

# NEWSLETTER

No. 404 June 2011

# Society Meetings and Events

#### 2011

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Friday 18 November Annual General Meeting, London

#### NEWSLETTER ONLINE:

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# ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES: THE NEXT FIVE YEARS

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An interview with John Toland, new Institute Director from October 2011, by Ben Mestel, INI Deputy Director

Ben Mestel: Next year the Institute will celebrate its 20th anniversary. What do you think are the principal achievements of the Institute over its first 20 years?

John Toland: Although the work was not done here, the most prominent single incident in the history of the Institute to date was the announcement by Andrew Wiles of his ultimately successful assault on Fermat's Last Theorem. Of course that particular event was not in the original plan, but the intention always has been, and will remain, to create and develop one of the premier mathematical institutes of its kind, cultivating research of the very highest quality, attracting the best scientists and mathematicians from around the globe. At first I think the Institute was regarded by UK colleagues with suspicion, as an elite institution with programmes that benefited Cambridge most. Twenty years later, when large numbers of UK mathematicians have benefited from its ever-widening portfolio of activities, the mood has changed. That represents real success in what it set out to do.

What is your vision for the Institute over the next 20 years?

Over the next 20 (or fewer) years the Institute will have to confront a broad range of difficult issues, some of which are commented upon in responses to subsequent questions. On the one hand it is small, but at the same time it is expected to deliver high-quality. visible, achievements across a huge range of activities in the mathematical sciences. On the other it has to continue its support for the individual researcher, working alone or in collaboration, on fundamental problems, to achieve research outputs of the highest international quality. It has to be alert to new developments and prepared to pumpprime emerging ideas, and it has to recognise that not all projects will be equally successful. The role of the director is to maintain an atmosphere and promote a culture of creativity. On a related note, I hope that in 20 years' time there will be a much larger proportion of women participants than now. The Institute needs to make its activities accessible through a broad range of measures.



What do you think are the challenges

Challenges: to maintain the high gual-

and opportunities for the Institute in the

ity and level of the Institute's activities in

the information age, when there are many

more institutes worldwide than 20 years

ago and when travel costs, visas issues,

availability of long-term participants and

the green agenda impinge on its everyday

activities. This is to say nothing of the fi-

nancial threat following cutbacks in public

placed to play a prominent role in what

is undoubtedly a golden age for mathe-

matics and it is the only institute of its kind serving colleagues across the UK with

long-stay programmes of such breadth

and depth. It has an increasingly success-

ful fund-raising Development Committee.

The opportunity to support and extend

its work must be grabbed with both

The 2010 International Review of Math-

Opportunities: the Institute is well

#### NEWSLETTER

next five years?

funding in real terms.

How do you think the Institute can respond to the 'Impact' agenda?

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I believe that a significant concern for mathematics in the context of impact is that in law you cannot patent a theorem. When a good and entirely original mathematical idea becomes 'a method', without acknowledgement as so often happens, its impact cannot be tracked, and credit is attributed to the sciences in which the final outcomes are described. This is inevitable and it was always thus. Mathematicians need to maintain confidence that the value of their work is not diminished by the lack of auditable impact and to recognise that its all pervasive influence and relevance across science and technology is beyond question. They need also to be conscious of the need where possible to explain what they are doing, sometimes at public expense, to a wider audience, including politicians.

(This is an edited version of the full interview, which will appear in the *Newsletter of the European Mathematical Society*, issue 80 (June 2011), www. euro-math-soc.eu.)

ematical Sciences has published its draft report. How do you think the Institute can help with the development of the Mathematical Sciences in the UK?

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This is a very big question, parts of which have been answered in response to other questions and I will say only this. I think the Institute aspires only to support the best mathematics being done today in whatever context in which it is to be found.

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## No. 404 June 2011

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pm at Goodenough College, Large Common Room, London House, Mecklenburgh Square, London WC1N 2AB. The business shall be:

GENERAL MEETING

the appointment of scrutineers

2) announcement of Council's recommendation

There will be a General Meeting of the Soci-

ety on Friday 1 July 2011, to be held at 3.30

for Election to Honorary Membership 3) announcement of Prize winners for 2011

The General Meeting (see below) will be followed by a Society Meeting. I hope that as many members as possible will be able to attend.

> Fiona Nixon Executive Secretary

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# LONDON MATHEMATICAL SOCIETY MEETING AND FIELDS MEDALLIST LECTURE

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### Friday 1 July 2011

### Goodenough College, Large Common Room, London House, Mecklenburgh Square, London WC1N 2AB

- **3.30** Opening of the meeting and LMS business, including the announcement of the 2011 Prizewinners (open to all)
- 3.45 Robert McCann (Toronto)
- 4.45 Tea/Coffee
- 5.15 Cédric Villani (Lyon), Fields Medallist
- 6.30 Reception

These lectures are aimed at a general mathematical audience. All interested, whether LMS members or not, are most welcome to attend this event.

A reception will be held at the LMS at 6.30 pm with a dinner afterwards at the British Museum Restaurant. The cost to attend the dinner will be  $\pm$ 35 per person. Those wishing to attend the dinner should contact Isabelle Robinson (isabelle.robinson@lms.ac.uk) before **Friday 24 June**.

