THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 351 September 2006

Forthcoming Society Meetings

2006

Monday 11 September
SW and South Wales Regional Meeting, Bath
P-L. Lions
T. Seppalainen
[*page 5*]

Friday 17 November
AGM, London
Geometric Analysis
R. Hamilton
P. Topping

2007

Friday 20 April
Midlands Regional Meeting
Loughborough

Wednesday 30 May
SW and South Wales Regional Meeting, Cardiff

Friday 22 June
London

Thursday 25 October
Northern Regional Meeting
Sheffield

Friday 23 November
AGM, London

HONORARY MEMBERSHIP

The London Mathematical Society has elected Professor Joseph Keller of Stanford University to Honorary Membership of the Society in recognition of his fundamental contributions to many areas of applied mathematics. The Society also acknowledges the support he has offered British Mathematics through close interaction with individuals and departments stretching over many decades.

It is fair to say that Joseph 'Joe' Keller is the most influential living applied mathematician residing in the West. He has published of the order of 400 articles since his first appeared in 1947 – his originality, creativity, mathematical dexterity and physical insight shine through in all of these works. He remains as alert and passionate about research today as he did when leading the legendary Courant Institute Group in the 1950/60s. Perhaps the most significant aspect of Joe's professional life is the sheer number of people who have worked with him or been influenced directly by his efforts. He has been selfless in offering his ideas and energies to benefit both youngsters and established researchers, and is always encouraging and enthusiastic when sitting through lectures given by students.

Joe Keller was born in Paterson, New Jersey, in 1923 and educated at New York University (PhD 1948). He remained there as a Professor of Mathematics in the Courant Institute of Mathematical Sciences until 1979, at which time he moved to Stanford University to become Professor of Mathematics and Mechanical Engineering. He became Professor Emeritus in 1993, but continues to travel and lecture widely.

Joe's research concerns the use of mathematics to solve a myriad of problems in science and engineering. For example, he developed the Geometrical Theory of Diffraction to describe and evaluate the propagation and scattering of acoustic and electromagnetic waves. It continues to be used widely to analyze radar reflection from objects, to calculate elastic wave scattering from flaws in solids, to study acoustic wave propagation in the ocean, etc. Another

example is his formulation of the EBK method of quantization to determine energy levels of atoms and molecules in quantum mechanics and to solve characteristic value problems in other fields. It is not possible to give anywhere near a complete list of publication topics, but they range from fluid mechanics to lichen growth, mathematical finance and stochastic PDEs to numerical analysis, biomechanics to nonlinear systems, and many other useful areas.

Joe Keller is a member of the National Academy of Science, a Foreign Member of the Royal Society of London, and was Honorary Professor of Mathematical Sciences at the University of Cambridge. He is a recipient of the Wolf Prize (1997), the Frederick E. Nemmers Prize (1996), the NAS Award in Applied Mathematics and Numerical Analysis (1995), the National Medal of Science (1988), the Timoshenko Medal (1984), the Eringen Medal (1981), the von Karman Prize (1979) and was the Gibbs Lecturer of the American Mathematical Society (1977), and the von Neumann Lecturer of SIAM (1983).

GREY AREA

What means this burst of sunshine? Has the *Newsletter* become a commercial directory? Are we sponsored by a lugubrious chart-topping band? Have we (alarming thought) been taken over by a Certain Publisher?

None of these: it is simply that after extensive consultation and careful scrutiny of the *Newletter*'s colour sample display (the fruit bowl on the Editorial Board table) a natural conclusion was reached. Next year it may be time for something more sanguine. To make text more readable some further minor adjustments have been made: readers tired of the usual *Newletter* fare might like to try spotting what they are. Those who find the LMS logo at the top of the front page a little restless will have the astigmatic sympathy of the General Editor.

David Chillingworth

LMS Newsletter

General Editor: Dr D.R.J. Chillingworth (D.R.J.Chillingworth@maths.soton.ac.uk)
Reports Editor: Dr S.A. Huggett (s.huggett@plymouth.ac.uk)
Reviews Editor: Mr A.J.S. Mann (a.mann@gre.ac.uk)
Administrative Editor: Miss S.M. Oakes (oakes@lms.ac.uk)
Editorial office address: London Mathematical Society, De Morgan House,
57-58 Russell Square, London WC1B 4HS (tel: 020 7637 3686; fax: 020 7323 3655;
email: oakes@lms.ac.uk, web: www.lms.ac.uk)
Designed by CHP Design (tel: 020 7240 0466, email: info@chpdesign.com, web:www.chpdesign.com)
Publication dates and deadlines: published monthly, except August.
Items and advertisements by first day of the month prior to publication.
Information in the *Newsletter* is free to be used elsewhere unless otherwise stated; attribution is requested when reproducing whole articles. The LMS cannot accept responsibility for the accuracy of information in the *Newsletter*. Views expressed do not necessarily represent the views or policy of the London Mathematical Society.

Charity registration number: 252660.

ANNUAL LMS SUBSCRIPTION 2006-07

The LMS annual subscription, including payment for publications, for the session November 2006 – October 2007 is due on 1 November 2006. Together with this *Newsletter* is a renewal form to be completed and returned with your remittance in the enclosed envelope.

Rates

The annual subscription to the London Mathematical Society for the 2006-07 session is:

- Ordinary Members £39.50
- Reciprocity Members £19.75
- Associate Members £10.00

The prices of the Society's periodicals to Ordinary, Reciprocity and Associate Members for 2006-07 are:

- *Bulletin* £40.00
- *Journal* £80.00
- *Proceedings* £80.00
- *Nonlinearity* £60.00
- *Journal of Computation and Mathematics* remains free.

Payment

No action is required if you are already paying by direct debit, and do not wish to change your choice of publications. Fully complete and return the form if you are paying by direct debit but wish to change your choice of publications or add/delete a subscription to the European Mathematical Society. Bank accounts of members paying by direct debit will be debited with the appropriate amount on **15 January 2007**. Other members should either enclose a cheque (£ sterling or US$) with their form or, if they have a UK bank account and wish to take advantage of this convenient form of payment, request a direct debit mandate. Although the facility to pay by credit card is open to all members of the Society, it is our preference that members continue to pay by direct debit.

Publications Pricing Policy

The LMS has a pricing structure that allows individual members to purchase its journals, for personal use only, at a substantial discount. In common with other mathematical societies, the Society regards a subscription as for personal use only if:

(a) issues are either destroyed or held on a continuing basis among the member's personal belongings, and are not deposited even temporarily in a library, common room or other public room, and
(b) are accessible to other mathematicians (or to students) only with the member's permission, given individually in each case.

Issues are the personal property of members, who would be able, without negotiation with authorities, to take the issues with them if they left their present institution or to give them to another individual who is willing to abide by these terms.

EUROPEAN MATHEMATICAL SOCIETY

The Council of the European Mathematical Society elected the following new officers and member to the Executive Committee for the period 1 January 2007 to 31 December 2010:

- President: Ari Laptev
- Vice-President: Helge Holden
- Secretary: Stephen Huggett
- Treasurer: Jouko Väänänen
- Member: Mireille Martin-Deschamps

Tuulikki Makelainen, who was appointed Secretary of the EMS at its inception in 1991, retired on 31 August. Her successor is Riitta Ulmanen (Riitta.Ulmanen@helsinki.fi).

COLLINGWOOD PRIZE

The 2006 Collingwood Memorial Prize has been awarded to Ruth C. Jenni (St John's College, University of Durham). The Collingwood Memorial Prize, established in memory of Sir Edward Collingwood FRS, President of the Society 1969-1970, is awarded to a final-year mathematics student at the University of Durham who intends to continue to a higher degree in mathematics at Durham or any other university.

MATHEMATICAL SOCIETY OF JAPAN PRIZES

Three prizes were awarded at the 2006 Annual Meeting of the Mathematical Society of Japan (MSJ).

The Seki-Takakazu Prize was founded in 1995 to honour people and organizations who have supported and encouraged the development of Mathematics in Japan over many years. The 2006 Prize was awarded to the Japan-U.S. Mathematics Institute (JAMI). The Japan-US Mathematics Institute was founded in 1988 by the Johns Hopkins Mathematics Department, with the cooperation of the Office of the President of Johns Hopkins University and members of the mathematical community of Japan. JAMI exists to further cooperation between the two countries in mathematical research through broadly based programs in Mathematics. It has organized 18 annual programs in widely ranging fields of mathematics, and the current programme is Recent Developments in *Higher Dimensional Algebraic Geometry*.

