



LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 407 October 2011

Society Meetings and Events

2011

Saturday 8 October
SW & South Wales
Regional Meeting,
Exeter [page 7]

Tuesday 11 October
Computer Science
Colloquium, London
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Annual General
Meeting, London
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Friday 18 November
Graduate Student
Meeting, London
[page 2]

2012

26–30 March
LMS Invited Lectures,
Glasgow

NEWSLETTER ONLINE:

Go to www.lms.ac.uk/newsletter

ANNUAL GENERAL MEETING

The Annual General Meeting of the Society will be held at 3.00 pm on Friday 18 November 2011 in the Jeffrey Hall at the Institute of Education, 20 Bedford Way, London WC1H 0AL.

The business shall be:

1. elections to Council and Nominating Committee
2. the report of the President on annual activity
3. the report of the Treasurer
4. the adoption of the Trustees Report for 2010/11
5. appointment of Auditors
6. presentation of certificates to LMS prizewinners.

It is hoped that as many members as possible will be able to attend.

Fiona Nixon
Executive Secretary

ANNUAL DINNER

The 2011 Annual Dinner will be held after the Annual General Meeting at 7.30 pm on Friday 18 November 2011 at The Russell Hotel, London WC1. The cost for members and their guests is £45 per person, which is for a three-course meal and wine. Members wishing to attend should make cheques payable to 'London Mathematical Society' and also indicate if they have any dietary requirements and send to: Leanne Marshall, London Mathematical Society, De Morgan

House, 57–58 Russell Square, London WC1B 4HS. Payment should arrive by **Monday 7 November**. Any queries should be sent to leanne.marshall@lms.ac.uk.

2011 ELECTIONS TO COUNCIL AND NOMINATING COMMITTEE

The ballot papers for the November elections to Council and Nominating Committee are being circulated with this copy of the *Newsletter*.

There are two candidates for the post of Education Secretary. Nine candidates for Members-at-large of Council are proposed by the Nominating Committee and one further has been nominated directly, for six vacancies. Four names have been proposed by the Nominating Committee for two vacancies in the membership of the Nominating Committee. The slates for election were placed on the LMS website on 8 July 2011.

Please note that completed ballot papers must be returned by **Thursday 10 November 2011**.

A separate form on which to suggest names of potential candidates for the 2012 elections for consideration by Nominating Committee is also included. Members may also make direct nominations; details will be in the May 2012 Newsletter or are available from Duncan Turton at the LMS (nominations@lms.ac.uk).

LONDON MATHEMATICAL SOCIETY

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www.lms.ac.uk/newsletter

LONDON MATHEMATICAL SOCIETY GRADUATE STUDENT MEETING

Friday 18 November 2011

Birkbeck College, Malet Street, London WC1E

This meeting is intended as an introduction to the Society Meeting later in the day. All graduate students (and indeed any mathematicians) will be very welcome.

9.30 Coffee and Registration

10.00 **1st speaker** *TBC*

11.00 Coffee/Tea

11.15 Graduate student talks

12.45 Lunch

13.30 Award prizes

13.35 **Susan Hezlet** (LMS Publisher) *How to get your papers published*

13.45 **2nd speaker** *TBC*

14.45 Move to Jeffrey Hall, IoE, for LMS meeting (see below and opposite)

The lectures will be held in Room Mal G16, Birkbeck College, Malet Street, London WC1E and a sandwich lunch will be provided. For directions see: www.bbk.ac.uk/maps/centrallondon.pdf.

Students are invited to give short talks (15 minutes) aimed at a general mathematical audience. Prizes will be awarded for the best two talks. If you would like to give a talk, please email Elizabeth Fisher (meetings@lms.ac.uk).

To register, please email Elizabeth Fisher (meetings@lms.ac.uk) by **11 November**.

Limited funds are available to help with students' travel costs, if they are also attending the afternoon meeting (details below).

The graduate event will be followed by an LMS Society Meeting starting at 15.00, which is open to all.

Angus Macintyre will give the Presidential address on *The logic of the real, complex and perfect exponentials*, and Alex Wilkie (Manchester) will speak on *Polynomials, quasipolynomials and o-minimality*.

For further details see: www.lms.ac.uk/content/society-meetings.

LONDON MATHEMATICAL SOCIETY

ANNUAL GENERAL MEETING

Friday 18 November 2011

Jeffrey Hall, Institute of Education 20 Bedford Way, London, WC1H 0AL
(Nearest tube: Russell Square)

Programme:

- | | |
|------------------|---|
| 3.00–3.30 | Annual General Meeting |
| 3.30–4.30 | Alex Wilkie (Manchester)
<i>Polynomials, quasipolynomials and o-minimality</i> |
| 4.30–4.55 | Tea |
| 4.55–5.00 | Announcement of Election Results |
| 5.00–6.00 | Angus Macintyre (LMS President)
Presidential Address:
<i>The logic of the real, complex and perfect exponentials</i> |

The meeting will include the presentation of certificates to the 2011 LMS prize winners.

The meeting will be followed by a reception at De Morgan House.

Funds are available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Requests for support and any other queries about the AGM should be sent to Elizabeth Fisher (meetings@lms.ac.uk).

SHAW PRIZE

The Shaw Prize in Mathematical Sciences 2011 was awarded to Demetrios Christodoulou (ETH, Zürich) and Richard Hamilton (Columbia University) for their highly innovative works in nonlinear partial differential equations in Lorentzian and Riemannian geometry and their applications to general relativity and topology.

The Shaw Prize consists of three annual awards: Astronomy, Life Science and Medicine, and Mathematical Sciences. Each prize carries a monetary award of US\$ 1 million. The Shaw Prize is an international award managed and administered by The Shaw Prize Foundation based in Hong Kong. For further information visit the website at www.shawprize.org.

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ANNUAL LMS SUBSCRIPTION 2011–12

Members are reminded that their annual subscription, including payment for publications, for the period November 2011 – October 2012 is due on **1 November 2011**. By the second week of October Members will be sent reminders via email or letter, detailing how to pay their subscription. In the case of Members who already have a Direct Debit set up and do not wish to alter their subscription, no action need be taken.

