory on graphs, amenability of discrete groups, zeta-functions on graphs, and analysis on fractals.

There are funds available to contribute to the expenses of members of the LMS or research students to attend the meeting and workshop. Requests for support can be expressed on the on-line registration form. For information on scientific questions contact T. Sunada (sunada@math.meiji.ac.jp) or P. Kuchment (kuchment@math.tamu.edu) or for information on organisational matters contact M. Marletta (MarlettaM@cardiff.ac.uk).

PROGRAMME COMMITTEE

Change of deadline for Schemes 1-5 and pressures on Scheme 1

1. Please would all applicants to Schemes 1 to 5 note that the deadline for applications to be considered at the June meeting of Programme Committee has been brought forward to **24 May**, a week earlier than previously advertised.
2. Programme Committee at its last meeting saw a huge and unprecedented flood of applications for Scheme 1 grants. The Committee is doing its best to respond and Council has made additional funds available to compensate in part, but applicants for Scheme 1 should be aware that the success rate in Scheme 1 has dropped significantly and may drop further.

S.A. Huggett
Programme Secretary

LMS AND IMA DISCUSSIONS

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 NSI 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.

ABEL PRIZE 2007

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2007 to Srinivasa S.R. Varadhan, Courant Institute of Mathematical Sciences, New York, for his fundamental contributions to probability theory and in particular for creating a unified theory of large deviations.

Srinivasa S.R. Varadhan was born 2 January 1940 in Madras (Chennai), India. He received his BSc honours degree in 1959 and his MA the following year, both from Madras University. In 1963 he received his PhD from the Indian Statistical Institute. He is currently Professor of Mathematics and Frank J. Gould Professor of Science at the Courant Institute. The Abel Prize will be presented to Srinivasa S.R. Varadhan by HM King Harald at the award ceremony in Oslo on 22 May.

The Abel Prize is an international prize for outstanding scientific work in the field of mathematics. The prize is meant to recognize contributions of extraordinary depth and influence to the mathematical sciences. The Abel Prize is awarded annually by the Norwegian Academy of Science and Letters. The prize amount is NOK6,000,000 or close to US$1,000,000. For more information about the Abel Laureate visit the website: www.abelprisen.no/en/prisvinnere/2007.

ROYAL SOCIETY OF EDINBURGH

The following mathematicians have been elected fellows of the Royal Society of Edinburgh:

- Stephen T. Buckland (Professor of Statistics and Co-Director of the National Centre for Statistical Ecology, University of St Andrews)
- Sergey Foss (Professor of Applied Probability, Heriot-Watt University)
- Jane Hillston (Professor of Quantitative Modelling; EPSRC Advanced Research Fellow, University of Edinburgh)
- Michael Weiss (Chair in Mathematical Sciences, University of Aberdeen)

Nicolai V. Krylov (Samuel G. Ordway Professor of Mathematics, University of Minnesota, USA) has been elected a Corresponding Fellow.

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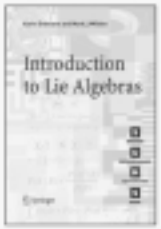
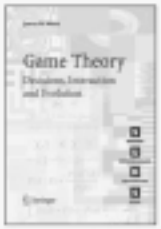


Introduction to Lie Algebras
K. Erdmann, M. J. Wildon, University of Oxford, UK
This book provides an elementary introduction to Lie algebras based on a lecture course given to fourth-year undergraduates. The only prerequisite is some linear algebra and an appendix summarizes the main facts that are needed. The treatment is kept as simple as possible with no attempt at full generality.
2006. X, 251 p. 36 illus. (Springer Undergraduate Mathematics Series) Softcover
ISBN 978-1-84628-040-5 ► € 34,95 | £19.95

Worlds Out of Nothing
A Course in the History of Geometry in the 19th Century
J. Gray, The Open University, Buckinghamshire, UK
Based on the latest historical research, this is the first book to provide a course on the history of geometry in the 19th century. The book is a comprehensive resource with full background material and selections and translations from original sources.
2007. XXIII, 376 p. (Springer Undergraduate Mathematics Series) Softcover
ISBN 978-1-84628-632-2 ► € 32,95 | £19.95



Game Theory
Decisions, Interaction and Evolution
J. N. Webb, Nottingham, UK
This book offers an informal introduction to game theory intended as a first course for undergraduate students of mathematics. Uniquely, it covers optimal decisions, classical games and evolutionary game theory in one volume.
2007. IX, 241 p. (Springer Undergraduate Mathematics Series) Softcover
ISBN 978-1-84628-423-6 ► € 32,95 | £19.95

Metric Spaces
M. Ó Searcóid, University College Dublin, Ireland
From the reviews ► *This book is truly about metric spaces. ... The book is packed full of material which does not often appear in comparable books. ... this is a great book and suitable ... for third-and fourth-year under-graduates and beginning graduate students* ► Marion Cohen, MathDL, January, 2007
2007. XIX, 304 p. (Springer Undergraduate Mathematics Series) Softcover
ISBN 978-1-84628-369-7 ► € 32,95 | £19.95

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CATHERINE RICHARDS PRIZE

The Institute of Mathematics and its Applications has awarded the Catherine Richards Prize for 2006 to Dame Kathleen Ollerenshaw for her article *Constructing pandiagonal magic squares of arbitrarily large size* which was published in the February and April issues of *Mathematics Today*. The Catherine Richards Prize of £250.00 is awarded annually for the best item published in *Mathematics Today* in the preceding year.

ROLLO DAVIDSON TRUST

The Trustees of the Rollo Davidson Trust award an annual prize for young probabilists. The prize winner for 2007 is Remco van der Hofstad (Eindhoven University of Technology) for his work in probability and statistical mechanics.

The Trust was founded in 1975 in memory of Rollo Davidson, an accomplished mathematician of remarkable potential, and Fellow-elect of Churchill College, Cambridge, who died on the Piz Bernina in 1970. Initial funding from the Trust came from the royalties of two collections of papers published in 1973/74 by friends and colleagues of Rollo. The Trust has benefited from the continuing association with the Davidson family. Further details of the Rollo Davidson Trust can be found at www.statslab.cam.ac.uk/Rollo/index.html.

DR ANTHONY CHRISTOFIDES

Dr Anthony (Tony) Christofides, who was elected a member of the London Mathematical Society on 21 October 1977, died on 19 January 2007. He was an esteemed and long-serving member of the Department of Mathematics in University College Galway (now National University of Ireland, Galway). He was born in Istanbul on 24 September 1937, grew up and received his education at the Hellenic Community School in Alexandria. Moving to the UK around 1955 he took his A-Levels and enrolled in the University of London, from which he graduated in 1960. Under the supervision of Dr D.E. Cohen he was awarded a PhD from that university in 1966 with a thesis entitled *Structure and Presentations of Unimodular Groups*. In 1964 he joined the staff of the Department of Mathematics in University College, Dublin, before coming to UCG in 1965 to replace Professor Sean Tobin who was on sabbatical leave from 1965/66. In 1968 Tony was appointed as a Statutory Lecturer in Mathematics at the Department in UCG and worked in the department until his retirement in September 2003. Then as now in UCG, first-year lectures in Mathematics are also provided in Irish and, being a very talented linguist, Tony (who in the early 1960's had immersed himself in Irish culture) gave these lectures for many years. Indeed he continued to give these lectures in Irish after his official retirement until the recent illness prevented him from so doing in 2006-7. Tony had interests in Algebraic Number Theory, Field Theory and Group Theory.

James Ward
National University of Ireland, Galway

SIR GARETH ROBERTS

A Celebration of the Life and Work of Sir Gareth Roberts will be held at Wolfson College, Oxford on Saturday 2 June, commencing at 4.00 pm (provisional time). Sir Gareth who died on 6 February 2007 had been President of the Science Council and was Chairman of the Engineering & Technology Board. For further information contact Sue Hales, Wolfson College (tel: 01865 274102; email sue.hales@wolfson.oxford.ac.uk).

