# THE LONDON MATHEMATICAL SOCIETY



# NEWSLETTER

No. 323 February 2004

# Forthcoming Society Meetings

#### 2004

Friday 20 February London D. Schleicher S.M. Rees (Mary Cartwright Lecture) [page 3]

#### Wednesday 12 May Nottingham Midlands Regional Meeting

#### Friday 18 June London Hardy Lecture

#### Friday 2 July

Newcastle Northern Regional Meeting

#### Friday 17 September Exeter South West & South Wales Regional Meeting

Friday 19 November London Annual General Meeting

# LIBRARY UPDATE

Users of the LMS Library, which is integrated with the UCL Mathematics Library and housed in the DMS Watson Building, Malet Place, will be aware of the problems we have faced in gaining access to electronic journals and MathSciNet. Until recently it was necessary to leave the building and proceed to the Cruciform Library in order make use of a computer terminal.

I am delighted to say that there has been a dramatic improvement in this state of affairs, and there is now a terminal in the DMS Watson Library designated for use by LMS members. MathSciNet is available and certain electronic journals can be accessed. The Science Librarian, whose desk is close to the LMS terminal, can inform users about photocopying facilities.

I am grateful to Martin Moyle, the UCL Science Librarian, for recognising how inconvenient the previous arrangement was for LMS members, and for taking steps to improve matters.

Full details of the library facilities available to LMS members can be found at: www.lms.ac.uk/ contact/library.html.

> Robert Curtis LMS Librarian

# ALEXANDER G. REZNIKOV

Alexander G. Reznikov, Professor of Pure Mathematics at the University of Durham, who was elected a member of the London Mathematical Society on 18 June 1999, died on 5 September 2003, aged 43. Sasha Reznikov was born in Kiev on 14 January 1960. After graduating from Kiev University he worked as an applied mathematician in various Soviet institutes before emigrating to Israel in 1989. A year later he completed his PhD thesis at Tel Aviv under the supervision of Vitali Milman. From there, after a vear's postdoctoral fellowship at ICTP in Trieste, he became a lecturer at the Hebrew University in Jerusalem, where he remained before moving to his chair in Durham in 1997.

Reznikov's most influential work is his proof of Spencer Bloch's conjecture on representations of the fundamental group of an algebraic variety. The proof is a remarkable combination of arithmetic and analytic methods. Reznikov made highly original use of hard analysis in a whole series of areas of geometry: Riemannian geometry, symplectic topology, 3-manifold theory, and geometric group theory.

## **NEW YEARS HONOURS LIST**

Congratulations to Celia Hoyles, professor of mathematics education, Institute of Education, University of London, and member of the Advisory Committee on Mathematical Education (ACME), who received an OBE, for services to education.

## HUMAN FRONTIER SCIENCE PROGRAM

The International Human Frontier Science Program (HFSP) is an international non-governmental non profit association devoted to the promotion of basic research focused on the elucidation of the sophisticated and complex mechanisms of living organisms. The Program

- provides research grants to international joint research teams;
- provides fellowships to researchers;

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- organizes and/or subsidizes workshops; and
- conducts other activities necessary to achieve the objectives of the Organization.

Particular importance is attached to the concepts of *scientific merit, internationality*, especially *intercontinentality*, and *interdisciplinarity*, in implementing the Program activities.

The member countries are Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Italy, Japan, Luxembourg, the Netherlands, Portugal, the Republic of Ireland, Spain, Sweden, Switzerland, the United Kingdom and the USA. However, scientists from all countries may participate in the Research Grant and Fellowship programs.

The HFSP supports novel, innovative and interdisciplinary basic research focused on the complex mechanisms of living organisms; topics range from molecular and cellular approaches to systems and cognitive neuroscience. A clear emphasis is placed on novel collaborations that bring biologists together with scientists from fields such as physics, mathematics, chemistry, nanoscience, computer science and engineering to focus on problems at the frontier of the life sciences.

The Program has recently announced a call for applications for research grants in support of international collaborative projects with a strong emphasis on involving scientists from biology with colleagues from other disciplines. The next deadline for submitting letters of intent for the research grants is **31 March 2004**. Further information can be obtained at www.hfsp.org.

# **LMS Newsletter**

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# LONDON MATHEMATICAL SOCIETY MARY CARTWRIGHT LECTURE

#### Friday 20 February 2004

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

3.30 – 4.30	Professor Dierk Schleicher (Bremen)
	Understanding Complex Dynamical Systems and their
	Parameter Spaces
4.30 - 5.00	Теа
5.00 - 6.00	Mary Cartwright Lecture
	Professor Mary Rees (Liverpool)
	The Topographer's View of Parameter Spaces

The two talks by Mary Rees and Dierk Schleicher will discuss parameter spaces which arise in complex dynamical systems: each point in such a parameter space represents a different dynamical system, and different parameters are distinguished by the different features which the corresponding dynamical systems might have. This gives interesting structure to parameter spaces. One often finds that a relatively small class of dynamical features yields a good understanding of the entire parameter space.

The first talk, Understanding Complex Dynamical Systems and their Parameter Spaces by Dierk Schleicher, will provide some examples of parameter spaces, of different dynamical features and how they help to distinguish different dynamical systems. The rigidity given by complex differentiability of the maps allows us to translate many questions into the realm of symbolic dynamics. We will illustrate the rich interplay between complex dynamical systems, symbolic dynamics, and combinatorial models in a number of cases.

In the second talk, Mary Rees will concentrate on some parameter spaces of quadratic rational maps, and will describe the *topographer's view* of these spaces, one of the subjects in a forth-coming Astérisque volume (288). This is essentially a geometrization theorem for a larger space of maps. It is a recurring theme in dynamics that purely topological information has a considerable bearing on dynamical behaviour, not only on the level of individual maps, but also on the level of parameter spaces. The large influence of critical points in complex dynamics is related to this.

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

A reception will be held at De Morgan House at 6.15 pm with a dinner afterwards at Poons Restaurant, 50 Woburn Place, London WC1 at 7.15 pm. The cost will be £24.50 per person, inclusive of wine. Those wishing to attend should inform The Administrator, Susan M. Oakes, at the Society, enclosing a cheque payable to the 'London Mathematical Society' to arrive no later than **Monday 16 February 2004**.

# THE LONDON MATHEMATICAL SOCIETY

#### NEWSLETTER

#### WORLD DIRECTORY OF MATHEMATICIANS A suggestion of the CEIC

After the International Mathematical Union (IMU) announced the discontinuation of the World Directory of Mathematicians (WDM) (*LMS Newsletter* no.319) a number of colleagues asked the IMU whether it would be possible to establish an electronic version of WDM. The IMU Committee on Electronic Information and Communication (CEIC, see www.ceic.math.ca) has attended to this request and investigated the possibilities.

Owing to the limited financial means of the IMU there is no way to set up and maintain a central registry such as the combined membership list of AMS/MAA/SIAM/etc. (see www.ams.org/cml). It seems feasible, though, to keep a central list - based on distributed input and voluntary contributions. CEIC proposes to give this idea a try and start with a basic version of an Electronic World Directory of Mathematicians (EWDM).

The CEIC would like to couple this suggestion with the request to every mathematician to offer a personal homepage on the web. With respect to the contents and structure of such a personal homepage CEIC proposes the design of a standardized personal homepage for mathematicians, to be called the Mathematician's Professional Homepage (MPH), that contains personal mathematical information in an organized fashion - just as the Math-Net Page is designed to display institutional mathematical information in a structured way. The design comes in two versions, a simple design and a more elaborate one. The plea to offer and maintain a structured personal webpage should not be interpreted as a bureaucratic dampening of individual style. Reasons why structured webpages are desirable can be found at www.mathunion.org/MPH-EWDM.