Rates

The annual subscription to the London Mathematical Society for 2011–12 is:

- Ordinary membership £54.00
 - Concessions on Ordinary membership:
 - Reciprocity £27.00
 - Career break or part-time working £14.00
 - Associate membership £14.00
- Members also have the option to pay their

European Mathematical Society subscription via the LMS (£23) and subscribe to the *Journal of the EMS* (£94).

The member prices of the Society's journals for 2012 are:

	Print	Online*	Print+Online*
<i>Bulletin</i>	£57.00	£45.00	£69.00
<i>Journal</i>	£105.00	£85.00	£126.00
<i>Proceedings</i>	£112.00	£90.00	£134.00
<i>Nonlinearity</i> (except N. America)	£75.00	£97.00	
<i>JCM</i> (electronic)	—	free	—

(*inclusive of VAT)

Please note that for online subscriptions it is essential that we have an up-to-date email address.

Elizabeth Fisher
Grants and Activities Administrator

Note to readers. The price for the *Journal of the EMS* was stated incorrectly in the September 2011 *Newsletter*. The correct price is given above.

LMS Newsletter

www.lms.ac.uk/newsletter

Editorial office: newsletter@lms.ac.uk; London Mathematical Society, De Morgan House, 57–58 Russell Square, London WC1B 4HS (t: 020 7637 3686; f: 020 7323 3655)

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

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

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Charity registration number: 252660.

The London
Mathematical
Society



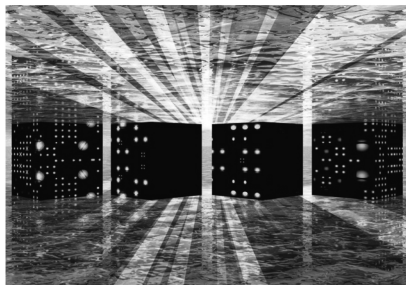
NAIS The Centre for
Numerical Algorithms
and Intelligent Software

LMS Computer Science Colloquium

High Performance Scientific Computing at the Exascale

Tuesday 11 October 2011, 10.30–16.30

De Morgan House, 57–58 Russell Square, London, WC1B 4HS.
Nearest tube: Russell Square



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The aims of the meeting are to showcase state of the art scientific computing applications, to identify some of the challenges posed by next generation high performance machines and indicate promising approaches to tackling the problem.

Marc Snir (Illinois)

Exascale Computing: The Last Rehearsal Before the Post-Moore Era

Ulrich Rüde (Erlangen)

Towards Exascale Computing: Multilevel Methods and Flow Solvers for Millions of Cores

Oubay Hassan (Swansea)

Towards Fully Parallel Aerospace Simulations on Unstructured Meshes

Paul Kelly (Imperial College)

Software Abstractions for many-core software engineering

Full abstracts and timetable for the day can be found at:

www.lms.ac.uk/content/lms-computer-science-day

The Computer Science Day is part of an LMS initiative of activities at the interface between Mathematics and Computer Science. Research students from both the Computer Science and Mathematics communities are especially welcome to participate.

To register, please contact Elizabeth Fisher (computerscience@lms.ac.uk).

The day is free for students and £5 for all others which is payable on the day. A sandwich lunch will be provided.

Limited funds are available to help with students' travel costs. Further details are available from Elizabeth Fisher at the Society (computerscience@lms.ac.uk).

LONDON MATHEMATICAL SOCIETY

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The London
Mathematical
Society



New Zealand
Mathematical
Society

LMS – NZMS AITKEN UK LECTURE TOUR 2011

The 2011 LMS Aitken Lecturer is Professor Geoff Whittle (Victoria University of Wellington).

The Forder–Aitken lectureship scheme is a collaboration between the London Mathematical Society and the New Zealand Mathematical Society in which each society invites an eminent mathematician from the other country to give lectures at different universities around the country.

Geoff Whittle is the first Aitken Lecturer to visit the UK and he will give talks on *Well-quasi-ordering Binary Methods* and *Matroid Representation over Infinite Fields* at:

St Andrews

Matroid Representation over Infinite Fields
5 October at 2.30 pm, Mathematical Institute

Well-quasi-ordering Binary Methods
6 October at 2.30 pm, Mathematical Institute
(part of the Scottish Combinatorics Afternoon)
Organiser: Sophie Huczynska
(sophieh@mcs.st-and.ac.uk)

Manchester

Well-quasi-ordering Binary Methods
10 October at 3 pm, Frank Adams
(Tea at 2.30pm)
Organiser: Alexandre Borovik
(borovik@manchester.ac.uk)

Cambridge

Well-quasi-ordering Binary Methods
13 October at 2.30 pm, Room MR12
Organiser: Imre Leader
(I.Leader@dpmms.cam.ac.uk).

QMUL

Well-quasi-ordering Binary Methods
14 October at 4.30 pm, Room M103
Matroid Representation over Infinite Fields
17 October at 4.30 pm, Room M103
Organiser: Peter Cameron
(p.j.cameron@qmul.ac.uk)

Oxford

Well-quasi-ordering Binary Methods
18 October at 2.30 pm,
Mathematical Institute
Matroid Representation over Infinite Fields
18 October at 4.30 pm,
Mathematical Institute.
Organiser: Alex Scott
(scott@maths.ox.ac.uk).

For further information on attending each lecture, please contact the local organisers.

Abstracts for both lectures can be found on the LMS website: www.lms.ac.uk

For general enquiries about the Aitken Lectures, please contact Elizabeth Fisher
(meetings@lms.ac.uk).

LONDON MATHEMATICAL SOCIETY

SOUTH WEST & SOUTH WALES REGIONAL MEETING

Saturday 8 October 2011

Exeter University

Programme:

9.30 Opening of the Meeting

John Coates (Cambridge)

L-functions and arithmetic from a p -adic perspective

10.30 Tea/Coffee

11.30 **David Burns** (King's College London)

TBC

12.30 Lunch

14.00 **Jürgen Ritter** (Augsburg)

On equivariant Iwasawa theory

The LMS Regional Meeting is part of a two-day workshop on Iwasawa theory, starting on Friday 7 October.

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 or to register, email the organiser Nigel Byott (N.P.Byott@exeter.ac.uk). More information can be found on the web page at http://people.exeter.ac.uk/sz236/iwasawa_workshop/program.html.