The Spring Prize is awarded each year to a mathematician who is not older than forty and has made an outstanding contribution to mathematics. The 2006 Prize was awarded to Professor Takuro Mochizuki (Kyoto University) for his distinguished contributions to the study of asymptotic behaviour of harmonic bundles. Mochizuki extends the theory of harmonic bundles by Simpson to non compact and higher dimensional case. As an application of his theory, Mochizuki has established Kashiwara's conjecture, that is, the category of semi-simple regular holonomic D-modules on projective varieties is preserved by various functors. Mochizuki's contribution can be viewed also as an extension of the study of asymptotic behaviour of variation of Hodge structures by Cattani, Kaplan, Schmid, Kashiwara, Kawai to the case of harmonic bundles. It should be noted that Kashiwara's conjecture has been proved almost simultaneously and independently by Drinfeld, Gaitsgory and Boeckle-Khare through the method of arithmetic geometry.

The Algebra Prize was awarded to Masaki Hanamura (Tohoku University) for his outstanding contribution to the study of mixed motives and to Hiroyuki Yoshida (Kyoto University) for his outstanding contribution to the study of automorphic forms and periods.

Masaki Hanamura contributed to the construction problem of mixed motives. Existence of the category of mixed motives over a field has not yet been established, but he defined the category which amounts to the derived category of mixed motives and also an object which should be regarded as the mixed motives associated with an algebraic variety and thereby representing the Chow group. Independently Voevodsky and Levine constructed the same sort of category. This is shown to be equivalent but the method is completely different.

Hiroyuki Yoshida studied the following three subjects recent years. He solved Shimura's conjecture on periods of Hilbert modular forms. Assuming the existence of motives, he proved that Siegel modular forms of degree m should have $m+1$ fundamental periods, and special values of various L functions are written in terms of the fundamental periods. He gave a conjectural description of special values of logarithmic derivatives of Artin L-functions by using Shimura's period symbols and also gave p-adic analogues with Dr T. Kashio.

LONDON MATHEMATICAL SOCIETY

SOUTH WEST & SOUTH WALES REGIONAL MEETING

Department of Mathematical Sciences University of Bath

Monday 11 September 2006

3.15pm **LMS business meeting**

3.30pm **Timo Seppäläinen (Madison)**
Limit shapes and fluctuations for some planar stochastic growth models

4.30pm **Tea**

5.00pm **Pierre-Louis Lions (Paris)**
Stochastic lattices and deformation energies

There will be a dinner afterwards. For registration, further details and to reserve a place at the dinner, see the webpage www.bath.ac.uk/math-sci/lms-bath or contact Mrs G. Lowe at gml@maths.bath.ac.uk.

The meeting will be followed by a workshop from 11 – 15 September on *Analysis and Stochastics of Growth Processes*. The aim of this workshop is to bring together analysts and probabilists working on the mathematical description of growth phenomena. Models based on the physics of individual particles will be discussed alongside models based on the continuum description of large collections of particles.

There are funds available to contribute to the expenses of members of the LMS or research students to attend the meeting and workshop. Requests for support can be expressed on the on-line registration form. For further information see www.bath.ac.uk/math-sci/lms-bath or contact the organizers (P. Mörters, R. Moser, M. Penrose, H. Schwetlick, J. Zimmer) at lms06@maths.bath.ac.uk.

MSOR SUPPORTING POSTGRADUATES

Regional Workshops

Following on from the inaugural series of events in 2005, the *Maths, Stats & OR Network* is pleased to announce six one-day regional workshops to provide discipline-specific support, advice and guidance to postgraduate students who teach Mathematics and Statistics.

- University of Nottingham
  Thursday 28 September
- University of Birmingham
  Tuesday 3 October
- University of Leeds
  Thursday 19 October
- London (at De Morgan House)
  Monday 23 October
- University of Glasgow,
  Wednesday 25 October
- University of Bristol
  Wednesday 1 November

The workshops will be hosted by academics with significant experience of teaching within Higher Education, and will cover the following topics:

- Planning and Preparing for Teaching
- Facilitating Problem Solving Classes
- Encouraging Participation and Providing Support
- Assessing Student Work and Providing Feedback

There will be an interactive element throughout with which the participants will engage, and there will be an ongoing series of Questions & Answers so that participants may seek answers to specific questions that they may have.

The workshops have been designed so that they are applicable to postgraduates who are new to teaching this academic year, as well as those who have prior experience. There is no charge for delegates who wish to attend one of these events. However, a cancellation fee will be charged to those who register but fail to attend without providing at least one week's notice; lunch and refreshments will be provided.

For further details and to book online please visit www.mathstore.ac.uk/postgrads2006.

FERMAT PRIZE FOR MATHEMATICS RESEARCH

Université Paul Sabatier 2007 Award

The Fermat Prize rewards research work in fields where the contributions of Pierre de Fermat have been decisive:

- Statements of variational principles
- Foundations of probability and analytical geometry
- Number theory

The spirit of the prize is focused on rewarding the results of researches accessible to the greatest number of professional mathematicians within these fields.

The amount of the Fermat prize has been fixed at €20,000. The Fermat prize is awarded once every two years in Toulouse; the tenth award will be announced in October 2007.

Winners of preceding awards:

- A. Bahri, K.A. Ribet (1989)
- J.-L. Colliot-Thélène (1991)
- J.-M. Coron (1993)
- A.J. Wiles (1995)
- M. Talagrand (1997)
- F. Bethuel, F. Hélein (1999)
- R.L. Taylor, W. Werner (2001)
- L. Ambrosio (2003)
- P. Colmez, J.-F. Le Gall (2005)

Rules governing the award, candidacy formalities, etc. are available from the organising secretariat of the Fermat prize: Prix Fermat de Recherche en Mathématiques, Service Communication, Université Paul Sabatier, 31062 Toulouse Cedex 9, France. Closing date for application forms is **30 June 2007**.

Springer
the language of science
springer.com

New from Springer

Scientific Computing with MATLAB and Octave

A. Quarteroni, Ecole Polytechnique Fédérale de Lausanne, Switzerland; F. Saleri, Politecnico di Milano, Italy

From the reviews of the 1st edition ► *...Scientific Computing with MATLAB is written in a clear and concise style, figures, tables and formula boxes complement the explanations... The whole book is an invitation, if not a request, of the authors to the reader to play with MATLAB, apply its powerful menagerie of functions to solve the given (or own) problems – in brief, supervised learning by doing...*
► Anselm A.C. Horn, Journal of Molecular Modeling 2004

2nd ed. 2006. XII, 324 p. (Texts in Computational Science and Engineering, Vol. 2) Hardcover
ISBN 3-540-32612-X
► € 39,95 | £30,50

Computing the Electrical Activity in the Heart

J. Sundnes, G. T. Lines, X. Cai, B. F. Nielsen, K.-A. Mardal, A. Tveito, Simula Research Laboratory, Lysaker, Norway

This book describes mathematical models and numerical techniques for simulating the electrical activity in the heart. It gives an introduction to the most important models of the field, followed by a detailed description of numerical techniques for the models. Particular focus is on efficient numerical methods for large scale simulations on both scalar and parallel computers.

2006. XI, 318 p. (Monographs in Computational Science and Engineering, Vol. 1) Hardcover
ISBN 3-540-33432-7
► € 69,95 | £54,00

Production Planning by Mixed Integer Programming

Y. Pochet, Université Catholique de Louvain, Belgium; L. A. Wolsey, Université Catholique de Louvain, Belgium

2006. XXIII, 499 p. 77 illus. (Springer Series in Operations Research and Financial Engineering) Hardcover
ISBN 0-387-29959-9
► € 49,95 | £38,50

Ordinary Differential Equation with Applications

C. Chicone, University of Missouri, Columbia, MO, USA

From the reviews of the first edition ► *As an applied mathematics text on linear and nonlinear equations, the book by Chicone is written with stimulating enthusiasm. It will certainly appeal to many students and researchers.*
► F. Verhulst, SIAM Review

2nd ed. 2006. XIX, 636 p. 73 illus. (Texts in Applied Mathematics, Vol. 34) Hardcover
ISBN 0-387-30769-9
► € 59,95 | £46,00

Easy Ways to Order for the Americas ► Write: Springer Order Department, PO Box 2485, Secaucus, NJ 07096-2485, USA ► Call: (toll free) 1-800-SPRINGER ► Fax: +1(201)348-4505 ► Email: orders-ny@springer.com or for outside the Americas ► Write: Springer Distribution Center GmbH, Haberstrasse 7, 69126 Heidelberg, Germany ► Call: +49 (0) 6221-345-4301 ► Fax: +49 (0) 6221-345-4229 ► Email: SDC-bookorder@springer.com ► Prices are subject to change without notice. All prices are net prices.

