

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 426 June 2013

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NEWSLETTER ONLINE: newsletter.lms.ac.uk

FELLOWS OF THE ROYAL SOCIETY

Among those elected to Fellowship of the Royal Society in 2013 were:

- Keith Ball, Professor of Mathematics, Mathematics Institute, University of Warwick
- Raymond Goldstein, Schlumberger Professor of Complex Physical Systems, Department of Applied Mathematics and Theoretical Physics, University of Cambridge
- Gareth Roberts, Professor of Statistics, Department of Statistics, University of Warwick

Elliot Lieb, Professor of Mathematics and Higgins Professor of Physics, Princeton University was elected a Foreign Member.

For further information visit the website at http://royalso ciety.org/about-us/fellowship/ new-fellows-2013.

WOMEN IN MATHEMATICS

BBC Woman's Hour

Professor Gwyneth Stallard, Chair of the LMS Women in Mathematics Committee, and Professor of Pure Mathematics at the Open University, and Dr Eugenia Cheng, Senior Lecturer in Mathematics at Sheffield University have appeared on BBC Radio 4's Woman's Hour.

Professor Stallard and Dr Cheng discussed the reasons for the low numbers of female mathematics professors in UK mathematics departments and what might be done to improve their chance of success.

Professor Stallard highlighted the recent LMS report, Advancing Women in Mathematics: Good Practice in UK University Departments. The report – which is the first to cover the mathematical sciences – provides valuable data on the proportions of women at each career stage. This data enables each department to benchmark itself against the national picture and will assist both departments and the LMS in targeting actions appropriately.

A recording of the interview is available at www.bbc.co.uk/pro grammes/b01rvpk8 and the full report on Good Practice is available on the LMS website at www.blitzadv. co.uk/LMS-BTL-17Report.pdf.

GENERAL MEETING

There will be a General Meeting of the Society on Friday 5 July 2013, to be held in the Hardy Room, De Morgan House, Russell Square, London WC1B 4HS. The business shall be:

- 1. the appointment of Scrutineers
- 2. announcement of Council's reco mendation for Election to Honorary Membership
- 3. announcement of LMS prize winners for 2013

The General Meeting will be followed by a Society meeting (see page 3). It is hope that as many members as possible will be able to attend.

> Fiona Nixon Executive Secretary

WILLIAM BENTER PRIZE IN APPLIED MATHEMATICS 2014

The prize, awarded by the City University of Hong Kong, recognizes outstanding mathematical contributions that have had a direct and fundamental impact on scientific, business, finance and engineering applications. It will be awarded to a single person for a single contribution, for a body of related contributions of his/her research, or for his/her lifetime achievement. The prize recipient will be expected to come to City University of Hong Kong to receive his/her award in person and to give a presentation of his/her work.

The 2012 prize was awarded to Professor James Murray, FRS. The prize is awarded once every two years. The prize amount is US\$100,000. The next award will be given in December 2014.

Nomination is open to everyone. Nominations should not be disclosed to the nominees and self-nominations will not be accepted. A nomination should include a covering letter with justifications, the CV of the nominee,

and two supporting letters. Nominations should be submitted to the Selection Committee (mclbj@cityu.edu.hk) by the deadline of **31 December 2013**. For further information visit the website at: www6.cityu.edu.hk/ rcms/WBP/index.html.

FERRAN SUNYER I BALAGUER PRIZE

Prize Winner 2013

The 2013 prize has been awarded to Professor Xavier Tolsa, Universitat Autňnoma de Barcelona for his work on analytic capacity, the Cauchy transform, and non-homogeneous Calderón-Zygmund theory.

Call for the 2014 Prize

The prize will be awarded for a mathematical monograph of an expository nature presenting the latest developments in an active area of research in mathematics. The prize amount is €15,000 and the winning monograph will be published in Birkhäuser Verlag's series *Progress in Mathematics*. Deadline for submission is **2 December 2013**. For further information visit the website at http://ffsb.iec.cat.

LMS Newsletter

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http://newsletter.lms.ac.uk

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LONDON MATHEMATICAL SOCIETY

SOCIETY MEETING

Friday 5 July 2013

De Morgan House, Russell Square, London

(Nearest Tube: Russell Square)

3.30 Opening of the meeting and LMS business, including the announcement of the 2013 prize winners (open to all)

Karl-Theodor Sturm (Bonn)

Geometric Analysis on the Space of Metric Measure Spaces

The space X of all metric measure spaces (X, d, m) plays an important role in image analysis, in the investigation of limits of Riemannnian manifolds and metric graphs as well as in the study of geometric flows that develop singularities. We show that the space X - equipped with the L²-distortion distance Δ is a challenging object of geometric interest in its own. In particular, we show that it has nonnegative curvature in the sense of Alexandrov. Geodesics and tangent spaces are characterized in detail. Moreover, classes of semiconvex functionals and their gradient flows on X are presented.

4.45 Tea/Coffee

5.15 S.R. Srinivasa Varadhan (NYU)

Probability, Counting and Large Deviations.

Calculations in probability theory often involves counting the number of objects in a given set. Tools from probability theory can therefore be useful in counting as well. We will look at some examples where Large Deviation Theory can be used to perform the count.

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.

To register for your place at the meeting, please contact Elizabeth Fisher (Imsmeetings@ Ims.ac.uk).

A reception will be held at the LMS at 6.30 pm with a dinner afterwards. The venue and cost to attend the dinner are to be confirmed. Those wishing to attend the dinner should contact Elizabeth Fisher (Imsmeetings@Ims.ac.uk) before **26 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. The meeting will be preceded by a Graduate Student Meeting.

Contact Elizabeth Fisher (Imsmeetings@Ims.ac.uk) for further information.

WOMEN IN MATHEMATICS DAY 2013

Report

On 18 and 19 April 2013 a two-day LMS Women in Mathematics Conference was held at the Isaac Newton Institute in Cambridge. This proved to be a lovely venue for such an event and with excellent facilities. The very full programme comprised five talks by invited speakers, six contributed talks, a talk on Athena SWAN and good practice, a presentation on funding, and discussion groups focussing on various issues that affect mathematicians in general and some that are more likely to affect female mathematicians. There were also posters on display for participants to peruse during the tea breaks and lunch, and of course a conference dinner. The invited speakers spoke mainly on the

topics of their mathematical research, and I felt that the standard was extremely high, the talks all being understandable and interesting, and with many beautiful graphics! In addition the invited speakers each included some narrative on her career progression; I found this an inspiring and useful detail allowing the more junior members of the audience to learn how these mathematicians had managed to have successful academic careers despite having to deal with concerns such as working overseas, having children, not always being able to find full-time or permanent positions and 'the two

tion as a spouse or partner).

The contributed talks and the posters provided some insight into the current research of other young mathematicians, and provided a spring-board for many conversations during the tea and lunch breaks. All the participants were asked to vote for a poster to win the poster competition and the winner was Tahel Ronel from the University of Manchester with her poster *Inductive Logic and Rationality based on Symmetry.*

There was time set aside on both of the days for discussion groups, the focus of which ranged from finding funding and taking the next step in your career to good practice in university departments and balancing work and family. These provided a forum for people to share their questions, concerns and experiences, and also added to the sociable atmosphere of the conference. Some of these topics were also presented in more detail during the funding talk and the Athena Swan talk, the latter of which outlined in particular that, in university departments, good practice benefits everyone whereas bad practice tends to have a disproportionately negative effect upon female staff.

On the Thursday evening there was a delicious dinner hosted at Murray Edwards College, providing more opportunity to socialise with the other attendees. In all, the *Women in Mathematics* meeting was an enjoyable and enriching experience, and one I would enthusiastically recommend.

> Jenny Cooley University of Warwick



Mamta Balodi (Motilal Nehru National Institute of Technology) Pointed Majid algebras

GOOD PRACTICE WORKSHOP Report

A workshop on Good Practice in mathematics departments was held on 22 April 2013 at the ICMS in Edinburgh, sponsored by the LMS and the Edinburgh Mathematical Society. The principle aim of the event was for participants to learn more about practical steps towards implementing good practice and applying for Athena SWAN Awards to recognise their good practice. Representatives from Mathematical Sciences departments that had already achieved Athena SWAN awards attended to share their experiences (Professor Adele Marshall, QUB, and Professor David Riley, Nottingham), as well as James Lush, a representative from the Equality Challenge Unit (ECU) who administer the Athena SWAN scheme. Professor Peter Clarkson (Kent) shared his experience of being on a recent Athena SWAN judging panel.