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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MATHEMATICS POLICY ROUND-UP

September 2011

RESEARCH

Mathematics community expresses funding concerns to the Prime Minister

The Council for the Mathematical Sciences (CMS) has written to the Prime Minister to express its major concerns over the future of the mathematical sciences in the UK as a result of changes to funding being made by the Engineering and Physical Sciences Research Council (EPSRC). A copy of the letter is available at www.cms.ac.uk/summaries/CMSLettertoPrimeMinister.pdf.

EPSRC shaping capability for mathematics

The LMS has set up a blog to receive contributions on how EPSRC developments are affecting individual institutions or departments; how the LMS should respond; and what individual members can do to help. You can access the blog at <https://epsrclms.wordpress.com>.

EPSRC Funding Guide – August 2011

The Funding Guide sets out the arrangements and procedures for research grants and research fellowships, together with a summary of other types of grants. It includes terms and conditions agreed across all research councils for full economic cost (FEC) research grants and fellowships. The Funding Guide is available at www.epsrc.ac.uk/SiteCollectionDocuments/FundingGuide.pdf.

REF 2014 news

The Higher Education Funding Council for England (HEFCE) has published draft assessment criteria and working methods of the main and sub-panels for consultation, which closes on 5 October 2011 (www.hefce.ac.uk/research/ref/pubs/2011/03_11). The LMS will be submitting a response to the consultation and this will appear on the LMS website in due course.

HIGHER EDUCATION

Analysis of the Higher Education White Paper

The Higher Education Policy Institute (HEPI) has published a report analysing the government's White Paper on the future of higher education. The report concludes that the government's policies will succeed in their most important aim – that of reducing the level of tuition fees. However, the price will be much greater government control over universities than in the past, and a system where market mechanisms have had to be sacrificed to central direction. The reforms are also likely to lead to a polarised sector with a small number of institutions charging the maximum fee of £9000 and the majority reducing their fees to around £7500. There are serious doubts about whether the new funding arrangements will lead to savings on the scale predicted by the government. The full report is available at <http://tinyurl.com/3g793fu>.

Launch of consultation to put students at the heart of the system

The Department for Business, Innovation and Skills has launched a consultation on details of the regulatory system for the future of higher education, following publication of the higher education white paper *Putting students at the heart of the system*. A copy of the consultation is available at www.bis.gov.uk/hereform. The deadline for submissions is 27 October 2011.

SCHOOLS AND COLLEGES

Mathematics A-level numbers continue to rise

The number of A-level mathematics entries across the UK is up 7.8% on last year, with 82,995 students sitting the exam. In other STEM subjects, physics was up 6.1% (to 32,860), biology up 7.2% (to 62,041) and chemistry up 9.2% (to 48082).

Figures released by the Joint Council for Qualifications also show that:

- A-level further mathematics has continued to rise in popularity, with entries increasing by 5.2% (to 12,287)
- AS mathematics entries increased by 25.3% (to 141,392)
- AS further mathematics entries continued the trend, increasing by 24.7% (to 18,555)

Full tables of results are available on the Joint Council for Qualifications website at www.jcq.org.uk.

Mathematics GCSE

The number of GCSE mathematics entries across the UK is up 1.3%, to 772,944.

Dr John Johnston
Mathematics Promotion Unit

VISIT OF J-E. PIN

Professor Jean-Eric Pin (University Paris Diderot, LIAFA and CNRS) is a world authority in the area of Automata, Semigroups and Formal Languages. He will visit the UK from 14 to 26 November 2011. Professor Pin will give lectures on:

- Tuesday 15 November at the Manchester Algebra seminar, *A Mahler's theorem for functions from words to integers*; contact Mark Kambites (Mark.Kambites@manchester.ac.uk)
- Monday 21 November at the Heriot-Watt MAXIMALS seminar held at the ICMS, *The abstract notion of recognition: algebra, logic and topology*; contact Mark Lawson (markl@ma.hw.ac.uk)
- Thursday 24 November to the York Semigroup, *The kernel of a monoid morphism*; contact Victoria Gould (victoria.gould@york.ac.uk)

For further information about Professor Pin's visit contact Victoria Gould (victoria.gould@york.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF A. BISWAS

Professor Atanu Biswas (Indian Statistical Institute) will be visiting the UK from 12 to 25 October 2011. Professor Biswas's research area is statistics. In particular he is interested in adaptive designs and group sequential designs in clinical trials, categorical data analysis, time series of discrete data, model selection, problems on selection and ranking, nonparametric inference, sequential analysis, survival analysis, illness-death model and distribution theory. Professor Biswas will give talks at:

- University of Warwick, Department of Statistics, 17 October at 11.15
Comparison of treatments and data-dependent allocation for circular data from a cataract surgery
- Aston University, Birmingham, School of Engineering and Applied Science, 20 October at 12.00
Descriptive measures for nominal categorical variables
- University of Birmingham, School of Mathematics: 21 October at 14.30
Unbalanced and partial group sequential methods for normal responses in clinical trials

Professor Biswas will be based at the University of Birmingham during his stay, hosted by Dr Apratim Guha (a.guha@bham.ac.uk). The visit is supported by an LMS Scheme 2 grant.

LMS CONFERENCE FACILITIES

De Morgan House offers 40% discount on room hire to all Mathematical charities and 20% to all not-for-profit organisations. Support the LMS by booking the next London event at De Morgan House.

Call us now on 020 7927 0800 or email roombookings@demorganhouse.co.uk to check availability, receive a quote or arrange a viewing of the venue.



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Professor of Mathematics

The Department of Mathematics at ETH Zurich (www.math.ethz.ch) invites applications for a professor position in Mathematics. We are seeking for candidates with an outstanding research record and a proven ability to direct research of high quality. Willingness to teach at all university levels and to participate in collaborative work both within and outside the school is expected.

The new professor will be responsible, together with other members of the Department, for teaching undergraduate (German or English) and graduate courses (English) for students of mathematics, natural sciences and engineering.

Please apply online at www.facultyaffairs.ethz.ch. Your application should include your curriculum vitae and a list of publications. The letter of application should be addressed to the President of ETH Zurich, Prof. Dr. Ralph Eichler. **The closing date for applications is 30 November 2011.** With a view towards increasing the number of women in leading academic positions, ETH Zurich specifically encourages women to apply.