HISTORY OF MATHEMATICS SERIES

New FROM THE AMS

The Volterra Chronicles
The Life and Times of an Extraordinary Mathematician 1860–1940
Judith R. Goodstein, *California Institute of Technology, Pasadena, CA*
The tumultuous life and extraordinary contributions of Italian mathematician and scientist Vito Volterra are chronicled in this richly illustrated book, the first full-scale biography available. The text chronicles Volterra's meteoric rise as a leader in Italy's modern scientific renaissance and his tragic fall under the rule of Benito Mussolini. Based partly on unpublished family letters, the book explores the family dynamics and historical influences that shaped this pioneering mathematician.

History of Mathematics, Volume 31; 2007; approximately 315 pages; Hardcover; ISBN: 978-0-8218-3969-0; List US$59; All AMS members US$47; Order code HMATH/31

Co-published with the London Mathematical Society beginning with Volume 4. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

A CO-PUBLISHING PARTNERSHIP

Also Available ...

COMING SOON
1001 Problems in Classical Number Theory
Jean-Marie De Koninck, *Université Laval, Québec, QC, Canada*, and Armel Mercier, *Université du Québec à Chicoutimi, QC, Canada*
2007; approximately 340 pages; Hardcover; ISBN: 978-0-8218-4224-9; List US$49; All AMS members US$39; Order code PINT

Probability Theory in Finance
A Mathematical Guide to the Black-Scholes Formula
Seán Dineen, *University College Dublin, Ireland*
Graduate Studies in Mathematics, Volume 70; 2005; 294 pages; Hardcover; ISBN: 978-0-8218-3951-5; List US$55; All AMS members US$44; Order code GSM/70

A History of Analysis
Hans Niels Jahnke, *University of Essen, Germany*, Editor
History of Mathematics, Volume 24; 2003; 422 pages; Hardcover; ISBN: 978-0-8218-2623-2; List US$89; All AMS members US$71; Order code HMATH/24
Co-published with the London Mathematical Society beginning with Volume 4. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity Commissioners.

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LMS RESEARCH MEETING COMMITTEE

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 84 symposia to date, in a wide range of mathematical disciplines. In 2007 there will be two Durham Symposia, both supported by EPSRC.

- *Recent Developments in Random Walks*, 2-12 July (organisers: B. Hambly, L. Saloff-Coste and P. Tarrès).
- *Twistors, Strings and Scattering Amplitudes*, 19-25 August (organisers: P. Candelas, X. de la Ossa, L. Mason and Z. Bern).

More information on the first symposium may be obtained from Ben Hambly (hambly@maths.ox.ac.uk) and on the second one from Lionel Mason (lmason@maths.ox.ac.uk).

The symposia in 2005 and 2006 were as follows.

2006

- Dynamical Systems and Statistical Mechanics (C. Beck, C. Dettmann and M. Pollicott)
- Methods of Integrable Systems in Geometry (F. Burstall, S. Dorfmeister, M. Guest, F. Pedit)

2005

- Conformal Field Theory and String Theory (P. Bowcock, P. Dorey, K. Wendland)
- Operator Theory and Spectral Analysis (B. Davies, Y. Safarov, E. Shargorodsky)

The Durham website (www.maths.dur.ac.uk/events/Meetings/LMS/) contains information on all previous and forthcoming symposia including, in many cases, a list of participants, abstracts of talks, a symposium photograph (the earliest surviving photograph is from 1976), lecture notes and, for more recent symposia, videos of the talks.

The LMS Research Meetings Committee welcomes ideas for symposia for 2009 and later, from potential organisers and others, who should contact the Chairman of the Committee, Professor A.J. Scholl (scholl@lms.ac.uk). Detailed proposals are made at least two years ahead. For each symposium an application is made to EPSRC for a substantial research grant, including full economic costs of the organisers, 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/rmc).

As well as the successful series of Durham Research Symposia the Research Meetings Committee supports research workshops. These may be held anywhere in the UK, and are an opportunity for a small group of active researchers to work together for a concentrated period on a specialised topic. Possible aims could include:

- to understand an important new piece of mathematics in an area where the participants hope to make further progress;
- to make progress on a particular problem;
- to combine expertise to shed new light on a specific area

There is no prescribed format for an LMS workshop, but it is expected that the number of participants will be usually no more than 40, and could be as low as 10, meeting for a period of a week or more. All participants should be actively involved in the programme, and should be identified in the proposal; the participation of appropriate postdocs and graduate students is encouraged. Applications to support development of research in an area not ready for a larger-scale application (either to LMS or EPSRC) are welcomed. All proposals are refereed, and the Committee will only offer support if it believes that the benefits to UK mathematics are likely to be significant.

Requests for support (for travel and subsistence of participants, and reasonable associated costs) in the range £4k–£15k will be considered by the Committee. Applications for partial support for larger events will only exceptionally be supported. The primary purpose of the scheme is to support new research initiatives, and the Committee may take this into account in considering support for meetings which form part of an established series. Grant requests for conferences should be made to the Society's Programme Committee instead, which has funds for this purpose.

Applications should be sent by email to adminoff@lms.ac.uk; there is no application form. Proposals should contain a description of the research area, the aims and format of the workshop, a list of participants and a budget, as well as details of proposed location and timing. Applicants are advised to consult the Research Meetings Committee Chair, Professor A.J. Scholl (scholl@lms.ac.uk), informally about their proposed programme and timescale before making an application.

ENGAGING MATHS

Display Material Available

Banners and brochures produced to accompany the *Engaging Maths* showcase event held at a Terrace Reception in the Houses of Parliament are now available to borrow from De Morgan House.

As described in the EPSRC News section of the LMS *Newsletter* issue 356, and in the Mathematics Policy Roundup in issue 357, *Engaging Maths* was held jointly by the CMS and EPSRC to inform MPs and policy makers of the importance and pervasive nature of the mathematical sciences.

Nine banners were produced for the occasion, each highlighting an application of recent mathematics research. The accompanying brochures describe case studies covering examples of mathematics in security, telecommunications and the internet, the environment, finance and economics, industry, transport and travel, and in medicine and biology. An electronic version of the brochure is available to view at www.epsrc.ac.uk/publications/other/engagingmaths.htm.

The CMS and EPSRC would be delighted to see these materials reused at other events around the country. If you are interested in using the banners or brochures at an event you are holding please contact Caroline Davis (caroline.davis@lms.ac.uk) for further information.

MATHEMATICS POLICY ROUNDUP

Chancellor Gordon Brown's budget brought welcome news for research, promising that the science budget would rise by another 2.5% annually until 2010 and allaying fears that Research Councils might not have access to 'End of Year Flexibility' – an important budgeting mechanism for carrying forward unspent money into the next financial year. The availability of EYF had been threatened in addition to the £68 million cuts announced by the Department for Trade and Industry in February; the Engineering and Physical Sciences Research Council must still meet its £29 million share of this by making cuts in the current year. In response, Professor Peter Giblin, wrote as chair of the Heads of Departments of Mathematical Sciences to the Treasury, the Department for Trade and Industry and the chair of the EPSRC, expressing serious concerns that the 'ring-fence' around the science budget had been broken. John Kingman, managing director of public services and growth at the Treasury, replied promptly to HoDoMS but offered little comfort apart from pointing out that "the DTI's decision … was not taken lightly".

