

NEWSLETTER

No. 400 February 2011

Society Meetings and Events

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Friday 25 February Mary Cartwright Lecture, Oxford [page 3]

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Thursday 5 May LMS Spitalfields Day INI, Cambridge

Friday 6 May Women in Mathematics Day, London [page 21]

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Tuesday 14 June Midlands Regional Meeting, Birmingham

Friday 1 July London

Tuesday 19 July Northern Regional Meeting, Leeds

NEWSLETTER ONLINE:

Go to www.lms.ac.uk/ newsletter

CREATING ORIGINAL AND ELEGANT MATHEMATICS

The Career of a De Morgan Medallist

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Inspiration has come from many sources for Professor Bill Morton (University of Oxford), the winner of this year's De Morgan Medal 'in recognition of his seminal contributions to the field of numerical analysis of partial differential equations and its applications, and for services to his discipline'. A hallmark of Morton's work is the creation of original, elegant mathematics for real-world applications.

Morton's long-standing inspiration from one of the greats in mathematics, David Hilbert, started when he was first introduced to Hilbert spaces by Jack de Wet whilst studying quantum mechanics as a mathematics undergraduate at Oxford. Hilbert is one of the most influential mathematicians of his time, and his famous address to the International Congress of Mathematicians in Paris in 1900, where he announced a number of unsolved problems, was to Morton's mind 'crucial' in its plea that mathematics should always remain a single, undivided subject.

A change of direction

Morton enjoyed a productive

four years at the Courant Institute of Mathematical Sciences (CIMS) in New York. USA where his early research in numerical analysis produced several publications that are regularly cited as landmarks. The CIMS was the successor to Hilbert's institute at Göttingen, Germany, and Richard Courant, Peter Lax, Cathleen Morawetz and many others were key influences. Morton had gone to CIMS initially on sabbatical leave from the Atomic Energy Authority (AEA) at Harwell where he had worked on Monte Carlo methods for nuclear criticality. It was this that led to the initial invitation to the CIMS. but then Courant invited him back to pursue the graduate studies that completely changed his career.

At Harwell, and later at Culham, Morton 'found it particularly enlightening to work with theoretical physicists', but his role was too much concerned with developing computing, and he wanted to get back to mathematics. So he left the AEA and went into academia, first in the mathematics department at the University of Reading and later at the University



of Oxford, and finally, in semi-retirement,

at the University of Bath. In each case he

concentrated on graduate teaching, bringing his wide experience to bear on the MSc

Morton has also been a pioneer in other

courses in each department.

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Other work

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Analysis; later he became an IMA vicepresident. At the University of Reading he founded (with Professor M. Baines) the Institute for Computational Fluid Dynamics

www.lms.ac.uk/newsletter

Bill Morton has changed the way we look at the numerical analysis of partial differential equations through his world-leading research, his vision and his dynamic leadership qualities. With regard to his award Morton states: "It was an immense pleasure to receive the De Morgan Medal and a verv rewarding moment in my career. I would like to thank the Prizes Committee, particularly for the award citation, which made me

Mathematics Promotion Unit



areas. In 1963 he joined the Society of Industrial and Applied Mathematics (SIAM), and was elected the first President of the UK Section when it was formed in 1997. He ioined the Institute of Mathematics and its Applications (IMA) when he returned to the UK in 1964. The IMA was then very influential in promoting conferences and publications in numerical analysis, and Morton was very proud." a founding editor (jointly with Professor Dr John Johnston M. Powell) of the IMA Journal of Numerical



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Bill Morton (right), with the Medal and LMS President Angus Macintyre

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LONDON MATHEMATICAL SOCIETY MARY CARTWRIGHT MEETING

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Friday 25 February 2011

Oxford University Museum of Natural History

Programme:

3.30 Opening of the meeting

Peter Donnelly (Oxford) Modelling Genes

4.30 Tea

5.00 Mary Cartwright Lecture

Alison Etheridge (Oxford) Evolution in a Spatial Continuum



Mary Cartwright

A reception will be held after the meeting at the Mathematics Institute followed by a dinner at the Ashmolean Museum at a cost of £30 per person, inclusive of wine. Contact Isabelle Robinson (isabelle.robinson@ Ims.ac.uk) by **Friday 18 February 2011** if you would like to attend.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Contact Duncan Turton/Elizabeth Fisher (womeninmaths@lms.ac.uk) for further information.

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NEW YEAR HONOURS LIST 2011

Congratulations to the following who have been recognised in the New Year Honours list:

Knights Bachelor (KB)

Professor Adrian Smith, FRS, Director General, Knowledge and Innovation, Department for Business Innovation and Skills, for public services and higher education

Companion of the Order of the Bath (CB)

Professor Brian Collins, Chief Scientific Adviser, Department for Business Innovation and Skills, for services to civil engineering and the environment

Officer of the Order of the British Empire (OBE) Professor Muffy Calder, University of Glasgow, for services to Computer Science

ICIAM 2011 PRIZES

At the opening ceremony of the International Congress for Industrial and Applied Mathematics (ICIAM 2011) to be held in Vancouver from 18 to 20 July 2011 (see page 16), five ICIAM prizes will be awarded:

- The ICIAM Collatz Prize is awarded to Emmanuel Candès (Stanford and Pasadena, USA) in recognition of his outstanding contributions to numerical solution of wave propagation problems and compressive sensing, as well as anisotropic extensions of wavelets.
- The ICIAM Lagrange Prize is awarded to Alexandre J. Chorin (Berkeley, USA) in recognition of his fundamental and original contributions to applied mathematics, fluid mechanics, statistical mechanics and turbulence modelling. His methods for the numerical solution of Navier–Stokes

LMS Newsletter

www.lms.ac.uk/newsletter

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Events calendar: please send updates and corrections to calendar@lms.ac.uk

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Typeset by the London Mathematical Society at De Morgan House; printed by Holbrooks Printers Ltd.

Publication dates and deadlines: published monthly, except August. Items and advertisements by the first day of the month prior to publication, or the closest preceding working day.

Advertising: for rates and guidelines, see www.lms.ac.uk/newsletter/ratecard.html

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Charity registration number: 252660.

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LMS INVITED LECTURER 2011

Professor Emmanuel Candès (Stanford)

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Compressed Sensing

21–25 March 2011 Centre for Mathematical Sciences, Cambridge

Emmanuel Candès will give an eight-lecture minicourse, at a level suitable for graduate students, on *Compressed Sensing*. This is a subject very much at the interface of pure and applied mathematics and the lectures should interest a wide audience.

There will also be one-hour lectures by:

- Anders Hansen (Cambridge)
- Vincent Rivoirard (Paris-Dauphine)
- Carola Schönlieb (Cambridge)
- Jared Tanner (Edinburgh)

College accommodation will be available. Funding is available for research students from UK universities and a limited amount of funding is available for others. Please email Ims2011@maths.cam.ac.uk for more details.

For further details see: www.dpmms.cam.ac.uk/~bjg23/candeslectures.html.

equations stand at the basis of the most popular codes in computational fluid mechanics.

- The ICIAM Maxwell Prize is awarded to Vladimir Rokhlin (New Haven, USA) for his work on fast multipole methods which have revolutionized fields like numerical electromagnetism for radar, and molecular dynamics for chemistry.
- The ICIAM Pioneer Prize is awarded to James Albert Sethian (Berkeley, USA) for his fundamental methods and algorithms which have had a large impact in applications such as imaging and shape recovery in

medicine, geophysics and tomography, and drop dynamics in inkjets.

 The ICIAM Su Buchin Prize is awarded to Edward Lungu (Gabarone, Botswana) for his mathematical modelling of problems related to Africa and his fundamental contribution to developing teaching, research and organizational structures for applied mathematics in Southern Africa.