Peter Clarkson

Key points from the discussions during the day were:

- Good practice is beneficial to all: special measures for women are not what are being advocated.
- The LMS Good Practice Report contains data to help benchmark your department against the national picture. This was acknowledged to be a very useful resource and the LMS was urged to continue to keep the data up to date.
- Athena SWAN judging panels are made



up of a mixture of academics, university administrators and learned society administrators. When an application from a mathematics department comes to a panel the composition of the panel will normally include a mathematician. Volunteering to be a panellist is encouraged and can provide useful insights for your own submission. Contact James Lush at the ECU, James.Lush@ecu.ac.uk, if you want to put your name forward.

 Advice from the ECU and previous applicants is not to apply for a higher award than you think you deserve – honesty is appreciated by the judging panels.

The presentation slides from the event will be made available from the ICMS workshop page (search for the April 22 workshop at www.icms.org.uk) and the LMS website. The next Good Practice Workshop will be held in the autumn in London.

Cathy Hobbs, University of the West of England Penny Davies, University of Strathclyde

CECIL KING TRAVEL SCHOLARSHIP 2012

The 2012 Cecil King Award has been made to Stephen Scully (University of Nottingham). He will visit UCLA. Stephen's research interests relate to the study of torsors and projective homogeneous varieties under the actions of linear algebraic groups over fields, an area which unites exciting recent developments in algebraic geometry with a number of classical topics in algebra (e.g. quadratic forms and central simple algebras). During his visit to UCLA. Stephen will work



body problem' (finding a job in the same loca-

Kerstin Weller (University of Oxford) Asymptotic properties of some minor-closed classes of graphs

under the direction of Professor Alexander S. Merkurjev, a renowned expert in this field. His work will focus on the study of various modern algebro-geometric invariants of quadratic forms. This programme of research may be regarded as a broad approach to the theory of quadratic forms over arbitrary fields, encompassing several problems simultaneously, both classical and new.

ROLLO DAVIDSON PRIZE

The Rollo Davidson Trustees have awarded the 2013 Rollo Davidson Prize jointly to Eyal Lubetzky (Microsoft Research, Redmond) and Allan Sly (University of California, Berkeley) for their work on the dynamics of the Ising model, and especially their remarkable proof of the cut-off phenomenon.

The Trust was founded in 1975 in memory

of Rollo Davidson, an accomplished mathematician of remarkable potential, and Fellow-elect of Churchill College, Cambridge, who died on the Piz Bernina in 1970. Initial funding from the Trust came from the royalties of two collections of papers published in 1973/74 by friends and colleagues of Rollo. The Trust awards an annual prize for young probabilists and has benefited from the continuing association with the Davidson family. For further information visit the website at www.statslab.cam.ac.uk/Rollo/ index.html.

MATHEMATICS POLICY ROUND-UP May 2013

RESEARCH

Statement from Academies on R&D investment

In a joint statement, the presidents of the Academy of Medical Sciences, the British Academy, the Royal Academy of Engineering and the Royal Society have called on government to increase capital investment while maintaining the ring-fenced science budget. http://royalsociety.org/policy/

publications/2013/fuelling-prosperity.

She figures 2012

The European Commission has published the She Figures for 2012. Published every three years, they provide a wealth of data on the gender breakdown at different levels, and in different sectors, within research and innovation. 'The numbers bring mixed news, with hints of progress largely obscured by the reality of the widespread underrepresentation of women in research, particularly in STEM fields'. The full report is available at http://tinyurl.com/c3s5g5z.

HIGHER EDUCATION

Athena SWAN awards announced

There has been an increase in submissions to the Athena SWAN Charter this year, which has resulted in a record 68 successful Athena SWAN awards being presented to individual departments and higher education institutions. This included Bronze Department Awards for Imperial College London - Department of Mathematics and Sheffield Hallam University – Department of Engineering and Mathematics. Information on all the Awards is available at http://tinyurl.com/cab89b2.

HEFCE Annual Conference 2013

The conference was entitled Shaping the future: the social and economic contribution of higher education and was held at Imperial College London on 18 April. Transcripts of the presentations are available at http:// tinyurl.com/cwnur4v.

SCHOOLS AND COLLEGES

National Curriculum Review

The Department for Education consultation on the National Curriculum closed on 16 April 2013 and the LMS response can be found at http://tinyurl.com/cpsbu7e.

Other responses were received from the Advisory Committee on Mathematics Education (ACME) http://tinyurl.com/cxtdgn2, the Royal Statistical Society (RSS) http://tinyurl. com/brup37o and Mathematics in Education and Industry (MEI) http://tinyurl.com/ cnyz47u

Plans for more 'rigour' in school maths risk more pupils falling behind

In a letter to the Education Secretary Michael Gove), the chief executive of National Numeracy Mike Ellicock says that proposals for the new school maths curriculum in England will do nothing to build the positive attitudes and resilience that are essential to children's learning. By offering merely an atomised list of concepts and skills, without recognising the links between them, the curriculum will not develop the confidence, understanding and resilience that we all need to function effectively in adult life. The letter is available at http://tinyurl.com/c824ylf.

Curriculum is 'out of step' with needs of modern economy

The CBI has responded to the DfE consultation on the National Curriculum. Commenting on the mathematics the CBI said. 'England has some of the poorest post-16 maths participation rates in the developed world so the focus on functional numeracy and making maths study more demanding is right. Our curriculum has lagged behind the leading education systems for too long. We back the government's ambition for the vast majority to carry on studying maths up to 18 but it needs to send out a powerful signal by extending the maths National Curriculum beyond GCSE-level. It is vital that everyone carries on studying at the level most appropriate to them – either to prepare them for more in-depth study or give them the basic skills they need for work'. The full response is available at http://tinyurl.com/cdnfbz3.

Clarification about changes to AS qualifications

There has been considerable concern amongst mathematics teachers that new arrangements for AS Mathematics and AS Further Mathematics would mean that students would no longer be able to take them as the first year of a two year A-level programme. The DfE has now clarified what this will mean from 2015. The full statement is available at http://tinyurl.com/cxo7wso

Technical baccalaureate announced

The Government has announced a new Technical Baccalaureate. The Tech Bacc will be a performance measure marking achievement by young people aged 16–19 in three areas. The Tech Bacc will be introduced for courses beginning in September 2014, and reported for the first time in the college and school sixth-form performance tables in January 2017. The three elements are:

- a high-quality Level 3 vocational qualification. A list of these courses will be published towards the end of the year;
- a Level 3 "core mathematics" qualification, including AS level mathematics.
 Further information about core mathematics courses for post-16 students will be published by the Department for Education (DfE) in due course.

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 the extended project. This will develop and test students' skills in extended writing, communication, research, and self-discipline and self-motivation. More information is available at http://tinvurl.com/cd3zur8.

STEM education for 14–19 year olds

The Parliamentary Office of Science and Technology has published a POSTnote reviewing the current state of STEM education for 14–19 year olds in the UK, highlighting key challenges and ongoing policy reforms. The leaflet is available at http://tinyurl.com/ buejoxt.

OTHER

Science, research and innovation funding priorities: Request for views

John O'Reilly, Director-General of Knowledge and Innovation at the Department for Business, Innovation and Skills, has written to the CBI, the Chief Scientific Advisers Committee, the Council for Science and Tech-

nology and the national academies to ask for their input. It is a repeat of the process O'Reilly's predecessor Adrian Smith conducted in 2010.

O'Reilly has also published his letter online and invited others to submit responses. The deadline for submitting views was 17 May and these suggestions will feed into O'Reilly's work on the research budget for 2015-16. More information is available at http://tinyurl.com/cqvp2lq.

Triennial review of the Council for Science and Technology (CST)

David Willetts, Minister of State for Universities and Science has announced a triennial review of the CST. The CST is a non-governmental public body that advises the Prime Minister on strategic issues that cut across the responsibilities of individual government departments. The full ministerial statement is available at http://tinyurl.com/ d5tsvc9.