More maths grads went live this month, with a major national launch on 23 April at Queen Mary, University of London. Around 150 people attended the launch, from politicians and members of the press to school teachers, university staff and representatives from industry. Speakers included Sir Peter Williams, founder of Oxford Instruments and chair of the Advisory Committee on Mathematics Education, and Kate Bellingham,

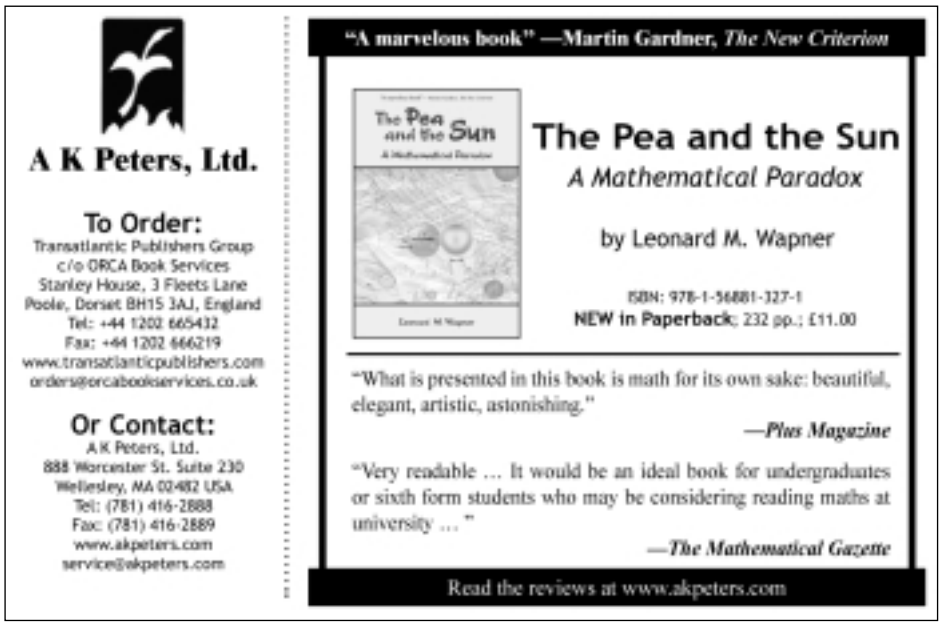
cont'd

former presenter of Tomorrow's World and now trainee mathematics teacher. The three partner universities (Leeds, Coventry and QMUL) are now in the process of recruiting local staff.

The first performances of a new play *A Disappearing Number* which chronicles the collaboration between G.H. Hardy and his Indian protégé Srinivasa Ramanujan was hailed a success. The production was conceived and directed by Simon McBurney, founder of the experimental theatre group Complicité. He came to the LMS Annual General Meeting last year to begin his research into the world of mathematics and went on to spend many hours poring over papers and books in the LMS archives which were relevant to the Society's 1926 president. The play is billed as 'A show that explores the beauty of mathematics and the complexities of modern India, meditating on the nature of imagination, journey and identity.' The production began its tour in Plymouth and then tours extensively, finally in September to London (the Barbican) before going onto Germany, Austria and Holland. More details at www.complicite.org/productions. There is also to be a film about Ramanujan, directed by British director Stephen Fry and India's Dev Benegal (www.ramanujanthefilm.com/).

April was a month of conferences. The Heads of Departments of Mathematical Sciences met in Birmingham; the British Mathematical Colloquium took place in Swansea; the British Applied Mathematics Colloquium was held in Bristol; the Mathematical Association's annual meeting was in Keele whilst the Association of Teachers of Mathematics' Easter conference was in Loughborough. *Mathematics 2007*, the Institute of Mathematics and its Applications' one-day conference on 'topical issues', was held at De Morgan House.

Caroline Davis
Mathematics Policy and Promotion Officer



VISIT OF DR LUDA MARKUS-EPSTEIN

Dr Luda Markus-Epstein (Technion University, Haifa) will be visiting the UK from 12-26 May.

Her work develops algorithms addressing decision problems in group theory, using techniques from topology and the theory of semigroups and automata. She will speak at the:

- Maximals Algebra Seminar (run jointly by Edinburgh and Heriot-Watt Universities) on Tuesday 15 May
- Newcastle Geometry and Algebra Seminar on Thursday 17 May
- Manchester Algebra Seminar on Tuesday 22 May

Details of Dr Markus-Epstein's visit can be found on the seminar web pages or obtained from Sarah Rees (Sarah.Rees@newcastle.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR NIKITA RATANOV

Professor Nikita Ratanov (Rosario University, Bogotá, Colombia) will be visiting the UK from 2-18 June. He is well known for his work on statistical solutions of PDEs and applications of probabilistic models in bio-logy, mathematical physics, and finance. Professor Ratanov will give lectures on *branching random motions*, *nonlinear hyperbolic systems*, and *travelling waves* as follows:

- 8 June, Department of Statistics, University of Leeds
- 11 June, Department of Mathematics, Heriot-Watt University
- 13 June, Mathematics Institute, University of Warwick

Short trips to the University of Cambridge and the University of Wales, Swansea may also be possible during the visit. For more information contact Dr Leonid Bogachev (bogachev@maths.leeds.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR ALEXANDER RYBKO

Professor Alexander Rybko (Institute for Information Transmission Problems, Russian Academy of Sciences, Moscow) is a well-known specialist in various directions of applied probability including stochastic networks and stochastic mechanics. He will visit Edinburgh (Heriot-Watt and University of Edinburgh) and London (Queen Mary) from 24 June to 8 July. For further information contact Professor S. Foss (foss@ma.hw.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF DR ONDREJ ZINDULKA

Dr Ondrej Zindulka (Czech Technical University) will be visiting the UK from 21 May to 1 June. He is an expert in topological measure theory and Hausdorff measures. During his visit, he will give seminars at the Open University, University of Glasgow and University of St Andrews.

For more detailed information contact Dr Toby O'Neil, Department of Mathematics, Open University (t.c.oneil@open.ac.uk). This visit is supported by an LMS Scheme 2 grant.

CONFORMAL FIELD THEORY AND TOPOLOGY

The Maxwell Institute *Colloquium on Conformal Field Theory and Topology* will be held on Wednesday 23 May from 10 am – 5 pm at the ICMS, 14 India Street, Edinburgh. The speakers are:

- Dan Freed (Texas)
- Vassily Gorbounov (Aberdeen)
- Stephan Stolz (Notre Dame)
- Peter Teichner (Berkeley)

The colloquium is organized by Andrew Ranicki, Richard Szabo and Constantin Teleman. Please email a.ranicki@ed.ac.uk if you intend to attend as space is limited.

SHAPING THE FUTURE OF NONLINEAR PDEs IN THE UK

EPSRC has recently invested significant resources in nonlinear PDEs in the UK by making two *Science and Innovation* awards in this area. These, to be held in the University of Oxford and in the Maxwell Institute, Edinburgh (comprising the mathematics departments of Edinburgh and Heriot–Watt universities), are designed to enhance the position of nonlinear PDEs throughout the UK. In addition to new posts in the three institutions, there will be a large programme of activities to benefit the entire UK nonlinear PDE community. Included in this programme are international conferences, workshops, instructional conferences/summer schools, activity groups/networks, and visitor programmes.

The directorships of the two centres – the Centre for Analysis and Nonlinear PDE in the Maxwell Institute and the Centre in the Analysis of Nonlinear PDEs in Oxford – are now interested in ideas, suggestions and proposals from the UK PDE community for specific activities that could be undertaken by one of the two centres, or jointly, under the aegis of these programmes. It should be noted that there will be every opportunity for activities to take place outside Oxford and Edinburgh.

At this time, the directors would like to invite views from groups and/or individuals on ways in which these two new centres can best help energize and be responsive to the UK nonlinear PDE community. Specifically they invite expressions of interest, ideas and suggestions under the following four headings:

- international conferences
- workshops
- instructional conferences/summer schools
- activity groups/networks
- visitor programmes

The directors are not at this stage asking for full proposals. Contributions received by **15 May** will be especially welcome. Please make such on at most two sides of A4, and send them to the directors by email (contact points below).

In order to involve and consult the UK PDE community as widely as possible, we shall be holding a UK Nonlinear PDEs Scoping Consultation Meeting open to all. This will take place on 29 May at De Morgan House, 57-58 Russell Square, London WC1B 4HS. The ideas and suggestions received prior to this meeting will help shape it, and the more concrete proposals for activities which will follow. The agenda of the meeting is included below.

Colleagues planning to attend the meeting should indicate their participation by email to Laura Darling (laura.darling@ed.ac.uk). For more information please contact one of the directors:

- John Ball (ball@maths.ox.ac.uk), Director, Centre in the Analysis of Nonlinear PDEs, Mathematical Institute, 24-29 St Giles', Oxford OX1 3LB.
- Tony Carbery (A.Carbery@ed.ac.uk) & Sergei Kuksin (S.B.Kuksin@ma.hw.ac.uk), Co-directors, Centre for Analysis and Nonlinear PDE, Maxwell Institute, Edinburgh.