For the full citations visit the website at www.iciam.org/prizes2011.html, and for further information about ICIAM 2011 visit the website at www.iciam2011.com.

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SERIES 2012

will visit the University of Oxford from 12 February to 12 March 2011. She will give the following talks:

- Monday 21 February, 2.15 pm, Oxford-Man Institute, Stochastic Analysis Seminar Numerical algorithms for backward stochastic differential equations: convergence and simulations; contact: Z. Qian (gianz@maths.ox.ac.uk)
- Wednesday 2 March, 2 pm, School of Mathematics, Loughborough University, Probability Seminar Reflected BSDE with discontinuous barriers and related variational inequality; contact: H. Zhao (H.Zhao@lboro.ac.uk)
- Tuesday 8 March, 4 pm, Imperial College London, Probability Seminar Reflected BSDE with a constraint and its applications; contact D. Crisan (d.crisan@imperial.ac.uk)

For further information contact Zhongmin Qian (qianz@maths.ox.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR F.L. SANTOS

Professor Francisco Leal Santos (University of Cantabria, Santander, Spain) will visit the UK from 14 to 20 March 2011. His research is concentrated around polytopes and triangulations. In 2010 he came up with a spectacular construction disproving the famous Hirsch conjecture from 1957 stating that the diameter of the one-skeleton of a *d*-dimensional polytope with *n* facets is at most n - d. Professor Santos will give lectures at:

- University College London, 15 March; contact Imre Bárány (barany@math.ucl.ac.uk)
- Oxford, 16 March; contact Alex Scott (scott@maths.ox.ac.uk)
- Cambridge, 17 March; contact Imre Leader (I.Leader@dpmms.cam.ac.uk)

Professor Santos will be based in London, hosted by Imre Bárány. His visit is supported by an LMS Scheme 2 grant. Cl De Rea

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gesting a topic and lecturer, would be prepared to organise the meeting at their own institution or a suitable conference centre.

LMS INVITED LECTURES

Proposals for the 2012 Lectures are sought

from any member who, in addition to sug-

The annual Invited Lectures series consists of meetings at which a single speaker gives a course of about ten expository lectures, examining some subject in depth, over a five day period (Monday to Friday) during a University vacation. The meetings are residential and open to all interested. It is intended that the texts of the lectures given in the series shall be published. In addition to full expenses, the lecturer is offered an *honorarium* for giving the course. A grant is also given to the host department to support attendance at the lectures.

Enquiries about the Invited Lectures should be directed to the Programme Secretary at the Society (grants@lms.ac.uk). The deadline for the submission of proposals is **Tuesday 15 February 2011**.

Recent Invited Lecturers are:

- 2010 M. Bramson (University of Minnesota) Stability of queuing networks
- 2009 A.D. lonescu (University of Wisconsin, Madison) Black holes in vacuum: examples and uniqueness properties
- 2008 A. Okounkov (Princeton) Random surfaces
- 2007 D. Ben-Zvi (University of Texas, Austin) The geometric Langlands correspondence
- 2006 M.F. Singer (North Carolina State Univ.) Introduction to the Galois theory of differential and difference equations

VISIT OF DR XU MINGYU

Dr Xu Mingyu (Institute of Applied Mathematics, Chinese Academy of Sciences, Beijing)

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Cecil King Travel Scholarship



The London Mathematical Society annually awards a \pm 5,000 Cecil King Travel Scholarship in Mathematics to a young mathematician of outstanding promise. The Scholarship is awarded to support a period of study or research abroad, typically for a period of three months.

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The award is competitive and based on a written proposal describing the intended programme of study or research abroad and the benefits to be gained from such a visit. A shortlist of applicants will be selected for interview.

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

Applications should be made using the form available on the Society's website (www.lms.ac.uk/content/cecil-king-travel-scholarship) or by contacting education@lms.ac.uk. The closing date for applications is **Friday 25 February 2011**. It is expected that interviews will take place in London in late April or early May.

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

CHRISTOPHER ZEEMAN MEDAL

Deadline

Readers are reminded that the deadline for receipt of nominations for the 2011 IMA–LMS Christopher Zeeman Medal is **Friday 11 February 2011**. To put someone forward for the medal, please contact the IMA for a nomination form by sending an email to lynn.webster@ima.org. uk, or by writing to: The Secretary to the Christopher Zeeman Medal The Institute of Mathematics and its Applications Catherine Richards House 16 Nelson Street Southend-on-Sea, Essex SS1 1EF.

For full details of Zeeman Medal see the Society's December *Newsletter* (No. 398) or email prizes@lms.ac.uk.

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MATHEMATICS POLICY ROUND UP

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International Review of Mathematical Sciences 2010

Following the recent International Review of Mathematical Sciences, there was a public launch of the Review Panel's report and findings at an EPSRC 'town meeting' on Friday 28 January 2011 at the Senate House, University of London. For more information visit the EPSRC website at www.epsrc.ac.uk.

Funding for HEFCE, science and research

The individual budgets for the seven UK Research Councils over the 2011/12–2014/15 spending review period have been announced by David Willetts, Minister for Universities and Science: "Despite the considerable pressure on public spending, we have delivered stable funding. A ring fence around science and research programmes – including for the first time HEFCE research funding – will provide stability and certainty." The total budget allocation across RCUK for 2011/12–2014/15 is around £11.2 billion.

To coincide with the announcement of the budgets, each Research Council published its Delivery Plan for the period. These delivery plans set out the priorities and commitments that the Councils will meet to achieve their forward strategies. The EPSRC Delivery Plan executive summary can be found at http:// tinyurl.com/34pnmku.

For more information visit the Research Councils UK website at www.rcuk.ac.uk/news/ 2010news/Pages/101220.aspx. There is also more information and a copy of the HEFCE funding letter available at http://tinyurl.com/2dblkbp.

Higher Education Policy Institute report

The Higher Education Policy Institute (HEPI) has published a commentary on the government's proposals for the future financing of higher education and student fees. In its report, HEPI analysed the financial implications of these proposals and concluded that they were extremely sensitive to assumptions about future graduate earnings and also about the level of fees that universities would charge. On the latter point, HEPI concluded that unless measures were put in place to restrict the fees that universities could charge, most would charge around or close to £9,000, whereas the government's assumption was that such a level of fee would be 'exceptional' and that £7,200 would be charged on average.

A copy of the full report is available on the HEPI website at www.hepi.ac.uk.

Mathematics education

The Nuffield Foundation has published a report Is the UK an outlier? An international comparison of upper secondary mathematics education. The research was undertaken by Dr Jeremy Hodgen and David Pepper from King's College London, and by Linda Sturman and Graham Ruddock from the National Foundation for Educational Research. It compares the participation rates and content of upper secondary mathematics education in 24 countries. In the UK, upper secondary refers to post-GCSE education (or post-S4 in Scotland), although the precise age group varies from country to country. According to the research fewer than one in five students in England, Wales and Northern Ireland studies any kind of mathematics after GCSE, representing the lowest levels of participation among the 24 countries. The level of participation is higher in Scotland, where just under half of students study mathematics after S4, but is still below the average. A copy of the full report is available on the Nuffield Foundation website at www.nuffieldfoundation.org/#3.

New Concordat to engage the public with research

HEFCE has signed a Concordat which aims to create stronger ties between the public and research carried out across all disciplines in

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the higher education sector.

Sir Alan Langlands, Chief Executive of HEFCE, said: "As universities have developed their wider roles in the economy and society, the bond with the public has strengthened significantly. A recent HEFCE-commissioned survey by Ipsos MORI demonstrated that the public appreciates this relationship, with a large majority indicating the importance of government investment in higher education, while acknowledging the wide benefits that universities bring to the UK. We are keen to support this Concordat. It provides a significant milestone in furthering mutual engagement and understanding between universities and their wider communities and will underpin the importance to the country of all disciplines, including the arts and humanities as well as the sciences."