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

The 6th European Congress of Mathematics

(6ECM) will be held in Kraków, Poland, from

2 to 7 July 2012. Up to ten European Mathe-

matical Society (EMS) prizes will be awarded

at the Congress to outstanding young mathe-

maticians from Europe, and everyone is en-

Any European mathematician who has not

reached his/her 35th birthday on 30 June

2012, and who has not previously received the

prize, is eligible for an EMS Prize at 6ECM. Up

to ten prizes will be awarded. The maximum

age may be increased by up to three years in

the case of an individual with a broken ca-

reer pattern. Mathematicians are defined to

be European if they are of European nation-

ality or their normal place of work is within

Europe. Europe is defined to be the union of any

couraged to nominate candidates.

#### NEWSLETTER

**EMS PRIZES** 

Principal guidelines

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**Call for nominations** 

country or part of a country which is geographically within Europe or that has a corporate member of the EMS based in that country. Prizes are to be awarded for work accepted

#### Nominations for the award

The Prize Committee is responsible for the evaluation of nominations. Nominations can be made by anyone, including members of the Prize Committee and candidates themselves. It is the responsibility of the nominator to provide all relevant information to the Prize Committee, including a résumé and documentation. The nomination for each award must be accompanied by a written justification and a citation of about 100 words that can be read at the award ceremony. The prizes cannot be shared.

#### Description of the award

The award comprises a certificate including the citation and a cash prize of €5,000.

### LMS Newsletter

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#### Award presentation

The prizes will be presented at the 6th European Congress of Mathematics by the EMS President. The recipients will be invited to present their work at the Congress.

#### Prize fund

The money for the prize fund is offered by the Foundation Compositio Mathematica.

#### Deadline for submission

Nominations for the prize must reach the chair of the Prize Committee at the following address, not later than **1 November 2011**: Professor Frances Kirwan, FRS, Balliol College, Oxford OX1 3BJ (kirwan@maths.ox.ac.uk).

### DANIEL QUILLEN

Daniel Quillen died on 30 April 2011, at the age of 70. He was born in New Jersey, was an undergraduate at Harvard, and then a graduate student of Raoul Bott there. Immediately after finishing his thesis, on partial differential equations, he obtained a position at MIT, where he remained until he moved to Oxford as Waynete professor from 1984 to 2006.

He was among the most creative and influential mathematicians of his time, and was at home in many different areas of the subject. While still in his twenties he had the idea of axiomatizing a very general notion of homotopy which can be applied in the most diverse categories. Little noticed at the time, this has proved ever more important, and is now the basis of a whole area of algebraic geometry. In an amazing burst of activity around 1970 he not only created algebraic K-theory in the form we now use, and proved Serre's conjecture that projective modules over a polynomial ring are free, but also (simultaneously with Sullivan) proved the Adams conjecture about the stable homotopy groups of spheres, and discovered the link between formal group laws and cobordism theory which dominates the field of stable homotopy to this day. At the same time he introduced a completely new perspective on the cohomology of finite groups, and, again simultaneously with Sullivan, was a pioneer of rational homotopy theory.

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Not long after that he turned to quite different kinds of mathematics and introduced the Quillen metric on the determinant line of an elliptic operator, and the notion of a superconnection in differential geometry, which has become a basic tool in index theory and quantum field theory. Later still his interests became focused on cyclic homology, and he made notable contributions in that field too.

He was awarded a Fields Medal in 1978.

He leaves his wife Jean, whom he married when they were both students at Harvard, their six children, and many grandchildren.

All Souls College, Oxford

Graeme Segal

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# **MICHAEL ZEDEK**

Professor Michael Zedek, who was elected a reciprocity member of the London Mathematical Society on 16 March 1972, died on 14 December 2010, aged 84.

# THE MATHEMATICS OF TURBULENT DIFFUSION

#### A Celebration of the Career of Philip Chatwin

A meeting to celebrate the career of Philip Chatwin, who died in September 2010, is being held from 7 to 8 September 2011 at the University of Sheffield. It will cover the different aspects of the diffusion of contaminants in fluid flows on which he worked.

A website with further information is in the process of being created; for the time being any inquiries should be addressed to Nils Mole (N.Mole@sheffield.ac.uk). The meeting is supported by the University of Sheffield and by an LMS Conference grant.

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Papers by winners of the **Fields Medal Special collection Published in** Izvestiya: Mathematics • Russian Mathematical Surveys • Sbornik: Mathematics ۲ **FREE TO READ IN 2011** Visit iopscience.org/fields-medal to discover first-class research in mathematics The London Turpion Mathematical Society Russian Academy of Science

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# **IOP** Publishing

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#### No. 404 June 2011

# MATHEMATICS POLICY ROUND-UP

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#### May 2011

#### National Curriculum Review

On 20 January 2011 the Secretary of State for Education, Michael Gove announced a major review of the National Curriculum in England (the review does not include post-16 secondary education). The LMS has responded to this Review, and the response is available on the LMS website at http://tinyurl.com/5rgeqcm.

A number of other STEM organisations have responded to the review:

- Institute of Mathematics and its Applications (IMA), http://tinyurl.com/6l398cv
- Royal Statistical Society (RSS), http://tinyurl. com/6ethmzg
- Advisory Committee on Mathematics Education (ACME), http://tinyurl.com/6etqqf6
- Science Community Representing Education (SCORE) – Association for Science Education, Institute of Physics, Royal Society, Royal Society of Chemistry, and Society of Biology, http://tinyurl.com/6qvzj3t
- Science Council, http://tinyurl.com/6asqa82

#### LMS response to White Paper The Importance of Teaching

The Schools White Paper *The Importance of Teaching* 'sets out a radical reform programme for the schools system, with schools freed from the constraints of central government direction and teachers placed firmly at the heart of school improvement'.