Campaign for Science and Engineering (CaSE) appoints new director

CaSE has announced that its new director will be molecular biologist Sarah Main. Dr Main previously worked in a policy role at the Medical Research Council. Most recently she was seconded to BIS to work on building evidence for the value of public research funding for the UK economy ahead of this year's spending review. She takes up the role at the beginning of June. More information is available at http://sciencecampaign.org. uk/?p=12557



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Dr John Johnston Mathematics Promotion Unit

LMS DURHAM RESEARCH **SYMPOSIA 2013**

In 2013 there will be three Durham Symposia, all supported by EPSRC:

- 3 -12 July Polylogarithms as a Bridge between Number Theory and Particle Physics H. Gangl (Durham), P. Heslop (Durham), G. Travaglini (QMUL) For further information visit: www.maths. dur.ac.uk/events/Meetings/LMS/2013/ PNTPP13/
- 15-25 July Graph Theory and Interactions H. Boersma (Twente), P. Cameron (QMUL), N. Peyerimhoff (Durham), A. Vdovina (Newcastle) For further information visit: www.maths.dur.ac.uk/events/Meetings/ LMS/2013/GTI13/
- 12-22 August Geometric and Cohomological Group Theory P. Kropholler (Southampton), I. Leary (Southampton), C.

Martinez (Zaragosa), B. Nuncinkis (RHUL) For further information visit: www.maths. dur.ac.uk/events/Meetings/LMS/2013/ GCGT13/

LMS Durham Research Symposia have been held at the University of Durham each year in July and August since 1974 and this year, Durham will host the 100th Durham Symposium. The Symposia cover a wide range of mathematical disciplines and recent symposia include:

2012

- Interactions of birational geometry with other fields C. Birkar, I. Cheltsov, T. Browning
- Grand Biological Challenges for Mathematicians K. Peeters, A. Taormina, R. Twarock

2011

- Mathematics of Data Assimilation I. Roulstone, P.-J. Leeuwen, N. Nichols
- Automorphic Forms and Galois Representations F. Diamond, P. Kassaei, M. Kim
- Geometry and Arithmetic of Lattices M. Belolipetsky, M. Bridson, M. Lackenby,
- J. Parker

The Durham website www.maths.dur. ac.uk/events/Meetings/LMS contains information on all previous and forthcoming symposia including, in many cases, a list of participants, abstracts of talks, a symposium photograph (the earliest surviving photograph is from 1976), lecture notes and, for more recent symposia, videos of the talks.

VISIT OF DA-JUN ZHANG

Professor Da-jun Zhang (Department of Mathematics, Shanghai University, China) will visit the UK from 17 June to 14 July 2013. Professor Zhang's expertise is in integrable systems, in particular integrable lattices and exact solution methods. During his visit he will lecture at:

• University College London, Department of Mathematics, Room 505, Thursday 20 June at 2 pm:

Discrete integrable systems: characteristic curves and dispersion relations (contact: R. Halburd: r.halburd@ucl. ac.uk)

 University of Glasgow, School of Mathematics and Statistics, Room 416, Tuesday 25 June at 3 pm: Bilinear structures of discrete Boussinesg type equations

(contact J. Nimmo: Jonathan.Nimmo@ glasgow.ac.uk)

• University of Leeds, School of Mathemat-



Professor Zhang will be based at the University of Leeds. The visit is supported by an LMS Scheme 2 grant.

BIOLOGICAL DYNAMICS WORKSHOP

A workshop on Biological Dynamics will be held at the University of Surrey from Monday 8 to Tuesday 9 July 2013. Talks will as usual be pedagogical and of interest to a wide range of researchers in applied mathematics. Speakers will include:

- Philip Aston (Surrey)
- Stephen Coombes (Nottingham)
- Gianne Derks (Surrey)
- Anne Skeldon (Surrey)
- Julia Yeomans (Oxford)

Financial support for research students and post-doctoral research assistants is available. To offer a contributed talk, contact either Claudia Wulff (Surrey) c.wulff@surrey.ac.uk or Jonathan Dawes (Bath) J.H.P.Dawes@ bath.ac.uk.

This is a joint meeting of two LMS-funded networks: the London Dynamical Systems Group (LDSG) and PANDA. Further details can be found at http://tinyurl.com/cekf9px.



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American Mathematical Society



COMPACTNESS AND CONTRADICTION

Terence Tao, University of California There are many bits and pieces of folklore in mathematics that are passed down from advisor to student, or from collaborator to collaborator, but which are too fuzzy and nonrigorous to be discussed in the formal literature. Traditionally, it was a matter of luck and location as to who learned such "folklore mathematics". But today, such bits and pieces can be communicated effectively and efficiently via the semiformal medium of research blogging. This book grew from such a blog. The articles, essays, and notes in this book are derived from the author's mathematical blog in 2010. It contains a broad selection of mathematical expositions, commentary, and self-contained technical notes in many areas of mathematics, such as logic, group theory, analysis, and partial differential equations. The topics range from the foundations of mathematics to discussions of recent mathematical breakthroughs. Apr 2013 262pp 9780821894927 Paperback £35.95

What's the mathematical sciences With the mathematical sciences <t

WHAT'S HAPPENING IN THE MATHEMATICAL SCIENCES Volume 9

Dana Mackenzie

What's Happening in the Mathematical Sciences looks at some highlights of the most recent developments in mathematics. These include the mathematics behind stories that made headlines, as well as fascinating mathematical stories that never made it into the newspapers. Included in this volume are chapters on a new statistical technique called topic modelling, which is breaking down the academic barriers between maths and the humanities, and new discoveries about mathematicians' (and a lot of other people's) favourite toy - the Rubik's Cube.

May 2013 136pp 9780821887394 Paperback £20.50

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LONDON MATHEMATICAL SOCIETY MIDLANDS REGIONAL MEETING

Tuesday 11 June 2013

Ken Edwards Lecture Theatre 2, University of Leicester

2.00 pm Opening of the meeting

Frances Kirwan (Oxford) Hyperkähler implosion

- 3.15 pm Franz Pedit (Amherst, Tübingen) Constrained Willmore tori: Theory and experiment
- 4.15 pm Tea/Coffee (poster session)

5.00 pm **Peter Topping** (Warwick) Ricci flow and Riemann surfaces

7.00 pm Dinner at Kayal (local Kerala restaurant)

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 and to register and to reserve a place at the dinner, visit: http://tinyurl.com/LMSMidlandsRegionalMeeting. The cost of the dinner will be approximately £20, not including drinks.

The meeting forms part of a workshop on *Advances in Surface Theory* from 12-14 June. For further details visit: http://tinyurl.com/AdvancesSurfaceThe ory or contact the organisers (k.leschke@le.ac.uk).

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.

NEWS FROM ICMS

Overseas activities

EPSRC-DST Indo-UK Initiative

The UK Engineering and Physical Sciences Research Council (EPSRC) and the Indian Department of Science and Technology (DST) are jointly funding a programme of workshops in applied mathematics. The International Centre for Mathematical Sciences (ICMS) is pleased to be providing the administration for this programme. Roughly half the workshops will take place in each country. We expect the majority of the UK workshops will be held at ICMS in Edinburgh. Workshop participants should be from the two countries and each proposal should involve one or more organisers from each country.

will take place in 2014, 2015 and 2016. Proposals should be submitted at one of the deadlines at the end of July or January - current submission deadline 31 July 2013. Full details of the submission procedure can be found in the Call for Proposals section of our website at www. icms.org.uk/proposals.

It is envisaged that the workshops themselves

James Clerk Maxwell AIMS Fund

The Scottish Government supports the African Institute for Mathematical Sciences' Next Einstein Initiative. Responding to an initiative by members of the Scottish mathematical community, the Scottish Funding Council generously agreed to make funds available to set up the James Clerk Maxwell AIMS Fund. The purpose of the fund is to provide financial compensation for mathematical science departments in Scotland which release staff for teaching or other supportive activities at one of the AIMS centres in South Africa, Senegal and Ghana. ICMS provides administrative support for these activities and details can be found on our website at www.icms.org.uk/workshops/aimsjcmf/

2013 Workshop Programme

Our wide-ranging 2013 workshop programme started in January with Online databases: from L-functions to combinatorics, co-sponsored by

AIM and NSF. It was followed in March by an interdisciplinary workshop Mathematical aspects of the physics with non-self-adjoint operator and two algebra workshops in April. May brought workshops on nonlinear PDEs, complex analysis and the Mathematics of Splashing!