Consultation on changes to information published by institutions

This is a joint consultation by HEFCE, Universities UK and GuildHE on proposals for giving prospective students useful information about higher education courses; developing the National Student Survey; and improving accessibility to the information which higher education institutions publish about their courses and which is used for quality assurance. The consultation closes on **Monday 7 March 2011**. For more information visit the HEFCE website at www.hefce.ac.uk.

Programme for International Student Assessment (PISA) 2009 results

The PISA 2009 results present the findings from the most recent PISA survey, which focused on reading and also assessed mathematics and science performance. The full results are available on the OECD website at www.oecd.org.

World Maths Day

World Maths Day takes place on Tuesday 1 March 2011. Students play at home and at school against other students around the world in live games of mental arithmetic. For more information visit www.worldmathsday. com.

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Dr John Johnston Mathematics Promotion Unit

IMA MATHEMATICS 2011

The Institute of Mathematics and its Applications (IMA) is holding a major one-day conference on mathematics and its current applications on 24 March 2011 at Saddlers' Hall, Gutter Lane, London. The conference is the sixth in the series addressing the wide range covered by mathematicians in their work. The aim of the conference is to bring together people with an interest in mathematics and its applications to consider current issues in the subject. The conference topics will cover research topics in mathematics, industrial applications of mathematics and the public understanding of mathematics. These topics will be of interest to both mathematicians and those working with mathematicians as the presentations will address the impact of the work rather than emphasise its technical nature. The conference gives an opportunity for informal discussion between people who are interested in a variety of areas in mathematics.

Speakers include: David Hand on modern applications in statistics, Heather Tewkesbury on industrial mathematics, Steve King on the use of mathematics for a manufacturer to assess the health of equipment, David Percy on mathematics in sport, Steve Humble on his work in helping a wider understanding of mathematics, a speaker on the Bloodhound project and a speaker on school mathematics issues.

Further information, including the fees, can be found on the conference website at www.ima.org.uk/Conferences/maths_2011. html.

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Head of THE UNIVERSITY of York Department

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Department of Mathematics

York Attractive Salary

The University of York is one of Britain's leading universities. It has an excellent reputation in teaching and research and was placed in the top ten UK Universities by the 2008 Research Assessment Exercise (RAE). It has since retained this position in various league tables and regularly ranks amongst the top 100 Universities worldwide. It also won the University of the Year award in the Times Higher this year.

Housed within this world class University, the Department of Mathematics is a single integrated unit which combines leading mathematical and interdisciplinary research with high quality undergraduate and postgraduate teaching. Our Department was recently voted "Best Department" by its students and we were placed first among comparable universities on measures of teaching excellence in both the 2008 and the 2010 National Student Survey. In the 2008 RAE about one half of our outputs in Pure and Applied Mathematics were rated World Leading or Internationally Excellent. We have continued to lead in research since that time with a number of colleagues receiving high profile grants and awards.

The Role:

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- To provide overall academic leadership of the department; ensuring the highest possible quality of teaching and research to maintain and continue to improve the reputation of the department at a national/international level.
- An exciting opportunity to lead and shape the strategic direction of the department, in close collaboration with colleagues, including oversight of resource allocation and staff management.
- To promote cooperative working relationships within the department and across the University. Reporting directly to the Vice-Chancellor and contributing to the development of the University's Corporate Plan.

The Candidate:

- Excellent track record in undertaking high-quality research, publishing in leading international journals, attracting and supervising research students and raising external grant funding.
- Experience in a leadership and management role in Higher Education.
- Highly developed inter-personal and communication skills with a proven ability to engage effectively with a wide range of internal and external stakeholders.

For further information, including details on how to apply and a full information pack, please visit www.odgers.com/34392

Closing date for applications: Friday 18th February 2011.

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PETER J. HILTON

Professor Peter Hilton, who was elected a member of the London Mathematical Society on 27 November 1947, died on 6 November 2010, aged 87.

Peter was born in London and educated at Oxford University. During World War II, at age 18, he was recruited from Oxford, because of his mathematical ability and knowledge of German, to work at Bletchley Park, the secret British facility dedicated to breaking German codes. This project was led by Alan Turing, the celebrated mathematician and founder of computer science, with whom the young Peter Hilton worked closely. Initially, Peter worked on breaking the Enigma code, and, later, on the more refined Fish code. Once the British Official Secrets Act was lifted in the 1980s, his lectures about the years at Bletchley Park were highly popular at venues all over the world.

After the War Peter obtained his doctorate from Oxford. He then went on to hold academic positions at Cambridge and Manchester Universities, and a Chair at the University of Birmingham. In 1962 he moved to the United States where he was Professor of Mathematics, first at Cornell, then at the University of Washington and the Battelle Institute. He held the Louis D. Beaumont Chair at Case Western Reserve University for a number of years, ending in 1982 when he became Distinguished Professor at Binghamton University, retiring in 1995.

Peter Hilton was one of the most influential mathematicians of his generation. He made major contributions to algebraic topology and homological algebra. His influence on these subjects has been profound. In his later years he was also a significant figure in Mathematics Education, especially in Europe. He published hundreds of research articles and many books on mathematics and mathematics education, and he lectured at conferences into his mideighties. His latest book was reviewed in the December *Newsletter*.

He is survived by his wife Margaret, two sons,

two grandsons and one great granddaughter. Krzysztof Pawałowski Adam Mickiewicz University

A version of this obituary originally appeared in the Group Action Forum Newsletter.

GAVIN BROWN

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Professor Gavin Brown, who was a member of the London Mathematical Society from 15 May 1969 to 31 October 1997, died on 25 December 2010, aged 68.

Tom Körner writes: Gavin Brown had a double career in mathematics and in academic administration and reached high distinction in both roles.

He came from Lundin Ling, a small village on the East coast of Scotland, and never lost his Scottish accent, his Scottish charm or his Scottish toughness. His father was a brick layer, but scholarships enabled him to study and shine first at school and then at St Andrews. His early research at Newcastle was in functional analysis, but he was rapidly led to measure algebras and thence to harmonic analysis, much of his work being done in collaboration. Some of his most beautiful results lie on the boundary between number theory and Fourier analysis.

He moved from a lectureship at Liverpool to a professorship at the University of New South Wales. He gradually became involved in administration taking on the position of Dean of the Faculty of Science at UNSW, then Vice Chancellor of the University of Adelaide and finally Vice Chancellor of the University of Sydney (the senior university of Australia). After retirement he was appointed the Inaugural Director of the Royal Institution of Australia.

He steered his universities safely through very stormy seas aided by his good humour and good sense. It is a sign of how well organised he was that he continued to produce interesting research throughout his career (including over 30 papers whilst at Sydney). Mathematics has lost a distinguished practitioner and a great advocate.

He is survived by his wife, son and daughter.