In summary:

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The Personal Homepage Call IMU asks every mathematician to set up and maintain a personal homepage. IMU requests that this homepage be presented in a user friendly way, and suggests a struc-

ture along the lines of the Mathematician's Professional Homepage (MPH).

The Electronic World Directory of Mathematicians Call IMU plans to set up and maintain an Electronic World Directory of Mathematicians (EWDM). Every mathematician who has a homepage is asked to register the homepage through the EWDM registration mechanism, see www.math union.org/ewdm/ join.php.

For detailed information on these suggestions click on www.mathunion.org/MPH-EWDM.

#### SUBSCRIBING TO IMU-NET

The International Mathematical Union is as much concerned about the current wave of spam mails as probably everybody else. The current mailing list, called 'IMU-Net-initial' has been carefully selected from various sources, including the email addresses of those mathematicians who have participated in ICM 2002 in Beijing or ICM 1998 in Berlin. IMU thus hopes that most recipients have some interest in the issues presented in this electronic newsletter.

Here is IMU's promise concerning the initial list of email addresses: IMU will send everybody on the current mailing list IMU-Net-initial the first two issues of IMU-Net. This list will be made inactive at the end of 2003 and will be replaced by a new IMU-Net mailing list. To get on this list you have actively to subscribe to the list. Thus, if you want to receive this mail service in the future, you have to subscribe (no cost involved, of course).

- There are two ways of subscribing to IMU-Net:
- Visit www.mathunion.org/IMU-Net and go to the 'Subscribe' button to subscribe to IMU-Net online.
- Send an email to imu-net-request@math union.org with the Subject-line: Subject: sub scribe.

In both cases you will receive an email to confirm your subscription to minimize misuse. Previous issues can be seen at: www.math union.org/Publications/Newsletter/archive/index.html.



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2nd ed. 2003. CDXXXVIII, 12 p. 46 illus. (Applications of Mathematics, Vol. 51) Hardcover € 79,95; sFr 133,00; £ 61,50 ISBN 0-387-00211-1

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2003. Approx. 518 p. 170 illus. (Interdisciplinary Applied Mathematics, Vol. 26) Hardcover **€ 79,95**; sFr 133,00; £ 61,50 ISBN 0-387-00893-4

#### H. Kielhöfer

#### **Bifurcation Theory**

# An Introduction with Applications to PDEs

This book gives a unified presentation in an abstract setting of the main theorems in bifurcation theory, as well as more recent and lesser known results..

2004. VII, 347 p. 38 illus. (Applied Mathematical Sciences, Vol. 156) Hardcover € **79,95**; sFr 133,00; £ 61,50 ISBN 0-387-40401-5



# **HARDY LECTURER 2006**

The Council of the London Mathematical Society has agreed to institute a Hardy Lecturer for 2006, in place of the Hardy Fellowship, and nominations are now sought for this award.

The Hardy Lecturer will be a distinguished overseas mathematician who will make a significant contribution to the UK mathematical scene – the word 'distinguished' is not intended to exclude those at an early stage of their careers. He or she will visit the UK for a period of about two weeks, and give the Hardy Lecture at a Society meeting, normally held in London in June. The Lecturer will also give at least two other lectures, on different topics, at other venues in the UK. The schedule will be decided by the Programme Secretary in consultation with the President and the Lecturer, and it should be designed to allow as many UK mathematicians as possible to benefit from the Lecturer's presence in the UK.

Grounds for the award of the Lectureship shall include:

- the achievements of the Lecturer, including work in, influence on, and general service to mathematics; lecturing gifts; and breadth of mathematical interests;
- the overall benefit the UK mathematical community might derive from the visit;
- the possibility of bringing to the UK a mathematician who might otherwise visit rarely or never.

The Society will offer to pay the Lecturer an *honorarium*, the expenses of travel to and from the UK, and full financial support for a visit of at most two weeks. The Society will make all the necessary arrangements for travel and accommodation within the UK. If the Lecturer is accompanied by an established partner, the Society will also pay the partner's travel expenses, but not subsistence.

Nominations should be made by letter through the head of department to the Society's Executive Secretary at The London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS. Normally there should be only one nomination from any department, but Council recognises that differences in departmental structures may require this rule to be interpreted flexibly.

Proposals should arrive by **Friday 27 February 2004**. The nominations will be considered by the 2004 Prizes Committee before being presented to Council. A decision should be known by early summer 2004.

Further information can be obtained from the Executive Secretary, Peter Cooper (cooper@lms.ac.uk).

# **NEWS FROM ICIAM**

The ICIAM Officers from 1 October 2003 are

- Ian Sloan, President
- Olavi Nevanlinna, Past President
- Alain Damlamian, Secretary
- Barbara Keyfitz, Treasurer
- Li Tatsien, Officer-at-Large

The Board, at its meeting in Sydney, was pleased to admit two new Associate Members. (The category of Associate Member is designed for societies which are 'significantly' but not 'principally' concerned with applied or industrial mathematics.) The new members are: The Austrian Mathematical Society and The Canadian Mathematical Society.

The Officers have decided to recommend to the Board that the second Officer-at-Large position created by resolution in Sydney not be filled until the 2005 meeting of the Board. That will ensure that the four-year terms of the two Officers-at-Large are staggered appropriately, and will also allow the Board to take account of the choice of next President, who will be elected at the same meeting.

For the first time the Council (as distinct from the Congresses) has its own website, at www.iciam.org. This is due to the voluntary efforts of the ICIAM webmaster, Ross Moore of Macquarie University in Sydney, and can be contacted at iciam@iciam.org if you have comments or suggestions for the website.

As a service to the community, a section of the website shows future conferences of member societies. Please advise the webmaster of any errors or omissions, and make sure that this section is kept up-to-date.

## DAVID CRIGHTON CONCERT 2004

Sunday 22 February, 8pm, West Road Concert Hall, Cambridge. Jesus College Orchestra. Conductor: Sam Gladstone, Piano: Tom Poster. Rossini Overture to 'La Scala di Seta', Beethoven Piano Concerto No. 3 in C minor, Dvorák Symphony No. 8 in G major. Tickets £6 (£3 Concessions) available on the door or in advance from the Arts Theatre Box Office, St Edwards Passage, Cambridge (01223 503333).

# VISIT OF PROFESSOR M. TAITSLIN

Professor Mikhail Taitslin (Tver' University, Russian Federation) is visiting the Mathematical Institute, University of Oxford, until 16 February. During his visit he will give two talks on applications of model theory to database theory at the Mathematical Institute, Oxford, and two talks at the University of Edinburgh and the University of Leeds. His visit is partially funded by an LMS Scheme 2 grant. For further information contact Professor B. Zilber (zilber@maths.ox.ac.uk).

# REAL ANALYSIS AND MEASURE THEORY MEETING

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The XI Meeting on Real Analysis and Measure Theory (CARTEMI) will be held in Ischia (Naples, Italy) from 11-17 July. Since 1984 it has been a biennual event of European relevance where established scientists and young researchers discuss their recent work in mathematical disciplines such as Measure Theory, Real Analysis and Lattice Theory, taking into consideration their role in applications to Decision Theory, Economics, Mathematical Finance and Theoretical Physics. There will be 50-minute invited lectures and shorter communications (25 minutes). The opening lecture will be given by Professor J.D.M. Wright (Reading). The Invited speakers are: C.D. Aliprantis (Purdue, USA), N. Fusco (Naples, Italy), M.G. Graziano (Calabria, Italy), D. Koelzow (Erlangen, Germany), P. Mattila (Helsinki, Finland), A. Olevskii (Tel Aviv, Israel), W. Pfeffer (California, USA). For further information visit the website (www.dma.unina.it/~cartemi).

#### ICM 2006 Pre-registration is open

The next International Congress of Mathematicians, ICM2006, will be held at the Palacio Municipal de Congresos de Madrid (Madrid City Hall Convention Center) Madrid, Spain, 22-30 August 2006. Pre-registration is open at: www.icm2006.org.