In its response the London Mathematical Society welcomes the White Paper on *The Importance of Teaching* (http://tinyurl.com/ 2ukoqgd) and its commitment to the creation of a teaching system among the best in the world. It especially welcomes:

- the emphasis on core subjects and a stronger emphasis on content;
- the emphasis on the special importance of the teaching of STEM subjects;
- the desire to increase the number of new

mathematics teachers and to improve the skills of existing mathematics teachers; and

 the request to learned bodies to be involved in the reform of GCSEs and A-levels. The LMS aims to be actively involved in

these developments by, in particular,

- contributing to the specialist subject knowledge of mathematics teachers via their continuing professional development (CPD);
- contributing to the revision of the mathematics curriculum and to its assessment;
- assisting in the provision of good mathematics text books and other resources; and
- continuing its general support of a variety of enrichment activities.

The full response is available on the LMS website at http://tinyurl.com/65ugfd5.

#### Response to the Comprehensive Spending Review (CSR)

The Council for the Mathematical Sciences (CMS) has responded to the House of Commons Science and Technology Committee's call for written evidence on the CSR. The full submission is available on the CMS website at www.cms.ac.uk/reports/2011/CSRfinal. pdf.

# ICT in the teaching of mathematics at HE institutions

The LMS has produced a position statement on this subject and the full statement is available on the LMS website at http://tinyurl. com/5wqhwll.

#### Implementing the EPSRC Delivery Plan

At the end of December 2010 the EPSRC published its Delivery Plan providing a high-level overview for 2011–2015. The EPSRC has stated that 'While the direction and ambitions set out within our Delivery Plan will remain



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unchanged over the spending review period, the priorities and the portfolio we will develop will, by necessity, be dynamic. As these evolve over the next four years we will publish further details on our website'. For more information on the implementation, visit http://tinyurl.com/5v4gldx.

#### Education Select Committee calls for fundamental reform of Ofsted

The House of Commons Education Select Committee has published a report calling for separate education and children's care inspectorates to raise the quality of inspection and restore confidence. The Committee concludes that splitting Ofsted into two new organisations – the Inspectorate for Education and the Inspectorate for Children's Care – will help to focus and improve inspection. The report is

available at http://tinyurl.com/5rlka7x.

#### Education Select Committee takes evidence on the English Baccalaureate

The Education Select Committee has taken evidence from Nick Gibb MP, Minister of State for Schools, Department for Education. The Committee examined issues arising from the introduction of the English Baccalaureate (EBac) and its impact on students and schools. The Committee considered the choice of subjects and qualifications included in the EBac, the value of the EBac as a performance measure and the implications of the EBac for young people's progression in education, or to employment.

#### **HEFCE annual conference 2011**

HEFCE's annual conference, Achieving excellence in a new world, was held in Birmingham in April. The conference attracted heads of HEFCE-funded higher-education institutions and leaders of partner organisations. The conference theme of achieving excellence in a new world, in view of the planned changes to higher education funding and finance, and the anticipated government White

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Paper on higher education provided a forum for discussion. The speakers included HEFCE Chief Executive Sir Alan Langlands, Secretary of State for Business, Innovation and Skills, Vince Cable and Professor Brian Cox. The presentations are available at www.hefce. ac.uk/news/events/2011/annconf.

# Quality Assurance Agency for Higher Education (QAA)

The QAA is launching a new process for reviewing academic quality and standards in higher education institutions in England and Northern Ireland in September 2011. The new process is called Institutional Review and replaces the current institutional audit. For more information about the new process visit www.qaa.ac.uk/reviews/institutionalreview.

#### **Royal Society Summer Science Exhibition**

The Annual Royal Society Summer Science Exhibition will be held from 5 to 10 July 2011 at the Royal Society in central London. The exhibition is free to attend and showcases a wide range of cutting-edge science and technology research. The exhibition is open to the public as well as students and teachers, scientists, policymakers, and the media. More information about the event is available at http://royalsociety.org/summer-science.

> Dr John Johnston Mathematics Promotion Unit

# VISIT OF PROFESSOR A.V. CHECHKIN

Professor Aleksei V. Chechkin (Institute for Theoretical Physics, Kharkov, Ukraine) will be visiting Dr Rainer Klages (Queen Mary University of London) from 6 June to 4 July 2011. They will be collaborating on fluctuation relations for anomalous dynamics.

This visit is supported by an LMS International Short Visit Scheme 5 grant. For further information email Rainer Klages (r.klages@ qmul.ac.uk).

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# VISIT OF PROFESSOR L. VAINERMAN

Professor Leonid Vainerman (University of Caen, France) will be visiting the UK from 5 to 18 June 2011. Professor Vainerman is a well-known expert in the theory and applications of operator algebras. In particular, he has been working on general duality theory, theory of quantum groups and groupoids, and their applications. During his visit Professor Vainerman will give lectures at:

- University of York, Wednesday 8 June; contact Alexei Daletskii (alex.daletskii@vork.ac.uk)
- University of Wales Swansea, Tuesday 14 June; contact Eugene Lytvynov (e.lytvynov@swansea.ac.uk)
- University of Nottingham, Wednesday 15 June; contact Viacheslav Belavkin (vpb@maths.nottingham.ac.uk )

For further information contact Alexei Daletskii (alex.daletskii@york.ac.uk). The visit is supported by an LMS Scheme 2 grant.