WOMEN IN MATHEMATICS

A Contact Person for IMU

There is a widely-recognized demand for an increase in mathematical capacity, in all countries and at all levels. There is a need for mathematicians, for teachers of mathematics, and for researchers and practising scientists who are knowledgeable about and comfortable with mathematical tools.

At the same time the mathematical science community is losing talented people at all levels. The proportion of women in academic mathematical sciences declines at each successive professional level, beginning with PhD graduates and progressing through senior faculty and management. I believe that an important goal of the mathematical community is to increase the presence of women in mathematics at all levels and that the beneficiaries of the actions will not only be women.

There is evidence that the actions of departments, academic institutions, other organizations such as professional societies, research institutes, advocacy groups (like Association for Women in Mathematics, European Women in Mathematics and Women in Mathematics committees within mathematical societies) can make a difference, which proves that appropriate efforts are necessary and could be effective.

Therefore I have accepted with pleasure the invitation to be a 'contact person' who would help the IMU permanent Secretariat set up a webpage where people would find pointers to

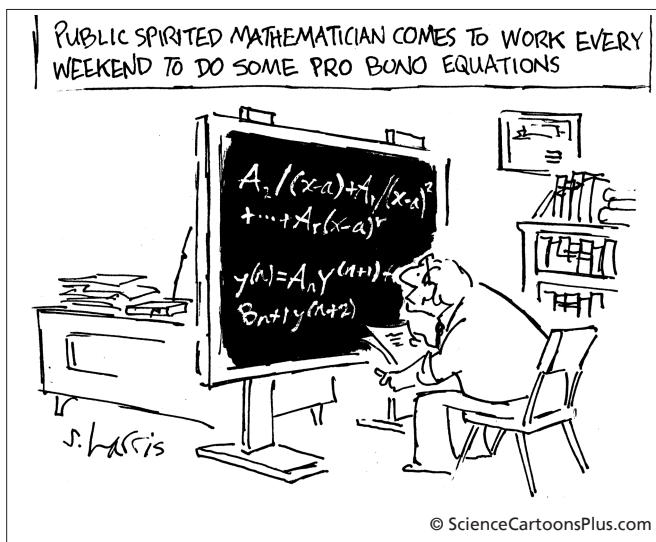
databases, articles, etc., on the global issue of Women and Mathematics, and who would relay to them information to be added to the webpage. My intent is to make the IMU webpage a point of departure for anyone who wants to find out about initiatives and/or studies and findings related to Women and Mathematics, anywhere in the world.

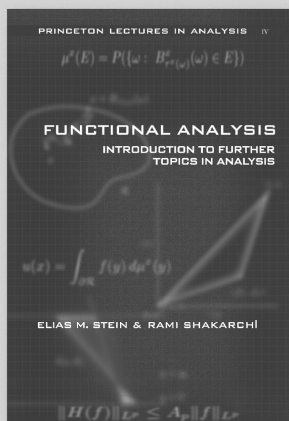
I would like to use this opportunity to draw your attention to *A Call to Action*, the report of the BIRS Workshop of Women in Mathematics (24–28 September 2006), <http://tinyurl.com/3hqz9k>, which was a call for action to improve the representation and experiences of women in mathematics in North America. (I have quoted from the report in the first paragraphs of my text here.)

Dusanka Perisic
University of Novi Sad
(dusanka@dmi.uns.ac.rs)

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The above item is taken from the 47th issue of the IMU electronic newsletter *IMU Net* (see www.mathunion.org/IMU-Net).





Functional Analysis

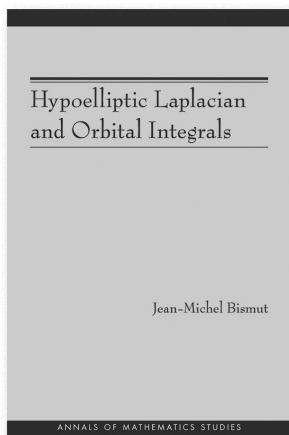
Introduction to Further Topics in Analysis

Elias M. Stein & Rami Shakarchi

This is the fourth and final volume in the Princeton Lectures in Analysis, a series of textbooks that aim to present, in an integrated manner, the core areas of analysis. Beginning with the basic facts of functional analysis, this volume looks at Banach spaces, L_p spaces, and distribution theory, and highlights their roles in harmonic analysis. The authors then use the Baire category theorem to illustrate several points, including the existence of Besicovitch sets. The second half of the book introduces readers to other central topics in analysis, such as probability theory and Brownian motion, which culminates in the solution of Dirichlet's problem.

Cloth \$85.00 978-0-691-11387-6

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Hypoelliptic Laplacian and Orbital Integrals

Jean-Michel Bismut

This book uses the hypoelliptic Laplacian to evaluate semisimple orbital integrals in a formalism that unifies index theory and the trace formula. The hypoelliptic Laplacian is a family of operators that is supposed to interpolate between the ordinary Laplacian and the geodesic flow. In this book, semisimple orbital integrals associated with the heat kernel of the Casimir operator are shown to be invariant under a suitable hypoelliptic deformation, which is constructed using the Dirac operator of Kostant.

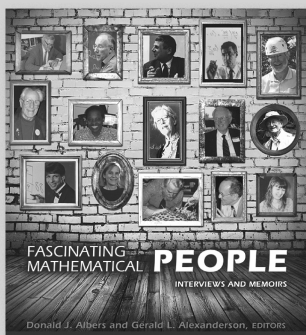
Paper \$65.00 978-0-691-15130-4

Cloth \$110.00 978-0-691-15129-8



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Fascinating Mathematical People

Interviews and Memoirs

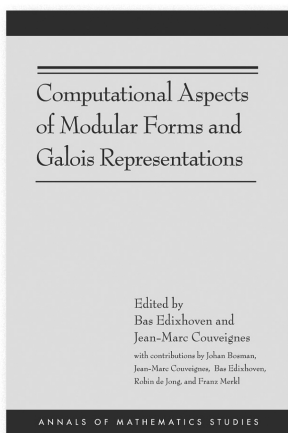
Edited by Donald J. Albers & Gerald L. Alexanderson

With a foreword by Philip J. Davis

"Fascinating Mathematical People is a wonderfully varied collection. We meet brilliantly successful teachers, authors, a dentist, and two Fields Medal-winning Scandinavians. Some came from academic or intellectual families, another from a blazing-hot glass factory in Pennsylvania, and still another from an ancient and storied English aristocratic background. All of them had surprising side paths and detours on their way to mathematical success."