# DO YOU HAVE WHAT IT TAKES TO BE A SCIENCE OR ENGINEERING ROLE MODEL?

Can you inspire young people and communicate positively with the media? Do you have an active, interesting life, both inside and outside work?

If so, you could become part of an exciting, national campaign to raise awareness of science and engineering amongst young people.

NOISE (New Outlooks In Science & Engineering) is a UK-wide campaign funded by the EPSRC (Engineering & Physical Sciences Research Council). It aims to stimulate young people's interest in science and engineering by making these subjects more relevant and accessible.

A key element of the campaign is the team of young Be Yourself! role models. These role models come from a range of research backgrounds and have a variety of interests outside work. They do everything from testing the armour of tanks and investigating the bounce of cricket pitches, to building apparatus to strengthen the muscles we use to breathe. The team includes a snow-boarding quantum physicist from London, an ice-climbing sports engineer from Sheffield and a DJ analytical chemist from York.

As NOISE role models, the Be Yourself! team get involved in activities that specifically target young people (chairing events, giving talks, explaining their science in informal workshops and running experiments) and generic media activity.

The campaign is about to enter its fourth year and the organisers are looking for young, enthusiastic scientists and engineers to join the team. They are particularly keen to find young mathematicians.

If you are interested in being considered as a Be Yourself! role model, please contact Moira Mathers (moira.mathers@aeat.co.uk) for an application form. The closing date is Friday **13 February 2004**; successful candidates will be invited for interview on 8 or 9 March 2004.

If you would like more information on the campaign, and the existing team, visit the website at www.noisenet.ws.

## 21ST CENTURY MATHEMATICS CONFERENCE

The World Conference on 21st Century Mathematics will be held from 18-20 March in Lahore, Pakistan. The conference's prime aim is to bring together researchers in mathematics from around the world for useful discussion of current challenges and future directions in pure mathematics, applied mathematics, computational mathematics, industrial mathematics and actuarial mathematics.

The tentative keynote speakers are: D.K Arrowsmith (UK), Mark Bashmakov (Germany), Tetsuo Ida (Japan), Arif Zaman (Pakistan), Nicolae Popescu (Romania), Alexander Kondratyev (Russia) and A.Q.M. Khaliq (USA).

For further details for submitting abstracts, contact A.D.R. Choudary, Chair (choudary@cwu.edu) or Faqir M. Bhatti, Secretary and Co-Chair (fmbhat ti@lums.edu.pk). The conference website is at: www.wc2004.sms.edu.pk.

## MATHEMATICAL KNOWLEDGE CONFERENCE

An interdisciplinary conference on mathematical knowledge will be held from 30 June to 2 July in Cambridge. It aims to engage philosophers, mathematicians and psychologists in discussing what is distinctive about mathematical knowledge and its mode(s) of acquisition. Speakers include Brian Butterworth (Psychology, University College London), Susan Carey (Psychology, Harvard), Mark Colyvan (Queensland), Mic Detlefsen (Notre Dame), Timothy Gowers (Mathematics, Cambridge), Akihiro Kanamori (Mathematics, Boston University), Mary Leng (Cambridge), Charles Parsons (Harvard), Alexander Paseau (Cambridge), Michael Potter (Cambridge), Gideon Rosen (Princeton) and Crispin Wright (St Andrews). For further information email philmaths@lists.cam.ac.uk or visit the website (www.joh.cam.ac.uk/fellows/MCL33/math conf.html).

## ICNAAM

An international conference on Numerical Analysis and Applied Mathematics (ICNAAM) will be held in Chalkis, Greece, from 10-14 September. The aim of ICNAAM is to bring together leading scientists of the international numerical and applied mathematics community and to attract original research papers of very high quality. The topics to be covered include (but are not limited to): all the research areas of Numerical Analysis and Computational Mathematics and all the research areas of Applied Mathematics (www.uop.gr/~icnaam/res8/aimscope.htm).

The Chairmen and organisers are: Dr T.E. Simos, Active Member of the European Academy of Sciences and Arts and Corresponding Member of the European Academy of Sciences, Department of Computer Science and Technology, University of Peloponnese, Greece and Dr Ch. Tsitouras, Technological Educational Institute of Chalkis, Greece. Vice-Chairman: Dr G. Psihoyios, Anglia Polytechnic University, UK. Scientific Committee: Professor G. vanden Berghe, Belgium; Professor P.E. Bjorstad, Norway; Professor J. Cash, UK; Professor R. Cools, Belgium; Professor A. Cuyt, Belgium; Professor B. Fischer, Germany; Professor R.W. Freund, USA, Professor I. Gladwell, USA; Professor B. Hendrickson, USA; Professor A. Klar, Germany; Professor W.F. Mitchell, USA; Dr T.E. Simos, Greece; Professor W. Sproessig, Germany; Dr Ch. Tsitouras, Greece; Professor G. Alistair Watson, UK.

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Extended abstracts will be published in a Special Volume of Wiley-VCH. The journals in which selected Proceedings of ICNAAM 2004 will be published are: (i) *Applied Numerical Analysis* and Computational Mathematics (ANACM) (Wiley-VCH) and (ii) Mathematical Methods in the Applied Sciences (Wiley & Sons).

For further information contact the ICNAAM Secretary, Mrs Eleni Ralli-Simou, 26 Menelaou Street, Amfithea Paleon Faliron, GR-175 64, Athens, Greece (email: icnaam@uop.gr, fax: +30210 94 20 091) or visit the website: www.uop.gr/~icnaam/.

# POSTGRADUATE OPEN DAY

King's College London is holding a Postgraduate Open Day in Mathematics on Friday 13 February. The College has one of the largest departments of Pure Mathematics and Applied Mathematics in the UK. Research degrees are offered in Analysis and Partial Differential Operators, Number Theory, Geometric Lie Theory, Geometric Index Theory, Disordered Systems and Neural Networks and Financial Mathematics and Applied Probability. Taught MSc programmes exist in Pure Mathematics and Mathematical Physics. More specialised MSc degrees are offered in Financial Mathematics. Information Processing and Neural Networks and Theoretical Physics: Supersymmetry, Strings and the Fundamental Laws of Nature. Provisional programme:

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

Interviews (for PhD candidates) and discussions with current postgraduate students will take place throughout the day. For copies of the registration form and further information contact: Miss Rebecca Cullen, Postgraduate Secretary, Mathematics Department, King's College London, Strand, London WC2R 2LS (tel: 020 7848 2107, email: pg.maths@kcl.ac.uk) or visit the website at www.mth.kcl.ac.uk/post graduate/openday2004/.

## **INVERSE PROBLEMS WORKSHOP**

A one-day workshop on Inverse Problems will be held at the Department of Mathematics, UMIST, on Monday 8 March. The workshop is organized by the British Inverse Problems Society and funded by an LMS grant. Visit the website www.ma.umist.ac.uk/bl/ukipws for further details or email Bill Lionheart (Bill.Lionheart@umist.ac.uk).

# **POSTGRADUATE COMBI-**NATORIAL CONFERENCE

The 15th Postgraduate Combinatorial Conference will be held at Queen Mary, University of London, from 20-22 April. Subjects likely to be covered at the conference include graph theory, design theory, coding theory, cryptography, partial orders, extremal set theory, theoretical computer science and model theory. The conference is aimed at current research students in all areas of combinatorics and discrete mathematics, allowing them to meet and talk about their research in an informal environment. In addition, there will be three talks by invited speakers:

- Andrew Thomason (University of Cambridge)
- John Truss (University of Leeds)
- Bridget Webb (Open University)

The first 20 UK-based students to apply will receive a discounted registration fee, thanks to financial support from the London Mathematical Society and the British Combinatorial Committee. Full details are available from the conference webpage www.maths.qmul.ac.uk/~rfb/pcc2004/ (where there is an online registration form) or from the organiser, Robert Bailey (r.f.bailey@gmul.ac.uk).