012617x

NEWS FROM THE MATHEMATICAL SCIENCES PROGRAMME AT EPSRC

New Responsibilities within the Mathematical Sciences Programme.

The Mathematical Sciences Programme has a new member. His name is Mark Bambury and he will be looking after Statistics and Applied Probability, and Operational Research.

Contact details for all members of the team can be found on the EPSRC website, but are also listed below:

- Annette Bramley: Programme Manager. Email: Annette.Bramley@epsrc.ac.uk, tel: 01793 444 304
- Anne Farrow: Applied Mathematics (with particular responsibility for studentships). Email: Anne.Farrow@epsrc.ac.uk, tel: 01793 444 110
- Caroline Batchelor: Mathematical Physics and Mathematical Analysis (with particular responsibility for Complexity). Email: Caroline.Batchelor@epsrc.ac.uk, tel: 01793 444 458
- Katharine Bowes: Pure Mathematics (with particular responsibility for Fellowships, Mathematics for Industry and Business and Public Engagement). Email: Katharine.Bowes@epsrc.ac.uk, tel: 01793 444 162
- Mark Bambury: Statistics and Applied Probability and Operational Research (with particular responsibility for the Small Grants Call). Email: Mark.Bambury@epsrc.ac.uk, tel: 01793 444 183

Recently funded grants
The outcomes of recent EPSRC panels – Senior Research Fellowships, Advanced Research Fellowships and June Responsive Mode Panel – are now available on the EPSRC website.

2007 Advanced Research Fellowships
Applications are invited for the 2007 Advanced Research Fellowships exercise. Advanced Research Fellowships are awarded to outstanding researchers with between 3-10 years of postdoctoral experience. Fellows are expected to devote themselves to research for the period of the award (up to 5 years), with the expectation that they will have established an independent research career of international standing by the end of the award. Approximately 50 of these awards are made each year. Closing date: **4.00 pm on 9 November 2006**.

2007 Senior Research Fellowships
Applications are invited for the 2007 Senior Research Fellowships exercise. Senior Research Fellowships are awarded to outstanding academic scientists and engineers of international repute with a minimum of 10 years post doctoral experience. Fellows will be released from their current teaching and administration loads to devote themselves to research for the period of the award (up to 5 years). The proposed research must be important, timely and should offer opportunities for major scientific advances. Only a few of these most prestigious awards are made each year. Closing date: **4.00 pm on 1 November 2006**.

Postdoctoral Fellowships Call 2006
The Physics, Information and Communications Technologies (ICT) and Mathematical Sciences Programmes are offering Postdoctoral Fellowships to enable the most talented young researchers to establish an independent research career, shortly or immediately after completing a PhD. The awards are open to physicists, theoretical computer scientists, mathematicians, statisticians and operational researchers who have a maximum of 3 years' postdoctoral experience at date of application and are not in a permanent academic position. The research must be within the remit of the EPSRC mathematical sciences or physics programme, or be in theoretical computer science. The Fellowships must be held at a UK University; they are for a period of up to three years and cover the salary costs of the Fellow, travel and subsistence and equipment.

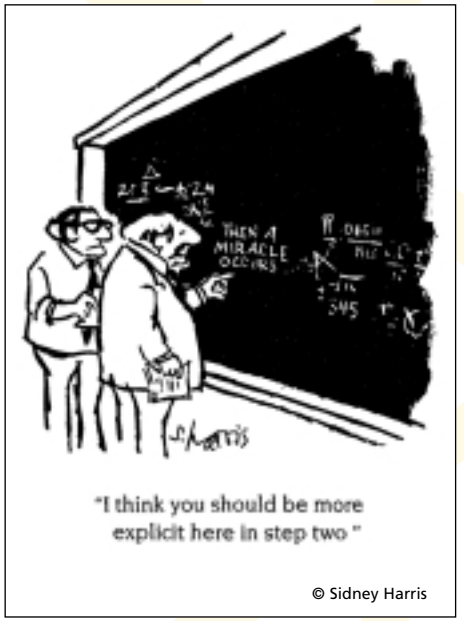
For further information contact Dr Katharine Bowes (email: Katharine.Bowes@epsrc.ac.uk, tel: 01793 444 162). Closing date: **4.00 pm on 26 September 2006**.

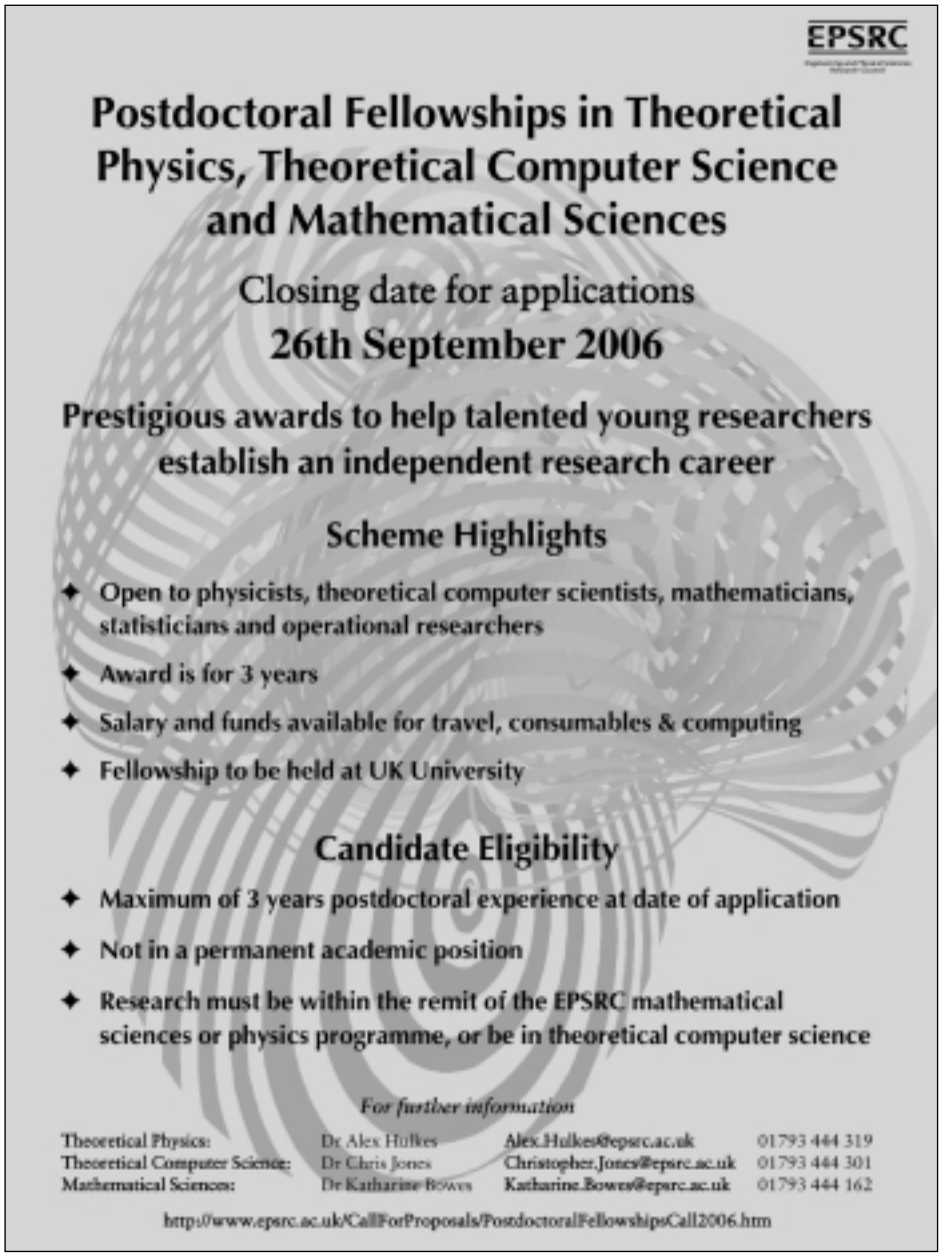
Postdoctoral Fellowships at the Life Science Interface 2006/2007
The Life Sciences Interface Programme is offering Postdoctoral Fellowships to enable the most talented young researchers from physical sciences or engineering disciplines to establish an independent research career working across the interface into the life sciences, shortly or immediately after completing a PhD. The awards, which are for a period of up to three years, will be held at a UK academic institution but include provision for the fellow to spend between 12 to 18 months working at a leading overseas laboratory. The award covers the salary cost of the Fellow, the associated costs of the research (including travel and subsistence, consumables and minor equipment) and the additional travel and living costs associated with the period spent working overseas. There are no nationality or residence restrictions on who can hold these fellowships. Closing date: **4.00 pm on 12 September 2006**.