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CHAOS 2011 4th Chaotic Modeling and Simulation International Conference

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May 31 - June 3, 2011 Agios Nikolaos, Crete Greece

www.cmsim.org

Honorary Committee

Leon O. Chua

EECS Department, University of California, Berkeley, USA, Editor of the International Journal of Bifurcation and Chaos

Ji-Huan He

Donghua University, Shanghai, China, Editor of Int. Journal of Nonlinear Sciences and Numerical Simulation

Gennady A. Leonov

Dean of Mathematics and Mechanics Faculty, Saint-Petersburg State University, Russia, Member (corresponding) of Russian Academy of Science

David Ruelle

Academie des Sciences de Paris, Honorary Professor at the Institut des Hautes Etudes Scientifiques of Bures-sur-Yvette, France

Ferdinand Verhulst Mathematics Faculty, Utrecht, The Netherlands

Conference Topics

- 1. Chaos and Nonlinear Dynamics
- 2. Stochastic Chaos
- 3. Chemical Chaos
- 4. Data Analysis and Chaos
- 5. Hydrodynamics, Turbulence and Plasmas
- 6. Optics and Chaos
- 7. Chaotic Oscillations and Circuits
- 8. Chaos in Climate Dynamics 9. Geophysical Flows
- 10. Biology and Chaos
- 11. Neurophysiology and Chaos
- 12. Hamiltonian Systems
- 13. Chaos in Astronomy and Astrophysics
- 14. Chaos and Solitons
- 15. Micro- and Nano- Electro-Mechanical Systems
- 16. Neural Networks
- 17. Chaos, Ecology and Economy
- 18. Algorithmic Music Composition

Website: http://www.cmsim.org

Plenary Speakers

Marisa Faggini, University of Salerno, Italy Chaos Theory: Implications for Economic Analysis

Hansjorg Kielhofer, University of Augsburg, Germany

Pattern Formation of the Stationary Cahn-Hilliard Model

Alexander G Ramm, Department of Mathematics, Kansas State University, USA

Stability of solutions to some evolution problems

Vic J Law, Dublin City University, National Center of Plasma Science and Technology, Dublin, Ireland Decoding of atmospheric pressure plasma emission signals for process control

The Conference includes three types of presentations

Key Note Presentations on the main topics of the Conference selected by the Program Committee; Contributed papers or posters proposed by authors; Special Sessions or Workshops proposed from people working in a special topic of the chaotic field

A collection of the best papers presented in the three previous CHAOS Conferences are included in the following books published by World Scientific

- Topics on Chaotic Systems: Selected Papers from 1. the CHAOS2008 International Conference, C. H. Skiadas et al. Eds, World Scientific, 2009
- 2 Chaotic Systems: Theory and Applications, C. H. Skiadas and I. Dimotikalis, Eds, World Scientific, 2010.
- 3. Chaos Theory: Modeling, Simulation and Applications: Selected Papers from the CHAOS2010 International Conference, C. H. Skiadas et al. Eds, World Scientific, forthcoming.

Contact: Conference Secretariat

Email: secretariat@cmsim.org

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COMBINATORICS AT OXFORD

A One-Day Meeting in Combinatorics will be held in Oxford on Wednesday 16 March 2011. The meeting will take place in the Mathematical Institute, with talks starting at 11 am and coffee available beforehand from 10.30 am. This year's speakers are:

- Maria Chudnovsky (Columbia)
- Leslie Goldberg (Liverpool)
- Francisco Santos (Cantabria)
- Paul Seymour (Princeton)

Stephan Thomasse (Montpellier)

Anyone interested is welcome to attend. Some funds may be available to contribute to the expenses of research students who wish to attend the meeting. Further details can be obtained from Alex Scott (scott@maths. ox.ac.uk) or from the website at http://tinyurl. com/32yrf2d. The meeting is supported by an LMS Conference grant and by the British Combinatorial Committee.



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ANALYTIC AND GEOMETRIC METHODS IN MEDICAL IMAGING

22-26 August 2011

in association with the Newton Institute programme entitled Inverse Problems (25 July – 21 December 2011)

Organisers: M. Brown (Cardiff), T. Fokas (Cambridge), E. Haber (UBC), Y. Kurylev (UCL), W. Lionheart (Manchester), A. Nachman (chair) (Toronto).).

Theme of conference: The introduction of X-ray Computed Tomography (CT) in 1972 revolutionised Medical Imaging, replacing classical qualitative imaging by a quantitative format. Mathematics has since played a crucial role in several aspects of this vast discipline. While inversion of the Radon Transform was the basic starting point for CT, various other current and emerging imaging modalities (such as MRI, PET, Ultrasound, Elastography, Impedance Imaging, Photoacoustic Imaging, Thermography) each require the solution of different mathematical Inverse Problems to produce images from the corresponding physical measurements. Once images have been obtained, their immensely important current and future clinical use gives rise to a number of Image Analysis problems: segmentation, noise removal, deblurring, registration. Furthermore, in an exciting emerging area, determination of tissue parameters by medical imaging methods is used in Patient Specific Modelling of biological processes, promising to reach a whole new level of diagnostic and therapeutic planning techniques.

All three areas of Medical Imaging identified above (Inverse Problems, Image Analysis and Patient Specific Modelling) have seen significant mathematical developments, involving deep new analytical and geometric tools. The aim of the workshop is to establish connections between recent analytic and geometric work in Inverse Problems and analytic and geometric methods being developed by researchers in Image Processing and Patient Specific Modelling.

Further information and application forms are available from the website at: www.newton.ac.uk/ programmes/INV/invw03.html. Closing date for the receipt of applications is 6 May 2011.

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ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

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DESIGN OF EXPERIMENTS IN HEALTHCARE

15-19 August 2011

in association with the Newton Institute programme entitled Design and Analysis of Experiments (18 July – 21 December 2011)

Organisers: S. Biedermann (Southampton), V. Dragalin (Quintiles, USA), S. Eldridge (QMUL), H. Grossman (QMUL), M. Krams (Johnson & Johnson), P. Müller (University of Texas MD Anderson Cancer Center).

Theme of conference: The purpose of this workshop is to gather together people working in various aspects of design experiments in health-care, in the widest understanding of that word, from drug development in pre-clinical and clinical trials, treatment individualisation, studies on primary care, and gathering of evidence for public policy, to choice experiments in health economics. Participants and speakers include experts from industry and academia. Several talks will specifically focus on challenges and problems arising with the practical implementation of proposed strategies. Presentations describing both the current attempts to use DoE to overcome the recognised inefficiencies of the traditional drug development as well as the new challenges in implementing the DoE in clinical trials will be a basis for exchange of information among the researchers from the pharmaceutical companies, regulatory authorities, and from academia.

Further information and application forms are available from the website at: www.newton.ac.uk/ programmes/DAE/daew03.html. Closing date for the receipt of applications is **30 April 2011**.

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NONLINEAR WAVES AND SOLITONS IN LATTICES

A workshop on *Nonlinear Waves and Solitons in Lattices* will take place from 4 to 5 April 2011 at the ICMS in Edinburgh. At this workshop the speakers will present recent work and outline current problems in the field of nonlinear waves and solitons on lattices. As well as mathematical analysis, the speakers cover a wide range of disciplines including both pure and applied approaches to science and engineering. It will thus provide an excellent introduction to the subject area for younger researchers. In addition, time will be made available for discussions and to allow the formation of new collaborations. The meeting will mark the retirement of Chris Eilbeck. The speakers are:

- Juan Achilla (Madrid, Spain)
- Alan Champneys (Bristol, UK)
- Leonor Cruzeiro (Faro, Portugal)

- Dirk Hennig (Portsmouth, UK)
- Guillaume James (Toulouse, France)
- Magnus Johansson (Linköping, Sweden)
- Nikos Karachalios (Samos, Greece)
- Faustino Palmero (Sevilla, Spain)
- Mike Russell (Edinburgh, UK)

Limited financial assistance is available for PhD students and participants from African and former Soviet Union countries. Apply to one of the organizers: Jonathan Wattis (Jonathan.Wattis@nottingham.ac.uk) or Gabriel Lord (gabriel@ma.hw.ac.uk). For further information visit the website at www.icms.org. uk/workshops/wattis.

The workshop is supported by an LMS Conference grant, the Edinburgh Mathematical Society and the International Centre for Mathematical Sciences.