# VISIT OF PROFESSOR C. MUELLER

Professor Carl Mueller (University of Rochester, USA) will be visiting the UK from 5 to 24 June 2011. He will give lectures on his recent work on SPDEs at:

- University of Manchester, Wednesday 8 June, 2.15 pm; contact Tusheng Zhang (tzhang@maths.man.ac.uk)
- Swansea University, Thursday 16 June, 3.00 pm; contact Jianglun Wu (j.l.wu@swansea.ac.uk)
- University of Oxford, Monday 20 June, 2.15 pm; contact Zhongmin Qian (qianz@maths.ox.ac.uk)

Professor Mueller will be based in Swansea, hosted by Jianglun Wu. The visit is supported by an LMS Scheme 2 grant.

# VISIT OF PROFESSOR H. OMBAO

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Professor Hernando Ombao will be visiting the UK from 4 to 23 July 2011. His research concerns time series analysis, in particular methods for the analysis of non-stationary time series and change-point detection. Professor Ombao is also well known for his work on the analysis for brain imaging spatiotemporal data sets. Professor Ombao will give lectures at:

- Warwick, Short Course, 6–8 July; contact John Aston (j.a.d.aston@warwick.ac.uk)
- Bristol, 12 July; contact Guy Nason (g.p.nason@bristol.ac.uk)
- Lancaster, 18 July; contact Idris Eckley (i.eckley@lancaster.ac.uk)

Professor Ombao will be based in Warwick, hosted by John Aston. His visit is supported by an LMS Scheme 2 grant.

# VISIT OF PROFESSOR A. GRIGORYAN

Professor Alexander Grigoryan (University of Bielefeld) will be visiting the UK from 4 to 12 June 2011. His research area includes a number of aspects of geometric and stochastic analysis. During his visit he will give talks at:

- Oxford, Monday 6 June: Heat kernels for diffusions and jump processes on fractallike spaces
- Warwick, Wednesday 8 June: Escape rate of Brownian motion on complete Riemannian manifolds
- London, Thursday 9 June: On positive solutions of semi-linear elliptic inequalities on Riemannian manifolds
- Cambridge, Newton Institute, Friday 10 June: Stochastic completeness for random walks and jump processes

For further information contact Boguslaw Zegarlinski (b.zegarlinski@imperial.ac.uk). The visit is supported by an LMS Scheme 2 grant.

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# TWISTORS, GEOMETRY AND PHYSICS

A meeting on *Twistors, Geometry and Physics* to mark the 80th birthday of Sir Roger Penrose will take place from 21 to 22 July 2011 at the Mathematical Institute, Oxford. Twistor theory is one of his most remarkable discoveries and continues to have applications across pure mathematics and mathematical physics. This meeting will focus on some recent developments with speakers both on geometry and physics. The speakers are:

- Nima Arkani-Hamed (IAS, Princeton)
- Mike Eastwood (ANU) CR geometry and conformal foliations
- Nigel Hitchin (Oxford) Twistors and octonions
- Andrew Hodges (Oxford)
   Polytopes and amplitudes
- Claude LeBrun (Stonybrook)
   On Hermitian, Einstein 4-manifolds
- David Skinner (Perimeter Institute) Scattering amplitudes as holomorphic linking in twistor space Talks will start at

2 pm on the 21st and finish by 4.30 pm on the 22nd. Research students are welcome. Book by 28 June if you wish to attend the dinner on 21 July at 6.45 pm (predinner drinks) for 7.15 pm at Wadham College. There will be a registration fee of £15 to cover teas. coffee and sandwich lunch.

To register, book for the dinner and further details visit the website at www.maths.ox.ac.uk/~lmason/rp80.html or email rp80@maths.ox.ac.uk. The conference is supported by an LMS Conference grant.

# IWASAWA ALGEBRAS

A one-day workshop on *Iwasawa Algebras* will be held on 21 June 2011 at the University of Cambridge. The speakers are

- Konstanstin Ardakov (Nottingham) Simple modules over the rational Iwasawa algebra in the semisimple case
- Simon Wadsley (Cambridge) Introduction to Iwasawa algebras
- Christian Wuthrich (Nottingham) How we use Iwasawa algebras in number theory

The workshop is part of the South England Profinite Groups Meetings and is supported by an LMS Scheme 3 grant. For more information visit the website at www. dpmms.cam.ac.uk/~rdc26/meeting.html or contact Rachel Camina (rdc26@dpmms.cam. ac.uk).



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# LONDON MATHEMATICAL SOCIETY

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# POPULAR LECTURES 2011

Institute of Education, London – Wednesday 29 June University of Birmingham – Thursday 29 September

Dr Colva Roney-Dougal St Andrew's University

#### Symmetry, Chance & Determinism

By playing some games with symmetries, we'll discover the surprising fact that choosing randomly can give the same answer (almost) every time!



L. Fairhead (LMD-CNRS)



#### Dr Hilary Weller University of Reading

# How Climate Models Work and Could They Be Better?

Hilary Weller will describe some of the physics behind how the real climate works, some of the mathematics involved in creating a computer model of the climate to make climate predictions <u>and</u> how climate data is gathered in order to test the models.

We will see that, although climate models are far from perfect, some predictions can be made with confidence.

**LONDON:** Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. **Register by Friday 24 June.** 

**BIRMINGHAM:** Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm. Admission is free, with ticket. **Register by Friday 23 September.** 

To register for tickets, please email Lee-Anne Parker (leeanne.parker@lms.ac.uk) or visit the LMS website for a registration form (www.lms.ac.uk).