Looking ahead, we have a busy summer and autumn coming up, which includes over three Mathematics of Planet Earth workshops (MPE2013, below)

- Differential geometry and continuum mechanics 17-21 June
- Summer school for Ricci curvature: limit spaces and Kähler geometry 1-5 July
- Ricci curvature: limit spaces and Kahler geometry 8-12 July
- Information, probability and inference in systems biology (IPISB 2013) 15-17 July (MPE2013)
- Stochastic, statistical and computational approaches to immunology 22-26 July (MPE2013)
- Singularities in geometry and applications III 2 - 6 September
- Tipping points: fundamentals and applications 9-13 September (MPE2013) Individual web pages for each workshop will be available via www.icms.org.uk/activities/ forthcomingworkshops.

Events for early career researchers

ICMS is excited to be co-organizing the conference Young researchers in mathematics 2013 with postgraduate students from Heriot-Watt University, University of Edinburgh and University of Glasgow. This will bring around 200 post-grads and post-docs to Edinburgh from 17 -20 June for a varied programme of talks and events including plenary lectures from Professor Dusa McDuff FRS and Sir Michael Atiyah FRS. See www. maths.gla.ac.uk/YRM2013/ for more details.

In the first week of July we will be hosting the Summer school for Ricci curvature also aimed at post-grads and post-docs. We also continue to provide administrative support to the Scottish Mathematical Sciences Training Centre and the Edinburgh Mathematical Society's annual meeting for postgraduate students.

Public engagement

The first half of 2013 has given us many opportunities to bring mathematics to the general public in Edinburgh. As part of the January workshop, Professor Brian Conrey gave a public lecture on the Riemmann Hypothesis Primes and Zeros: A million dollar mystery. Edinburgh went maths mad and the 65 free tickets were snapped up in less than 24 hours!

ICMS Staff and the Outreach Team from the School of Mathematics at University of Edinburgh combined forces to present The Valknut Challenge at the National Museum of Scotland's Viking-themed RBS Museum Lates in February. The valknut appears in Viking art in several forms, one of which is the first recorded image of the topological structure the Borromean Rings. Our versions were a couple of large scale textile models to play with and

models made from drinking straws and strips of fabric to take away. See Julia Collins' blog for more information about what we were up to: haggisthesheep.wordpress. com/2013/03/03/thevalknut-challenge. Early March was

spent preparing for Interlocking ring puzzles the Edinburgh In-

ternational Science Festival which takes place over two weeks centred on the Easter weekend. This year the Festival is 25 years old. We hosted the seminar which celebrated the occasion by bringing together many of the founders of the Festival. ICMS was a particularly apt venue for the event. The first Festival awarded the Edinburgh Medal to Nobel laureate Abdus Salam. In his acceptance speech Professor Salam made the first proposal that led to the foundation of ICMS.

based on Viking art

To mark 2013 as the year of Mathematics of Planet Earth, we invited Dr Deirdre Hollingsworth of University of Warwick to speak at the Festival on mathematical modelling in immunology. Her interactive talk Surviving the next

pandemic, was informative and lively without shving away from the odd graph or equation. Around 180 people found out why being popular could be bad for your health!



Professor Keith Ball, Scientific Director ICMS; Dr Deirdre Holllingsworth, University of Warwick; Councillor Donald Wilson, Lord Provost of Edinburgh

Closing the Festival was Edinburgh's first Maker Faire event at which Madeleine Shepherd (ICMS) and Julia Collins (University of

Edinburgh) displayed work in progress on their latest mathematical art collaboration. Botanica Mathematica. This involves finding mathematical svstems which generate botanical forms and ex-



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pressing them in Julia Collins (University of Edinburgh) textiles. If vou're and Helene Frossling (ICMS)

intrigued have a look at their website botanicamathematica.wordpress.com.

We are now looking ahead to the public lectures and event associated with the summer workshops. In June, Jason Reece, University of Strathclyde, will speak on molecular engineering and we anticipate announcing more events, particularly those related to the MPE2013 workshops, on our website by time of printing. Please visit www.icms.org.uk/ activities/public-events.

> Madeleine Shepherd Communications Officer, ICMS

ETH

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Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

Assistant Professor of Mathematics

The Department of Mathematics at ETH Zurich (www.math.ethz.ch) invites applications for an assistant professor position in mathematics. Candidates should hold a PhD or equivalent and have demonstrated the ability to carry out independent research work. The new professor will be expected to teach undergraduate (German or English) and graduate courses (English) for students of mathematics, natural sciences and engineering.

This assistant professorship has been established to promote the careers of younger scientists. The initial appointment is for four years with the possibility of renewal for an additional two-year period.

Please apply online at www.facultyaffairs.ethz.ch

Applications should include a 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 September 2013.** ETH Zurich is an equal opportunity and family friendly employer and is further responsive to the needs of dual career couples. In order to increase the number of women in leading academic positions, we specifically encourage women to apply.

ETH

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 position in an algorithmic area of mathematics related to optimization. The duties of the future professor include teaching in mathematics and related areas.

We are seeking candidates with an internationally recognized research record and with proven ability to direct research of highest quality. Expertise and a strong background in optimization and/or computation will be especially appreciated. Willingness to teach at all university levels and to collaborate with colleagues from departments outside mathematics is expected.

Together with the colleagues from the department, the new professor will be responsible for undergraduate courses in mathematics at ETH Zurich for students of mathematics, engineering and natural sciences, and for graduate courses in the programs MSc in Applied Mathematics, MSc in Computational Science and Engineering, MSc in Statistics, and MSc in Quantitative Finance (joint degree with the University of Zurich). The successful candidate will be expected to teach undergraduate level courses (German or English) and graduate level courses (English).

Please apply online at www.facultyaffairs.ethz.ch

Applications should include a 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 September 2013. ETH Zurich is an equal opportunity and family friendly employer and is further responsive to the needs of dual career couples. In order to increase the number of women in leading academic positions, we specifically encourage women to apply.

No. 426 June 2013

LMS INVITED LECTURES 2013



Professor Fedor Bogomolov (Courant Institute, NYU)

Birational Geometry and Galois Groups

10-14 June 2013 University of Edinburgh

The lectures will discuss the relation between the structure of the Galois group of algebraic closure of a field of rational functions and the structure of the field itself. More precisely, they will cover how to extract effectively birational invariants (i.e. geometric invariants of projective models of the field from the Galois group).

There will also be supplementary lectures by:

- G. Brown (Loughborough) Fano 4-fold hypersurfaces
- I. Cheltsov (Edinburgh) Finite subgroups of Cremona group
- T. Logvinenko (Warwick) Derived categories and birationality

University and local Guesthouse accommodation will be available.

Limited financial support is available with preference given to UK research students. Please contact the organisers for further details (i.cheltsov@ed.ac.uk, J.Martinez-Garcia@sms.ed.ac.uk).

Deadline for funding: 1 May 2013.

For further details on the 2013 Invited Lectures visit www.maths.ed.ac.uk/ cheltsov/fedya/

LMS POPULAR LECTURES 2013

Institute of Education, London – Tuesday 25 June

King Edward School, Birmingham – Thursday 26 September

Professor Ray Hill University of Salford

Mathematics in the Courtroom

In this talk, Professor Ray Hill shows how the misuse of mathematics can lead to miscarriages of justice, and how the correct use of mathematics can help to prevent them.



University of Cambridge Addictive Number Theory

For hundreds of years, mathematicians have asked intriguing questions about adding whole numbers, for example concentrating on particularly important sequences such as the prime numbers and the square numbers.

Dr Vicky Neale

We shall discuss some of these problems (solved and unsolved), and some of the elegant techniques from across mathematics that have been used to tackle these problems.