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THE LONDON MATHEMATICAL SOCIETY JOINTLY WITH GRESHAM COLLEGE

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Tuesday 17 May 2011 6:00 pm at Barnard's Inn Hall

Undecidable and Decidable Problems in Mathematics

Professor Angus Macintyre, FRS

Queen Mary, University of London

Professor Macintyre, the current President of the London Mathematical Society, presents a survey and some reflections to mark the centenary of Turing's birth.

ADMISSION FREE

NO RESERVATIONS REQUIRED - FIRST COME, FIRST SERVED

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ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

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EXPERIMENTS FOR PROCESSES WITH TIME OR SPACE DYNAMICS

18-22 July 2011

in association with the Newton Institute programme entitled Design and Analysis of Experiments (18 July – 21 December 2011)

Organisers: D. Ueinski (Zielona Góra), A. Curtis (Edinburgh).

Theme of conference: Applications of DOE in engineering often deal with large scale and highly complex systems where time and/or space are inevitable components. They may involve models in the form of ordinary differential, differential algebraic or partial differential equations. To some extent, optimal experimental design theory carries over to many dynamic problems in which the underlying design space can be a class of input sequences (time-domain analysis), a range of frequencies (frequency domain), a range of sampling intervals (sampling strategies), or a set of spatial sensor locations. However, the framework commonly adopted by statisticians has to be altered here to take account of factors continuously changing in time and/or space (e.g. temperature, pressure). Synergy of different methodologies opens up new perspectives for dealing with the complex settings to which the classical optimum experimental design methodology is not fit.

The workshop meets the urgent need of cross-fertilization between the engineering areas and DOE experts. Specific domains which constitute its main topics are: input profile design in control engineering, design subject to correlated observations, design for geographical surveys, design of observation networks, ill-posed inverse problems, and decentralised approaches to optimum experimental design. We plan invited and contributed talks from international speakers, a poster session, as well as a lot of time for informal discussion.

Further information and application forms are available from the website at: www.newton.ac.uk/ programmes/DAE/daew01.html. Closing date for the receipt of applications is 8 April 2011.

MATHEMATICAL NEUROSCIENCE 2011

A conference on *Mathematical Neuroscience* will take place from 11 to 13 April 2011 at the ICMS, Edinburgh. This three-day conference will provide an overview of the current state of research in mathematical approaches to neuroscience, bringing together both physical and life scientists. Drawing together the field in this way will allow for a critical discussion of the relevant experimental facts and of various mathematical methods and techniques that have been successfully applied to date. Importantly, it will draw attention to, and help develop, those pieces of mathematical theory which are likely to be relevant to future studies of the brain. The meeting will consist of invited speakers and registered participants though will be limited to 100 people. The schedule will allow for a number of poster presentations. The invited speakers are:

• Ernest Barretto (George Mason University)

• Romain Brette (ÉNS, Paris)

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- Jack Cowan (University of Chicago)
- Bard Ermentrout (University of Pittsburgh)
- Yixin Guo (Drexel University)
- Kenneth Harris (Imperial College London)
- Axel Hutt (INRIA, France)
- Máté Lengyel (University of Cambridge)
- Arjen van Ooyen (VU University Amsterdam)
- Alex Roxin (Hospital Clínic de Barcelona)
- Eric Shea-Brown (University of Washington)
- Louis Tao (Center for Bioinformatics, Peking University)
- Paul Tiesinga (Radboud University Nijmegen)
- John White (University of Utah)
- Si Wu (Shanghai Institute for Biological Sciences)

The registration fee for the conference is ± 90 .

A one-day training workshop for PhD students and post-docs entitled *An introduction to Mathematical Neuroscience* will take place prior to the meeting (on 10 April). Some financial assistance is available to graduate students who attend **both** the training workshop and the conference.

Further details of this meeting and how to register may be found at www.icms.org.uk/ workshops/neuro2011. Enquiries should be addressed to Audrey Brown (audrey.brown@ icms.org.uk).

MEGA 2011: EFFECTIVE METHODS IN ALGEBRAIC GEOMETRY

The MEGA 2011: Effective Methods in Algebraic Geometry conference will take place from 30 May to 3 June 2011 at the University of Stockholm, Sweden. The conference is open to scientists world-wide from both academia and industry. Attendance is by registration only. Invited speakers will include:

- Johannes Buchmann (Technische Universität Darmstadt, Germany)
- Guy Casale (Université Rennes 1, France)
- Anne Frühbis-Krüger (University of Kaiserslautern, Germany)
- Anton Leykin (Georgia Tech, USA)
- Monique Laurent (Centrum Wiskunde & Informatica, The Netherlands)
- Diane Maclagan (University of Warwick, UK)
- Pablo Parrilo (MIT, USA)

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- Kristian Ranestad (University of Oslo, Norway)
- Duco van Straten (University of Mainz, Germany)

Details of the conference programme and how to submit papers are available at www. esf.org/conferences/11372. For further information contact Alessandra Piccolotto (apiccolotto@esf.org). Closing date for paper submissions is **8 February 2011**. Closing date for applications is **16 March 2011**.

The conference is chaired by Sandra di Rocco (KTH, Stockholm) and Mikael Passare (Stockholm University). The conference is organised by the European Science Foundation (ESF), in partnership with the European Mathematical Society (EMS) and the ERCOM Institute Mittag-Leffler (IML).

APPLIED TOPOLOGY DAY

The Mathematical Institute in Oxford will host a one-day meeting on Monday 28 February 2011 on topology and its applications. The speakers are:

- Dorothy Buck (Imperial College, London) The classification of rational sub tangle adjacencies, with applications to complex nucleoprotein assemblies
- Michael Farber (Durham) Stochastic algebraic topology
- Jacek Brodzki (Southampton) Geometry and topology of data sets For further information see http://people. maths.ox.ac.uk/tillmann/atd or contact Ulrike Tillmann (tillmann@maths.ox.ac.uk).

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EQUADIFF 2011

The Equadiff is a series of biennial European conferences on theoretical aspects of differential equations held in rotation in Eastern and Western Europe. Recent locations in the Western series include Berlin (1999), Hasselt (2003) and Vienna (2007), all of which attracted in excess of 400 participants.

The next Western-series Equadiff will be held at Loughborough University from 1 to 5 August 2011. It will be the first time that the meeting has taken place in the United Kingdom. The conference will be organised around fifteen plenary lectures, twenty-five minisymposia and additional sessions for contributed papers. A number of special events will also be organised. The following mathematicians will present plenary talks at the conference:

- Mary Silber (Northwestern University, USA)
- Georg Weiss (Heinrich-Heine-Universität Düsseldorf, Germany)

Deadline for early registration is 1 May 2011. Further information is available on the conference website at www.lboro.ac.uk/ departments/ma/equadiff.

PARRONDO GAMES

Professor Juan Parrondo (Madrid) will be speaking at the University of Greenwich on Wednesday 16 February 2011 at 1 pm on his Parrondo Games. The talk will take place in Lecture Theatre 080, Queen Anne Court, Old Royal Naval College, London SE10 9LS. For further information visit the website at http:// mathsoc.cms.gre.ac.uk/Parrondo or contact Noel-Ann Bradshaw (n.bradshaw@gre.ac.uk).



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- Thierry Gallay (Université) de Grenoble I, France) Vassili Gelfreich (University of Warwick, UK) Rav Goldstein (University of Cambridge, UK) Sergei Kuksin (École)
- Polytechnique, France) Andrea Malchiodi (SISSA, Italy)

University, USA)

Nice, France)

David Damanik

- Jonathan Mattingly (Duke) University, USA)
- Barbara Niethammer (University of Oxford, UK)
- George Papanicolaou (Stanford University, USA)
- Jesús María Sanz-Serna (Univ. de Valladolid, Spain)



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WOMEN IN MATHEMATICS DAY 2011

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The next Women in Mathematics Day will be held on **Friday 6 May 2011** at De Morgan House, 57–58 Russell Square, London. Sessions will include talks by women mathematicians in a variety of appointments and at different career stages.