Characterisation, Modification and Mathematical Modelling of Sudsing
EPSRC and Procter & Gamble (P&G) have formed a strategic partnership to jointly fund high quality basic, strategic and applied research. Following the successful announcement of a programme of research in the areas of process engineering, physical and synthetic chemistry, and materials and their properties, EPSRC and P&G are launching a call for Expressions of Interest from those wishing to submit a full research proposal to address research challenges in the area of the characterisation, modification and mathematical modelling of Sudsing Systems (e.g. non-stable foams). The closing date for Expressions of Interest is **4.00 pm on 20 September 2006**.

INTERACT
INTERACT is the EPSRC programme to establish and build strong research links between the UK and India, China or Japan. In this 4th call of INTERACT, we invite applications from UK researchers interested in building strong networks and collaboration with those in India, China or Japan. Funding is provided for travel and subsistence and follow-on funds for the establishment of an international network of activity. It is expected that the strong partnerships formed from this programme will lead to collaborative research activity between high quality research groups in China, India or Japan and those in the UK. Closing date: **4.00pm on 14 September 2006**.

Please see a full list of current calls on the EPSRC website (www.epsrc.ac.uk/CallsForProposals/).





TOPOLOGY

The Editors of the journal *Topology* have asked that the following Open Letter to Elsevier Science be made widely available to the mathematical community:

Dear Mr Ross,

We regret that we have to tell you that we, the Editorial Board of *Topology*, are resigning with effect from 31 December 2006.

As you are well aware, the Editors have been concerned about the price of *Topology* since Elsevier gained control of the journal in 1994. We believe that the price, in combination with Elsevier's policies for pricing mathematical journals more generally, has had a significant and damaging effect on *Topology*'s reputation in the mathematical research community, and that this is likely to become increasingly serious and difficult, indeed impossible, to reverse in the future.

As you know, we have made efforts over the last five to ten years to negate this effect. When the alternative subscription option was introduced a few years ago (electronic access combined with annual print delivery for half the regular price), we were hopeful that it would help in this regard. However it made little impact, probably because most university libraries which subscribe to *Topology* do so through consortia deals.

The journal *Topology* has an illustrious history with which we, on becoming editors, were extremely proud to be associated. It owed its foundation to the inspiration and vision of the great Oxford topologist JHC Whitehead in the late 1950s, and the Honourary Advisory Editorial Board and also our predecessors on the Editorial Board have included some of the greatest names on 20th century mathematics. We believe that the journal's ethos and structure, based around a group of editors making editorial decisions jointly in Oxford with the expert assistance and advice of highly eminent editors elsewhere around the world, has many strengths and has provided a great service to the mathematical community in the past. However we feel that Elsevier's policies towards the publication of mathematics research have undermined this legacy.

Therefore, with great reluctance and sadness, we have made the difficult decision to resign.

Yours sincerely,

Martin Bridson
Ralph Cohen
Nigel Hitchin
Frances Kirwan
Marc Lackenby
Jean Lannes
Wolfgang Luck
John Roe
Ulrike Tillmann

VISIT OF DR F. BOLLEY

Dr Francois Bolley (University of Paris Dauphine) will visit England this Autumn. He will lecture at

- Lancaster University, 27 October
- Oxford Stochastic Analysis Seminar, 30 October
- Imperial College, London, 2 November

at venues and times to be announced. The title of his lectures will be *Transportation inequalities and applications to interacting particle systems*. For further information, please contact Gordon Blower (g.blower@lancaster.ac.uk). This visit is supported by the London Mathematical Society under Scheme 2.

VISIT OF DR S. RICHARD

Dr S. Richard (Lyon) will be visiting the UK during October to lecture and collaborate with Professors Davis, Sobolev and Hunton on analysis and mathematical physics. He will give lectures at the University of Birmingham on the 5th, at the University of Leicester on the 9th and at King's College London on the 12th. His visit is supported by an LMS Scheme 2 grant. For further information contact Professor J. Hunton (jrh7@mcs.le.ac.uk).

MOVING INTERFACE PROBLEMS

The Institute for Mathematical Sciences (Singapore) is organizing a programme on *Moving Interface Problems and Applications in Fluid Dynamics*. The programme will take place from 8 January – 31 March 2007 in Singapore.

It is a perennial challenge to develop accurate (and yet not-so-complex) mathematical models for faithful descriptions of various moving interface problems with different applications. In this programme, we will discuss recent developments in the modelling and simulations of biological flow coupled to deformable tissue/elastic structure, shock wave and bubble dynamics in biological treatment (occurring in shock lithotripsy, lipoplasty, phacoemulsification and others) with experimental verification, multi-medium flow or multi-phase flow involving cavitation/supercavitation (arising from large pressure changes) and detonation problems. This programme will address (mathematical) issues arising from these areas, including:

- how to deal efficiently with interfacial topological change
- how to overcome the unphysical oscillations
- how to suppress the numerical instability when a fluid is coupled to a stiff material or when the density ratio of two media is very large
- how to deal efficiently with stiff chemical reactions in computations
- whether and when one should consider using isotropic or anisotropic models, considerations of thermal and friction effect, and other factors during the modelling of multi-phase flows with relevance to the bio-medical field and physical environment

The purpose of this programme is to bring together fluid mechanists, physicists, biological scientists, computational scientists, applied and computational mathematicians and engineers to develop and promote interdisciplinary research on modelling, theory, and simulations in the area of fluid dynamics involving moving interfaces, with a view to applications in the bio-medical field and physical environment and with relevance to industry and the defence community. It will provide a platform for local and international researchers to exchange ideas, conduct collaborative research and identify future directions and developments in these fields.

The programme consists of two workshops, four tutorial sessions, and collaborative research. One workshop focuses on moving interface problems and applications in biological flow; the other emphasizes compressible multi-medium flows, bubble dynamics, cavitating flow, detonation and their applications.

- *Moving Interface Problems and Applications in Biological Flows* 8-12 January 2007. Speakers: J. Barrett, Aaron Fogelson, K. Ito, J. Lowengrub, K. Takayama and Pei Zhong
- *Multiphase Physical Flows and Applications* 12-16 March 2007. Speakers: Shi Jin, Frank Lu, Richard Saurel, T. Tang and G. Tryggvason

Visit www.ims.nus.edu.sg/Programs/fluiddynamic/index.htm for more information and registration. For general enquiries, please email to imssec@nus.edu.sg. For enquiries on scientific aspects of the programme, please email Boo Cheong Khoo at mpekbc@nus.edu.sg.

WAVES, POLLUTION AND MODELLING

A one day seminar to celebrate the contribution of Professor Ron Smith to British Applied Mathematics will be held on Monday 25 September in the Mathematical Sciences Department Room, David Davis Building, Loughborough University. The meeting will commence at 1:15 with tea and coffee, finishing at 17:45 with a wine party. The speakers are:

- Introduction by Roger Grimshaw *Outline summary of Ron Smith's achievements*
- Jerry Bona (University of Illinois, Chicago) *Model equations for surface water waves in two and three dimensions: theory and application*
- Philip Chatwin (Sheffield University) *Remarks on some of Ron Smith's work in longitudinal dispersion*
- Howell Peregrine (Bristol University) *Violent water wave impact on walls*
- Ted Johnson (University College London) *Vortices from variational principles*
- Anthony Kay (Loughborough) *Pollution, plumes and perturbation problems*

There are limited funds available to contribute to the travel expenses of research students to attend the meeting. Requests for support including an estimate of costs may be sent to Professor Roger Smith (R.Smith@lboro.ac.uk). Further information is available on the website (www.lboro.ac.uk/ about/map). The meeting is supported by an LMS conference grant.

BELFAST FUNCTIONAL ANALYSIS DAY 2006

This year's Belfast Functional Analysis Day (BFAD) will feature Professor Andreas Defant from Oldenburg University (Germany) as the main speaker, with two one-hour lectures on *Classical summation methods in noncommutative probability*. As usual there will be contributed talks by the participants.

The meeting will be held in the Department of Pure Mathematics at Queen's University Belfast on Saturday 25 November. It is organised by Drs Martin Mathieu and Ivan Todorov and Professor Anthony Wickstead. It is supported by an LMS conference grant and postgraduate students studying at a UK or RoI university can be supported.

Full details and further updates can be found at www.qub.ac.uk/bfad. Enquiries can also be sent to m.m@qub.ac.uk (Dr Martin Mathieu).

GRESHAM LECTURES 2006

Robin Wilson, Gresham Professor of Geometry

History of Mathematics
Following on from the last two years, these lectures trace the historical development of mathematics from the 18th century to the present day.