LONDON: Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. **Register by Thursday 20 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 20 September.**

To register for tickets, please email <u>popularlectures@lms.ac.uk</u> or visit the LMS website for abstracts and a registration form (<u>www.lms.ac.uk/content/popular-lectures</u>).

LMS NEWSLETTER

http://newsletter.lms.ac.uk

YOUNG RESEARCHERS IN MATHEMATICS CONFERENCE

The fourth Young Researchers in Mathematics Conference will be held at the University of Edinburgh from 17 to 20 June 2013, organized jointly by students of University of Glasgow, Heriot-Watt University and University of Edinburgh with the collaboration of ICMS.

This conference is aimed at postgraduate students and postdoctoral researchers in mathematics, and hosts over 200 participants. A unique opportunity is provided to meet potential collaborators and other graduate students, and learn about the latest research in other branches of mathematics. All participants are encouraged to give a talk about their research, whether partial or complete. The conference is divided into twelve broad subject tracks, and participants are encouraged to attend talks from a variety of tracks. Each track will be led by a keynote talk given by a leading researcher

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- in that area. • Algebra: Ken Brown (University of Glasgow)
- Algebraic Topology: Ulrike Tillmann (University of Oxford)
- Analysis and PDEs: James Robinson (University of Warwick)
- Category Theory: Tom Leinster (University of Edinburgh)
- Combinatorics: Béla Bollobás (University of Cambridge)
- Financial Mathematics: Mihail Zervos (London School of Economics)
- Geometry: Silvia Sabatinii (EPFL)
- *History of Mathematics*: Andrea Albrecht (University of Freiburg)
- *Mathematical Biology*: Jonathan Sherratt (Heriot-Watt University)
- *Mathematical Physics*: Christian Blohmann (Max Planck Institute)
- Number Theory: Ben Green (University of Cambridge)
- Numerical Analysis: Endre Suli (University of Oxford)

The conference fee is £45. For further information and to register, visit the website at www.maths.gla.ac.uk/YRM2013/Home.html or email yrm2013@gmail.com. The organizers acknowledge the generous support of the LMS via a Postgraduate Research Conference Scheme 8 grant and a further grant to subsidise graduate students who also attended the British Mathematical Colloquium.

POSTGRADUATE GROUP THEORY CONFERENCE

The 15th Postgraduate Group Theory Conference (PGTC) will be held at the University of Manchester from 1 to 4 July 2013. The PGTC is a PhD student organised conference which is held annually and aims to bring together PhD students who have research interests in Group Theory.

The conference will consist of short, accessible, presentations given by PhD students on an area of Group Theory of their choice. The plenary speakers are:

- Martin Liebeck (Imperial College London) Model theory and finite groups
- Colva Roney-Dougal (University of St Andrews) Random elements of finite groups

Registration can be accessed via the website at www.maths.manchester.ac.uk/~pgtc/. The conference is supported by an LMS Postgraduate Research Conference Scheme 8 grant and the Manchester Institute of Mathematical Sciences.



The 23rd Postgraduate Combinatorial Conference (PCC) will be held at Royal Holloway, University of London from 14 to 16 August 2013. The PCC is an established annual conference organised by, and for, current research students in all areas of combinatorial and discrete mathematics, under the auspices of the British Combinatorial Committee. The PCC is mainly aimed at UK-based students, but also open to those from abroad.

The aim of the conference is to allow

newsletter@lms.ac.uk

research students to meet and discuss their research in a relaxed environment, to gain practice at presenting their research outside of their own department, and to meet preeminent researchers in their area. Each student is encouraged to contribute by giving a talk which will last 25 minutes (including five minutes question and answer time). The speakers will include;

- Julia Böttcher (LSE)
- Carolyn Chun (Brunel University London)
- Daniel Kráľ (Warwick)

To register, and for further details, visit the website at http://tinyurl.com/c9h4g8d. The conference is supported by an LMS Postgraduate Research Conference Scheme 8 grant and a grant from the British Combinatorial Committee.

COMBINATORICS AT OXFORD

A one-day *Combinatorics Meeting* will be held in Oxford on Wednesday 5 June 2013. The meeting will take place in the Mathematical Institute, with talks starting at 11 am and coffee available beforehand from 10.30 am. This year's speakers are:

- Amin Coja-Oghlan (Frankfurt) Chasing the k-SAT threshold
- Ben Green (Cambridge) Counting sumsets and the clique number of random Cayley graphs, revisited
- Penny Haxell (Waterloo) Morphing planar graph drawings
- Peter Keevash (QMUL) Dynamic concentration of the triangle-free process
- Jean-Sebastien Sereni (CNRS) Questions (and answers) about fractional colourings Anyone interested is welcome to attend.
 Some funds may be available to contribute to the expenses of research students who wish to attend the meeting. Further details can be obtained from Alex Scott (scott@maths.ox.ac. uk) or from the webpage at http://people. maths.ox.ac.uk/scott/Pages/one-day_meeting. htm. The meeting is supported by an LMS Conference grant and the British Combinatorial Committee.

BRITISH LOGIC COLLOQUIUM 2013

The British Logic Colloquium (BLC) 2013 will be held at the University of Leeds from 5 to 7 September 2013, together with a symposium (4 to 5 September 2013) in memory of Sir Michael A.E. Dummett, FBA, DLitt (1925-2011).

Speakers will include:

Dummett Day

- Midday 4 September to midday 5 September:
- Douglas Bridges (Canterbury)
- Imogen Dickie (Toronto)
- Per Martin-Loef (Stockholm)
- Michael Rathjen (Leeds)
- Ian Rumfitt (Birkbeck)
- Crispin Wright (St Andrews/New York)

British Logic Colloquium

Midday 5 September to midday 7 September:

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- Ulrich Berger (Swansea)
- Olaf Beyersdorff (Leeds)
- Vasco Brattka (Munich)
- Kentaro Fujimoto (Bristol)
- Nicola Gambino (Palermo/Leeds)
- Charlotte Kestner (Central Lancashire)
- Jochen Königsmann (Oxford)
- Todor Tsankov (Université Paris Diderot)
- Jon Williamson (Kent)
- Elvira Mayordomo (Zaragosa/Iowa State) These events will be supported by an LMS

Conference grant and by the British Logic Colloquium. The Dummett Day will be partfunded by the European Research Council project *The Nature of Representation*.

It is expected that there will also be a *BLC Postgraduate Logic Meeting* on the afternoon of 3 September and morning of 4 September.

BLC organising committee: Andy Lewis-Pye, Dugald Macpherson, Peter Schuster (all Leeds). *Dummett Day* organising committee: Laura Crosilla, Robert Williams, Peter Schuster (all Leeds). For further information email: blc2013@leeds.ac.uk or visit the website at: www1.maths.leeds.ac.uk/~blc2013/.





Computational Group Theory

LMS-EPSRC Short Course

University of St. Andrews 29 July – 2 August 2013

Organisers: Alexander Konovalov, John McDermott, Angela Miguel & Max Neunhöffer

Course outline

The course will introduce students to the four main areas of Computational Group Theory: permutation groups, soluble and p-groups, matrix groups and finitely presented groups. The course will cover typical problems and standard algorithms, along with the analysis of these algorithms and their practical use on a computer. In the practical sessions there will be some emphasis on using the computer algebra system GAP, a world wide open source project established in 1988. After this course the participants will have a good understanding of what computers can and cannot do with groups and will be able to use GAP to answer their own group theoretic questions. The course aims to appeal to a broad spectrum of students from areas such as Algebra, Topology, Combinatorics and Graph Theory.

The four main lecture course topics are:

- Permutation Groups (Alexander Hulpke, Colorado State University)
- Soluble Groups and p-Groups (Bettina Eick, Technische Universität Braunschweig)
- Matrix Groups/Constructive Recognition (Derek Holt, University of Warwick)
- Finitely Presented Groups (Max Neunhöffer, University of St Andrews)

These lecture courses will be supplemented by tutorial sessions.

For further information please visit: http://www-circa.mcs.st-andrews.ac.uk/cgt2013

Applications: Applications should be made using the registration form available via the Society's website at: <u>www.lms.ac.uk/content/short-instructional-courses</u>. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **Monday 17 June 2013.** Numbers will be limited and those interested are advised to make an early application.