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

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# LONDON MATHEMATICAL SOCIETY NORTHERN REGIONAL MEETING

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# Tuesday 19 July 2011

MALL Seminar Room, Mathematics Building, University of Leeds

#### **Programme:**

2.30 Opening of the meeting

**Gregory Cherlin** (Rutgers) The classification of homogeneous combinatorial structures

#### 3.45 Tea/Coffee

- **4.15** Alexander Kechris (California Institute of Technology) The dynamics of automorphism groups of homogeneous structures
- 6.00 Dinner at University House

These lectures are aimed at a general mathematical audience. All interested, whether LMS members or not, are most welcome to attend this event.

For further details, to register or to reserve a place at the dinner, email the organisers (J.K.Truss@leeds.ac.uk). The cost of the dinner will be approximately  $\pm 30$ , including drinks.

The meeting forms part of a workshop on *Homogeneous Structures* from 19 to 22 July. For further details visit the website at www.maths.leeds.ac.uk/events/lmsnorth2011 or contact the organisers.

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

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LMS-EPSRC Short Courses aim to provide training for postgraduate students in core areas of mathematics. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.

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#### ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

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### IS CRYPTOGRAPHIC THEORY PRACTICALLY RELEVANT?

#### 31 January – 2 February 2012

in association with the Newton Institute programme Semantics and Syntax: A Legacy of Alan Turing (9 January – 6 July 2012)

The workshop aims to bring together researchers who work in theoretical aspects of cryptography (principally, provable security of protocols) with people working on applied aspects of cryptography, particularly people involved in standardization and in industrial deployment of cryptography. The main goal of the workshop is to strengthen the dialogue between these two groups of people, which is currently perceived to be quite weak. Ultimately, we aim to make a start on bridging the divide between what academic cryptographers believe should be the goals of cryptographic protocol design and what is actually deployed in the real world. The potential benefits of doing so are:

- To bring a better understanding of real-world cryptographic issues to the theoretical community, helping to inform their research and set new research challenges for the theoretical community;
- Enabling practitioners to develop a clearer view of the current state-of-the-art in cryptographic research and what it offers to practice;
- Providing a forum for exchanging ideas and building relationships between researchers from the different communities.

Further details including speakers will be added in due course. Registration will open at a later stage. Further information and application forms are available from the website at: www.newton.ac.uk/programmes/SAS/sasw07.html.

The workshop is supported by the Newton Institute, the eCrypt-2 European Network of Excellence in Cryptography and by the EPSRC Leadership Fellowship award of Professor Kenny Paterson.

# **STOCHASTIC ANALYSIS**

#### A UK–China Workshop

A UK-China workshop on *Stochastic Analysis* will take place from 25 to 29 July 2011 at Loughborough University. Most of the leading researchers in stochastic analysis in China and the UK have agreed to participate. The workshop has been timed to coincide with the awarding of an honorary Doctor of Science degree to Shige Peng. Apart from the talks, time will be made available for discussion and to allow the formation of new collaborations, especially among young researchers. The latter are strongly encouraged to attend and there will be special sessions for short talks and/ or poster presentations. Limited financial assistance is available for PhD students, and

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they should apply to one of the two local organisers: Huaizhong Zhao (H.Zhao@lboro. ac.uk) or David Elworthy (K.D.Elworthy@ warwick.ac.uk). For further information visit the workshop website linked to www. lboro.ac.uk/departments/ma/events/index. html.

The Scientific Committee is: Mufa Chen (Beijing Normal), Terry Lyons (Oxford), James Norris (Cambridge), Shige Peng (Shandong), Aubrey Truman (Swansea) and Jiaan Yan (CAS, Beijing). The workshop is supported by an LMS Conference grant and by Loughborough University.

# PDEs AND SPECTRAL THEORY

This four-day analysis meeting on Partial Differential Equations and Spectral Theory will take place at Imperial College London from 5 to 8 September 2011. The conference is organised jointly by Imperial College in collaboration with King's College and University College London to mark the 80th birthday of Professor Michael Solomyak. The list of invited speakers includes worldrenowned mathematicians specializing in different aspects of spectral theory and partial differential equations:

- M. Solomyak (Weizmann Institute)
- D. Crisan (Imperial College London)
- E.B. Davies (King's College)
- D.E. Edmunds (Cardiff University)
- M. Esteban (Université Paris Dauphine)
- R. Frank (Princeton University)
- T. Hoffman-Ostenhof (Vienna University)
- V. Ivrii (University of Toronto)
- A. Kiselev (University of Wisconsin)
- V. Kozlov (Linköping University)
- N. Nikolski (Université Bordeaux 1)
- L. Pastur (Institute for Low Temperature Physics & Engineering, Kharkov, Ukraine)
- G. Rozenbum (Chalmers University)
- M. Ruzhanski (Imperial College London)

• B. Simon (Caltech)

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• N. Ural'tseva (St Petersburg University)

No. 404 June 2011

- T. Weidl (Universität Stuttgart)
- D. Yafaev (Université Rennes)
- B. Zegarlinski (Imperial College London)

The conference is supported by an LMS Conference grant and an Imperial College– EPSRC Programme Grant (Research Workshop Grant RW001 AL). Limited financial assistance will be available for PhD students.

For further information contact the organisers: Ari Laptev (a.laptev@imperial.ac.uk), Yuri Safarov (yuri.safarov@kcl.ac.uk) or Alexander Sobolev (a.sobolev@ucl.ac.uk).