The 18th century: Crossing bridges
4 October
What shape is the Earth? How do strings vibrate? Can you construct a 65,537-sided polygon? Can you cross the seven bridges of Königsberg? While British mathematics drowned in Newtonianism, major bridges were being crossed on the Continent ...

The 19th century: Revolution or evolution?
25 October
What is a number? Can you solve a quintic equation? Is Euclid true? Is the calculus correct?

The 19th century witnessed major breakthroughs in geometry, algebra and calculus, and a move 'back to basics'. But were these the results of continual change, or did they indicate a revolution in the subject?

The 20th century: Chaos, codes and colouring
15 November
What is the Mandelbrot set? How can prime numbers protect your bank balance? Why is mathematics incomplete? More new mathematics arose in the 20th century than was known up to that time – including the long-awaited proofs of Fermat's last theorem and the four-colour theorem.

The lectures all take place on Wednesdays at 1.00 pm and 6.00 pm at Gresham College, Barnard's Inn Hall, Holborn, London EC1N 2HH (near Chancery Lane tube station), tel: 020 7831 0575; website: www.gresham.ac.uk. Admission is free.

THE RANKIN LECTURES 2006

A series of five one-hour lectures will be given by Persi Diaconis (Stanford) during the week 6 – 10 November 2006, in the Mathematics Department of the University of Glasgow. The overall title of the series is:

Harnessing chance

To quote Professor Diaconis:

"The twentieth century has been called 'the time of taming chance'. Now, we are harnessing chance to make and break codes, find patterns in DNA, and even do basic counting. These themes will be explored in a sequence of lectures aimed at a general scientific public."

In particular, all mathematicians, statisticians, computer scientists, philosophers and other interested members of the public are welcome to attend. At least one of the talks will be accessible to school pupils. Further details of the programme, and details concerning accommodation, can be found at www.maths.gla.ac.uk/~ajb/rankin.

There are limited funds to support the attendance of postgraduate students.

Email enquiries can be made to rankin@maths.gla.ac.uk. This will be the first in what we intend to be a long-running lecture series, funded by the Glasgow Mathematical Journal Trust, in memory of Professor Robert Rankin, former member of our department.

LONDON MATHEMATICAL SOCIETY

in association with the COW Algebraic Geometry Seminar

Spitalfields Day

Aspects of geometry

Lecture room L2, Mathematical Institute, Oxford

Wednesday 27 September 2006

2.00 – 3.00 **David Mumford (Brown)**
Metrics on the space of simple closed plane curves

3.00 – 3.45 **Tea**

3.45 – 4.45 **Bernd Sturmfels (UC Berkeley)**
Tropical implicitization

5.00 – 6.00 **Wine and cheese reception**

The talks are aimed at graduate students and researchers interested in geometry, understood in a wide sense, as applied to problems such as image recognition and other aspects of computation. Anyone interested is welcome to attend; please let Balázs Szendroi know if you intend to come (szendroi@maths.ox.ac.uk).

Abstracts of talks are available from www.maths.ox.ac.uk/~szendroi/spitalfields.html.

There are limited funds available to assist students to attend; please apply by **15 September**.

SCOTTISH COMPUTATIONAL MATHEMATICS SYMPOSIUM

The 15th Scottish Computational Mathematics Symposium will take place on Thursday 14 September from 10:30-17:30 at Heriot-Watt University, Riccarton Campus, Edinburgh. The speakers are:

- Assyr Abdulle (Basel, moving to Edinburgh)
- Lyonnel Boulton (Heriot-Watt)
- Chris Budd (Bath)
- Mike Giles (Oxford)
- Tony Shardlow (Manchester)

Anyone interested is welcome. The meeting is supported by an LMS conference grant and some funding is allocated for travel for UK-based PhD students. Registration, student funding and other details are at www.ma.hw.ac.uk/scms.

OPERATOR ALGEBRAS AND APPLICATIONS

Conference in Honour of Christopher Lance

A conference on Operator Algebras and Applications will be held at the University of Leeds from 21-23 September. The meeting will survey some of the recent progress in operator algebras and applications, and will celebrate the contributions and influence of Professor Christopher Lance in this area of mathematics. The organisers gratefully acknowledge the support of the London Mathematical Society, the University of Leeds, and the University of Aberdeen. Invited lecturers include:

- N.P. Brown (Pennsylvania State)
- J. Cuntz (Münster)
- D.E. Evans (Cardiff)
- E.G. Effros (UCLA)
- E. Kirchberg (HU Berlin)
- M. Mathieu (Belfast)
- M.A. Rieffel (Berkeley)
- J.R. Ringrose FRS (Newcastle)
- A.G. Robertson (Newcastle)
- A.M. Sinclair FRSE (Edinburgh)
- I. Todorov (Belfast)
- S. Wassermann (Glasgow)
- J. Zacharias (Nottingham)

Further information is available from the conference webpage: www.maths.gla.ac.uk/~asw/ecl.htm. Graduate students at UK universities who wish to apply for financial assistance should contact Rob Archbold at opalg@maths.abdn.ac.uk.

ALGORITHMS AND COMPLEXITY

The second Algorithms and Complexity in Durham Workshop (ACiD 2006) will be held at Durham University from 18-20 September. The workshop is intended to be a forum for mathematicians and computer scientists working on all aspects of algorithms and complexity. Possible topics include, but are not limited to:

- Algorithm design and analysis
- Computational complexity
- Randomized algorithms
- Algorithmic graph theory
- Combinatorial algorithms
- Approximation algorithms
- Applications of algorithms
- Constraint satisfaction
- Exact and parameterized computation
- Proof complexity
- Databases and information retrieval
- Quantum computing
- Discrete optimization

The invited speakers are:

- Jan Krajicek (Academy of Sciences of the Czech Republic, Prague)
- Alexander Schrijver (CWI, Amsterdam)
- Detlef Seese (AIFB, University of Karlsruhe)
- Berthold Vöcking (RWTH, Aachen University)

The workshop is supported an LMS conference grant. For further information visit the website www.dur.ac.uk/acid.2006/.

Staff Tutor in Mathematics, Statistics and Computing

Faculty of Mathematics and Computing
£26,402 - £38,772, Ref: 2907
Based in South Manchester - Available from 1 January 2007

The Open University

This is an exciting opportunity to make a major contribution to HE teaching in NW England. Regionally-based you will be at the forefront of supported distance higher education, leading a team of highly qualified tutors.

You will share responsibility for the management and administration of our undergraduate courses and contribute to course development and preparation of distance learning materials.

Your role will include: appointing, training and supervising part-time tutors; planning tuition at local centres; and authoring distance learning materials. Considerable travel and some evening/weekend work is required.

A good honours degree, preferably a higher degree, in Mathematics, Statistics, Computing or related subject is essential; a specialism in Mathematics would be preferable; experience in adult education and/or distance learning would be an advantage.

For more detailed information, an application form and how to apply go to www3.open.ac.uk/employment, or call the Recruitment Secretary on +44 (0)1908 654161 or email mcs-recruitment@open.ac.uk quoting the reference number. Closing date: 19 September 2006

Disabled applicants who meet the essential job requirements will be interviewed. Further particulars are available in large print, disk or audiotape (minicom 01908 654901).

We promote diversity in employment and welcome applications from all sections of the community.

AMERICAN MATHEMATICAL SOCIETY

Announcing Our New European Acquisitions Editor — ***Ina Mette***

As one of the leading organizations for research mathematics, the AMS has the expertise and experience to market and promote your book worldwide. AMS books are also distributed to libraries and booksellers throughout the world, with significant representation in Europe, Scandinavia, India, Japan, and the Middle East.

Contact Ina Mette if you would like to submit a manuscript to the AMS.

Ina Mette, *European Book Acquisitions*
Lütt Iserbrook 25
D-22589 Hamburg, Germany
email: ina@ams.org

AMS
AMERICAN MATHEMATICAL SOCIETY
www.ams.org

RECORDS OF PROCEEDINGS AT MEETINGS

ORDINARY MEETING

held on *Friday 16 June 2006* at University College London. About 75 members and visitors were present for all or part of the meeting.

The meeting began at 3.30 pm, with the President, Professor J.F. TOLAND, FRS, FRSE, in the Chair. On a recommendation from Council it was agreed to elect Professor A.R. Camina and Professor P.T. Saunders as scrutineers in the forthcoming Council elections. On a recommendation from Council, Messrs Kingston Smith were appointed as auditors for 2006/07.

The President presented a certificate to the 2005 Honorary Member, Professor J-P. Bourguignon of the Institut des Hautes Études Scientifiques.