All applicants will be contacted within two weeks after the deadline; information about individual applications will not be available before then

In the event of over-subscription preference will be given to UK-based research students

Fees

All research students registered at a UK university will be charged a registration fee of $\pounds 100$. There will be no charge for subsistence costs.

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£125) **£375** in total.

All others (overseas students and postdocs, those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£250) **£500** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). Fees are not payable until a place on the course is offered but will be due by Friday 19 July.

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.





Random Graphs, Geometry & Asymptotic Structure

LMS-EPSRC Short Course

University of Birmingham 19-23 August 2013

Organisers: N. Fountoulakis and D. Hefetz

Course outline

The objectives of this course are two-fold:

1. to provide an introduction to recent developments and techniques for classical problems in the theory of random graphs;

2. to cover geometric and topological aspects of the theory of random graphs and introduce participants to the diversity and the depth of the combinatorial, probabilistic and analytical methods that have been invented in this context.

The three main lecture course topics are:

- Long paths and hamiltonicity in random graphs (M. Krivelevich, Tel Aviv University)
- Random graphs from restricted classes (K. Panagiotou, Ludwig-Maximilians-Universität)
- Random geometric graphs (M. D. Penrose, University of Bath)

There will also be a special guest lecture:

• Random planar graphs (C. McDiarmid, University of Oxford)

These lecture courses will be supplemented by tutorial sessions.

For further information please visit: http://web.mat.bham.ac.uk/combinatorics/LMS-EPSRC/

Applications: Applications should be made using the registration form available via the Society's website at: www.lms.ac.uk/content/short-instructional-courses. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **Monday 8 July 2013.** Numbers will be limited and those interested are advised to make an early application.

All applicants will be contacted within two weeks after the deadline; information about individual applications will not be available before then

In the event of over-subscription preference will be given to UK-based research students

Fees

All research students registered at a UK university will be charged a registration fee of **£100**. There will be no charge for subsistence costs.

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£150) **£400** in total.

All others (overseas students and postdocs, those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£300) **£550** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). <u>Fees are not payable until a place on the course is offered but will be due by Friday 9 August 2013.</u>

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.





Topology in Low Dimensions

Durham University 26 – 30 August 2013

Organiser: Andrew Lobb

Course outline

Low-dimensional topology has seen a proliferation of new invariants and techniques over the last decade or so which are intimately interrelated. The ideas behind them are approachable from a number of points of view: for example from algebraic geometry, differential geometry, algebraic topology, or from representation theory. The invariants include Khovanov homology and its offspring, Floer homologies, and various gauge theories.

It is important that the new generation of topologists and geometers becomes familiar with these techniques in which many disparate areas of mathematics are united. A problem in getting to grips with this area is that there are no good comprehensive written sources for students to study independently that give a sensible balance of the theory and the applications.

The course aims to present a broad selection of these ideas, covering the construction, the properties, and what can be done with them.

The three main lecture course topics are:

- Heegaard-Floer homology (Matthew Hedden, Michigan State University)
- Khovanov homology and its offspring. (Jacob Rasmussen, Cambridge)
- Contact 3-manifolds and holomorphic curves. (Chris Wendl, UCL)

These lecture courses will be supplemented by tutorial sessions.

For further information visit:www.maths.dur.ac.uk/~ddmb48/LMS Durham Short Course.html

Applications: Applications should be made using the registration form available via the Society's website at: <u>www.lms.ac.uk/content/short-instructional-courses</u>. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **15 July 2013.** Numbers will be limited and those interested are advised to make an early application.

All applicants will be contacted within two weeks after the deadline; information about individual applications will not be available before then

In the event of over-subscription preference will be given to UK-based research students

Fees

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All research students registered at a UK university will be charged a registration fee of **£100**. There will be no charge for subsistence costs.

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£125) £400 in total.

All others (overseas students and postdocs, those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£250) **£500** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). Fees are not payable until a place on the course is offered but will be due by **Friday 16 August 2013**.

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.

Research highlights from the leading mathematical journals





Izvestiya: Mathematics iopscience.org/im Russian Mathematical Surveys lopscience.org/rms

Sbornik: Mathematics iopscience.org/msb

Free to read in 2013

2012 highlights Collections of the very best articles published in 2012.

Fields Medal collection

Go to iopscience.org/fields-medal to discover a special collection of first-class research in mathematics.

New in 2013

From 2013 all subscriptions to the journals include electronic access dating from the first English translation volumes at no extra cost.





CONTINUITY, COMPUTABILITY, **CONSTRUCTIVITY**

From Logic to Algorithms

Continuity, Computability, Constructivity is a workshop series bringing together researchers from real analysis, computability theory, and constructive mathematics. The next one will take place at Swansea University, Gregynog from 26 to 30 June 2013. The overall aim is to apply logical methods in these disciplines to provide a sound foundation for obtaining exact and provably correct algorithms for computations with real numbers and related analytical data, which are of increasing importance in safety critical applications and scientific computation. The invited speakers are:

- Hajime Ishihara (JAIST Japan)
- Margarita Korovina (Novosibirsk)
- Jean-Michel Muller (Lvon)

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Matthias Schroeder (Vienna)

The tutorial speakers are:

- Pieter Collins (Maastricht) Computability and dynamical systems
- Norbert Müller (Trier) Fast implementation of exact real number computation
- Arno Pauly (Cambridge) Weihrauch degrees of unsolvability

To register your interest in the conference contact Monika Seisenberger (m.seisenberger@swansea.ac.uk). For further information visit the website at www. cs.swan.ac.uk/ccc2013.The conference is supported by an LMS Conference grant, the College of Science at Swansea University, and the British Logic Colloquium.

ZETA FUNCTIONS OF GROUPS

A four day workshop on Zeta Functions of Groups and Related Algebraic Structures will take place at the University of Padova. Italy from 22 to 25 September 2013. The topics covered will include:

Probabilistic zeta functions

- Representation growth
- Subgroup and subring growth
- Asymptotics of number fields
- Lattice enumeration

Limited financial support is available to support the participation of junior researchers. To register for the workshop or to contact the organizers email zetafunctionspadova2013@googlemail.com. Further information, including a list of invited speakers, can be found at http://events. math.unipd.it/grouptheory13.

GROUPS ST ANDREWS 2013

Groups St Andrews 2013 will take place from 3 to 11 August 2013 at the University of St Andrews. The conference aims to cover all aspects of group theory. The short lecture courses given by the Principal Speakers are intended to be accessible to postgraduate students, postdoctoral fellows, and researchers in all areas of group theory.

The Principal Speakers are:

- Emmanuel Breuillard (Université Paris-Sud 11)
- Martin Liebeck (Imperial College London)
- Alan Reid (University of Texas)
- Karen Vogtmann (Cornell University)

The invited one-hour speakers are:

- Inna Capdeboscg (University of Warwick)
- Radha Kessar (City University London)
- Markus Lohrey (Universität Leipzig)
- Derek Robinson (University of Illinois at Urbana-Champaign)
- Christopher Voll (University of Bielefeld)

In addition, all participants will have the opportunity to contribute a talk. For more information on all aspects of the conference. including how to submit an article to the proceedings and details of the extensive social programme see the conference website www.groupsstandrews.org/2013/index.shtml. The meeting is supported by an LMS Conference grant.

MATHEMATICAL MODELS IN ECOLOGY AND EVOLUTION

After a successful meeting in the Netherlands, the fourth biannual Mathematical Models in Ecology and Evolution (MMEE) will be back in the UK, in the historic city of York from 12 to 15 August 2013. In keeping with the spirit of previous meetings, the aim is to showcase the latest developments of mathematical modelling in evolution and ecology by presenting a programme including keynote talks and thematic sessions. The organisers aim to create an inclusive and diverse programme of contributed talks and posters. The involvement of research students and early-career scientists is especially encouraged. The confirmed keynote speakers are:

- Suzanne Alonzo (Yale)
- Alasdair Houston (Bristol)
- Sonia Kefi (Montpellier)
- Richard Law (York)
- Drew Purves (Microsoft Research)

Surveys in Combinatorics 2013

CAMBRIDGE



For further information visit the website at https://sites.google.com/a/vork.ac.uk/ mmeeyork2013/.