# ASPECTS OF HYPERBOLICITY

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A conference on Aspects of Hyperbolicity in Geometry, Topology and Dynamics will take place at the Mathematics Department, University of Warwick from 25 to 27 July 2011. This is a workshop and celebration of Caroline Series' 60th birthday. Confirmed speakers are:

- Jack Button (Cambridge)
- Francis Bonahon (USC)
- Ken Bromberg (Utah)
- Dick Canary (Michigan)
- David Dumas (UIC)
- Vaibhav Gadre (Harvard)
- Bill Goldman (Marvland)
- Steve Kerckhoff (Stanford)
- Frédéric Paulin (Paris-Sud)
- Kasra Rafi (Oklahoma)
- Makoto Sakuma (Hiroshima)
- Jean-Marc Schlenker (Toulouse)
- Corinna Ulcigrai (Bristol)

Limited funds are available for participants. If you plan to attend, please register online or contact the organisers. For more information visit the website at www.warwick. ac.uk/~masgar/Conference/Series60.html. The conference is supported by EPSRC grant AHGTD(EP/I014985/1).

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#### NEWSLETTER

#### www.lms.ac.uk/newsletter

# 2011 HEILBRONN ANNUAL CONFERENCE

The 2011 Heilbronn Annual Conference will be held at the University of Bristol from 8 to 9 September, commencing at lunchtime. A number of distinguished mathematicians are invited to present lectures, intended to be accessible to a mixed audience of mathematicians. Confirmed speakers include:

- Dave Benson (Aberdeen University)
- Bruno Buchberger (Johannes Kepler University)
- William Kahan (Berkeley)
- Wilfrid Kendall (Warwick University)
- Jean-François Le Gall (University of Paris-Sud 11)
- Tandy Warnow (University of Texas)

All interested mathematicians are invited to attend. There is no registration fee but to enable estimation of numbers, intending participants are requested to inform Claire Barr (claire.barr@bristol.ac.uk). UK graduate students and postdoctoral fellows who would like to attend and need support should contact Claire Barr before **15 July** detailing their requirements, enclosing a brief CV and explaining why other support is not available. The final programme and additional details will be posted in due course at www.maths. bris.ac.uk/research/Heilbronn\_institute.

# ENUMATH 2011

The European Numerical Mathematics and Advanced Applications (ENUMATH) conferences are a forum for discussion of basic aspects and new trends in numerical mathematics and challenging scientific and industrial applications at the highest level of international expertise. They started in Paris in 1995 and were subsequently held at the universities of Heidelberg (1997), Jyväskylä (1999), Ischia Porto (2001), Prague (2003), Santiago de Compostela (2005), Graz (2007) and Uppsala (2009).

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The 2011 ENUMATH Conference will take place at the University of Leicester from 5 to 9 September 2011. The invited speakers are:

- J-F. Gerbeau (Inria-Rocquenc, France)
- Vivette Girault (Paris, France)
- Ivan Graham (Bath, UK)

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- Tony Lelievre (Cermics/Univ. Paris 6, France)
- Valeria Simoncini (Bologna, Italy)
- Chi-Wang Shu (Brown, USA)
- Andrew Stuart (Warwick, UK)
- Stefan Turek (Dortmund, Germany)
- Karsten Urban (Ulm, Germany)
- Ragnar Winther (Oslo, Norway)

The Public Lecture Speaker is Nick Higham (Manchester, UK) The programme also includes a number of organised minisymposia. For further information visit the website at www2.le.ac.uk/departments/mathematics/ research/enumath2011.

# **USING MAPLE**

Adept Scientific will be working once again with Manchester Metropolitan University (MMU) to deliver a one-day conference on 30 June 2011 that demonstrates how Maple can be used to help deepen students' understanding of a variety of mathematics and technical concepts.

Maple has a 25-year track record of delivering significant teaching benefits to leaders of a wide range of mathematics-based courses at school, college and university level. MAPLE experts and novices alike will see how this software delivers real results in the classroom environment. The speakers are:

- Surak Perera, MAPLE Product Specialist, Adept Scientific
- Stephen Lynch, MMU, author of Dynamical Systems with Applications using Maple
- Grahame Smart, Mathematics Department, Forest Hill School, Lewisham, South London Space is limited and registration is required.

More information and registration details can be found at www.scmdt.mmu.ac.uk/ maple\_maths\_conference.

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ake o 9 .ce)	Discrete and Computational Geometry Satyan L. Devadoss & Joseph O'Rourke	Discrete geometry is a relatively new development in pure mathematics, while computational geometry is an emerging area in applications-driven computer science. Their intermingling has yielded exciting advances in recent years, yet what has been lacking until now is an undergraduate textbook that bridges the gap between the two. <i>Discrete and</i> <i>Computational Geometry</i> offers a comprehensive yet accessible introduction to this cutting-edge frontier of mathematics and computer science. Cloth \$49.50 978-0-691-14553-2	
am in- sia. at ics/ ain sity 30 can nd- ical	Weyl Group Multiple Dirichlet Series Type A Combinatorial Theory Ben Brubaker, Daniel Bump & Solomon Friedberg	Weyl group multiple Dirichlet series are generalizations of the Riemann zeta function. Like the Riemann zeta function, they are Dirichlet series with analytic continuation and functional equations, having applications to analytic number theory. By contrast, these Weyl group multiple Dirichlet series may be functions of several complex variables and their groups of functional equations may be arbitrary finite Weyl groups. Furthermore, their coefficients are multiplicative up to roots of unity, generalizing the notion of Euler products. This book proves foundational results about these series and develops their combinatorics. Paper \$49.50 978-0-691-15066-6 Cloth \$85.00 978-0-691-15065-9	_19_
rer- s of rses PLE this om <i>ical</i> nt, on ed. ails	Validated Numerics A Short Introduction to Rigorous Computations Warwick Tucker	This textbook provides a comprehensive introduction to the theory and practice of validated numerics, an emerging new field that combines the strengths of scientific computing and pure mathematics. In numerous fields ranging from pharmaceutics and engineering to weather prediction and robotics, fast and precise computations are essential. Validated numerics yields rigorous computations that can find all possible solutions to a problem while taking into account all possible sources of error—fast, and with guaranteed accuracy. Cloth \$45.00 978-0-691-14781-9	
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# REVIEW