—Reuben Hersh, coauthor of *Loving and Hating Mathematics*

Cloth \$35.00 978-0-691-14829-8



Computational Aspects of Modular Forms and Galois Representations

How One Can Compute in Polynomial Time the Value of Ramanujan's Tau at a Prime

Edited by Bas Edixhoven & Jean-Marc Couveignes

With Robin de Jong, Franz Merkl & Johan Bosman

Modular forms are tremendously important in various areas of mathematics, from number theory and algebraic geometry to combinatorics and lattices. Their Fourier coefficients, with Ramanujan's tau-function as a typical example, have deep arithmetic significance. Prior to this book, the fastest known algorithms for computing these Fourier coefficients took exponential time, except in some special cases. The case of elliptic curves (Schoof's algorithm) was at the birth of elliptic curve cryptography around 1985. This book gives an algorithm for computing coefficients of modular forms of level one in polynomial time.

Paper \$65.00 978-0-691-14202-9

Cloth \$100.00 978-0-691-14201-2



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LONDON MATHEMATICAL SOCIETY

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BIG BANG 2012

The *Big Bang Science and Engineering Fair* will be held at the Birmingham NEC from 15 to 17 March 2012. At last year's event at London's ExCeL, the mathematics community was offered a floor space of 90 m² in which a number of organisations created a wide variety of engaging activities designed to demonstrate mathematical principles. These included puzzles, card tricks, the mathematics of complexity, aerodynamics, projectiles and trigonometry. All the activities were low cost and could be reproduced in an ordinary classroom. During three days of the event, *Big Bang* attracted about 29,000 visitors. A report on the mathematics activity in last year's event may be found at www.ima.org.uk/viewItem.cfm?cit_id=383783.

The organisers considered the MathsZone (called the *X Plus Why? Factor*) a success and,

for 2012 at the NEC, the mathematics community has been offered between 100 m² and 150 m² of stand space in which to create a MathsZone along the lines of the 2011 event. We are now in the process of requesting proposals for activities for the NEC. If you have an activity that has already been used at a fair, that would be an excellent start; possibly you developed something with the National HE STEM programme. However, if you would like to develop something new, we would still be delighted to hear from you. Although we can provide guidance on what makes a good activity, in general, it should be interactive, fun, supported by knowledgeable, engaging stand personnel and stimulate interest in mathematics.

Clearly, we are interested in getting as much mathematics into the *Big Bang* as possible and the existence of the MathsZone does not preclude applications for stand space elsewhere,

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CAMBRIDGE

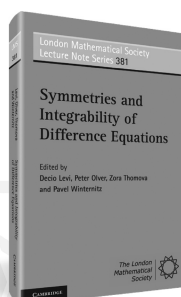
Symmetries and Integrability of Difference Equations

Edited by
Decio Levi, *Università degli Studi Roma Tre*
Peter Olver, *University of Minnesota*
Zora Thomova, *SUNY Institute of Technology*
Pavel Winternitz, *Université de Montréal*

- Shows how Lie group and integrability techniques have been adapted for difference equations
- Each chapter covers a single topic, and includes introductory material as well as the latest research results.

A comprehensive introduction to the subject, suitable for graduate students and researchers. This book is an up-to-date survey of the current state of the art and serves as a valuable reference for specialists in the field.

London Mathematical Society Lecture Note Series, No. 381
June 2011 | Paperback | 978-0-521-13658-7 | £40.00



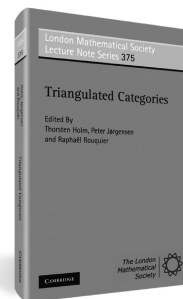
Triangulated Categories

Edited by
Thorsten Holm, *Leibniz Universität Hannover*
Peter Jørgensen, *Newcastle University*
Raphaël Rouquier, *Oxford University*

- An ideal reference for mathematicians interested in modern aspects of triangulated categories
- Explores applications from very different areas of mathematics
- A suitable introduction to the subject for graduate students

A collection of survey articles by leading experts, covering fundamental aspects of triangulated categories, as well as applications in algebraic geometry, representation theory, commutative algebra, microlocal analysis and algebraic topology. A valuable reference for experts and a useful introduction for graduate students entering the field.

London Mathematical Society Lecture Note Series, No. 375
June 2010 | Paperback | 978-0-521-74431-7 | £45.00



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particularly if the theme fits into one of the four zones: *Body Talk*, *Go Global*, *Energise* and the *Next Factor*.

To select mathematics activities as fairly as possible, an independent panel is being recruited to rank submissions, a process which worked well last year. If you would like to join us in the *X Plus Why? Factor* at the NEC, please email john.meeson@ima.org.uk for further details.

John Meeson

IMA



John Meeson's dog, Bertie, discovering that his trajectory is a parabola

THE ROYAL INSTITUTION OF GREAT BRITAIN

Mathematics Masterclasses for Young People

Do you have a passion for mathematics? Would you like to help us to engage young people with the subject? Royal Institution (Ri) mathematics masterclasses are hands-on and interactive extracurricular sessions led by top experts from academia and industry for keen and talented young people all around the UK. The programme was started by Professor Sir Christopher Zeeman in 1981 after the

popularity of his Ri Christmas Lectures on mathematics. The masterclasses are now celebrating their 30th anniversary.

The Ri is looking for volunteers to help run masterclasses in the UK with special attention to the areas of Bedfordshire, Leicestershire, Nottinghamshire, Belfast, Cheshire, Oxford and Essex. We welcome enquiries from researchers, professionals from industry, teachers, postgraduate

students or any other person with an interest in mathematics and introducing the younger generations to the art and practice of mathematics. Whether you would like to present a session or whether you have the influence to make things happen, we would like to hear from you.

For more information please contact Sara Santos on ssantos@ri.ac.uk or 020 7670 2915. Details about the masterclasses can be found on www.rigb.org/maths.