#### **INTERNATIONAL REVIEW OF MATHEMATICS** Report 9

The week (1 - 6 December) of the visit by the International Panel for the International Review of Mathematics passed in a blur of activity: a large number of mathematicians from all over the

country had done a huge amount of work in preparation, and Panel members have confessed to us how impressed they were that they were able to get such a good view of UK mathematics in such a short time. I suspect they were also a bit surprised that all of our intricate plans worked so well. Those of us who acted as "assistants" to the sub-panels as they travelled around the country certainly were! The eight visits were all extremely successful, and the Panel worked furiously together on what they had seen once it got back to London.

We still have to await the final report; however, from the preliminary post-Review report that was presented to the Steering Group by the Panel, it would appear that UK mathematics has done very well. In general, mathematics in the UK was thought to be in good shape and the Panel sought to help us try and plan for the future. They commented on what they felt would be required to help maintain the future quality and vitality of UK mathematics, with particular reference to the



The International Panel at work

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supply of new postgrads and postdocs; the effects of over-assessment on research output and research priorities; and the critical reliance on a core group of academics, many of whom will retire in the next 10 years. The Panel's report will be finalised over the next few months, and we look forward to the discussions on its implications. Stephen Huagett

Scientific Secretary to the Review



Left to right: Jean-Pierre Bourguignon, Robbert Dijkgraaf, Hans Othmer, Stephen Davis, Stephen Huggett, Margaret Wright, Ron Graham, John Guckenheimer, Niels Keiding, Michel Broué, Susan Murphy, Don Dawson, Peter Hall

#### No. 323 February 2004

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THE UNIVERSITY OF SHEFFIELD

## **DEPARTMENT OF PURE MATHEMATICS**

#### **CHAIR IN PURE MATHEMATICS**

Salary: By Agreement

Applications are invited from outstanding candidates for a new Professorship in the Department of Pure Mathematics. Applicants should be able to demonstrate an excellent research record and future plans for the pursuit of high-quality, internationally-leading research in areas of pure mathematics that link with some of those of the department's established research clusters in algebraic topology, differential geometry, algebraic number theory, non-commutative ring theory and commutative algebra.

Closing Date: 26 March 2004 (Ref. No: R3188)

#### **LECTURER IN PURE MATHEMATICS** £22,191 - £25,451 pa

It is expected that the appointee will have a proven research record (possibly with some postdoctoral experience), and will contribute to the high-quality research and teaching of the department. Preference may be given to candidates whose research interests would place them in one of the existing research clusters in the department: these are in algebraic topology, differential geometry, algebraic number theory, non-commutative ring theory and commutative algebra. Pure Mathematics at the University of Sheffield was awarded a grade 5 in the 2001 Research Assessment Exercise. The post is tenable from 1 September 2004 or as soon as possible thereafter.

This post attracts a special HEFCE-funded Golden Hello to the value of £9K paid in 3 instalments over 3 years, subject to individuals satisfying the eligibility criteria.

#### Closing Date: 23 February 2004 (Ref. No: R3186)

Informal enquiries regarding both posts may be made to Professor Rodney Sharp (0114 222 3746, email R.Y.Sharp@sheffield.ac.uk) or Professor John Greenlees (0114 222 3786, email J.Greenlees@sheffield.ac.uk). More information about the department's research strengths is on the department's website at http://www.shef.ac.uk/~puremath/.

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For full post details/application pack visit: **www.shef.ac.uk/jobs**/ or email: **jobs@sheffield.ac.uk**/tel: **0114 222 1631** (24hr). *Please quote Ref. No. in all enquiries* 

# MATHEMATICS PROMOTION/ POLICY ASSISTANT

The London Mathematical Society is seeking a person to work part-time for one year promoting mathematics, particularly to the media and policy makers, and presenting the value of mathematics and its applications. The person will be involved in a wide variety of tasks including:

- Handling interaction with the media
- Preparing materials to inform policy makers and advisers
- Collating statistics and data on mathematics education and research
- Supporting activities with schools and teachers

Candidates will be expected to have experience in at least two of the following areas: media relations, communicating with the public, science policy, design/production. Specific mathematics qualifications are not essential but a degree in a mathematical or scientific subject and an affinity with the subject will be preferred.

The appointment is for one year, half-time (17.5 hours/wk) on a salary of £20-24,000 p.a. (full time equivalent). The pattern of working hours is flexible but some specific periods, including attendance at conferences, will be required. The post will be based at the Society's headquarters in Russell Square, London; the start date is negotiable.

Inquiries and further information are available from Executive Secretary, Peter Cooper (cooper@lms.ac.uk); applications should be made on forms available from the Society (Ref: MPU1) by **13 February 2004**.

# RECORDS OF PROCEEDINGS AT MEETINGS

## **ANNUAL GENERAL MEETING**

held on *Friday 21 November 2003* at University College London. About 70 members and visitors were present for all or part of the meeting.

The meeting began at 3:15 pm, with the President, Professor P. GODDARD, FRS, in the Chair. He reported that Professor A. Camina, who had been appointed a Scrutineer at the June Society meeting, had withdrawn when his daughter had been nominated for Council. Council had appointed Professor R.Y. Sharp as Assistant Scrutineer in his place. Members who had not yet voted were invited to hand their ballot papers to Dr D.J. Collins and Professor Sharp, as Scrutineers.

In the absence of the Treasurer, Professor N.L. Biggs (General Secretary), presented the Treasurer's annual report, which is published in the *Newsletter*. Messrs Baker Tilly were appointed as auditors.

Four people were elected to Ordinary Membership: A. Charafi, G. Iori, T.S.H. Leinster, R. Ranman; six people were elected to Associate Membership: A.K. Bedi, J.R. Britnell, S. Gill, A. Roux, Y. Saltuk, D.N. Webdale. One member signed the book and was admitted to the Society.

The President, on Council's behalf, presented certificates to the 2003 Society Prizewinners: Polya Prize - Professor A.J. Macintyre; Berwick Prize - Professor T. Bridgeland; Senior Whitehead Prize - Dr P.M. Neumann; Whitehead Prizes -Dr N. Dorey, Dr T.D.H. Hall, Dr M. Lakenby, Dr M.L. Nazarov.

Professor L.C.G. Rogers gave a lecture entitled 'Monte Carlo valuation of American options'.

After tea, Dr Collins announced the results of the ballot. The following Officers and Members of the Council were elected: President: F.C. Kirwan; Vice Presidents: A.G. Chetwynd, A.J. Scholl; Treasurer: N.M.J. Woodhouse; General Secretary: N.L. Biggs; Programme Secretary: S.A. Huggett; Publications Secretary: J. Howie; Education Secretary: B.W. Stewart; Members-at-Large of Council for two years: C.J. Budd, R.D. Camina, R.T. Curtis, P.J. Davies, A.M. Etheridge, J.F.C. Kingman. The members elected to the Nominating Committee for 2003 were R.A. Bailey, K.A. Brown, D.A. Rand. Council membership is completed by the following who were elected for two-year terms in 2002: I.D. Abrahams, M. Bridson, M.M. Dodson, K.J. Falconer, S.E. Rees, F.A. Rogers.

The newly-elected President, Professor F.C. KIRWAN, FRS, took the Chair. Professor M.H.A. Davis gave the Naylor Prize lecture on 'Optimal investment with randomly terminating income'.

After the meeting, a reception was held at De Morgan House, followed by the Annual Dinner, which was held at The Montague on the Gardens Hotel, and attended by 65 people.