Why Beliefs Matter: Reflections on the Nature of Science by E. Brian Davies, Oxford University Press, 2010, 272 pp, £25.00, ISBN 978-0-19-958620-2.

This is a fascinating book on the nature of science, and its relationship to our beliefs about the world. The main scientific areas covered are

mathematics and physics (plus a little biology), with topics including the scientific revolution, the Platonic idea of mathematical reality, and the relationship between science and religion. Davies is arguing on several fronts, so it's difficult to sum up his ideas briefly, but broadly speaking he argues in favour of a Pluralist approach, arguing that the science that we, as humans, develop is inevitably determined by our biological nature. He posits that a purely reductionist approach to

understanding the human condition will never succeed, and that with our limited intellectual capacity we will always need more than one explanation for why higher-level facts are true: for example, we should never expect physics to cast light on ethical questions, even though the two areas can occasionally intersect.

On the mathematical front, he argues strongly against Platonism, mocking the idea that when we do research we are stumbling blindly around a world of ideal mathematical forms, eventually deducing something about their shape which we then bring back to our physical universe and christen a theorem. Instead, he advocates a Pluralist approach, rejoicing in intellectual ingenuity, seeking constructivist proofs where possible, and (possibly a big ask!) retaining a clear idea of which parts of mathematics can be proved constructively and which cannot.

Standard theories of science present it as developing from hypothesis, to observation,

to either rejection of, or increased confidence in, the hypothesis. Eventually the hypothesis is either disproved or becomes an accepted fact. Davies argues that this description is flawed in several respects. The practice of science depends strongly on both intuition and the availability of technology, and it is manifestly *not* the case that a single observation which ran contrary to the predictions of a well-known theory would

> make one throw away the entire theory. Davies also disagrees vehemently with those postmodernists who argue that science is just a cultural phenomenon: "science is important because it works, not because it has advocates in high places".

> On the relationship between science and religion, Davies surveys a huge range of thinkers, from Dawkins, to Swinburne, to Keith Ward. He concentrates on Christianity, but most major religions are mentioned. A de-

scription of the religious beliefs of ten eminent scientists shows conclusively (and unsurprisingly) that it is impossible to generalise about scientists' attitude to religion. More unexpectedly, a discussion of some leading Christian thinkers goes on to conclude that it is difficult to find any common core beliefs amongst them, either! Ultimately the chapter is inconclusive, and is clearer about what Davies disagrees with than what he agrees with, but this does not feel like a weakness.

Davies is not afraid to pick a fight, and he attacks both individuals such as Feyerabend, and whole disciplines such as multiverse theory, with verve, wit and not a little acidity. For example, in the middle of a discussion of determinism we get the lovely sentence "Replacing the phrase 'in principle' by 'not' often makes a sentence correspond more closely with reality", which I've been mentally applying to news broadcasts ever since! Although some of the ideas in the book are complex, the presentation

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is both lucid and entertaining. It has made me re-evaluate my own beliefs about the nature of mathematics. Davies raises more questions than answers, and I strongly recommend to you this thought-provoking book.

Colva Roney-Dougal University of St Andrews ۲

# *p*-ADIC FUNCTION THEORY AND ARITHMETIC DYNAMICS

This will be the second of four EPSRC-funded meetings on the *Frontiers of Nevanlinna Theory.* The workshop will be held at University College London from 27 to 29 June 2011. The main themes of the meeting are classical and non-Archimedean Nevanlinna theory, *p*-adic differential equations and dynamical systems. Speakers will include:

 Francesco Baldassarri (Università di Padova, Italy)

- Abdelbaki Boutabaa (Université Blaise Pascal Clermont-Ferrand II, France)
- William Cherry (University of North Texas, USA)
- Lucia di Vizio (Université Paris VII, France)
- Branko Dragovich (Institute of Physics, Belgrade, Serbia)
- Alain Escassut (Université Blaise Pascal Clermont-Ferrand II, France)
- Pei-Chu Hu (Shandong University, PRC)
- Franco Vivaldi (Queen Mary, University of London)

For more information visit the website at www. homepages.ucl.ac.uk/~ucahrha/conferences/ frontiers/frontiers2.html. Subsequent meetings in this series are *Applications of Nevanlinna theory to differential and functional equations* (17–19 April 2012) and *Nevanlinna theory and number theory* (18–20 June 2012). Contact Rod Halburd (R.Halburd@ucl.ac.uk) if you would like to attend.



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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.