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

Any postgraduates, postdocs or research assistants interested in giving a talk during the afternoon session or presenting a poster should contact Peter Clarkson (P.A.Clarkson@kent.ac.uk).

To encourage high-quality posters, a £50 book token will be awarded for the poster that is judged to be the Women in Mathematics Day Best Poster 2011.

Programme (tbc)

10.30–11.00	Registration and coffee
11.00–13.00	Morning Session (times tbc)
	Claire Gilson (Glasgow) Box and ball systems in integrable systems
	Joan Lasenby (Cambridge)
	The Mathematics of making movies
	Rowena Paget (Kent)
	Set partitions and symmetric groups
13.00–14.00	Lunch and poster session
14.15–16.00	Afternoon Session
	Postgraduate/Postdoc speakers
	Discussion groups
16.00–16.30	Теа

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

To register contact Elizabeth Fisher (womeninmaths@lms.ac.uk).

The day is free for students and $\pounds 5$ for all others – payable on the day.

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HIVE MIND

In 2007, the Complicite theatre company created an extraordinary production. *A Disappearing Number*, inspired by the collaboration between Indian autodidact Srinivasa Ramanujan and Cambridge mathematician G.H. Hardy, is a play about the mesmeric beauty of numbers. In 2008 it won the Olivier Award for Best New Play, and last summer it was revived for performances at the International Congress of Mathematicians in Hyderabad, India.

Alongside the production Complicite, in collaboration with Marcus du Sautoy, came up with a series of Maths/Drama workshops. Designed to explode the myth that mathematics, and learning mathematics, is boring, the workshops use drama pedagogy to teach mathematical principles.

This summer, the company developed the workshops even further, coming up with *Hive Mind*. Taking the beehive as a microcosm of a world governed by mathematical systems (the Maths/Drama workshops being predicated on the idea that such is the human world), could the techniques developed in the workshops be used to create a beehive with up to 500 children?

Complicite's Education Coordinator, Poppy Keeling and Associate Victoria Gould, a mathematician and actress, travelled to India to try *Hive Mind* with 22 mathematics and arts teachers brought together from schools across the country. They had four days to share their material and help the teachers create their own, followed by a final day with the school children who would be their 'bees'.

It was an incredible week. The teachers devised exercises that represented stages in the life cycle of the hive: the journey from egg to adult bee; building the honeycomb; foraging; the waggle dance and swarming; and set the children to performing these tasks. They also created large-scale movement pieces: spirals and chequer boards made up of children in alternately black or yellow T-shirts.

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At times it was hard-going as many of the teachers were initially convinced that mathematics couldn't be taught through movement and games. However on the final day, in a hall packed with children laughing and shouting as they carried out mathematics exercises, they all seemed pretty persuaded.

More information on the production and the Maths/Drama workshops can be found at www.complicite.org. The Maths/Drama project for teachers is supported by the London Mathematical Society.

> Poppy Keeling Complicite Education Coordinator

THE SYMMETRIC GROUP

The representation theory of the symmetric group is an active area of research that sees an appealing interplay between algebra and combinatorics. There will be a one-day meeting on this theme at Royal Holloway, University of London on the afternoon of Tuesday 29 March 2011. The speakers will be:

- Christine Bessenrodt (Hannover)
- Matthew Fayers (QMUL)
- Mark Wildon (RHUL)

A large part of the talks will be accessible to a non-specialist audience. All are most welcome to attend the meeting. It would be very helpful if you could email the local organiser Mark Wildon (mark. wildon@rhul.ac.uk) if you plan to come. For further information visit the website at www.ma.rhul.ac.uk/~uvah099/meeting. html.

Limited funds are available to reimburse travel expenses of UK-based students. The meeting is supported by an LMS Conference grant.

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INDIAN SUMMER

The LMS has been keen to support attendance at the International Congresses of Mathematicians (ICM) and the European Congresses of Mathematics (ECM), especially among younger mathematicians. For the ICM in Hyderabad last August we awarded just over £10,000 in 22 grants, and were particularly pleased to receive the two reports below. We hope that they will encourage more young mathematicians to attend the next ECM, which is in Kraków in 2012 (www.6ecm.pl).

> Stephen Huggett Programme Secretary

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The International Congress of Mathematicians was a unique experience. It was by far the largest conference that I have ever been to and it was encouraging to realize that there is such a large community of mathematicians around the world. The Congress was an opportunity to meet other young mathematicians for the first time and to talk about our work, and to see friends that I have made similarly at previous conferences.

The highlights of the Congress for me were the plenary lectures. This was the first time that I have been able to hear so many talks from the best mathematicians in the world working in areas without close connections to combinatorics, the subject of my research. It was fascinating to learn about what other mathematicians do and to see the wide variety of approaches that can be taken to different problems. I also attended panel discussions on mathematics education and popularization of mathematics, which were very interesting, partly because I do a small amount of teaching of undergraduates.

The lectures with the most obvious relevance to my work were those in the combinatorics section. Some of the current leaders in the field were present and these talks were very useful for learning about the direction in which research is currently heading and for giving me problems that I might think about myself. I also attended lectures in sections related to combinatorics, such as probability and statistics, and mathematical aspects of computer science, given by speakers who would be unlikely to be at most combinatorics conferences. This was a valuable and rare opportunity to hear about other problems that I might attempt as part of my research.

Attending an ICM, especially one in India, is something that would have been much harder to do without the support of the London Mathematical Society, and I am very grateful for that support.

> Bryn Garrod Trinity College, Cambridge

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The ICM has been a wonderful scientific experience. For a PhD student the whole environment was extremely motivating, and it gave me the chance to interact and ask questions to top researchers in my field (Algebraic Geometry). I recently changed area for PhD thesis from toric varieties to birational geometry, and the talks by Christopher Hacon and James McKernan, Boundedness Results in Birational Geometry and Flips and Flops, gave me a very good insight of the latest developments in the Minimal Model Program. These two talks allowed me to understand how the tools I am learning about right now are used in stateof-the-art research, and how my work could fit in the big picture, as well as how are the remaining unfinished parts of the MMP.

Daniel Huybrechts's talk on the nonseparatedness of the moduli space of hyperkähler manifolds and their sheaves introduced me to a construction I did not know before and which may turn out to be useful in the future.

Richard Thomas's talk on how to use

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Kontsevich's homological mirror symmetry conjecture to obtain knot invariants from purely algebraic constructions was really interesting. I know very little about knot theory, and besides the formulation, I was not aware of how Kontsevich's conjecture can be useful to attack difficult problems in symplectic geometry via algebraic geometry until I attended this talk.

Claire Voisin's plenary talk covered an area I had studied before: Hodge theory and Hodge structures. In one hour she gave a very detailed and precise view on the subject, surveying the latest developments in relation to Hodge's conjecture, a millennium project. It was certainly one of the best talks in algebraic geometry of the conference. The other plenary talk I found particularly interesting was the one on the work of Chern, since it summarised how he contributed to modern complex differential geometry from its early developments at the beginning of the century.

In addition to the talks in my area, I was extremely benefited of being able to speak to Dr Konstantin Shramov from the Steklov Institute. Dr Shramov used to be a post-doc in the University of Edinburgh and unfortunately he encountered several difficulties with the Home Office to come back to participate in conferences. Being able to speak to him about mathematics for a week after the talks was really enlightening.

Finally, the panel discussion organised by the LMS about supporting mathematics in the developing world was also very interesting and I could get in touch with Dr Felix Shu, a mathematician from Cameroon. Soon, I will be sending him mathematical material which is hard for them to obtain.

I would like to thank the LMS for supporting my trip to the ICM. It has been a remarkable mathematical experience.