#### REPORT ON THE LMS ANNUAL GENERAL MEETING Friday 21 November 2003

Problems in mathematical finance are typically of two different types, called 'European' and 'American'. European-style problems involve random cash-flows that take place at one or more pre-designated times in the future: whereas American-style problems, which are usually more difficult, involve random cash-flows taking place at one or more random times in the future. One can also make a distinction between problems associated with (a) the pricing of derivatives, and (b) optimal portfolio investment. The two lectures, at the Society's Annual General Meeting on 21 November 2003, were both concerned with American style problems the first lecture being on a problem of type (a), and the second on a problem of type (b).

The first lecture, by Professor L.C.G. Rogers (Cambridge), presented a paper on 'Monte Carlo valuation of American options'. The American style put option is a good example of a financial product that has a relatively simple structure, and is widely traded for many different classes of assets, and for which no exact solution is yet known even under the simplifying assumption of geometric Brownian motion for the price dynamics of the underlying asset. As a consequence the development of efficient numerical methods in connection with such problems for use in an investment banking context has been, and continues to be, of great significance, and this is especially the case for more exotic instruments involving several assets. The paper introduces a novel way to price American options by simulation of the path of (i) the option payoff and (ii) a cunning choice for a Lagrangian martingale. Taking the pathwise maximum of the option payoff minus the chosen Lagrangian martingale, and averaging over the simulated results, gives an upper bound for the price of the option. One of the surprising and significant features of this method is that its usefulness is not so much for the actual pricing of the option but rather the hedging of the position. This is of relevance particularly for the seller of the option (e.g. an investment bank), where hedging is of more importance than spot-on pricing (there is no risk involved in receiving the upper bound as payment rather than the unknown 'correct' price). A number of different structures were considered apart from the standard American put – for example (to mention just one) the American min-put on *n* assets, which has a standard put-like payoff with a fixed strike. but where the payoff is calculated with respect to the particular asset, from amongst the given n, that has the lowest value at the random time of exercise.

The Naylor Lecture, presented by Professor M.H.A. Davis (Imperial College), had as its title 'Optimal investment with randomly terminating income'. This is an American style problem of type (b). The problem of maximising utility of terminal wealth over a fixed time horizon (say, until retirement age) is well understood in so-called complete market situations, in which case the problem is essentially equivalent to that of derivative pricing (the relevant 'derivative payout' being the random terminal value of the investment portfolio that maximises the expected utility). This is often called the Merton problem. When consumption and income streams are included as well, then the picture does not fundamentally change if these cash flows are replicable through market investments. Such replicability is typically not the case in reality, however - especially for income, which can for various reasons all too familiar be subject to unexpected randomly timed alterations (due to the termination of employment, the onset of chronic illness or disability, and so on). There are of course analogues in corporate finance as well - e.g., the sudden loss of the income stream

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#### NEWSLETTER

from a key client who decides to move their business to a competitor. In the lecture by Mark Davis a particular problem of this type was studied in detail, and solved, involving an income flow chosen to be constant up to a termination date modelled by an independent exponentially distributed random time. The applications of this path-breaking new line of research are potentially to a great variety of practical problems in finance, both in the public and the private sector.

A reception at De Morgan House then followed, and after that the Annual Dinner at The Montague on the Gardens Hotel. Along with the speakers and prize winners, quests of honour at the dinner included Professor Jocelyn Bell Burnell (President, Royal Astronomical Society), Professor John Enderby (Physical Secretary, The Royal Society), Professor John McWhirter (President, IMA), Professor John O'Reilly (Chief Executive, EPSRC), Professor John Toland (Director, ICMS), Peter Tompkins (Vice President, Institute of Actuaries), Sir Peter Williams (Chairman, Engineering & Technology Board) and Mr Tony McWalter, MP, who delivered an engaging after-dinner speech on the important issues facing us concerning the funding of mathematics education and research in the United Kingdom. L.P. Hughston

King's College London

## **BOOK REVIEWS**

Selected Papers of Alan Hoffman with commentary, edited by Charles A. Micchelli, 2003, World Scientific Publishing, 446 pp, £78, ISBN 981-02-4198-4.

For over forty years Alan Hoffman worked as a mathematician at the IBM Research Center in Yorktown Heights. His mathematical career began with studies at Columbia and Princeton, where he worked on the foundations of geometry. In 1951 he moved to the National Bureau of Standards, where he was introduced to a new subject, linear programming. From these roots there grew a lifetime's fascination with problems about linear equations and inequalities, matrices, and algorithms.

The Selected Papers cover a wide range of topics, some motivated by challenges from a purely theoretical perspective, others clearly inspired by practical problems. There are about 40 papers, in seven sections: Geometry, Combinatorics, Matrix Inequalities and Eigenvalues, Linear Inequalities and Linear Programming, Combinatorial Optimization, Greedy Algorithms, Graph Spectra.

A few of the highlights can be picked out. In the Geometry section there is a 1956 paper, written with Newman, Straus, and Taussky, that uses facts about eigenvalues of the incidence matrix of a projective plane to prove a highly nontrivial combinatorial theorem. In the Section on Linear Programming there are two classics: one with Hoffman's bound for the approximate solutions of linear inequalities, and one that gave the first example of cycling in the simplex algorithm. In the section on Matrix Inequalities there are three papers on 'Gerschgorin variations' that vividly illustrate the aspects of matrix theory that are not simply part of abstract linear algebra. There is also a paper on the spectra of normal matrices, partly inspired by the work of Alfred Horn, the originator of the famous conjectures about the spectrum of the sum of hermitian matrices.

In the section on Combinatorial Optimization, there is the Hoffman-Kruskal paper on integral solutions and totally unimodular matrices, first published in 1956 in the famous book on Linear Systems edited by Kuhn and Tucker. And finally, in the section on Graph Spectra there is the Hoffman-Singleton paper on Moore graphs with diameter 2, containing the simple proof that the size must be 5. 10. 50 or 3250, and the construction of the unique graph with 50 vertices. This is a result that raised unfulfilled expectations. It turned out the graph with 50 vertices is associated with a classical simple group, and a few years later there was great excitement when several new simple groups were discovered by similar methods. But if there is a graph with 3250 vertices (and to this day no one knows), then its group must be almost trivial. So Hoffman and Singleton did not join the small band of those with sporadic groups named after them. Also in this section is a classic paper giving lower bounds for the chromatic number of a graph in terms of its largest and smallest eigenvalues.

The papers themselves are the heart of the book, and each one has a brief introduction that explains its origins and motivation. In addition to the major contributions mentioned above there are several little treasures. For example, there is Hoffman's paper on spectrally bounded graphs, proving that a graph with least eigenvalue that is large in absolute value must have an induced subgraph of a very special kind.

The whole is rounded off by a twentypage autobiography, notable for its insights into the diverse aspects of the life of a professional mathematician, and anecdotes about the many interesting people whom Hoffman encountered. As a mathematician conditioned by circumstances to adopt a utilitarian view, but nevertheless alive to the intellectual challenges of the subject, he has a refreshing outlook on life in general and mathematics in particular. Most important, he has the happy knack of remembering the good times, and it is noticeable that the only person who comes in for serious criticism is himself.

> Norman Biggs London School of Economics

A Brief History of Infinity. The Quest to Think the Unthinkable by Brian Clegg, 2003, Robinson, 255 pp, £8.99, ISBN 1-84119-650-9.

The Art of the Infinite: Our Lost Language of Numbers by Robert Kaplan and Ellen Kaplan, 2003, Allen Lane, 324 pp, £20, ISBN 07139-9629-3.

A Brief History of Infinity by Brian Clegg is a lively and informal account of the way the very small, the very large and the concept of infinity have been treated over the centuries. The narrative starts with a selection of Ancient Greek mathematics: Zeno's paradoxes, Archimedes' 'Sand Reckoner' and the irrationality of the square root of 2. Moving forwards in time, we have a discussion of Galileo's paradoxes, the problems surrounding 'infinitely small' quantities, and an account of the machinations around the development of calculus. After this, we are told about Cantor's development of set theory and his problems with Kronecker.