The meeting is supported by an LMS Conference grant which will allow the organisers to subsidise the attendance of UK PhD students, and also participants from LMS Scheme 5 or former Soviet Union countries.

MAFELAP 2013

The 14th Mathematics of Finite Elements and Application (MAFELAP) conference will take place at Brunel University from 11 to 14 June 2013, although an opening early evening lecture will be given by Professor J. Tinsley Oden (Texas at Austin, USA) on Monday 10 June to which all delegates are welcome.

As usual the conference will consist of plenary lectures, mini-symposia and parallel sessions. Registration will begin on 10 June. Further information is available on the website at www.brunel.ac.uk/mafelap2013.

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http://newsletter.lms.ac.uk

ALGEBRA, COMBINATORICS, DYNAMICS WORKSHOP

A workshop on *Algebra, Combinatorics, Dynamics and Applications* will be held at Queen's University Belfast from 2 to 5 September 2013. The workshop will focus on recent developments and classical ideas in the interplay between structural properties of algebras, properties of their representations and combinatorics and dynamics. The organisers are particularly interested to discuss problems where combinatorial methods appear as a main ingredient in the solution of an algebraic problem or where arguments of dynamical nature help to understand better some algebraic phenomenon.

Consideration will also be given to more general structures appeared in various applications, in particular in physics, analysis, geometry, topology, homotopy theory, and coding theory. Topics will include, but are not limited to the following:

 Algebras presented by relations (including quadratic algebras and quantum groups)

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- Combinatorics of defining relations, particularly combinatorics and dynamics of words; semigroups and semigroup algebras
- Properties of various generating series associated to rings, Hilbert series, growth, combinatorics of primes
- Representation spaces, dynamics of Gl_n action; Deformation theory
- Homological properties, properties of the Koszul complex
- Operadic generalizations of the above
- Structures related to operads featured in physics, geometry, topology, homotopy theory
- Novikov structures and pre-Lie algebras, Leibnitz algebras, ternary algebras, etc.
- Poisson structures, Calabi-Yau algebras, Gerstenhaber and Batalin-Vilkovisky algebras
- Cluster algebras
- Actions of groups over rings, lower Kgroups over noncommutative rings

- Operator algebras and semigroup actions on Banach spaces, their (infinite-dimensional) dynamics
- Computational aspects of the above, in particular, related to the Gröbner bases theory
- Speakers include:
- Vladimir Bavula (Sheffield)
- Vladimir Dotsenko (Dublin)
- Dimitry Gurevich (Valenciennes)
- Eivind Eriksen (Oslo)
- David Jordan (Sheffield)
- Peter Jorgensen (Newcastle)
- Arnfinn Laudal (Oslo)
- Tom Lenagan (Edinburgh)
- Abdenacer Makhlouf (Mulhouse)
- Yuri Manin (MPIM Bonn) tbc
- Sergei Silvestrov (Lund)
- Agata Smoktunowicz (Edinburgh)
- Alexander Veselov (Loughborough)
- Robert Wisbauer (Düsseldorf)

If you would like to suggest a talk email the title/abstract (TeX file) to n.iyudu@qub. ac.uk.

This will be a joint event with the ARTIN meeting. Anyone interested is welcome to attend. Some funds may be available to contribute to the expenses of research students who wish to attend the meeting. For further details and registration visit http:// sites.google.com/site/algebrabelfast2010/al gebrabelfast2013 or contact Natalia lyudu at n.iyudu@qub.ac.uk. The event is supported by an LMS conference grant.

COHOMOLOGY IN PROFINITE GROUPS

A one day meeting on *Cohomology in Profi nite Groups* will take place at Royal Holloway, University of London on 28 June 2013. This will be an introductory meeting to cohomology in profinite groups. The talks will be aimed towards people familiar either with cohomology in groups or with profinite groups, but not necessarily familiar with both. The speakers are:

 John Wilson (Cambridge and Oxford) Introduction to Profinite Groups and

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Cohomology I

- Peter Symonds (Manchester) Introduction to Profinite Groups and Cohomology II
- Thoma Weigel (Milano-Bicocca) Low Dimensional Group Theory
- Benjamin Klopsch (Otto-von-Guericke-Universität Magdeburg and Royal Holloway) Abstract and Continuous Extensions of p-adic Lie Groups

There are limited funds available to reimburse travel expenses of UK-based students and other young mathematicians.

The meeting is part of the South England Profinite Groups Meetings (www.ma.rhul. ac.uk/sepgm) and is supported by a Joint Research Group in UK LMS Scheme 3 grant and the Department of Mathematics, Royal Holloway University of London.

INTELLIGENT COMPUTER MATHEMATICS

Conferences on Intelligent Computer Mathematics 2013 will take place at the University of Bath from 8 to 12 July 2013. As computers and communications technology advance, greater opportunities arise for intelligent mathematical computation. While computer algebra, automated deduction, mathematical publishing and novel user interfaces individually have long and successful histories, there are now increasing opportunities for synergy among these areas. The conference consists of four tracks:

- Track A: Calculemus (chair: Wolfgang Windsteiger)
- Track B: Digital Mathematical Libraries (chair: Petr Sojka)
- Track C: Mathematical Knowledge Management (chair: David Aspinall)
- Track D: Systems & Projects (chair: Christoph Lange)

The conference is supported by an LMS Conference grant, enabling some support for research students: The conference is organised by James Davenport. For further information visit the website at www.cicm -conference.org/2013/cicm.php or email contact cicm2013@bath.ac.uk.

FUNDAMENTALS OF COMPUTATION THEORY

The symposium on Fundamentals of Computation Theory (FCT) was established in 1977 for researchers interested in all aspects of theoretical computer science, and in particular algorithms, complexity, formal and logical methods. The 19th International Symposium on Fundamentals of Computation Theory will take place at the University of Liverpool from 19 to 21 August 2013. The invited speakers are:

- Marek Chrobak (University of California, Riverside)
- Joel Ouaknine (Oxford University)
- David Peleg (Weizmann Institute)

Main areas covered in FCT include a variety of topics related to Mathematical Foundations of Computer Science including:

<u>Algorithms</u>: combinatorics and analysis of algorithms, computational complexity, computational geometry, computational algebra, algorithm design and optimization approximation, randomized, and heuristic methods, parallel and distributed computing, circuits and boolean functions, online algorithms, machine learning and artificial intelligence.

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<u>Formal methods</u>: algebraic and categorical methods, automata and formal languages, computability and nonstandard computing models, logics and model checking, models of reactive, hybrid and stochastic systems, foundations of concurrency and distributed systems, principles of programming languages, program analysis and transformation, specification, refinement and verification, database theory, security, type systems;

Emerging fields: quantum computation, algorithmic game theory, computational biology, *ad hoc*, dynamic, and evolving systems, foundations of cloud computing and ubiquitous systems.

For further information visit the website http://fct2013.csc.liv.ac.uk/ and the records of all previous events are available from www.infor matik.uni-trier.de/~ley/db/conf/fct/index.html. The proceedings will be published in the Lecture Notes in Computer Science series by Springer-Verlag. The meeting is supported by an LMS Conference grant.

http://newsletter.lms.ac.uk

newsletter@lms.ac.uk

YORKSHIRE DURHAM GEOMETRY DAY

A Yorkshire Durham Geometry Day will take place in Room CM221, Department of Mathematical Sciences, Durham University at 11 am on Wednesday 19 June 2013. The speakers include:

- Lamia Alqahtani (Leeds)
- Hans-Joachim Hein (Imperial College)
- Andrea Malchioldi (Warwick)
- Jonas Nordström (Lund)

There will be an early dinner at 6 pm. The local organisers are John Bolton, (john.bolton@ dur.ac.uk) and Wilhelm Klingenberg (wilhelm. klingenberg@dur.ac.uk). For further information visit the website at http://maths.dur. ac.uk/~dma0wk/ydgd2013.html. The meeting is supported by an LMS Scheme 3 grant.