Consultation Meeting

2.00: Coffee

2.30: Main Meeting

- Welcome by the directors of the two centres: J. Ball, A. Carbery, S. Kuksin, and the Meeting Chair, J. Toland.
- Background to the Science and Innovation Programme and presentations on the aims and objectives of the two centres:
  C. Batchelor (EPSRC);
  A. Carbery /S. Kuksin (Maxwell Institute);
  J. Ball (Oxford).
- Current position: summary of results of consultation exercise.
- Structured discussion based around the outcome of the consultation exercise:
  General comments;
  Topics and themes for activities such as conferences, workshops, instructional conferences/summer schools;
  Activity groups/networks;
  Visitor programmes.
- Summary and next steps.

4.00: Tea and Coffee

4.30: Lecture by Nikolai Nadirashvili (CNRS Marseille) *On Hessian Equations*

5.30: Drinks Reception

The financial and administrative support provided by the LMS is gratefully acknowledged.

COLLOQUIA IN COMBINATORICS IN HONOUR OF NORMAN BIGGS

There will be two linked one-day colloquia in combinatorics, honouring the contributions of Norman Biggs to the field, and more generally to mathematics in the UK. The first day will be held at Queen Mary, University of London, on Wednesday 16 May and the second will take place at the London School of Economics and Political Science on Thursday 17 May. Those interested are welcome to attend for all or any part of the event. Confirmed speakers include:

Queen Mary, University of London:

- Béla Bollobás (Cambridge)
- David Conlon (Cambridge)
- Jackie Daykin (Royal Holloway)
- Tony Gardiner (Birmingham)
- Anthony Hilton (Queen Mary)
- Svante Janson (Uppsala)
- Colin McDiarmid (Oxford)
- Robin Wilson (Open University)
- Douglas Woodall (Nottingham)

London School of Economics:

- Chris Godsil (Waterloo)
- Peter Rowlinson (Stirling)
- John Shawe-Taylor (UCL)
- Derek Smith (Swansea)
- Dominic Welsh (Oxford)
- and a special presentation by Norman Biggs (LSE)

The speakers for the LSE meeting, and many of those speaking at Queen Mary, have been associated with Norman in one form or other during the course of his career. Their research interests are varied, and we hope that the talks they give will be of wide interest to all those working in combinatorics or related fields. There will be a drinks reception following the final talk on Thursday 17 May.

Anyone interested is welcome to attend. Some funds may be available to contribute to the expenses of research students who wish to attend the meetings. Further details can be obtained from Graham Brightwell (g.brightwell@lse.ac.uk) and Robert Johnson (r.johnson@qmul.ac.uk), or from the web page (www.cdam.lse.ac.uk/biggsfest.html). Support for this event by the London Mathematical Society and the British Combinatorial Society is gratefully acknowledged.

PhD ASSISTANTSHIP IN MATHEMATICS

The Department of Mathematics at the National University of Ireland Maynooth will offer an assistantship to a new entrant PhD student commencing in September 2007.

The award will be approximately €37,500, comprising of €8,000 per year plus (EU) fees for a duration of three years. The recipient will be expected to undertake some work for the Department.

All PhD applications received before **31 May** will be considered for this award. Email admin@maths.nuim.ie or visit www.maths.nuim.ie for more information.

LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2007

Institute of Education, London University – Thursday 12 July
University of Birmingham – Tuesday 18 September

Dr Hinke Osinga

Chaos and Crochet

'Maths predicts things – so why is the weather forecast often wrong? The intricacies of chaos theory can be explained with a surface that you can make by crochet.'

Dr Stephen Huggett

Knots

'The mathematical theory of knots is a weird and wonderful world. It is easy to enter, but surprisingly difficult to answer some of its most obvious questions!'

LONDON Commences at 7.00pm, refreshments at 8.00pm, ends at 9.30pm. Admission is free, with ticket. Apply by **4 July** to Lee-Anne Parker, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (email: parker@lms.ac.uk). A stamped addressed envelope would be appreciated.

BIRMINGHAM Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00pm. Admission is free. Enquiries to Dr Simon Goodwin, School of Mathematics, University of Birmingham, Birmingham B15 2TT (email: goodwin@maths.bham.ac.uk).

The lectures are intended to be suitable for a general audience and no specific mathematical knowledge will be assumed. Although the talks are not primarily intended for professional mathematicians, everyone is welcome and some members may wish to apply for tickets for friends and relatives.

GEOMETRIC ANALYSIS

Spitalfields Day Report

A Spitalfields Day on *Geometric Analysis* was held on Monday 26 March 2007 at the Mathematics Institute of the University of Warwick, as the first day of a workshop on *Geometric flows and related topics* organised by Peter Topping (Warwick). Four excellent talks were delivered by leading mathematicians.

The morning began with a talk by Gerhard Huisken of Max-Planck's Albert Einstein Institute in Golm, who has been one of the pioneers of geometric flows over the past 25 years. He spoke about *Mean curvature type flows and isoperimetric inequalities* and the impact that this field is having on General Relativity.

Afterwards, Rick Schoen (Stanford) – a second major figure in the build-up of geometric analysis over the past 30 years – described *Recent progress on the high-dimensional Yamabe problem*.

The afternoon was devoted to Hamilton's Ricci flow programme for proving the Poincaré conjecture and, more generally, Thurston's geometrization conjecture.

Bruce Kleiner (Yale) who has been a leading figure in the effort to piece together a complete argument for this programme gave *An overview of Perelman's work on geometrization*. After tea, Bill Minicozzi (Johns Hopkins) described his work with Toby Colding (Courant/MIT) on *Width and finite extinction of Ricci flow* which uses the theory of harmonic maps and minimal surfaces to give a shortcut in the proof of the Poincaré conjecture.

The occasion was particularly poignant given the recent death of one of the founders of geometric flows, and long-time Warwick professor James Eells. After the talks, over a glass of wine, David Elworthy stood up and said a few words about Eells' colourful life.

Peter Topping
University of Warwick

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R. Schoen, G. Huisken, P. Topping, B. Kleiner, W.P. Minicozzi II

LONDON MATHEMATICAL SOCIETY

Friday 22 June 2007, University College London

3.30 pm **LMS business** (see page 2)
A. Macintyre (Queen Mary, London)
4.45 pm **Tea**
5.15 pm **H. Woodin** (Berkeley)

There are funds available to contribute in part to the expenses of members of the Society or research students to attend the 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).

A reception will be held at De Morgan House at 6:30, with a dinner afterwards. For further information contact Susan Oakes (oakes@lms.ac.uk).

COMBINATORICS OF ARC-TRANSITIVE GRAPHS AND PARTIAL ORDERS

There will be a two-day meeting at the University of Leeds from 2-3 August entitled *Combinatorics of Arc-Transitive Graphs and Partial Orders*. The following have agreed to speak, and there will also be some shorter invited talks given by research students.

- Robert Gray (University of Leeds)
  On connected-homogeneity in graphs and partial orders
- Manfred Droste (University of Leipzig)
  On homogeneous Chu spaces and graphs
- Simon Smith (Oxford University)
  The structure of locally finite highly arc-transitive digraphs
- Daniela Amato (The Queen's College, Oxford)
  Infinite primitive highly arc-transitive digraphs
- Cheryl Praeger (University of Western Australia, Perth)
  s-arc-transitivity and local s-arc-transitivity for graphs
- Norbert Seifter (Leoben)
  Reachability relations in transitive digraphs
- Rognvaldur G. Moller (University of Iceland)
  Dynamics of graph automorphisms and metric ends
- Nik Ruskuc (University of St Andrews)
  Endomorphism monoids of graphs and partial orders

There will be limited grants available to support attendance by UK-based research students. There is a registration fee of £24, for those who register by 30 June, and after that date the registration fee will be £30. Accommodation will be available in Lyddon Hall, on the university campus. Bed and breakfast costs £26 a night, and £36 for en-suite rooms. Cheques should be made payable to the University of Leeds. Contact J.K. Truss (pmtjkt@maths.leeds.ac.uk) if you are interested in attending. There is a web page at www.maths.leeds.ac.uk/~pmtjkt/meeting.html. The meeting is supported by the LMS.