Mathematics Summer Celebration Day: *Surprising Geometry Show* given by Dr Sara Santos for Ri masterclass students



Maths and Sport

Free Public Mathematics Lectures

by John D Barrow FRS, Gresham Professor of Geometry

How Fast Can Usain Bolt Run?

Tuesday, 15 November 2011 – 1pm – Museum of London, EC2

David and Goliath: Strength and Power in Sport

Tuesday, 13 December 2011 – 1pm – Museum of London, EC2

Citius, Altius, Fortius: Records, Medals and Drug Taking

Tuesday, 17 January 2012 – 1pm – Museum of London, EC2

Let's Twist Again: Throwing, Jumping, and Spinning

Tuesday, 21 February 2012 – 1pm – Museum of London, EC2

On the Waterfront

Tuesday, 27 March 2012 – 6pm – Museum of London, EC2

Final Score

Tuesday, 24 April 2012 – 1pm – Museum of London, EC2



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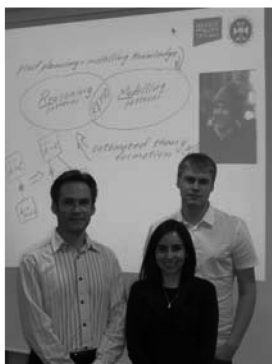
Formal Aspects of Computing
Science Specialist Group

The London
Mathematical
Society



BCS-FACS EVENING SEMINAR
Joint event with the London Mathematical Society
Wednesday 30 November 2011 at 6:00 pm

De Morgan House, 57-58 Russell Square, London WC1B 4HS.
Nearest tube: Russell Square.



Picture courtesy of Andrew Ireland

From l-r: Andrew Ireland, Maria Teresa Llano, Gudmund Grov and Alison Pease (on screen)

Reasoned Modelling: Towards Decision Support for System Designers
Professor Andrew Ireland (Heriot-Watt University)

Formal modelling and reasoning are closely related activities. In particular, modelling decisions are typically informed by the analysis of failed proofs. While such analysis is not intellectually challenging from the perspective of mathematical reasoning, it does represent a major barrier to the uptake of formal design methods by mainstream software engineers - whose intuitions lie in modelling and not proof. This problem is exacerbated by the huge number of proof obligations that arise during industrial scale developments.

Overcoming this barrier would increase the accessibility and productivity of formal design methods, and ultimately the dependability and security of software intensive systems. Andrew Ireland's talk will describe a programme of research called reasoned modelling which aims to reduce this barrier. In essence he and his collaborators are focused on the development of techniques that abstract away from the complexities of low-level proof obligations, in particular proof-failures, and provide designers with high-level modelling guidance. Their approach is based upon a classification of common modelling patterns. Combined with automatic proof-failure analysis, they use these patterns to automatically generate modelling guidance. Complementing this top-down process, they are experimenting with bottom-up AI theory formation techniques. Specifically, they are exploring how the HR automated theory formation system can be used to increase the flexibility of our modelling patterns. He will report on progress within the context of Event-B, a refinement based modelling formalism. Their longer-term vision for reasoned modelling will also be outlined. This talk is based upon joint work with Gudmund Grov, Maria Teresa Llano and Alison Pease.

Refreshments will be available from 5.30 pm.

The seminar is free of charge and open to everyone.

*If you would like to attend, please email computerscience@lms.ac.uk by **25 November**.*

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

www.lms.ac.uk/newsletter

ALAN TURING YEAR

The Incomputable and the *Turing Centenary Conference* are part of a series of special events, running throughout the Alan Turing Year, celebrating Turing's unique impact on mathematics, computing, computer science, informatics, morphogenesis, philosophy and the wider scientific world.

The Incomputable

The Incomputable, a workshop of the six-month Isaac Newton Institute programme *Semantics and Syntax: A Legacy of Alan Turing*, will take place from 12 to 15 June 2012 at the Kavli Royal Society International Centre, Chicheley Hall, Newport Pagnell. The workshop is unique in its focus on the mathematical theory of incomputability, and its relevance for the real world. The invited plenary speakers are:

- S. Abramsky (Oxford)
- M. Davis (Berkeley/New York)
- S. Lloyd (MIT)
- P. Maini (Oxford)
- Y. Matiyasevich (St Petersburg)
- I. Németi/H. Andr  ka (Budapest)
- G. Sacks (Harvard)
- T.A. Slaman (Berkeley)
- R.I. Soare (Chicago)
- V. Vedral (Oxford)
- A. Zeilinger (Vienna)

The Incomputable is held in association with the Turing Centenary Conference (CiE 2012) in Cambridge the following week, which will run up to 23 June, the centenary of Turing's birth, and will culminate with a birthday celebration at Turing's old college, King's College, Cambridge. For further information contact S. Barry Cooper, University of Leeds (pmt6sbc@leeds.ac.uk) or visit the website at www.mathcomp.leeds.ac.uk/turing2012/inc.

Turing Centenary Conference

CiE 2012 – How the Word Computes will take place from 18 to 23 June 2012 at the University

of Cambridge. Its central theme is the computability-theoretic concerns underlying the broad spectrum of Turing's interests, and the contemporary research areas founded upon and animated by them. Invited speakers include:

- D. Aharonov (Jerusalem)
- V. Becher (Buenos Aires)
- L. Blum (Carnegie Mellon)
- R. Downey (Wellington)
- Y. Gurevich (Microsoft)
- J. Hartmanis (Cornell)
- A. Hodges (Oxford)
- R. Jozsa (Cambridge)
- S. Kauffman (Vermont/Santa Fe)
- J. Murray (Princeton)
- P. Smolensky (Johns Hopkins)
- I. Stewart (Warwick)
- L. Valiant (Harvard)

Deadline for submissions is **Friday 27 January 2012**. For further information contact Anuj Dawar, University of Cambridge (anuj.dawar@cl.cam.ac.uk) or visit the website at www.cie2012.eu.