#### **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 Stochastic Models and Data Analysis International Conference, Rome, Italy

8-9 Variational Multiscale Methods Workshop, Strathclyde (402)

13-17 Stabilization of Dynamical Systems and Processes ICMS Workshop, Edinburgh (398)
13-17 Arithmetic of Function Fields Workshop, Imperial College London (403)
14 LMS Midlands Regional Meeting,

#### Birmingham (404)

**15-18** Representation Theory Workshop, Birmingham (404)

**16-17** UK Magnetohydrodynamics Meeting, City University London (403)

**17** Symbolic Computation for Analysis Meeting, Canterbury (403)

**20-24** Geometric Group Theory Workshop, Heilbronn Institute, Bristol (402)

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

21 Iwasawa Algebras Workshop, Cambridge (404)

**23-25** Postgraduate Group Theory Conference, Aberdeen (403)

**26 - 1 Jul** Spectral Analysis and Its Applications LMS–EPSRC Short Course, University College London (402) **26 - 2 Jul** New Developments in Non-Commutative Algebra and Applications ICMS Workshop, Sabhal Mòr Ostaig, Isle of Skye (398)

27-29 Frontiers of Nevanlinna Theory 2: p-adic Function Theory and Arithmetic Dynamics, University College London (404)
27 - 1 Jul Moduli Spaces Closing Conference, INI, Cambridge (401)

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

# 29 LMS Popular Lectures, Institute of Education, London (404)

29 - 1 Jul Recent Advances in Geometric Group Theory Workshop, Southampton (403)
30 Providing a Mathematics and Statisics Support Service Using *Elluminate*, Loughborough (402)
30 Using Maple Conference, Manchester (404)

#### **JULY 2011**

1 LMS Meeting, London (404) 1 Developing Mathematical Thinking Through Problems, Puzzles and Games Workshop, Greenwich (402)

**3-8** British Combinatorial Conference, Exeter (403)

3-8 Tropical Geometry and Integrable Systems Conference, Glasgow (403)
4-8 Theories of Infinity ICMS–ESF Meeting, Edinburgh (398)
4-23 Gauge Theory and Complex Geometry Conference and Workshop, Leeds (402)
5-10 Royal Society Summer Science Exhibition, London (404)
9-11 Quantum Cohomology, Symplectic

Resolutions and Representation Theory Meeting, Oxford (403) 11-15 Numerical Relativity Beyond Astro-

physics ICMS Workshop, Edinburgh (398) 13-15 Mathematics of Filtering and its Applications Workshop, Brunel University (402)

**16-24** International Mathematical Olympiad, Amsterdam

**18-20** Toric Methods in Homotopy Theory Conference, Belfast (398)

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or Space Dynamics INI Workshop, Cambridge
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<b>18-22</b> Duality, BSDEs and Malliavin Calculus
in Mathematical Finance LMS–EPSRC Short
Course, Oxford (403)
18-22 ICIAM 2011, Vancouver, Canada (400)
19 Olga Taussky-Todd Lecture (B. Pelloni),
ICIAW 2011, Vancouver, Canada (402)
(404) (404)
19-22 Homogeneous Structures Workshop,
Leeds (404)
21-22 Twistors, Geometry and Physics
Meeting, Oxford (404)
25-27 Aspects of Hyperbolicity in Geometry,
Topology and Dynamics Conference, Warwick
(404)
25-29 Introductory Workshop on Inverse
Problems, INI, Cambridge (400)
25-29 Stochastic Analysis UK–China Workshop,
Loughborough (404)
20 - 5 Aug International Wathematics
Competition, Biagoevgrad, Bulgaria (402)
29-51 Privic 2011, Islamabad, Pakistan (402)
AUGUST 2011
1-5 EQUADIFF 2011, Loughborough (400)
1-5 Inverse Problems in Analysis and

18-22 Experiments for Processes with Time

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)
15-17 Galway Topology Colloquium, Belfast

(403) 15-19 Design of Experiments in Healthcare

INI Workshop, Cambridge (400)
17-19 Mathematical Models in Ecology and Evolution, Groningen, The Netherlands (403)
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 **29 - 2 Sep** Theoretical Fluid Dynamics LMS–EPSRC Short Course, Heriot-Watt University (404)

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

#### SEPTEMBER 2011

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**5-8** Partial Differential Equations and Spectral Theory Meeting, Imperial College London (404)

5-9 European Women in Mathematics General Meeting, Barcelona (396)
5-9 Accelerating Industrial Productivity via Deterministic Computer Experiments and Stochastic Simulation Experiments Workshop, INI, Cambridge (402)

**5-9** Mathematical Imaging in Interaction with Biomedicine ICMS Workshop, Edinburgh (398)

5-9 ENUMATH Conference 2011, Leicester (404)7-8 The Mathematics of Turbulent Diffusion Meeting, Sheffield (404)

8-9 Heilbronn Annual Conference, Bristol (404)

**11-17** Turning Dreams into Reality ICME, South Africa (388)

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

**12-16** Perspectives in Algebraic Lie Theory Workshop, INI, Cambridge (403)

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

29 LMS Popular Lectures, Birmingham (404)

#### OCTOBER 2011

7-8 LMS South-West and South Wales
Regional Meeting, Exeter
20 Mathematics in Defence Conference,
Shrivenham (401)

NOVEMBER 2011 18 LMS AGM, London



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# **R. TOWNSEND** LMS member 1866–1883



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Rev. Richard Townsend, MA, FRS Fellow of Trinity College, Dublin Professor of Natural Philosophy, University of Dublin

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