Interwoven with the mathematical threads are accounts of theological and philosophical ideas about infinity, biographical sketches of the personalities involved and tangential historical details. This sometimes makes the book feel like a series of anecdotes and a few of the detours left me rather confused. For example, after a discussion of the 'Sand Reckoner' we move via John Donne and William Blake into a discussion of Saint Augustine's views on infinity, before coming back to the proof of irrationality of root 2.

The book is addressed very much to the nonmathematician, and mathematicians may find slightly off-putting the ways in which their subject and its heroes are sometimes portrayed. I found over-dramatic the claim that Cantor and Gödel were 'driven ... over the edge into insanity' by 'contemplation of the infinite.' When discussing the proof of the irrationality of the square root of 2, Clegg writes 'In case, like me, your mind always switches off when faced with x's and y's...' and this strikes me as an unnecessary attempt at populism. Mathematical misdemeanours also creep into the discussion of set theory. Replacement and Foundation are missing from the list of Zermelo - Fraenkel axioms and

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Clegg gives the impression that the Russell Paradox is still an issue in ZF. These may seem to be technical quibbles about a popular science book (most authors would not have bothered to list the ZF axioms), but they slightly diminished my confidence in the accuracy of the rest of the text. Nevertheless there is a lot of enjoyment to be had from this book. Clegg tells a good story at a vigorous pace, and it is perhaps useful for mathematicians to be reminded of how they are seen by others.

According to the introduction (or 'Invitation') of The Art of the Infinite: our Lost Language of Numbers, Robert and Ellen Kaplan aim to show that 'Anvone who can read ... can come to delight in the works of mathematical art, which are among our kind's greatest glories.' As we (and our students) know, the real appreciation of these works of art often requires a substantial effort. The Kaplans take their task seriously and include some reasonably difficult proofs. although some of these are tactfully consigned to the appendices. For the non-mathematician, if reading Clegg's book is like viewing the photographs from a strenuous adventure holiday, then the Kaplans are asking you to pack your bags and ao trekkina in the Andes.

The main theme is again the development of the number systems: natural numbers, integers, rationals, real and complex numbers, then ordinals and cardinals. The approach is both algebraic (no fear of x's and y's here: the field axioms are proudly displayed) and geometric. The geometry appears formally as Euclidean geometry motivating the need to extend the natural numbers. It also appears informally in a very appealing feature of the book: the many hand-drawn diagrams and illustrations produced by Ellen Kaplan. Geometry also provides some of the most attractive set-pieces of the book: there is a nice discussion of Gauss' theorem on constructibility of regular polygons and I particularly enjoyed the account of the nine point circle of a triangle (for me an object of loathing, if not guite fear, at school). Projective geometry, Desargues' and Pappus' theorems also make an appearance.

Most of the obligatory biographical and historical sketches are woven quite smoothly into the text, although I found an interlude on the disagreement between Brouwer and Hilbert somewhat obtrusive.

This is a book that I would hope some of my first-year undergraduate students would want to read, and some of the more enthusiastic ones might already have read. There are some really delightful insights, explanations and examples here. However, I suspect that the book's lyrical prose style might be too rich for many of their tastes. At the risk of straining my earlier metaphor, I sometimes felt that whilst I was happy to go trekking with the Kaplans. I didn't want to be stopped every few minutes to listen to their description of the views. The book is gentler and less ambitious in its scope than the classic of this genre: What is Mathematics? by Courant and Robbins. I would certainly recommend that you order a copy for your library and, particularly if you are teaching first-year undergraduates, take a look for yourselves: you may find some delights which you had forgotten you once knew.

> David Evans UEA, Norwich

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# The University of Dublin TRINITY COLLEGE



Department of Pure and Applied Mathematics

# LECTURESHIPS (2 Permanent posts)

#### Salary Range: €28,366 - €68,709 per annum.

The Department of Pure and Applied Mathematics at Trinity College, Dublin is seeking candidates for the above posts. The appointments, which will be permanent, will be tenable from September 2004. These are teaching and research positions; the successful candidates will be required to teach at all levels, and will be expected to conduct a vigorous research programme.

Applicants must have a Ph.D. (or equivalent) and a demonstrated potential for excellence in research and teaching. In consequence of a recent chair appointment, strong preference will be given to candidates with research interests in analysis of nonlinear partial differential equations. Related areas such as harmonic analysis, global analysis and dynamical systems are also encouraged. Exceptional candidates in other areas may also be considered.

The appointments are likely to be made within the range  $\in 28,366 - \in 55,000$  per annum, point of entry to accord with qualifications and experience to date.

Further information about the Department may be obtained at: http://www.maths.tcd.ie, or from Professor S. Shatashvili at Email: samson@maths.tcd.ie.

Candidates should submit a curriculum vitae, list of publications and the names of three referees, to:

Recruitment Executive, Staff Office, Trinity College, Dublin 2, Ireland. Email: recruit@tcd.ie

Closing date not later than: 12 noon on Friday, 20th February, 2004.

Trinity College is an equal opportunities employer.

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# **Ri** The Royal Institution of Great Britain

## **CLOTHWORKERS' FELLOW IN MATHEMATICS**

The Ri has a vibrant and expanding mathematics programme focused mainly on stimulating and encouraging mathematically able young people (ages 5 to 18), but extending also to a wider audience through the Ri's public awareness of science activities. The Clothworkers' Fellow is responsible for advising on, overseeing and directing this programme, and in particular for developing and supporting the national network of secondary level Royal Institution Mathematics Masterclasses.

The person appointed will head a small team and will be expected to work closely and sensitively with the academics, teachers and other volunteers who are the mainstay of the programme. This involves some travel, including at weekends. He/she will be expected to work with other organisations sharing similar aims and objectives and to represent the Ri in external contacts to promote the mathematics programme.

Candidates should have a broad knowledge in the field of mathematics, its applications and teaching mathematics at university or post-16 level. Above all they should have an enthusiasm for enriching the mathematical experience of young people, particularly the more able, and for encouraging and helping teachers and others to achieve that objective.

It is expected that the appointee will be in post by the beginning of the academic year 2004/5. Salary will be in the range £31,000 to £35,800. The post is full time, but candidates who offer themselves part time (not less than 3 days per week) will be considered. The Fellow will be based at the Royal Institution, which is situated in central London and is within easy reach of public transport connections.

Further details of the post are available from Alan Winter, Director of Operations, Royal Institution of Great Britain, 21 Albemarle Street, London W1S 4BS (tel: 020 7670 2992, email: alanw@ri.ac.uk) to whom applications in your own style, including details of two referees, should be sent by **1 March 2004**. Interviews will be held on 5 April 2004.

The Ri is an equal opportunities employer.

# LONDON MATHEMATICAL SOCIETY Spitalfields Day

Tuesday 30 March 2004, University of Southampton

### **Applications of K-theory and Cohomology**

Organisers: Jacek Brodzki, Bernhard Koeck, Ian Leary (Southampton)

10:30 – 11:00	Coffee
11:00 – 12:00	<b>Rick Jardine (University of Western Ontario)</b> The discrete cohomology of algebraic groups
12:30 - 14:00	Lunch
14:15 – 15:15	Victor Snaith (Southampton) Algebraic K-theory and arithmetic
15:15 – 15:45	Теа
15:45 – 16:45	Marc Levine (Northeastern University) Motives, mixed motives and motivic cohomology

All talks will take place in the Lecture Room 4A of the Mathematics Building (54), University of Southampton.

The London Mathematical Society Spitalfields Days are an opportunity for recent developments in specialist topics to be made known to the general mathematical community. This Spitalfields Day will address recent exciting developments on the boundaries where algebraic K-theory meets with arithmetic, algebraic geometry and algebraic topology.