The President, on Council's behalf, proposed that Professor Joseph B. Keller, of Stanford University, be elected to Honorary Membership of the Society. This was approved by acclaim. The President read a short version of the citation, to be published in full in the *Bulletin*.

The President then announced the awards of the prizes for 2006:

Pólya Prize	Professor Sir Henry Peter Francis Swinnerton-Dyer, Bt, KBE, FRS (University of Cambridge);
Senior Berwick Prize	Professor Miles Reid, FRS (University of Warwick);
Fröhlich Prize	Professor Michael Weiss (University of Aberdeen);
Whitehead Prizes	Professor Raphaël Rouquier (University of Leeds) Professor Jonathan Sherratt (Heriot-Watt University) Dr Agata Smoktunowicz (University of Edinburgh) Professor Paul Sutcliffe (University of Kent)

The President read short versions of the citations, to be published in full in the *Bulletin*.

Five people were elected to Ordinary Membership: K.L. Borthwick, R.E. Callaghan, M. De La Rosa, A.S. Rao, A. Smoktunowicz.

The President introduced a lecture given by Professor Adrian Rice on *The Life and Legacy of Augustus De Morgan (1806-1871)*.

After tea, The President then introduced the 2006 Hardy Lecture given by Professor Yuri Manin on *Continued fractions, non-commutative boundaries and Einstein equations*.

After the meeting, a reception and dinner was held at De Morgan House.

LMS MEETING

The June Meeting of the London Mathematical Society was held on Friday 16 June at University College London. The meeting was large, being attended by about 75 members and visitors. It was opened by Professor John Toland, the LMS President, who had the pleasant task of announcing the prize winners for 2006 and presenting the certificate of Honorary Membership (awarded last year) to Professor Jean-Pierre Bourguignon of the Institut des Hautes Études Scientifiques.

The President then introduced Professor Adrian Rice, who gave a fascinating and highly entertaining lecture on Augustus De Morgan, almost exactly 200 years since his birth on the 27 June 1806. We learned that De Morgan was a man who could stick to his principles: he was Professor of Mathematics at University College London twice, and he resigned each time over a matter of principle! We also learned that De Morgan loved puzzles: when asked his age he said 'I was x years of age in the year x^2'.

As seems almost inevitable he is best known for something not his: De Morgan's Laws (so-called) were stated by William of Ockham in 1327. He is much less well known for the amazingly catalytic effect he had on various branches of mathematics, which Adrian went on to describe.

In an article in 1841 he gave what amounted to the axioms for a field. This article was acknowledged by Hamilton (in his 1853 lectures on quaternions) to have been highly influential. Indeed, as Adrian put it, algebra then multiplied considerably, but no longer necessarily associatively or commutatively, until by 1870 the subject was beginning to resemble what we view as abstract algebra today.

De Morgan also wrote on logic, developing his own curious and highly original notation. His symbolic logic was not only innovative, but it directly inspired his friend George Boole to publish his own work on what we now know as Boolean algebra. In addition, in 1860 De Morgan described what we now refer to as equivalence relations.

Also in 1860, he drew attention to the four colour conjecture, which directly stimulated the subsequent work by Cayley, Kempe, Tait, and Heawood, and arguably led to the development of much of graph theory.

Another profound contribution De Morgan made was to the founding of the London Mathematical Society. He was its first President, and played a crucial role in guiding its early development. There is no doubt that today's LMS owes much to him. His inaugural lecture as the President makes fascinating reading: among other things he described the virtues of the study of the history of mathematics.

Adrian finished his excellent lecture by showing us the De Morgan medal. The side showing De Morgan is familiar, but the other side is less well known and at first glance somewhat mysterious. It is an intriguing combination of his initials, surrounded by what he called the zodiac of syllogisms: his logical notation.

After tea, the President then introduced the 2006 Hardy Lecture given by Professor Yuri Manin on *Continued fractions, non-commutative boundaries and Einstein equations*.

The speaker began the talk by recalling the classical theory of elliptic curves as quotients of the complex plane by a lattice. This gives a classification of elliptic curves as $SL(2,Z)$-orbits on the upper half plane H, their moduli space thus being $SL(2,Z)\backslash H$. Elliptic curves with extra structure lead to more general moduli spaces $\Gamma\backslash H$, where Γ is some subgroup of the full modular group $SL(2,Z)$. These spaces are non-compact, but can be compactified by adding a finite set of cusps.

These are Gamma-orbits of rational points on the real line together with the point at infinity, parametrizing degenerate curves. This however raises the question whether the missing, non-rational points on the real line also have an interpretation in this picture. The speaker showed that the answer is yes, but the objects parametrized are no longer classical

elliptic curves, but quantum tori, their non-commutative generalizations. There is also a non-commutative modular curve, the (bad) quotient *GL(2,Z)\R*, best thought of via its non-commutative algebra of functions.

Next the speaker turned his attention to the theory of continued fractions. After recalling basic definitions, he showed that two real numbers are in the same orbit of *GL(2, Z)* if and only if they have the same tail in their continued fraction expansions; thus, the quotient *GL(2,Z)\R* is exactly parametrized by such tails. On the other hand, tails of continued fractions were much studied by Gauss, who conjectured a precise formula for the distribution of tails. Several proofs of this conjecture have been given over the years, exploiting the spectral properties of a certain operator, the Gauss-Kuzmin operator, in some suitable space of functions. The generalization of this theorem to arbitrary subgroups of the modular group, given in a paper of the speaker with Matilde Marcolli, can be interpreted as an instance of a theory of holomorphic functions on general non-commutative modular curves.

The next section of the talk introduced Mixmaster universes, a class of solutions of the Einstein equations near a Big Bang singularity of space-time. These universes were found to exhibit a special attractor-type behaviour, approximating one Kasner space-time, a simple solution of the Einstein equations, for some time, and then moving on to another Kasner space-time. Amazingly, Mixmaster universes are classified, once again, by tails of continued fractions, or the orbit space *GL(2,Z)\R*. This time, the integers in the continued fraction expansion parametrize the number of cycles the universe spends near a certain Kasner space-time.

After this excursion into physics, the discussion turned to modular symbols, period integrals on modular curves. Their arithmetic is strongly linked with the distribution of continued fractions, and it was shown how the speaker's work over many years has used this connection to good effect in both directions. The discussion culminated in a 'strange formula' describing the averaged values of modular symbols near the non-commutative boundary, whose strangeness was heightened by the fact that the audience never got to see the right hand side!

Finally, after this tour de force in modern mathematics and physics, it was time for conclusions. The speaker dropped one final tantalizing hint: he is hoping to use the theory of quantum tori and quantum modular functions to shed light on a long-standing classical question, the explicit construction of maximal abelian extensions of real quadratic number fields, generalizing well-known results for imaginary quadratic fields. This provided a fitting end to an extremely exciting and entertaining hour.

The LMS President proposed thanks to both speakers and formally closed the meeting, after which some members and visitors went to De Morgan House to reflect on the fascinating afternoon during an enjoyable reception and dinner.

Stephen Huggett, Plymouth
Balázs Szendroi, Oxford

REVIEWS

The Life of Galileo

David Hare, whose translation of Bertolt Brecht's *The Life of Galileo* is used in the National Theatre's current production, has written that science is only the ostensible subject of the play, that it is primarily about a man who is ethically unequipped to deal with the consequences of his own genius.

On the whole, I agree, but science is not just the canvas on which Brecht paints his story. The play was written at a time when physics had been changing radically, as it was in Galileo's time. After the dropping of the first atomic bombs in 1945, Brecht added more on the responsibility of scientists. He later wrote that he had originally been merely trying to follow the history, which he does quite closely, and that the moral had emerged. And while the moral is there for anyone who will listen, that it is worked out in a scientific context makes the play more immediate and relevant for scientists.

Brecht wanted his audience to appreciate the scientific argument around which the story of Galileo revolves. He sought the advice of his friend Hans Reichenbach, and so ensured that the science, while occasionally simplified because this is a play and not a public lecture, is authentic and clear.

The play begins with Galileo showing his housekeeper's son, and with him the audience, how the apparent motion of the sun can be explained if we suppose that it is actually the Earth that is moving. Half a century later, Hugh Whitemore successfully used a similar device in *Breaking the Code*, his play about Alan Turing. It is encouraging to see that audiences are willing to listen to and follow mathematical ideas if they are presented skilfully enough. It's also a nice touch that this discussion of Galilean frames of reference was informed by someone who had attended Einstein's first lectures on relativity, in Berlin in 1919.