POSTGRADUATE COMBINATORIAL CONFERENCE

The Postgraduate Combinatorial Conference (PCC) is an annual conference organised by, and for, current research students in all areas of combinatorics and discrete mathematics. It allows students to meet and talk about their research, and other PhD related issues. The 18th PCC will be held in St Andrews from 6-8 June. Most mathematical talks are contributed by the students themselves, apart from three talks by invited speakers:

- Carrie Rutherford (London SBU)
- Bruce Sagan (Michigan State University)
- Robin Wilson (Open University)

In addition, there will be two talks on 'post-PhD life': one on working as a postdoc, and one on what interviewers in the City expect from combinatorics PhDs. The conference is being supported by the London and Edinburgh Mathematical Societies as well as the British Combinatorial Committee. For more information visit the website www-circa.mcs.st-and.ac.uk/~pcc2007.

MAGNETIC FIELDS IN THE SUN AND STARS

To mark the 70th birthday of Nigel Weiss, there will be a one-day meeting on *Magnetic Fields in the Sun and Stars* at Centre for Mathematical Sciences, Cambridge on 22 June. The programme will consist of invited talks by some of Nigel's colleagues and former students. There will be a dinner in the evening in Trinity College. The meeting is partially supported by the LMS, and there are funds available for travel and subsistence for UK research students. Those interested in attending are invited to visit the website: www.damtp.cam.ac.uk/user/mrep/weiss07/weiss07.html where information about registration may be found.

MATHEMATICAL MODELS IN EVOLUTION AND ECOLOGY

Call for papers, posters and early registration

A conference on *Mathematical Models in Evolution and Ecology* will be held at the University of Sussex on 20-21 September. Confirmed keynote speakers are Chris Cannings, Sergey Gavrilets, Patsy Haccou, Yoh Iwasa, John McNamara and Karl Sigmund. It is now only five months to the conference and various deadlines are approaching. In particular the deadline for organising a special session is **17 May** and the deadline for paper/poster submission and early registration is **31 May**. Please register and submit your paper/poster as soon as you can. All information about the meeting appears on the conference website www.maths.sussex.ac.uk/MMEE2007. The meeting is supported by an LMS conference grant.

NEEDS 2007

NEEDS 2007, a new edition of the series of workshops on *Nonlinear Evolution Equations and Dynamical Systems*, will be held at Hotel Ametlla Mar, on the coast south of Barcelona, from 18-24 June. The meeting is concerned with integrable and chaotic dynamics, analytic/algebraic/geometric aspects of integrability, exact solutions and spectral problems in quantum mechanics, and nonlinear phenomena and their applications. A novel feature compared with previous NEEDS conferences is that the main part of the meeting is preceded by a mini-school for graduate students (16-17 June) with courses given by Alastair Rucklidge, Carles Simó, Paolo Santini and Steven Strogatz.

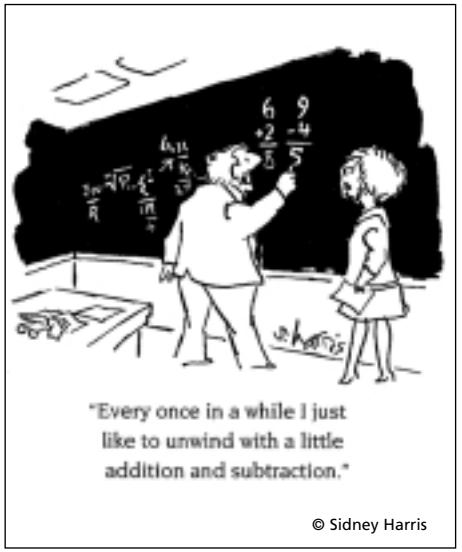
The deadline for registration is **4 May**. There are some funds available to support students and participants from developing countries. For more information contact Andy Hone (anwh@kent.ac.uk) or see the website www.needs-conferences.net/2007.

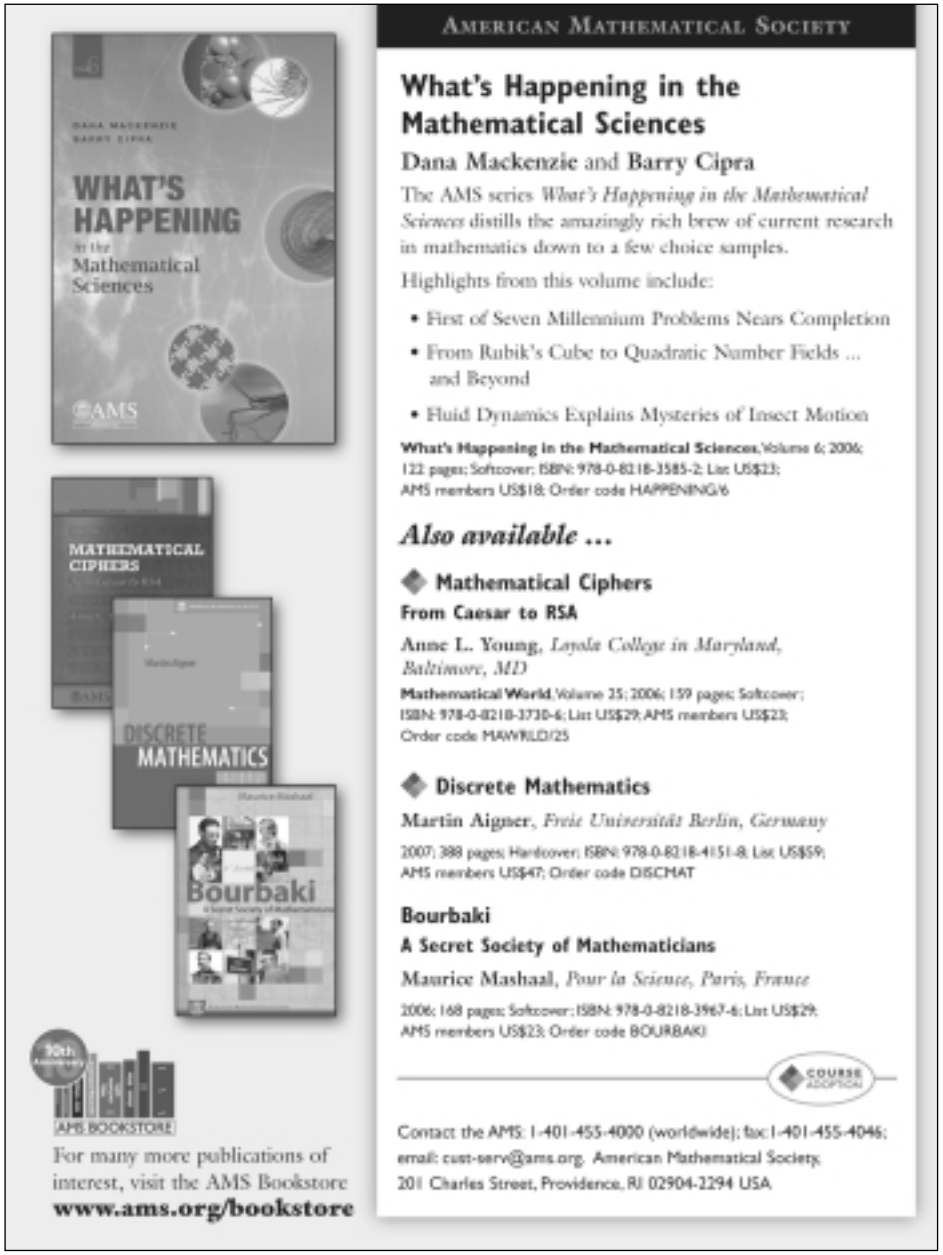
THE FIELDS INSTITUTE

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

- *Operator Algebras*
  1 September – 31 December 2007
- *New Trends in Harmonic Analysis*
  January–June 2008
- *Arithmetic Geometry, Hyperbolic Geometry and Related Topics*
  September–December 2008
- *Geometric Applications of Homotopy Theory*
  January–June 2007
- *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, please subscribe to the mailing list at www.fields.utoronto.ca/maillist.





EULER CONGRESS

The Russian Academy of Sciences, St Petersburg Scientific Center of RAS, St Petersburg Department of the V.A. Steklov Mathematical Institute, Euler International Mathematical Institute, St Petersburg State University, St Petersburg Mathematical Society and Euler Foundation are organizing a special congress on the occasion of the 300th anniversary of Leonhard Euler's birth. The Congress is supported by the Government of Russia and the local authority of St Petersburg.