These lectures are linked to the workshop on Applications of K-theory and Cohomology, which takes place in Southampton from 31 March until 2 April to mark Victor Snaith's 60th birthday. Main themes of the lecturers will include motivic homotopy theory and K-theory, algebraic cobordism of Levine, Morel, and Voevodsky, recent progress on the Bloch-Kato and Beilinson conjectures and applications of algebraic K-theory to the Kummer-Vandiver conjecture in number theory and current ramifications of these topics.

The Spitalfields Day and the Workshop are open to all. Anyone interested in attending should contact Jacek Brodzki (j.brodzki@soton.ac.uk). There are limited funds available to support research students.

# THE LEVERHULME TRUST

#### **2004 Philip Leverhulme Prizes**

The Leverhulme Trustees are offering up to 25 Philip Leverhulme Prizes 2004. The prizes are for outstanding young scholars who have made a substantial contribution to their particular field of study. Prizes are available in the following disciplines:

- Anthropology
- Earth, Ocean and Atmospheric Sciences
- Economics
- Mathematics and Statistics
- Medieval, Early Modern and Modern History

The value of each Prize will be £50,000, to be spent within two years. Awards will be made in recognition of the past research achievement and current standing of nominees. Prizes can be used for any purpose to advance the prize holder's research, with the following exceptions: augmentation of the prize holder's salary, capital items and equipment, and institutional overheads.

Prize winners should be under age 36 on Friday 14 May 2004 and should hold a post (irrespective of the source of funding) in a UK institution of higher education or research. Nominations are also welcomed for those aged 36 and over who have had career changes or breaks. The disciplines selected are intentionally broad, and nominations will be considered regardless of the nominee's departmental affiliation.

A nomination for a Philip Leverhulme Prize must be endorsed by the head of the nominee's institution and must reach the Trust by 4.00 pm on Friday 14 May 2004. Decisions will be made by the end of November 2004, and the prizes must be taken up at any time before the end of November 2005.

For nomination materials please send an A4-size self-addressed envelope to the Leverhulme Trust quoting reference PLP by **7 May 2004**, or consult the Trust's website: www.leverhulme.org.uk to download full nomination details.

The Leverhulme Trust, 1 Pemberton Row, London EC4A 3BG.

Registered Charity no. 288371



# Symmetries and Integrability of Difference Equations

EuroConference on Analytic Difference Equations, Special Functions & Quantum Models on the Lattice

Supported by the European Commission, Research DG, Human Potential Programme, High-Level Scientific Conferences (Contract No: HPCF-CT-2001-00013)

Helsinki, Finland, 19-24 June 2004

Chair: Jarmo Hietarinta (FI, Turku University, FI) Vice-Chair: Frank Willem Nijhoff (NL, Leeds University, UK)

Speakers will include				
K. Aomoto (Nagoya, JP)	L. Haine (Louvain, BE)	JP. Ramis (U. Paul Sabatier, FR)		
R. Askey (Wisconsin-Madison, US)	M. Ismail (U. South Florida, US)	V. Roubtsov (Angers, FR)		
A. Bobenko (TU Berlin, DE)	T. Koornwinder (Amsterdam, NL)	S. Ruijsenaars (CWI, NL)		
A. Doliwa (Warsaw, PL)	I. Krichever (Columbia, US)	P. Santini (Roma La Sapienza, IT)		
S. Elaydi (Trinity, San Antonio, US)	I. Laine (Joensuu, FI)	M. van der Put (Groningen, NL)		
V. Enolskii (Heriot-Watt, Edinburg, UK)	F. Marcellan (U. Carlos III, Madrid, ES)	J. Felipe van Diejen (Talca, CL)		
L. Faddeev (Steklov, St. Petersburg, RU)	M. Noumi (Kobe, JP)	P. Vanhaecke (Poitiers, FR)		
A. Grunbaum (Berkeley, US)	O. Ragnisco (Roma Tre, IT)	A. Zhedanov (Donetsk, UA)		

#### Scope of the conference

This meeting is the second in a series of two devoted to discrete systems and their integrability and symmetries (the first took place in Giens, France, 2002). This second conference will emphasise linear and nonlinear special functions, associated quantum problems and geometry.

The topics covered in this meeting will include: • Analytic difference equations and spectral theory • Difference bispectral problems • Difference Galois theory • Q-hypergeometric and elliptic modular functions • Representation theory and orthogonal polynomials • Algebraic curves and addition formulae of Abelian functions • Discrete and quantum geometry • Quantum models on the lattice • Quantum mappings.

The conference is open to researchers world-wide, whether from industry or academia. Participation will be limited to 100. The emphasis will be on discussion about new developments. The conference fee covers registration as well as full board and lodging. Grants will be available, in particular for nationals under 35 from EU or Associated States.

#### Deadline for applications: 19 March 2004

Scientific Programme and on-line Application at: <u>http://www.esf.org/euresco/04/pc04185</u>

For printed copies, contact the EURESCO Office: European Science Foundation, EURESCO Office, 1 quai Lezay-Marnésia, BP 90015, 67080 Strasbourg Cedex, France Tel.+33 388 76 71 35 Fax.+33 388 56 98 75 E-mail: euresco@esf.org

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# ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES, CAMBRIDGE RANDOM MATRIX THEORY AND ARITHMETIC ASPECTS OF OUANTUM CHAOS

(28 June – 2 July 2004)

Supported by the European Commission, Sixth Framework Programme – Marie Curie Conferences and Training Courses - MSCF-CT-2003-503674

in association with the Newton Institute programme entitled *Random Matrix* Approaches in Number Theory (26 January – 16 July 2004).

Organisers: J. Marklof (Bristol), F. Mezzadri (Bristol) and Z. Rudnick (Tel Aviv).

Theme of conference: One of the main objectives of quantum chaos is the understanding of how the ergodic properties of classical Hamiltonian systems affect the behaviour of the eigenfunctions and spectra of the corresponding quantum mechanics in the semiclassical limit. Some of the main open problems concern the equidistribution of all eigenstates in phase space (quantum unique ergodicity) and the statistical distributions of the energy levels. The workshop will focus on the study of quantum systems in a natural number-theoretic setting, which have provided ground for the most recent advances towards the solutions of many outstanding problems in quantum chaos.

Invited speakers: N. Anantharaman\* (Lyon), A. Gamburd (Stanford), E. Bogomolny (Orsay), S. De Bievre (Lille), M. Degli Esposti (Bologna), S. Graffi (Bologna), D. Hejhal\* (Uppsala), D. Jakobson\* (McGill), J.P. Keating (Bristol), S. Koyama (Keio University), P. Kurlberg (Chalmer), P. Leboeuf\* (Orsay), W. Luo (Ohio State), S. Nonnenmacher (Saclay), Y. Petridis (Cuny), A. Reznikov (Bar-Ilan University), P. Sarnak (Princeton), A. Strombergsson (Uppsala), T. Watson (UCLA), F. Steiner (Ulm), M. Sieber (Bristol), J. Toth\* (McGill), S. Zelditch (Baltimore), M. Zirnbauer (Koln).

(\* pending confirmation)

**Location and cost:** The EuroConference will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Wolfson Court. The conference package, costing £400, includes accommodation, breakfast and dinner from dinner on Sunday 27 June to breakfast on Saturday 3 July 2004, and lunch and refreshments during the days that lectures take place.

Further information and applications forms are available at: www.newton.cam.ac.uk/programmes/RMA/rmaw04.html

Completed application forms should be sent to Tracey Andrew, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH, or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is **29 February 2004**.

# ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES, CAMBRIDGE

## MATRIX ENSEMBLES AND L-FUNCTIONS

(12 - 16 July 2004)

Supported by the European Commission, Sixth Framework Programme – Marie Curie Conferences and Training Courses – MSCF-CT-2003-503674

in association with the Newton Institute programme entitled *Random Matrix* Approaches in Number Theory (26 January – 16 July 2004).