SHEFFIELD PROBABILITY DAY

The *Sheffield Probability Day* will take place on Wednesday 12 October 2011. The speakers are:

- Mark Davis (Imperial College) 2.15 pm
Pathwise stochastic calculus and applications to options on realized variance
- Claudia Kl  ppelberg (TU Munich) 3.45 pm
The 2011 Applied Probability Trust Lecture:
An introduction to COGARCH modelling with financial applications

The lectures will take place in Room K14, Hicks Building. Tea and coffee will be available at 3.15 pm in Room I15, Hicks Building. All are welcome. For further information contact Chris Drew (tel. 0114 222 3763, email spd@sheffield.ac.uk) or visit the website at http://maths.dept.shef.ac.uk/math/sem_week.php. The meeting is sponsored by the Applied Probability Trust.

Journals of the London Mathematical Society

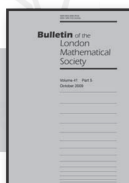


Journal of Topology

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Journal of the London Mathematical Society

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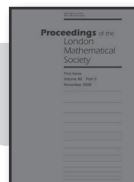
Bulletin of the London Mathematical Society

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Proceedings of the London Mathematical Society

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RECORDS OF PROCEEDINGS AT LMS MEETINGS

REGIONAL ORDINARY MEETING

held on *Tuesday 19 July 2011* at the University of Leeds. About 55 members and visitors were present for all or part of the meeting.

The meeting began at 2.30 pm, with the President, Professor A.J. MACINTYRE, FRS, in the Chair.

There were no elections to membership.

Three members signed the book and were admitted to the Society.

Professor J.K. TRUSS introduced a lecture given by Professor Gregory Cherlin on *The classification of homogeneous combinatorial structures*.

After tea, Professor Truss introduced a lecture given by Professor Alexander Kechris on *The dynamics of automorphism groups of homogeneous structures*.

The Chair expressed the thanks of the Society to the local organisers and the speakers for putting on such an interesting meeting.

After the meeting, a wine reception and dinner were held at Devonshire Hall.

HOMOGENEOUS STRUCTURES MEETING

Report

The LMS Northern Regional Meeting 2011 took place on Tuesday 19 July with two distinguished speakers (Gregory Cherlin and Alexander Kechris) and was followed by a three-day workshop on *Homogeneous Structures*. All these events took place at the School of Mathematics, University of Leeds and were supported by the London Mathematical Society and EPSRC. About 50 people attended.

A relational structure is homogeneous if every isomorphism between finite substructures extends to an automorphism. Countable homogeneous structures arise as Fraïssé limits of amalgamation classes of finite structures. The subject has connections to model theory, to permutation group theory, to combinatorics (for example through combinatorial enumeration, and through Ramsey theory), and to descriptive set theory.

The study of homogeneous structures and their automorphism groups has seen some exciting developments in recent years which has led to the discovery of some surprising interconnections between structural Ramsey theory, topological dynamics (extreme amenability, describing universal minimal G -flows), and constraint satisfaction (an area of theoretical computer science). Fraïssé amalgamation and homogeneous structures provide a framework which connects these diverse subject areas.

Many attendees commented on how wonderful it was that the talks managed to cover the diverse range of areas of mathematics listed above while at the same time remaining very interconnected, with speakers frequently referring back to ideas and results from other presentations given at the workshop. Another particularly pleasant aspect of the meeting

was the fact that several research students, and early-career postdoctoral researchers, were given the opportunity to give contributed talks. This reflects the fact that the subject is particularly attractive for early-career researchers, as the theory is well developed yet highly active, with many open questions which are interesting yet accessible. The LMS meeting and subsequent workshop helped to promote this exciting area of research in the UK. Many international experts attended and numerous participants from the UK were attracted. The meeting was such a success, and generated such excitement among the participants, that plans are already under way for a follow-up meeting on homogeneous structures next summer at Charles University, Prague.

Invited speakers included Manuel Bodirsky (École Polytechnique, LIX, Paris), Peter Cameron (Queen Mary, University of London), Gregory Cherlin (Rutgers), Manfred Droste (Universität Leipzig), David Evans (University of East Anglia), Robert Gray (University of Lisbon), James Mitchell (University of St Andrews), Jaroslav Nešetřil (Charles University, Prague), Michael Pinsker (Paris 7, Vienna, Jerusalem), Christian Rosendal (University of Illinois at Chicago), Katrin Tent (Universität Münster) and Anatoly Vershik (St Petersburg State University).

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

Robert Gray
University of Lisbon

UK–JAPAN WINTER SCHOOL 2012

The UK–Japan Winter Schools have been held since 1999. The aim of the School is to bring together Japanese and UK scientists, in particular young researchers and students, in a

relaxing and stimulating atmosphere. The next UK–Japan Winter School, on *String Theory, Geometry, and Mathematical Physics* will be held at the University of Oxford from 4 to 8 January 2012. There will be three short lecture courses plus a number of individual talks. The main lecturers are:

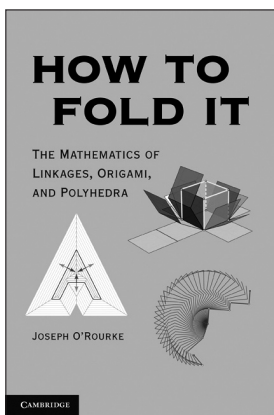
- Bertrand Duplantier (Institut de Physique Théorique, Saclay, France)
Schramm–Loewner evolution, Liouville quantum gravity and the KPZ relation
- Nigel Hitchin (Mathematical Institute, Oxford, UK)
tba
- Hiroshi Ooguri (Caltech, USA)
Topological string theory

For further information visit the website www.thphys.physics.ox.ac.uk/conferences/uk-japan-2012, or contact one of the local organisers: Andrei Starinets (andrei.starinets@physics.ox.ac.uk) and Andre Lukas (lukas@physics.ox.ac.uk).

REVIEW

How to Fold It: The Mathematics of Linkages, Origami and Polyhedra by Joseph O'Rourke, 2011, Cambridge University Press, 180 pp; pb £19.99, ISBN 978-0-521-14547-3; hb £50, ISBN 978-0-521-76735-4.

With its origins in a monograph by the author (with Erik Demaine) *How to Fold It* takes a mathematical approach to a selection of topics relating to 'folding' – whether these folds are found in the hinges of linkages and robot arms, the bond angles in proteins, or in paper shopping bags. Each topic is treated in an analytical way with a traditional theorem-and-proof approach, and is presented with motivating discussion, photographs and exercises to develop understanding. Animations and



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templates are provided at www.howtofoldit.org to help with visualisation and encourage the reader to print, fold and experiment.