The Congress will include the Euler Festival (10-12 June), and a series of satellite conferences (see below for a tentative list). The main event will comprise a celebration meeting on 10 June, and several invited talks related to Euler's tremendous scientific activity. The Congress will be held at the St Petersburg Department of the V.A. Steklov Mathematical Institute and the Euler International Mathematical Institute in St Petersburg, Russia.

The Local Organizing Committee: L.D. Faddeev (Chairman), Yu.D. Burago, V.A. Gritsenko, I.A. Ibragimov, S.V. Kislyakov, G.A. Leonov, Yu.V. Matiyasevich, G.A. Seregin, V.N. Tolstykh, E.A. Tropp, A.M. Vershik, S.V. Vostokov, P.G. Zograf.

Main Speakers

- J. Brüning (Humboldt University, Berlin)
- A. Connes (Collège de France, IHES)
- L. Faddeev (St Petersburg Department of Steklov Mathematical Institute)
- F. Hirzebruch (Max-Planck Institute for Mathematics, Bonn)
- V. Kozlov (Steklov Mathematical Institute, Moscow)
- L. Lovász (Eötvös Loránd University, Budapest)
- Yu. Manin (Max-Planck Institute for Mathematics, Bonn)
- S. Novikov (Steklov Mathematical Institute, Moscow)
- G. Wüstholz (ETH, Zürich)
- V. Zakharov (Landau Institute for Theoretical Physics, Moscow)

List of conferences

- L. Euler and modern combinatorics (A.M. Vershik, Yi Zhang) 1-7 June
- Euler equations and related topics (G.A. Seregin) 7-9 June
- **Euler Festival, 10-12 June**
- Arithmetic geometry (S.V. Vostokov), 13-19 June
- Geometry Meeting (Yu. D. Burago, Yu. Reshetnyak) 18-23 June
- Meeting in mathematical analysis (N.K. Nikolski, S.V. Kislyakov), 25-30 June
- Modular forms and moduli spaces (V. Gritsenko, D. Orlov, P. Zograf), 2-7 July
- Analytical methods of celestial mechanics (K. Kholshevnikov, N. Vassiliev) 8-12 July
- Theoretical and mathematical physics (D. Diakonov, A. Mirlin) 13-18 July
- Reliable methods for mathematical modeling (S. Repin) 24-27 July

Those interested in attending any of the events should register at www.pdmi.ras.ru/EIMI/2007/Euler300/app.html or email: euler300@imi.ras.ru.

GAME THEORY

SING3 is the third in the series of successful Spain-Italy-Netherlands Meetings on *Game Theory*, and the first one to be held in Spain. The first SING in this series took place in 2005 at Maastricht University (Netherlands) and the second one in 2006 at Foggia University (Italy). The next SING conference, which will also be the *Seventh Spanish Meeting on Game Theory*, is going to be held in Madrid from 4-7 July, organised by Universidad Complutense de Madrid, Universidad Carlos III de Madrid, Universidad Rey Juan Carlos and Universidad de Comillas. The Invited Speakers are:

- Guillermo Owen (Naval Postgraduate School, Monterey)
- Roberto Serrano (Brown University,

cont'd

Providence/Madrid Institute for Advanced Studies)
- Karl Sigmund (University of Vienna)
- William L. Thomson (University of Rochester, New York)

Further information visit the website: www.mat.ucm.es/congresos/sing3.

BANACH ALGEBRAS MINI-MEETING

There will be a meeting on *Banach Algebras* in Leeds on 15-16 May starting at 13.30. The lectures will be in Lecture Room 16 of the Roger Stevens Lecture Block. The speakers are:
- Ariel Blanco (Belfast)
- Matt Daws (Oxford)
- Sandy Grabiner (Claremont, California and Leeds)
- Niels Laustsen (Lancaster)
- Rick Loy (ANU, Canberra and Leeds)
- John Orr (Lincoln, Nebraska and Lancaster)
- Paul Ramsden (Leeds)
- George Willis (Newcastle, NSW)

Grabiner and Willis are supported by Scheme 2 grants of the LMS. For further details visit the website: http://maths.leeds.ac.uk/pure/analysis/bamm.html or contact H.G. Dales (garth@maths.leeds.ac.uk).

REVIEWS

Symmetry and the Monster: One of the Greatest Quests of Mathematics by Mark Ronan, Oxford University Press, £14.99, ISBN 0-19-280722-6.

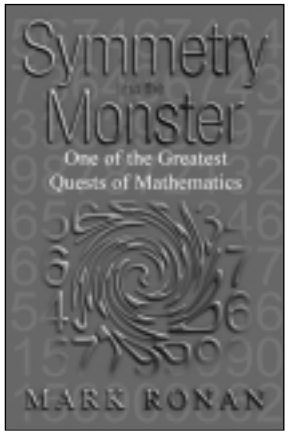
The quarter-century from 1955 to 1980 saw one of the most spectacular achievements of mathematics, namely the classification of finite simple groups. This was a joint effort between two overlapping teams, the constructors and the classifiers. In 1955 Chevalley showed that most of the finite simple groups then known (and some new ones) could be constructed in a uniform way from simple Lie algebras and finite fields. Soon Ree, Steinberg, Suzuki and Tits found further infinite families as subgroups of these Chevalley groups, and in a tidy world the list would have stopped there with these groups of Lie type, together with the rather obvious cyclic and alternating groups. However, in 1861 Mathieu had found five simple groups which did not seem to belong to any infinite family. Janko's discovery of a new simple group in 1964 stimulated a hunt for further examples, and within the next decade the number of such sporadic simple groups had risen to 26. Some of these were discovered as groups of automorphisms of highly symmetric objects, such as the 24-dimensional Leech lattice which yielded Conway's three groups, whereas others arose as exceptional cases in the classification process. This was a massive project, orchestrated by Gorenstein and driven forward by Aschbacher, beginning with a 255-page paper by Feit and Thompson in 1963 which proved Burnside's conjecture that every nonabelian finite simple group has even order. This suggested that such groups might be classified in terms of their properties associated with the prime 2, such as Sylow 2-subgroups and centralisers of involutions. By the early 1980s, many experts believed that this approach had found all the finite simple groups, though the final details did not appear in print until the publication in 2004 of the two-volume (and nearly 1000-page) monograph by Aschbacher and Smith on quasithin groups. The proof of the classification depends on over 100 papers, by dozens of authors, totalling more than 10,000 pages, and a revision programme, aiming to make it more concise and understandable, is well under way.

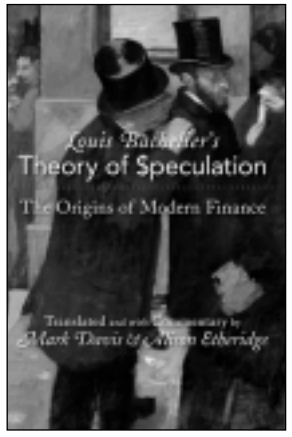
By far the largest of the 26 sporadic simple groups is the Monster group of order

$$2^{46} \times 3^{20} \times 5^9 \times 7^6 \times 11^2 \times 13^3 \times 17 \times 19 \times 23 \times 29 \times 31 \times 41 \times 47 \times 59 \times 71 \approx 10^{54},$$

conjectured by Fischer and Griess in 1973 and constructed by Griess (by hand!) in 1980 from an algebra of dimension 196884. Some intriguing numerical coincidences associated with this group soon emerged: Ogg observed that the primes p dividing its order are those for which the normaliser of a certain congruence subgroup $\Gamma_0(p)$ of level p in the modular group has genus 0, and McKay noticed that 196884 is a coefficient in the series for the modular j-function. Further analogies between the Monster and modular functions were studied by Conway, Norton and Thompson under the evocative heading of 'monstrous moonshine', and in 1998 Borcherds won a Fields Medal for solving some of their conjectures. He used vertex algebras, arising from string theory, and this link with physics may eventually justify Dyson's conjecture that the Monster group is 'built in some unsuspected way into the structure of the universe'.