Later in the same scene there is another exchange that mathematicians will find interesting, though for a different reason. Galileo is trying to convince the Chancellor of the university to increase his salary. The Chancellor refuses, on the grounds that Galileo is not doing the sort of research that will bring royalties to the university, and besides, mathematics does not attract as many students as useful subjects like philosophy and theology. Of course this is a play written in the 1930s, not a verbatim record of a conversation at the University of Padua in the early seventeenth century, but it is all too relevant to the present day.

© National Theatre

There are, however, far deeper matters for us to ponder. In one of the most telling scenes in the play, Galileo has just discovered the moons of Jupiter, one of the key observations that led to the replacement of the Ptolemaic model of the universe, and he has invited his patron, the Grand Duke of Tuscany, to come to his house and see the moons for himself. The Grand Duke accepts the invitation, but neither he nor his court scholars, a mathematician and a philosopher, ever actually look through the telescope. There would be no point, the scholars tell Galileo. As it is clear on theoretical grounds that the moons cannot exist, if they appear in the telescope that can only be due to a flaw in the apparatus.

Later in the play there is a lively argument between Galileo and two cardinals, and eventually, as in the historical account, he recants under pressure and accepts the Church's sentence of lifelong house arrest. But it is significant that the first debate is not with priests but with other scientists, with the issue not heresy but a challenge to a long-standing scientific theory, albeit one in which cracks had been appearing for some time. Brecht is warning us that threats to science do not always come from the outside.

The Life of Galileo is a long play, but on the evening I was there it kept its capacity audience enthralled throughout. Simon Russell Beale gives an outstanding performance as Galileo and the rest of the cast rise to the occasion. It's the best thing I've seen in the theatre for a long time.

P.T. Saunders
King's College London

It's About Time: Understanding Einstein's Relativity by N. David Mermin. Princeton, New Jersey: Princeton University Press, 2005. ISBN 0-691-12201-6.

The year 2005 saw a torrent of publications in recognition of the centenary of the *annus mirabilis* during which Albert Einstein published three of the papers for which he was to become best known. Many of the contributions to the torrent took up aspects of Einstein's life and work peripheral to his physics, partly out of the conviction that there was not more to say about his work on the theory of relativity. For those in the physics community, however, there remained more than a lingering doubt that the general public had picked up even a nodding acquaintanceship with that theory. As one of my advisers used to say, 'It's not that most people are still living in a Newtonian world. It's that they're still living in an Aristotelian cosmos.'

N. David Mermin, a long-time professor of physics at Cornell University, is no newcomer to the fray of explaining relativity. As long ago as 1968 he had contributed *Space and Time in Special Relativity* in the hope of making the subject accessible to those teaching in schools. The present volume is a descendant of that earlier effort, sharpened and refined by his experiences in the classroom with students with little or no mathematical background. Although the new book has a chapter on general relativity, the heart of the presentation is still the special theory, and by the success of his exposition of that will the author be judged.

One of the changes from his earlier text is that he has decided to depend only on algebra rather than going even so far as trigonometry. It is fair to say that he makes the case for not needing much by way of mathematical prerequisites in order to communicate the content of the theory of relativity. At one point at which a quadratic equation comes up, he turns to a different path in order to avoid that level of mathematical sophistication. Twentieth-century theories of physics can scarcely be made comprehensible with anything less.

What the author does to make up for the absence of mathematics is use the basic principles (relativity and the invariance of the speed of light) on which the theory rests to take the reader as far as possible through the subject. All mathematicians are familiar with situations where a straightforward approach might yield an answer but will take much slogging to get there. Mermin again and again comes up with an ingenious thought-experiment that will reduce the mathematical demands on the student solvers to a minimum. The setting to which he recurs features trains, tracks, and a cast of characters whose initials are taken from the first three letters of the alphabet. There are many occasions on which a reader with more mathematical background will be surprised by how many slight difficulties are finessed. From the author's preface one suspects that even physicists may find something unusual in his approach to deriving the basic equations of relativity.

The book does not offer a 'Physics for Poets' account of the subject that ignores technicalities. His combination of diagrams, verbal exposition, and elementary algebra leads to the formulae that one expects to see. In addition, he does not dwell on the philosophical underpinnings of relativity theory, or of physics in general. The book is remarkably sparing with references, offering only one or two items in footnotes and no bibliography. He refers to the 'Matthew Effect' without giving credit to Robert K. Merton. This is not a volume of historical scholarship but of exposition.

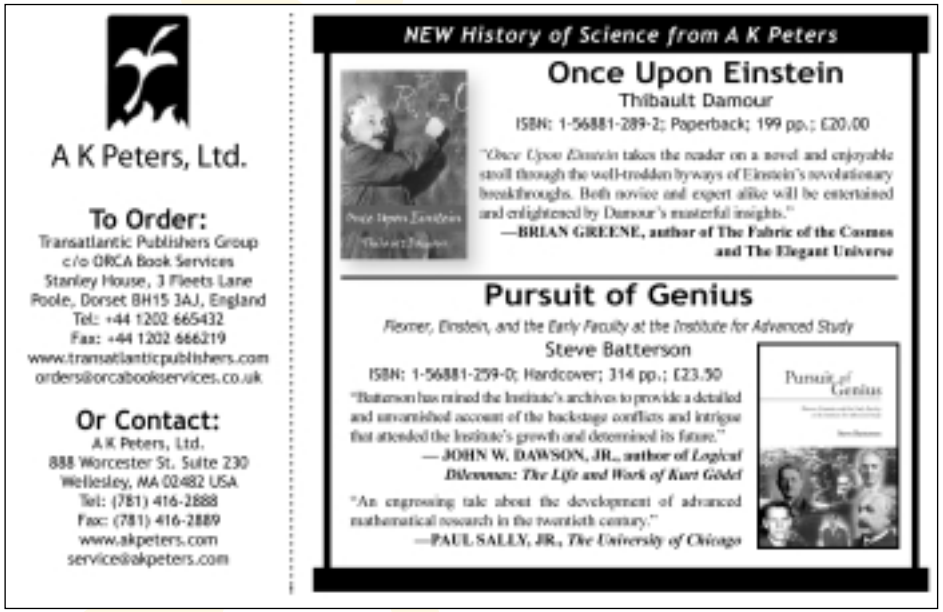
There are some aperçus that may be more familiar to specialists in relativity but come with refreshing novelty to others. For example, the author notes that the concept of time is nothing more than a convenient device for summarising compactly all the relationships holding between different clocks. With all the discussion of the philosophy of time still going on, it's handy to have so epigrammatic an account from the field.

If one is a mathematician but not a physicist nor saddled with the task of teaching relativity to the mathematically underprepared, this book offers an intriguing general picture of how science can work. The author provides more than one derivation for a given formula, depending on how early any assumption is built into the process. As a result, it looks as though the same result will follow for different reasons in the different approaches.

This is an insight which can be lost when one has enough mathematical apparatus to handle every problem with the same techniques. By looking for the approach which requires the least mathematical background, the author can also point to differences in the path that leads to a solution. When mathematics runs out, ingenuity has to be called into play, and ingenuity may reflect the subject better than execution of an algorithm.

This volume would not be the most efficient way for a mathematician to get into even the special theory of relativity. It offers plenty of evidence for the simplicity involved in that theory, as long as one can bring ingenuity to bear. The author notes at one point that he could supply a derivation of a result but that he couldn't bear to interrupt the narrative at that exciting moment. Whatever the benefits of mathematics in shortening an exposition, this introduction to special relativity demonstrates that the excitement of the subject does not suffer when it is pursued on a mathematical shoestring.

Thomas Drucker
University of Wisconsin, Whitewater



LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2006

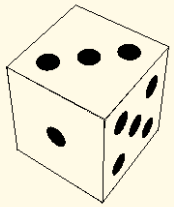
Birmingham University – Wednesday 27 September

Dr Emma McCoy

From Magic Squares to Sudoku

'This talk will look at the properties of Magic Squares, Latin Squares and Sudoku, showing that they are more than just a recreational pastime!'

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1



Dr John Haigh

How likely is that?

'Answers to questions about probability are often surprising, and may even seem paradoxical. But a logical approach shows why these answers arise.'

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

Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm. Admission is free. Enquiries to Dr Chris Sangwin, School of Mathematics, University of Birmingham, Birmingham B15 2TT (tel: 0121 414 6197, email: C.J.Sangwin@bham.ac.uk).

The Lectures given since 1998 are available to buy on video and DVD (DVD only since 2005); earlier lectures can be hired on video. These recordings provide good enrichment material for schools, as well as students and lecturers in university mathematics departments. Further details and an order form can be found via the LMS website: www.lms.ac.uk/activities/education_com/videos.html or by contacting Isabelle Robinson (robinson@lms.ac,uk).