The major theorems presented are remarkable – results that may surprise the reader include the fact that, with the right folds, any shape or collection of shapes (even ones with holes in) that is composed of straight lines may be cut out from a sheet of paper with just a single cut. For those that are motivated more by abstract shapes than paper chains, there is a worthwhile discussion of general results regarding whether a convex polyhedron can be sliced along its edges to unfold into a net – and conversely which polygonal nets can be folded up to form which polyhedra (yes, in many cases more than one!). My personal favourite shows why a paper shopping bag stays open while it is being filled, but folds away neatly afterwards – with the answer lying closer to graph theory than to physics.

The author aims to assume only 'high school' mathematics – 'a little algebra, trigonometry and geometry' – but still manages to reach the boundaries of knowledge by describing open problems. Inevitably, some of the fine detail of the bigger theorems is glossed over, but this is not unwelcome as the sketches provided give a good idea of how the proofs would look.

Although time is taken to explain the process of proof by induction (and even the notion of using Greek letters to label angles) I was still left wondering how far this book would suit a non-mathematician. The proofs demand concentration and careful reading, and the rigour of the approach may well scare off those who are not already familiar with a thorough theorem-and-proof approach. Those most suited would be undergraduates and postgraduates who have yet to be convinced that the topic of folding can produce any 'proper' mathematics – this will surely leave them in no doubt.

Martin Smith

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.

OCTOBER 2011

3 Supporting Postgraduates Who Teach Workshop, Southampton (405)

3-7 Mean-field Methods and Multiscale Analysis of Neuronal Populations Workshop, CIRM, Marseille (406)

3-7 Dynamical Systems and Classical Mechanics ICMS Workshop, Edinburgh (405)

5 *Matroid representation over infinite fields* LMS–NZMS Aitken Lecture, St Andrews (407)

5 Supporting Postgraduates Who Teach Workshop, Cardiff (405)

6 *Well-quasi-ordering binary methods* LMS–NZMS Aitken Lecture, St Andrews (407)

7-8 Iwasawa Theory Workshop, Exeter (407)

8 LMS South-West and South Wales Regional Meeting, Exeter (407)

10 *Well-quasi-ordering binary methods* LMS–NZMS Aitken Lecture, Manchester (407)

10 Supporting Postgraduates Who Teach Workshop, Bristol (405)

11 Computer Science Colloquium, London (407)

12 Sheffield Probability Day, Sheffield (407)

13 *Well-quasi-ordering binary methods* LMS–NZMS Aitken Lecture, Cambridge (407)

14 *Well-quasi-ordering binary methods* LMS–NZMS Aitken Lecture, QMUL (407)

17 *Matroid representation over infinite fields* LMS–NZMS Aitken Lecture, QMUL (407)

18 *Well-quasi-ordering binary methods and Matroid representation over infinite fields* LMS–NZMS Aitken Lectures, Oxford (407)

20 Mathematics in Defence Conference, Shrivenham (401)
 20 Supporting Postgraduates Who Teach Workshop, Sheffield (405)
 24-28 Spatio-temporal Evolution Equations and Neural Fields Workshop, CIRM, Marseille (406)
 28 Supporting Postgraduates Who Teach Workshop, Edinburgh (405)

NOVEMBER 2011

3 Supporting Postgraduates Who Teach Workshop, Manchester (405)
 7-11 Learning and Plasticity Workshop, CIRM, Marseille (406)
 11 Geometry Day, King's College London (406)
 12-13 MathsJam Weekend, Wychwood Park (405)
 15 *How Fast Can Usain Bolt Run?* Gresham College Lecture, Museum of London (407)
 18 LMS AGM, London (407)
 18 LMS Graduate Student Meeting, London (407)
 19 Dan Quillen Memorial Meeting, Oxford (406)
 23 Representation Theory and Number Theory Meeting, London (406)
 29-31 Dec SAMS-AMS Joint International Congress, Port Elizabeth, South Africa (406)
 30 BCS-FACS Evening Seminar, London (407)

DECEMBER 2011

5-9 Mathematical Models of Cognitive Architectures Workshop, CIRM, Marseille (406)
 12-16 Inverse Problems in Science and Engineering INI Workshop, Cambridge (401)
 13 *David and Goliath*, Gresham College Lecture, Museum of London (407)

JANUARY 2012

4-8 String Theory, Geometry, and Mathematical Physics UK-Japan Winter School, Oxford (407)
 8-11 Free Boundary Problems in Fluid Mechanics Meeting, Nottingham (406)

17 *Citius, Altius, Fortius*, Gresham College Lecture, Museum of London (407)
 31-2 Feb Cryptographic Theory INI Workshop, Cambridge (404)

FEBRUARY 2012

13-17 Symmetries of Discrete Objects Conference, Queenstown, New Zealand (406)
 21 *Let's Twist Again*, Gresham College Lecture, Museum of London (407)

MARCH 2012

15-17 The Big Bang Science and Engineering Fair, NEC Birmingham (407)
 21 Zeeman Medal 2011 Award Ceremony, The Royal Society, London (406)
 26-30 LMS Invited Lectures, Alexei Borodin, Glasgow (406)
 27 *On the Waterfront*, Gresham College Lecture, Museum of London (407)

APRIL 2012

16-19 BMC 2012, Canterbury
 17-19 Frontiers of Nevanlinna Theory 3: Applications of Nevanlinna Theory to Differential and Functional Equations, University College London (401)
 24 *Final Score*, Gresham College Lecture, Museum of London (407)

MAY 2012

28-1 Jun Boundary Value Problems for Linear Elliptic and Integrable PDEs: Theory and Computation ICMS Workshop, Edinburgh (405)

JUNE 2012

12-15 The Incomputable Workshop, Chicheley Hall, North Buckinghamshire (407)
 18-20 Frontiers of Nevanlinna Theory 4: Nevanlinna Theory and Number Theory, University College London (401)
 18-23 Turing Centenary Conference, Cambridge (407)

M.M.U. WILKINSON

LMS member 1873–1914



F. Treble, Norwich

Rev Michael Marlow Umfreville Wilkinson, MA FCPS
Fellow and Assistant Tutor, Trinity College, Cambridge