Ronan's book is a bracing historical tour through this landscape, from Theaetetus and the regular solids to the present day. Most simple groups are far from simple to describe, yet he gives some impressively clear non-technical descriptions of how various groups, such as those of Mathieu, Conway and Fischer, arise. There are vivid pen-portraits of many of the leading figures: Galois, of course, tragically and mysteriously dying so young; Lie, arrested as a suspected German spy while hiking through war-time France with his clothes in his backpack (it was raining) and singing Norwegian songs; Marshall Hall, shuffling through the streets of Oxford with a small fortune in ancient gold coins in his pocket; Conway, locking out the hubbub of family life to construct his groups in one mighty 12-hour calculation.





Ronan tells a good story, and in doing so he paints a convincing picture of how mathematicians conduct their research. I wish that he had found space to mention Sylow, whose theorems are crucial to any understanding of finite groups, that he had properly stated the group axioms (even in an appendix), that he had referred to simple groups and finite fields rather than 'atoms of symmetry' and 'cyclic arithmetic', and that he had given some suggestions for further reading. Nevertheless, I greatly enjoyed this book, and I strongly recommend it to anyone interested in group theory and its history.

Gareth Jones
University of Southampton

Louis Bachelier's Theory of Speculation: The Origins of Modern Finance translated and with commentary by Mark Davis and Alison Etheridge, Princeton University Press, 2006, 192pp, US$35.00 £22.95, ISBN 978-0-691-11752-2.

Louis Jean-Baptiste Alphonse Bachelier (1870-1946) was a French mathematician credited with being the first person to model and apply Brownian motion in his PhD thesis, the *Theory of Speculation* published in

1900. Bachelier's work on random walks predates Einstein's celebrated study of Brownian motion by five years; intriguingly though, Bachelier used his work to explore finance rather than physics. *Theory of Speculation* is one of the earliest papers to use advanced mathematics in the study of the stochastic processes of finance and the first to introduce the mathematics of option pricing, 73 years before Black-Scholes. Benoit Mandelbrot believes that the modern theory of finance relies on five men: Louis Bachelier, Harry Markowitz, William Sharpe, and Fisher Black and Myron Scholes. According to Mandelbrot, the foundations of the Capital Asset Pricing Model, Modern Portfolio Theory and Black-Scholes "all sit on the theoretical foundation laid by Bachelier a century ago".

Bachelier was born in Le Havre to a wine merchant. Following his parents' deaths, Bachelier had to suspend his graduate studies to run the family business, acquiring practical experience of financial markets. His grades at the Sorbonne were not exceptional, but his instructor, the legendary Henri Poincaré, admired Bachelier's approach to Gauss's law of errors in his thesis – "very original and all the more interesting as his reasoning could extend with some changes to the theory of errors itself". The thesis received a 'mention honorable', rather than 'très honorable', but was accepted for publication in the prestigious Annales Scientifiques de l'École Normale Supérieure.

Bachelier's subsequent academic career was problematic, starting fitfully at the Sorbonne and then interrupted by World War I. Bachelier went on to hold temporary positions until he was finally awarded a permanent professorship in 1927 at Besançon, where he worked for 10 years. Bachelier's influence on finance and economics may have been smaller than the scale of his insights deserved, but his work in probability was well-regarded, even popular. Bachelier's 1914 book *Le Jeu, la Chance et le Hasard (Games, Chance and Risk)* reportedly sold over six thousand copies.

Professors Davis and Etheridge have brought out a remarkably friendly book in four chapters – 'Mathematics and Finance', 'Théorie de la Spéculation', 'From Bachelier to Kreps, Harrison and Pliska' and 'Facsimile of Bachelier's Original Thesis'. It is a fun, even swift read, belying its length. With his earned authority, Samuelson extols the importance of Bachelier in the foreword. Davis and Etheridge set the context in a very human way. The reader gets to engage with Bachelier directly, and finds his work crosses the gap of a century with ease. The Sorbonne instructors' report on the thesis is also included, permitting us to see how it was evaluated in its own time. The inclusion of Bachelier's original thesis as a facsimile is a delightful touch, allowing the reader to feel the *début de siècle* through the typesetting and to delve into portions of the thesis for direct contact, without being intimidated by rusty or poor French. Davis' and Etheridge's discussion of the work's influence and context in the modern world is incisive without being voluminous. A few pages of references help to set the thesis in a wider context. The only material complaint is that there is no index.

This book suits anyone working in quantitative finance. Bachelier's thesis engages us formally with the paradox that besets the heart of financial theory: if markets are random then how do people make money? In order to find the 'non-random' in markets, we must first understand the stochastic theory of markets. This "illuminating homage to a long underrated science hero" (Samuelson's words) is a fitting place to start.

Michael Mainelli
Z/Yen Group

EPSRC

The London Mathematical Society

Fusion Systems

LMS-EPSRC Short Course

University of Birmingham, 30 July – 3 August 2007
Organisers: Chris Parker & Sergey Shpectorov

Fusion systems are mathematical objects that bring together groups and their representations and algebraic topology. This course aims to introduce students to the general theory behind Fusion Systems by presenting them simultaneously from a Group Theoretic, Representation Theoretic and Topological point of view.
The course consists of three series of five lectures as follows:

- **Michael Aschbacher** (Caltech) *Local theory of saturated fusion systems and p-local finite groups*
- **Radha Kessar** (Aberdeen) *Modular representation theory, blocks and fusion system*
- **Bob Oliver** (Paris) *Topological aspects of fusion systems*

Two guest lectures will be given on Friday 3 August:

- **Carles Broto** (Barcelona) *Homotopy theory and p-local groups*
- **Markus Linckelmann** (Aberdeen) *On control of fusion*

The course will be particularly valuable to postgraduate students studying group theory, representation theory or algebraic topology. More specific details about the course including the registration fees and the content of the lectures can be found at our website:

http://web.mat.bham.ac.uk/C.W.Parker/Fusion/lmsfusion.htm.

The number of people admitted to the course will be limited and so applications should be made using the online registration form available on the London Mathematical Society's website at:

www.lms.ac.uk/activities/rmc/sc/36poster.html.

The closing date for online registration is **Friday 25 May 2007**.

About the Short Courses
The principal aim of the courses is to provide training for postgraduate students in core areas of mathematics. The courses are intended to provide high quality courses for graduate students from around the country in an effective and efficient manner. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.

EPSRC

The London Mathematical Society

Homological Algebra and Equivariant Homology Theory

LMS-EPSRC Short Course

University of Southampton, 9 – 13 July 2007
Organisers: Peter H. Kropholler and Brita E.A. Nucinkis

The aim of the short course is to provide an introduction to homological algebra. More precisely, the goal is to provide a general understanding of the basic concepts involved and give an introduction to some applications in cohomology of groups, algebraic topology and equivariant homology theory. The course consists of three lecture courses of 6 lectures each:

- **Peter H. Kropholler** (Glasgow)
  Classical cohomology of groups and spaces
- **Brita E.A. Nucinkis** (Southampton)
  Bredon cohomology and classifying spaces for proper actions
- **Holger Reich** (Düsseldorf)
  Equivariant homology theories
- **Guest lecturer: Ian J. Leary** (Ohio State University)
  Classifying spaces and curvature

In addition there will be tutorial sessions run by postdoctoral researchers working in the field.

The course is aimed primarily at graduate students from all areas of pure mathematics. Furthermore, postdoctoral and young researchers are also encouraged to attend. The Course website is at: www.maths.soton.ac.uk/~bean/HomologicalAlgebra/index.html.

All PhD students registered at a UK university will be charged a registration fee of £100 (in the case of EPSRC funded research students, this fee should be paid by their departments from their DTA). All others (overseas students, postdocs) must pay the full subsistence costs of £379, plus a registration fee of £250, making a total of £629 for this course.

Applications should be made using the registration form available on the Society's website at: www.lms.ac.uk/activities/rmc/sc/35poster.html.

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is **Friday 18 May**. All applicants will be contacted by the London Mathematical Society approximately one week after this deadline; we will not be able to give information about individual applications before then.