LMS POPULAR LECTURES 2006

Review

How my old school mathematics teacher would laugh to read this review, which reveals his former student with the life-long horror of mathematics as one of the biggest fans of the LMS popular lectures. In this 24th anniversary year, Drs John Haigh from the University of Sussex and Emma McCoy from Imperial College London maintained the consistently high standard which we have all come to expect.

It is a rare delight to witness real expertise which makes the task of addressing an audience covering such a wide spectrum of mathematical ability and interests seem effortless. Luckily the audience is not only limited to those who attended in London during the hottest July on record, or who will attend in Birmingham in September. The DVD will be available as usual from the LMS for those who would like to spread the news further that mathematics can not only be relevant and useful, but entertaining into the bargain. What more could you ask for?

Dr Haigh's talk on probability was entitled *How Likely is That?*, and explored six scenarios, all of which he made accessible on various levels for the interest and amusement of us all. The first was called 'Numbers We Meet', which for the statisticians amongst us was a discussion of the relevance of Benford's Law (1937) regarding the distribution of first significant digits following a log pattern in some data types. For the mathematical historians there was a mention of Simon Newcombe's unsung prior discovery of this effect in 1880, and of T.P. Hill's application of it for the social scientists. For the rest of us there was sage advice on how to make our massage of expenses or tax return figures (if any) look realistic.

His next five scenarios ranged across a broad spectrum of entertaining probability problems from coin tossing through shared birthdates and guessing games. His logical explanations for the surprising and often paradoxical solutions drew on the importance of precise definition of any given problem, Bertrand's Paradox, the Law of Averages and William Feller. He concluded his lecture with a quick reference to his new book '*Taking Chances – Winning with Probability*'.

Dr McCoy's lecture *From Magic Squares to Sudoku* celebrated continuity and evolution rather than diversity, moving from ancient to modern, simple to complex and recreational to practical. Again there was something for everyone, from useful tips for puzzle aficionados to an insight into experimental design. She began by involving her audience in a two-person game called Fifteen, which is essentially a numerical version of noughts and crosses with a winning strategy and best starting number and position. She moved on to discuss the enduring appeal of Magic Squares, which already had a broad enough appeal to appear in an Albrecht Dürer etching of 1514, and were of interest to ancient Chinese mathematicians who discovered the canonical Lo Shu Magic Square.

The Swiss mathematician Leonhard Euler (1707–1783), whose tercentenary year is almost upon us, was featured at length as we moved through the 36 Officer Problem and the role of Latin Squares in experimental design before finishing up in Königsberg. Elizabeth McCoy (1998–) kindly provided a map based on very recent highway developments, which left us all finding the puzzle easier than usual to crack!

I hope that I have given you a taste of my view of a very enjoyable evening, without giving too much away for those who have either yet to attend or who are tempted to buy that little piece of excellence that is the annual LMS Popular Lectures DVD ...

Suzie McMahon

MATHEMATICS AND MUSIC

The next Cambridge Music Festival will be held in November. The schedule of talks and lectures during the festival are as follows:

Heavenly Music of the Universe (8 November)	Dr Carolin Crawford of the Institute of Astronomy explores the sounds of the universe. A preliminary lecture to the Festival's Soundscapes exhibition at Michaelhouse, Cambridge.
The Mathematical Heart of Jazz Harmony (13 November)	Tim Gowers, Professor of Mathematics at Cambridge University, explores how a small amount of mathematics sheds a great deal of light on the chords, harmonic progressions and history of jazz. With live performance by jazz trio (Gowers, Chris Hill *bass* Richard Barr *drums*).
Deciphering Music's Riddles and Codes (14 November)	Martin Ennis unravels some of the mathematic codes hidden in the music of Bach, Berg, Debussy and others.
Yea, why try her raw wet hat? (16 November)	What does it mean to say that Mathematics and Music go together? Robin Wilson of the Open University gives an illustrated talk featuring music from Tallis and Bach to Bartók and Hindemith. He answers such questions as Why are pianos always out of tune? Can music have a 'geometry' and what is the meaning of the title of this talk?
Music and Mathematics – the deepest connections (17 November)	Michael McIntyre, Professor of Mathematics at Cambridge University, gives his personal insights into the connections and patterns which link music and Mathematics.
Dancing with Maths (21 November)	Illustrated talk by Chris Budd, University of Bath. Why should mathematicians be interested in Folk Dancing? With live dance music.
The Physics of the Violin (22 November)	Why is the violin built the way it is? Professor Jim Woodhouse explores the physics of the violin. Talk with live musical examples.
The Sound of Gesture (24 November)	Stevie Wishart *composer/musician*, Todor Todoroffi *sound engineer* explore the links between live music of the violin and hurdy gurdy and real time technology. Pre-concert talk with Ian Winter of the Physiological Laboratory of the University of Cambridge.
How did Bach tune his harpsichord? (24 November)	Malcolm Greenhalgh *harpsichord builder* and Martin Ennis *harpsichordist* discuss temperament in Bach's time.

For further details of these lectures and the concerts visit the website www.cammusic.co.uk or contact Gillian Perkins, Director, Cambridge Music Festival (tel: 01223 350544, email: director@cammusic.co.uk).

CALENDAR OF EVENTS

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

SEPTEMBER 2006

4-8 Noncommutative Geometry and Physics, INI, Cambridge (349)
4-9 Stability, Coupling Methods and Rare Events, LMS/EPSRC Short Course, Heriot-Watt (349)
4-9 Analytic Aspects of Low Dimensional Geometry Symposium Workshop, Warwick, (350)
5-9 Computational and Algorithmic Aspects of Semigroup Theory Workshop, St Andrews (350)
7-9 Modern Mathematical Methods in Science and Technology Conference, Paros, Greece (350)
7-10 British Logic Colloquium, Oxford (350)
8-14 Complex Analysis and Potential Theory Conference, Istanbul (350)
11 Function Theory Meeting, De Morgan House (350)
11 LMS Midlands Regional Meeting, Bath (351)
11-12 CETL-MSOR Conference, Loughborough (350)
11-13 British Topology Meeting, Gregynog Hall (350)
11-15 Painlevé Equations and Monodromy Problems, INI, Cambridge (347)
12-15 Analysis and Stochastics of Growth Processes LMS Workshop, Bath (346)
14 Scottish Computational Mathematics Symposium, Heriot-Watt University (351)
15-16 Celebration of Bryan Birch's 75th Birthday, Bristol (348)
18-20 Algorithms and Complexity in Durham Workshop, Durham (351)
18-21 All Hands Meeting, East Midlands Conference Centre, Nottingham (347)
18-22 Painlevé Equations and Monodromy Problems: Recent developments, INI, Cambridge (347)
20-22 Credit Risk under Lévy Models ICMS Workshop, Edinburgh (342)
20-23 Mathematics Methods in Science and Engineering Conference, Spain (350)
21-23 Operator Algebras and Applications Conference, Leeds (351)
25 Waves, Pollution and Modelling Seminar, Loughborough (351)
25-29 Australian Mathematical Society Annual Meeting, Sydney (348)
27 LMS Popular Lectures, Birmingham (351)
27 Aspects of Geometry: LMS Spitalfields Day, Oxford (351)
28 Supporting Postgraduates who Teach Mathematics & Statistics, Nottingham (351)
29-30 Heilbronn Institute Annual Conference, Bristol (349)

OCTOBER 2006

3 Supporting Postgraduates who Teach Mathematics & Statistics Workshop, Birmingham (351)
4 The 18th Century: Crossing Bridges, Gresham College London (351)
13 Edinburgh Mathematical Society Meeting, Edinburgh (350)
19 Supporting Postgraduates who Teach Mathematics & Statistics, Leeds (351)
20 UK TeX Users Group, De Morgan House, London (348
23 Supporting Postgraduates who Teach Mathematics & Statistics Workshop, London (351)
25 Supporting Postgraduates who Teach Mathematics & Statistics, Glasgow (351)
25 The 19th Century: Revolution or evolution?, Gresham College London (351)
30-3 Nov Recent Advances in Monte Carlo Based Inference Workshop, INI, Cambridge (348)

JAMES ALEXANDER GREEN
DE MORGAN MEDALLIST
2001

Extract from the citation: The De Morgan Medal is awarded to Professor J.A. (Sandy) Green for his fundamental contributions to group representation theory. Green has been one of the most influential figures in representation theory of the last fifty years. In a 1955 paper Green startled the world of representation theory by giving the complex character table of $GL(n,q)$ in all generality. Green then turned to the modular representation of finite groups; he established the now fundamental 'Green correspondence'. After 1975, the emphasis of his work changed to algebraic groups. More recently he has made substantial contributions to the study of representations of quantum groups.