**Organisers:** Brian Conrey (American Institute of Mathematics), Peter Sarnak (Princeton University), Nina Snaith (University of Bristol).

Theme of workshop: This workshop will explore recent interest in utilising random matrix theory to probe the Riemann zeta function and other L-functions. Montgomery and Dyson realised in the 1970s that the zeros of the Riemann zeta function show the same statistical behaviour as the eigenvalues of random matrices, and more recently Katz and Sarnak proposed that the same is true of statistical properties of zeros of L-functions averaged over families. Over the last few years, random matrix theory has provided the first viable conjectures for mean values of zeta and L-functions on the critical line where their complex zeros are believed to lie. To find more such problems where the subjects can be combined to great effect, this gathering of number theorists and random matrix theorists will measure what can be done in random matrix theory against the current interesting problems in number theory.

So far, progress in number theory via random matrix theory has followed the pattern that a rigorous random matrix calculation is made, then the structure of this result leads to a conjecture for the equivalent number theoretic quantity. These various predictions that random matrix theory provides, such as those for averages of L-functions over families, have been established unconditionally. These in turn have lead, for example, to subconvex estimates for special values of L-functions from which the resolution of some long standing problems in number theory and mathematical physics have been achieved. Much more is expected to be achieved along such lines and this is one of the themes of this meeting.

Thus the number theoretical conjectures based on work in random matrix theory have great merit in themselves, but another of the focuses of the conference will be the search for a way to make rigorous the jump from random matrix theory to number theory.

Location and cost: The school will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Fitzwilliam College. Dinner and lunch will be served at Wolfson Court. The workshop package costing £480, includes accommodation, breakfast and dinner from dinner on Sunday 11 July until breakfast on Saturday 17 July, and lunch, and refreshments during the days that lectures take place.

Further information and applications forms are available at: www.newton.cam.ac.uk/programmes/RMA/rmaw05.html

Completed application forms should be sent to Tracey Andrew, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH, or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is 29 February 2004.

# ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES, CAMBRIDGE QUANTUM INFORMATION THEORY: PRESENT STATUS AND FUTURE DIRECTIONS

#### (23 – 27 August 2004)

in association with the Newton Institute programme entitled *Quantum Information Sciences* (16 August – 17 December 2004).

**Organisers:** Professor Serge Massar (Brussels), Professor Noah Linden (Bristol) and Professor Sandu Popescu (Bristol).

Theme of conference: This conference will take place during the Newton Institute Programme on Quantum Information Science. It will bring together physicists, computer scientists and mathematicians to discuss the current status of the field and present important recent developments. Despite substantial progress in the last few years, there are still very many open questions and fundamental issues to be understood; thus, particular emphasis will be put on reviewing the major challenges in the field. Subjects covered by the conference will include, but are not restricted to, quantum algorithms and algorithmic techniques, quantum communication and quantum cryptography, quantum entanglement and non locality, fault tolerant quantum information processing and communication, quantum information processing and quantum operations under constraints (for instance imposed by the physical system in which they are realised).

Invited speakers: The workshop will consist of approximately 30 invited talks. Invited speakers include: C. H. Bennett\*, S. Braunstein\*, H. Buhrman, N. Cerf, I. Cirac\*, R. Cleve, D. DiVincenzo, A. Ekert\*, N. Gisin, A. Holevo, M. Horodecki, R. Jozsa, A. Kent, A. Kitaev\*, P. Knight, R. Laflamme, D. Leung, S. Lloyd, H. K. Lo, S. Massar, M. Mosca, J. Oppenheim, M. Plenio\*, S. Popescu\*, B. Reznik, B. Schumacher\*, P. Shor\*, B. Terhal, L. Vaidman, U. Vazirani\*, V. Vedral, G. Vidal, R. Werner\*, A. Winter, W. Wootters.

(\* pending confirmation)

**Location and cost:** The Conference will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Wolfson Court. The conference package, costing £430, includes accommodation, breakfast and dinner from dinner on Sunday 22 August to breakfast on Saturday 28 August, and lunch and refreshments during the days that lectures take place.

Further information and applications forms are available from the web at: www.newton.cam.ac.uk/programmes/QIS/qisw01.html

Completed application forms should be sent to Tracey Andrew, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH, or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is **31 March 2004**.

# **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/diary.html).

#### FEBRUARY 2004

9 Random Matrix Theory and the Birch/Swinnerton-Dyer Conjecture; Spitalfields Day, Isaac Newton Institute, Cambridge (321)
13 Postgraduate Open Day, King's College London (323)
20 LMS Mary Cartwright Lecture, University College London (323)

#### **MARCH 2004**

8 Inverse Problem Workshop, UMIST (323)
18-20 21st Century Mathematics Conference, Lahore, Pakistan (323)
29-1 Apr Modelling Permeable Rocks IV, IMA Conference, Southampton University (319)
30 Applications of K-theory and Cohomology; Spitalfields Day, Southampton University (323)
30-2 Apr Applications of K-theory and Cohomology Meeting, Southampton University (321)

**31-2 Apr** Quantitative Modelling in the Management of Healthcare IV, IMA Conference, Salford University (319)

#### **APRIL 2004**

**5-7** Modelling in Industrial Maintenance and Reliability V, IMA Conference, Salford University (319)

5-8 BMC, Queen's University, Belfast (315)
13-16 Maths Takes Shape, MA Annual Easter Conference, York University (321)
15-17 Computation for Multiscale Problems in Physics, University of Warwick
16-17 Howard Hoare Symposium, Birmingham University (321) **19-22** BAMC, East Anglia University (320) **20-22** Postgraduate Combinatorial Conference, Queen Mary, University of London (323)

#### MAY 2004

12 LMS Midlands Regional Meeting, Nottingham28-31 Meeting in Honour of ProfessorWong, City University, Hong Kong (319)

#### **JUNE 2004**

16-18 Croatian Congress of Mathematics, Split University, Croatia (321) 18 Hardy Lecture, LMS Meeting, London 21-25 Mathematics for Industry European Conference, Eindhoven, The Netherlands (321) 21-2 Jul SMS-NATO Advanced Summer Institute Summer School on Morse Theoretic Methods in Non-linear Analysis and Symplectic Topology, Université de Montréal, Canada (322) 27-2 Jul Fourth European Congress of Mathematics, Stockholm, Sweden (315) 28-30 Analysing Conflict and its Resolution, IMA Conference, Oxford (319) **30-2 Jul** Mathematical Knowledge Conference, Cambridge (323)

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#### **JULY 2004**

2 LMS Northern Regional Meeting, Newcastle University
4-11 ICME10, Copenhagen, Denmark (308)
5-9 Geometry and Topology of Coxeter Groups, M.W. Davis, LMS Invited Lectures, Southampton University (321)
10-14 Mathematical Modelling and Applications International Conference, City University, London (321)
11-17 Real Analysis and Measure Theory Meeting, Italy (323)
12-16 IWOTA, Newcastle University

#### SEPTEMBER 2004

1-6 Pan-African Congress of Mathematics, Tunisia (308)
10-14 Numerical Analysis and Applied Mathematics Conference, Greece (323) **ERNEST WILLIAM HOBSON DE MORGAN MEDALLIST** 1920



Professor Hobson received the De Morgan tions to real function theory, particularly in Medal on 13 November 1920. He was occupied with his influential treatise The Theory of Functions of a Real Variable from 1907 to 1926. The first edition was published in researchers for many years and G.H. Hardy 1907 as a single volume. The work was constantly revised over the next twenty years and nearly all of Hobson's own contribu-

the theory of orthogonal series, appear only in the later editions. It was a standard treatise regarded as indispensable to wrote that 'there is no doubt that it is the most important book written by a modern English mathematician'.