About the Short Courses
The principal aim of the courses is to provide training for postgraduate students in core areas of mathematics. The courses are intended to provide high quality courses for graduate students from around the country in an effective and efficient manner. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.

EPSRC

The London Mathematical Society

Asymptotic Methods in Infinite Group Theory

LMS-EPSRC Short Course

Mathematical Institute, Oxford, 9 – 14 September 2007
Organiser: Dan Segal

An introduction to recent developments in infinite group theory: structure of profinite groups and pro-*p* groups, analytic and arithmetical objects that can be associated with infinite groups, the relations between infinite groups and their finite quotients. The lectures will provide enough of the necessary background so that participants are made aware of what is already known, can appreciate problems of current interest, and have some idea of the available tools. These tools cover a broad spectrum of contemporary mathematics and will be a valuable addition to the repertoire of research students who may find themselves working in the general area, not necessarily on the precise questions discussed in the course.

There will be three course lecturers:

- **Benjamin Klopsch** (Royal Holloway, University of London)
  Analytic pro-p groups (a meeting-ground between finite p-groups and Lie theory)
- **Nikolay Nikolov** (Imperial College)
  Strong approximation methods in infinite group theory (*a meeting-ground between algebraic groups and number theory*)
- **Marcus du Sautoy** (Oxford)
  Zeta functions associated to infinite groups (*a meeting-ground between combinatorics, algebraic geometry and analysis*).

In addition, there will be tutorial sessions, with the organiser and other researchers active in these areas.

The course is intended for research students in group theory and related areas, e.g. 'unconventional' zeta functions. The only prerequisite is a basic grounding in algebra.

All PhD students registered at a UK university will be charged a registration fee of £100 (in the case of EPSRC funded research students, this fee should be paid by their departments from their DTA). All others (overseas students, postdocs) must pay the full subsistence costs of £336, plus a registration fee of £250, making a total of £586 for this course.

Applications should be made using the registration form available on the Society's website at: www.lms.ac.uk/activities/rmc/sc/38poster.html.

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is **Friday 13 July**. All applicants will be contacted by the London Mathematical Society approximately one week after this deadline; we will not be able to give information about individual applications before then.

About the Short Courses
The principal aim of the courses is to provide training for postgraduate students in core areas of mathematics. The courses are intended to provide high quality courses for graduate students from around the country in an effective and efficient manner. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

CONTEMPORARY FRONTIERS IN HIGH-DIMENSIONAL STATISTICAL DATA ANALYSIS

7 – 11 January 2008

in association with: Newton Institute programme entitled *Statistical Theory and Methods for Complex, High-Dimensional Data* (7 January to 27 June 2008)

Workshop organisers: David Banks (Duke), Michael Titterington (Glasgow) and Sara van de Geer (Zürich).

Theme of workshop: The motivation for the research programme itself derived from the realisation that, with the spectacular evolution of computing facilities and the proliferation of applications in which the number of experimental units is comparatively small but the underlying dimension is massive, it has become necessary to fit complex models for which the effective number of parameters is very large. Areas of application include image analysis, microarray analysis, finance, document classification, astronomy and atmospheric science. Methodological advances have been made, but with them comes the need for further development and appropriate theoretical underpinning. The workshop will review the state-of-the-art of this rapidly developing field. Timed as it is at the beginning of the six-months research programme, the workshop will be broad in scope, with the aim of laying the groundwork for research interactions during the rest of the programme and beyond. Particular topics likely to be covered include the following: strategies for explicit and implicit dimension-reduction; classification methods for complex datasets, including machine-learning approaches; asymptotic theory for increasing dimension; graphical and other visualisation methods for complex datasets; and presentation of topical case studies, probably drawn from the areas of application listed above.

The workshop will therefore cover fundamental areas of modern statistical theory and methodology required for the analysis of important large-scale practical problems. The nature of the topics is such that it should be of interest to those working in machine learning research and others in computer science, as well as to mainstream statisticians.

Confirmed speakers: Peter Bickel (Berkeley); Peter Bühlmann (Zürich); Emmanuel Candes (Caltech); Brenton Clarke (Vancouver); Dennis Cook (Minnesota); Dianne Cook (Iowa); Lutz Duembgen (Bern); Jianqing Fan (Princeton); David Hoyle (Manchester); Enno Mammen (Mannheim); Charles Micchelli (Albany); Fionn Murtagh (Royal Holloway); Boaz Nadler (Weizmann); Richard Samworth (Cambridge); Werner Stuetzle (Seattle); Jon Wellner (Seattle); Ernst Wit (Lancaster); Alastair Young (Imperial); Bin Yu (Berkeley).

Location and cost: The workshop will take place at the Newton Institute and accommodation for participants will be provided in a single study bedroom with shared bathroom at Wolfson Court. The workshop package, costing £450, includes accommodation, breakfast and dinner from dinner on Sunday 6 January to breakfast on Saturday 12 January 2008, and lunch and refreshments during the days that lectures take place. Participants who wish to attend but do not require the workshop package will be charged a registration fee of £90. Self-supporting participants are very welcome to apply.

Further information and application forms are available from the web at: www.newton.cam.ac.uk/programmes/SCH/schw01.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 **30 September 2007**.

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).

MAY

7-11 Statistical Methods for Genetic Epidemiology ICMS Workshop, Edinburgh (358)
11 Yorkshire and Durham Geometry Day, Leeds (358)
11-12 Integrable Models, Conformal Field Theory Meeting, King's College London (358)
15-16 Banach Algebras Mini-meeting, Leeds (359)
16-17 Combinatorics Colloquia, London (359)
17-18 Ergodic Theory Meeting, Warwick (358)
18-19 Groups in Galway Conference, Galway (357)
18-20 Midwest Geometry Conference, Iowa, USA (350)
22 Multiplying and Dividing Whole Numbers, Gresham College London (355)
23 Conformal Field Theory and Topology Colloquium, Edinburgh (359)
25 Edinburgh Mathematical Society Meeting, Aberdeen (350)
26-28 Mathematical Theories of Abstraction, Substitution and Naming in Computer Science ICMS Workshop, Edinburgh (358)
29 Nonlinear PDEs Scoping Consultation Meeting, London (359)
29-1 Jun Applied Stochastic Models and Data Analysis Conference, Crete, Greece (355).
29-1 Jun Analysis on Graphs and its Applications Workshop, Cardiff (358)
30 LMS South West & South Wales Regional Meeting, Cardiff (359)
31-2 Jun Recent Advances in Probability, Statistics & Financial Stochastics Workshop, London (358)

JUNE

2-9 Symmetry and Perturbation Theory Conference, Otranto, Italy (356)
6-8 Postgraduate Combinatorial Conference, St Andrews (359)
6-8 Representation Theory of *p*-adic Groups, King's College London (358)
10-12 Euler Festival, St Petersburg (359)
18-19 Hamiltonian Dynamical Systems and Applications Seminar, Montreal (355)
18-22 Cherednik Algebras ICMS Workshop, Edinburgh (358)
18-24 Nonlinear Evolution Equations and Dynamical Systems Workshop, Barcelona (359)
22 LMS Meeting, London (359)
22 Magnetic Fields in the Sun and Stars Meeting, Cambridge (359)
25-30 Number Theory and Computability ICMS Workshop, Edinburgh (358)
30 Euler's Mathematical Legacy Meeting, Oxford (356)
30-4 Jul Geometry of Riemann Surfaces Conference, Crete (356)

JULY

2-6 Journées Arithmétiques Meeting, Edinburgh (357)
2-6 Effective Computational Methods for Highly Oscillatory Problems Workshop, INI, Cambridge (353)
2-6 Applications of Multiscale Methods and Statistical Inference Course, London (357)
2-12 Recent Developments in Random Walks LMS Durham Symposium (359)
4-6 Singularity Theory Conference, Liverpool (358)
4-7 Game Theory Meeting, Madrid (359)
9-12 3-Manifold Geometry and Topology Symposium Workshop, Warwick (350)
9-12 Diophantine Equations via Analytic Number Theory Workshop, Bristol (357)
9-13 Homological Algebra and Equivariant Homology Theory LMS-EPSRC Short Course, Southampton (359)
9-13 Further Developments in Quantitative Finance ICMS Workshop, Edinburgh (358)

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