> Jesús Martínez García University of Edinburgh

BIRATIONAL GEOMETRY MEETING

Report

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An LMS Meeting took place on Monday 6 December 2010 in Edinburgh with two distinguished speakers (Yum-Tong Siu and Yujiro Kawamata) and was followed by a five-day workshop on *Birational Geometry*. All these events took place at the International Centre for Mathematical Sciences (Edinburgh) and were supported by the London Mathematical Society and the International Centre for Mathematical Sciences. About 80 people attended.

Birational Geometry has seen dramatic advances in recent years. Most notably, the finite generatedness of the canonical ring of any algebraic variety has been proved by Birkar, Cascini, Hacon and McKernan using recent ideas of Shokurov and Siu, major steps in proving the Abundance Conjecture were taken by Siu and Kawamata, and Shokurov's ACC Conjectures were proved by Kollár, de Fernex, Mustață, Ein, Hacon and McKernan. These results have attracted the attention of all mathematicians to Birational Geometry.

The area is extremely vivid, as reflected by the large number of well-synchronized recent and upcoming events (in Trento, Paris, New York, Banff, Palo Alto, Moscow, Tokyo, Salt Lake City, to name but a few). It is particularly attractive for earlycareer researchers, as the theory is well developed yet highly active, with many open questions which are interesting yet accessible (even at postgraduate level). The LMS meeting and subsequent workshop helped to promote this exciting area of research in the UK. Many international experts attended and numerous participants from the UK were attracted.

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Invited speakers included Valery Alexeev (Georgia), Fedor Bogomolov (Courant), Alessio Corti (Imperial College London), Jean-Pierre Demailly (Grenoble), Simon Donaldson (Imperial College London), Osamu Fujino (Kyoto), Ludmil Katzarkov (Vienna), Alexander Kuznetsov (Steklov Institute), Kenji Matsuki (Purdue), James McKernan (MIT), Shigefumi Mori (RIMS), Mircea Mustață (Ann Arbor), Viacheslav Nikulin (Liverpool), Mihai Paun (Nancy), Yuri Prokhorov (Moscow State), Miles Reid (Warwick), Slava Shokurov (Johns Hopkins), Alexander Tikhomirov (Yaroslavl), Burt Totaro (Cambridge), Hajime Tsuji (Sophia), Claire Voisin (Jussieu), Shing-Tung Yau (Harvard), and Yuri Zarhin (Penn State). Note that there were three Fields medalists among the invited speakers (Donaldson, Yau and Mori).

The workshop was held in honour of Slava Shokurov's 60th birthday. Despite bad weather conditions (heavy snow storms) all the invited speakers arrived on time except Fabrizio Catanese, whose flight from Germany was cancelled. The workshop's webpage is at www.maths. ed.ac.uk/cheltsov/shokurov.

We thank the LMS for its generous support which made this event possible.

Ivan Cheltsov (Edinburgh) Caucher Birkar (Cambridge)

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RECORDS OF PROCEEDINGS AT LMS MEETINGS

ORDINARY MEETING

held on Monday 6 December 2010 at the International Centre for Mathematical Sciences, Edinburgh. About 65 members and visitors were present for all or part of the meetina.

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The meeting began at 3.30 pm, with the President, Professor A.J. MACINTYRE, FRS, in the Chair.

There were no new elections to membership, and the President apologised that owing to the adverse weather conditions the Membership Book was not available for signature.

The President announced that the next meeting of the Society would be in Oxford on 25 February 2011, and that the Records of Proceedings of the recent AGM would be brought to that meeting.

Professor Yujiro Kawamata gave a talk entitled Survey of the abundance conjecture.

Professor Yum-Tong Siu gave a talk on Recent and historical analytic techniques for algebro-geometric problems.

The President thanked the speakers for their excellent lectures. He also thanked Ivan Cheltsov for his work in organising the meeting, and in closing the meeting he wished Professor Vyacheslav Shokurov a very happy birthday.

After the meeting, a reception was held at the ICMS, followed by dinner in a nearby restaurant.

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REVIEWS

The Num8er My5teries by Marcus du Sautoy, Fourth Estate, 2010, 320 pp, \pm 16.99, ISBN 978-0-0072-7862-6.

Imagine riding a train, and the man opposite you engaging you in conservation. He does so by inviting you to ponder a few mysteries: the reality of climate change, the security of the internet, the stability of the solar system. Then you notice something curious. While it seems like he is putting together random ideas, all of his stories culminate in a fascinating fact about the next station. This sense of going on a journey with a brilliant and entertaining companion is the strongest impression I got from this lovely book.

Du Sautoy has genuine gifts: for coming up with new ways of illustrating old ideas, and for telling old stories in fresh ways (correcting outmoded notions of mathematics as a progression of white male protagonists). I never thought I would see Mersenne primes and the Riemann hypothesis linked with dragon noodles from Mr Chang's restaurant in Taipei. The extent to which Du Sautoy links mathematics not only to things in the world, but to music, to movies, to art, is exhilarating.

The supporting structure of the book is composed of five of the seven Millennium Prize Problems: the Riemann hypothesis, the Poin-

caré theorem, the P vs NP problem, the Birch & Swinnerton-Dyer conjecture, and the Navier–Stokes problem receive one chapter each. (It bothered me that the Hodge and Yang–Mills conjectures were omitted, until I read that the book grew from five Royal Institution Christmas lectures.) Each chapter progresses via serpentine stories, puzzles, and illustrations which seem to be mere detours, until you realise that they were essential for allowing the final 'my5tery' to be discussed at the end. While this sounds like a recipe for disaster, it works. Distributed throughout are barcodes which can be photographed by a smartphone, linking to websites with additional information. Luddites like me – whose only phone is connected to the wall – are not left out: web addresses are there too. The websites contain games, things to print out and build, movies, and more besides. I think that my favourite was one which automatically generated artwork in the style of Coldplay's X & Yalbum art. This was related to the discussion on codes – and the pitfalls of using them on album art covers.

The Christmas Lectures are aimed at children, and certainly many of the games and puzzles are aimed at that category, not to mention the book's hyperlinked nature. But what would they make of references to "the head on your Guinness" (in a discussion of the Poincaré Theorem) and the drug ecstasy (in the build-up to the P vs NP problem)? The cover claims that the book is aimed at "ages 1–101", which might be a tad optimistic, but is broadly true.

If I have to find one area for improvement it would be in the figures. On the plus side, although all black and white, they are very varied, with little purpose-made quirky works of art, photos, diagrams, sketches. But it seems that the publisher did not want to pay for reproductions of many images, so for



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example chapter three has to describe, rather than show, Dürer's Melancholia, a Roman 20sided die, and the Sagrada Familia cathedral in Barcelona. In fact, I could only count three images in the book not produced by one of the team. But this is a small quibble.

Telling old stories with new twists (just how big is that pile of rice on the chessboard?), bringing new illustrations to bear on old problems (what is the history of the tetrahedral tea bag?), asking insightful questions (why can't you blow a cubical bubble?): in all of these du Sautoy excels. The book contains some of the clearest and most remarkable explanations I have ever read of some of the deepest questions in mathematics. It illustrates like no other the beauty, power, fun, ubiquity, and compulsive nature of mathematics.

Phil Wilson

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University of Canterbury, New Zealand

A version of this review was published in *Plus* magazine (http://plus.maths.org) in October 2010.

Nets, Puzzles and Postmen: An Exploration of Mathematical Connections by Peter M. Higgins, Oxford University Press, 2009, 256 pp, £8.99 pbk, ISBN 978-0-19-921843-1.

Networks are everywhere where there are interconnections between objects – road, rail and airline networks, electrical circuits, neural networks and the world wide web. They also have their recreational side, in problems such as the Königsberg bridges problem and the four-colour problem. In view of their importance and accessibility, it is somewhat surprising that there are few popular mathematics books on the subject.

This book under review is a largely successful attempt to fill the gap. The opening chapter discusses networks in general, with particular reference to trees, chemical isomers and truthteller-and-liar problems. Here it is a shame that there are no pictures of real-life networks to set the scene – the first picture depicts the trees with six nodes, which is hardly likely to excite the reader. Later chapters deal with Games of logic, Connection problems, Colouring and planarity, Traversing a network, One-way systems, Spanning networks, Network flows, and various recreational applications – the sort of topics that appear in many introductory graph theory courses. Throughout, the writing is clear, the examples are interesting and well chosen, and there is also a good balance between the algorithmic aspects of the subject and the 'fun'. The text is well written and easy to read and the book is inexpensively priced, though the print is too small.

Unfortunately, inaccuracies abound. The author's map of Königsberg shows two islands when there was only one. He shows the 4-vertex graph that Euler is supposed to have drawn to solve the Königsberg problem, but Euler drew no such graph. (It first appeared 150 years later.) In the discussion of the four-colour problem Alfred Bray Kempe appears as A.P. Kempe, Percy Heawood is described as an American mathematician (he was English), and the author claims that Kempe was admitted to the Royal Society on the strength of his paper on the four-colour problem (it was only one of eight papers cited - the other seven were on linkages in which Kempe had done excellent work). The Appel–Haken proof was a proof and not a verification, and the Robertson et al. proof appeared before 1994 and not in 1996.

The book concludes with a section on further reading. It would also have been useful to have a proper bibliography that includes current editions of the books he cites, rather than earlier editions that are no longer available.

It is a shame that such blemishes tend to mar what would otherwise have been an excellent book. It is to be hoped that a revised and corrected edition will eventually be available.

> Robin Wilson The Open University

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CALENDAR OF EVENTS

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

Please send updates and corrections to calendar@lms.ac.uk.

FEBRUARY 2011

14-16 Workshop on Mathematics Journals, MSRI, Berkeley, USA (399)
16 Parrondo Games Lecture, Greenwich (400)

25 LMS Mary Cartwright Lecture, Oxford (400)

28 Applied Topology Day, Oxford (400)

MARCH 2011

14-18 Representations of Surface Groups and Higgs Bundles Workshop, Oxford (398)
16 One-Day Meeting in Combinatorics, Oxford (400)

21-25 Compressed Sensing LMS Invited Lectures 2011, Cambridge (400)

24 IMA Mathematics 2011 Conference, London (400)

28 - 1 Apr Discrete Harmonic Analysis
Workshop, INI, Cambridge (398)
29 The Symmetric Group: Representations and Combinatorics, Royal Holloway, University of London (400)

APRIL 2011

3-8 Topics in Probability, LMS–EPSRC Short Course, Oxford (400)

4-5 Nonlinear Waves and Solitons in Lattices Workshop, ICMS, Edinburgh (400)
4-8 Computational Challenges in Partial Differential Equations Meeting, Swansea (392)

10 An Introduction to Mathematical Neuroscience ICMS Training Workshop, Edinburgh (400) 11-13 BAMC 2011, Birmingham (398) 11-13 Mathematical Neuroscience ICMS Conference, Edinburgh (400) 11-14 Random Structures and Dynamics Workshop, Oxford (400) 11-15 Derived Categories Workshop, INI, Cambridge (399) 11-16 Groups, Combinatorics, Computing De Brún Workshop, Galway (398) 14-16 Young Researchers in Mathematics 2011 Conference, Warwick (398) 18-21 BMC 2011, Leicester (398) 25-29 The Kervaire Invariant and Stable Homotopy Theory ICMS Workshop, Edinburgh (398)

MAY 2011

5 LMS Spitalfields Day, INI, Cambridge
6 Women in Mathematics Day, London (400)
17 LMS–Gresham Lecture, London (400)
22-27 Progress on Difference Equations 2011, Dublin (398)
30 - 3 Jun MEGA 2011, Stockholm, Sweden

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31 - 3 Jun CHAOS 2011, Crete, Greece (400)

JUNE 2011

6-8 Nonlinear Diffusion: Algorithms, Analysis and Applications Workshop, Warwick (395)
6-10 Oscillatory Integrals in Harmonic Analysis ICMS Workshop, Edinburgh (398)
7-10 14th Applied Stochastics Models and Data Analysis International Conference, Rome, Italy
13-17 Stabilization of Dynamical Systems and

Processes ICMS Workshop, Edinburgh (398) 14 LMS Midlands Regional Meeting, Birmingham

20-24 Geometric Analysis ICMS Workshop, Edinburgh (398)

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22-24 First British Conference on Mathematics of Filtering and Its Applications, Brunel
26 - 2 Jul New Developments in Non-Commutative Algebra and Applications
ICMS Workshop, Sabhal Mòr Ostaig, Isle of Skye (398)

27 - 1 Jul Signal Pocessing with Adaptive Sparse Structured Representation, ICMS Workshop, Edinburgh (398)

JULY 2011

1 LMS Meeting, London

4-8 Theories of Infinity ICMS–ESF Meeting, Edinburgh (398)

4-8 Gauge Theory and Complex Geometry, Leeds

9-11 Quantum Cohomology, Symplectic Resolutions and Representation Theory Meeting, Oxford

11-15 Numerical Relativity Beyond Astrophysics ICMS Workshop, Edinburgh (398) **18-20** Toric Methods in Homotopy Theory Conference, Belfast (398)

18-22 Experiments for Processes with Time or Space Dynamics INI Workshop, Cambridge (400)

18-22 ICIAM 2011, Vancouver, Canada (400)
19 LMS Northern Regional Meeting, Leeds
19-22 Homogeneous Structures Workshop, Leeds

21-22 Twistors in Geometry and Physics, Oxford

25-29 Introductory Workshop on Inverse Problems, INI, Cambridge (400)

AUGUST 2011

1-5 EQUADIFF 2011, Loughborough (400)
1-5 Inverse Problems in Analysis and Geometry INI Workshop, Cambridge (400)
9-12 Optimum Design for Mixed Effects Non-Linear and Generalised Linear Models INI Workshop, Cambridge (399)
15-19 Design of Experiments in Healthcare INI Workshop, Cambridge (400) 22-26 Analytic and Geometric Methods in Medical Imaging INI Workshop, Cambridge (400)

29 - 1 Sep Algebra, Combinatorics, Dynamics and Applications, Queen's University, Belfast

30 - 2 Sep Designed Experiments: Recent Advances in Methods and Applications INI Workshop, Cambridge (399)

SEPTEMBER 2011

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5-9 European Women in Mathematics
General Meeting, Barcelona (396)
5-9 Mathematical Imaging in Interaction
with Biomedicine ICMS Workshop, Edinburgh (398)

10-16 Turning Dreams into Reality ICME, South Africa (388)

12-16 Networks: Stochastic Models for Populations and Epidemics ICMS Workshop, Edinburgh (398)

19-23 Hyperbolic Conservation Laws and Related Analysis with Applications ICMS Workshop, Edinburgh (398)

OCTOBER 2011

7-8 LMS South-West and South Wales Regional Meeting, Exeter

NOVEMBER 2011

18 LMS AGM, London

DECEMBER 2011

12-16 Inverse Problems in Science and Engineering INI Workshop, Cambridge (400)

APRIL 2012 16-19 BMC 2012, Canterbury

JULY 2012 2-7 6th European Congress of Mathematics, Kraków, Poland (397)

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W.W. STORY LMS member 1879–1899



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William Edward Story AB Harvard, PhD Leipzig Professor of Mathematics at Clark University, Worcester, Massachusetts, USA In 1908 elected to the National Academy of Sciences (USA)

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