28 SPECTRAL GEOMETRY, 28 CHAOS AND DYNAMICS

A workshop on *Spectral Geometry, Chaos and Dynamics* will be held at Loughborough University from 9 to 13 September 2013. The workshop will bring together researchers working in the fields of spectral theory, dynamical systems and other areas of pure mathematics. The main goal will be to stimulate research and identify the most promising and important directions for future research, as well as to report on the current state of developments in the field. Speakers who have provisionally confirmed their attendance include:

- Jens Bolte (Royal Holloway)
- Frederic Faure (Grenoble)
- Bernard Helffer (Paris)
- Luc Hillairet (Orleans)
- Dmitry Jakobson (Montreal)
- Gerhard Knieper (Bochum)
- Pär Kurlberg (KTH, Stockholm)
- Jens Marklof (Bristol)
- Dieter Mayer (Clausthal)
- Stephane Nonnenmacher (IPhT, Saclay)
- Mark Pollicott (Warwick)
- Iosif Polterovich (Montreal)
- Richard Sharp (Warwick)

- Corinna Ulcigrai (Bristol)
- Steven Zelditch (Baltimore)

There will be the possibility of support for graduate students to attend the conference. For scientific enquiries contact the organisers Alexander Strohmaier (a.strohmaier@lough borough.ac.uk) or Brian Winn (B.Winn@lough borough.ac.uk). The conference registration will be available at: http://store.lboro.ac.uk/ browse/module.asp?compid=1&modid=2 in due course. The workshop is supported by EP-SRC and an LMS Conference grant.

RELATIVISTIC QUANTUM INFORMATION

The 2013 workshop on *Relativistic Quantum Information* will take place from 24 to 27 June 2013 at the University of Nottingham. This workshop is the next in the annual RQI-North series. The idea of this year is to bring together researchers from a diverse range of backgrounds, including those working in the fields of the Unruh effect, the dynamical Casimir effect, analogue gravity, quantum information theory and foundational physics. The meeting will feature several distinguished speakers including:

- William G. Unruh (British Columbia)
- Carlo Rovelli (CPT)
- Per Delsing (Chalmers)
- Bei-Lok Hu (Maryland)
- Thomas Jennewein (Waterloo)
- Göran Johansson (Chalmers)
- Gerardo Adesso (Nottingham)
- Iacopo Carusotto (Trento)
- Giacomo D'Ariano (Pavia)
- Beatrix Hiesmayr (Vienna)
- Achim Kempf (Waterloo)
- Jose Ignacio Latorre (Barcelona)
- Robert Mann (Waterloo)
- Terry Rudolph (Imperial)
- Ralf Schützhold (Duisburg-Essen)
- Vlatko Vedral (Oxford)

For further information visit the website at http://rqin2013.weebly.com or contact Jason Doukas (jason.doukas@nottingham.ac.uk). The conference is partially supported by an LMS Conference grant.

UNIVERSITY OF CAMBRIDGE

FACULTY OF MATHEMATICS

ADAMS PRIZE

Pattern Formation in Physics and Biology

The University of Cambridge has announced the subject for one if its oldest and most prestigious prizes. The Adams Prize is named after the mathematician John Couch Adams and was endowed by members of St John's College. It commemorates Adams's role in the discovery of the planet Neptune, through calculation of the discrepancies in the orbit of Uranus.

The Chairman of the Adjudicators for the Adams Prize invites applications for the 2013-14 Prize which will be awarded this year for achievements in research on the mathematics of Pattern Formation in Physics and Biology.

The prize is open to any person who, on 31^{st} October 2013, will hold an appointment in the UK, either in a university or in some other institution; and who is under 40 (in exceptional circumstances the Adjudicators may relax this age limit). The value of the prize is expected to be approximately £14,000, of which one third is awarded to the prize-winner on announcement of the prize, one third is provided to the prize-winner's institution (for research expenses of the prize-winner) and one third is awarded to the prize-winner on acceptance for publication in an internationally recognised journal of a substantial (normally at least 25 printed pages) original article, of which the prize-winner is an author, surveying a significant part of the winner's field.

Applications (email and two hard copies), comprising a CV, a list of publications, the body of work (published or unpublished) to be considered, and a brief non-technical summary of the most significant new results of this work (designed for mathematicians not working in the subject area) should be sent to:

The Secretary of the Adams Prize Adjudicators, Faculty Office, Centre for Mathematical Sciences, Wilberforce Road, Cambridge, CB3 0WA

(email: faculty-office@maths.cam.ac.uk)

The deadline for receipt of applications is 31 October 2013.

OBITUARIES CARL LINDEN

Dr Carl N. Linden, who was elected a member of the London Mathematical Society on 21 December 1961, died on 13 March 2013, aged 81.



Malcolm McGregor writes: Carl was born in Swansea, the eldest of three children. After grammar school, with the financial support of a State Scholarship, he progressed to University of Wales Swansea. In 1952 he graduated with first class honours in Pure Mathematics, and in 1953 he obtained an MSc degree for his thesis on The generalisations of Picard's theorem.

With the aid of a Dr Samuel Williams Fellowship he then studied under the supervision of Dame Mary Cartwright at Trinity College, Cambridge. In 1956 he received his Doctorate for a thesis on *The minimum* modulus of functions regular and of finite order in the unit circle. It was she who introduced him to Blaschke products leading to a number of significant publications over many years.

After leaving Cambridge, Carl spent two years (1956-58) as a Scientific Officer at R.A.E. Farnborough working with the then new Deuce computer.

In 1958 he returned to academia when appointed to a lectureship at Swansea. In 1965 Carl was promoted to a Senior Lectureship, and in 1969 to a Readership. In the academic year 1977-78 he served as Acting Head of the Department of Pure Mathematics, a role he filled with consummate ease.

From 1994 to 1997 he worked part-time as a Reader in Pure Mathematics before retiring.

Carl Linden was a gifted and dedicated mathematician who will be greatly missed.

Carl is survived by his wife Jean, daughters Maris and Myrna, together with his grandchildren and great grandchildren.

JAMES CLUNIE



Phil Rippon writes (with advice from Milne Anderson): Jim was born on 26 October 1926 in St Andrews and attended Madras College there, where he was awarded the college's prestigious Dux (leader) in science in 1945. He completed his undergraduate studies at St Andrews University and then moved to Aberdeen University for his PhD, supervised by Professor Archibald James Macintyre. In his PhD thesis Jim developed what quickly became the 'modern' approach to the subject of Wiman-Valiron theory, published in two papers in the Journal of the London Mathematical Society. His first lectureship was at the University College of North Staffordshire, now Keele University, and in 1956 he moved from there to Imperial College London, where Professor Walter Hayman was setting up what was to become a world-leading group in complex analvsis.

At Imperial College, Jim's complex analysis research flourished and he wrote many hugely influential papers, and supervised seven research students. His papers included one on the coefficients of univalent functions, published in *Annals of Mathematics*, that led to the introduction of the so-called 'Clunie constant'; another in the Journal of the London Mathematical Society that contains a result now known as 'Clunie's lemma'; and a joint paper in *Crelle's Journal* with Professor J. Milne Anderson and Professor Christian Pommerenke that established the theory of so-called Bloch functions.

Jim was promoted to a chair at Imperial College in 1964 at the young age of 39 and retired early in 1981, moving first to a research fellowship at the Open University and then in 1986 to a research fellowship at York University, after which he retired properly. All his life he had fought hard to overcome a disability caused by an attack of childhood polio, which made standing and walking increasingly difficult as the years passed.

Jim married Nancy Tuff in 1955 and many colleagues remember their kindness and hospitality in London, Milton Keynes and York. Jim was regarded extremely warmly by many friends, and widely respected as a wise and knowledgeable colleague with a fine sense of humour. Indeed, his general knowledge was extraordinary, and his ability to complete The Times crossword before breakfast at conferences legendary. He is remembered too with great fondness by colleagues at the constituent colleges of the National University of Ireland, where he was the mathematics external examiner for many years and received an honorary doctorate of science in 1988.

Jim is survived by his daughter Fiona and granddaughter Alex.

REVIEWS

TOWING ICEBERGS, FALLING DOMINOES, AND OTHER ADVENTURES IN APPLIED MATHEMAT-ICS by Robert B. Banks, 2013, Princeton University Press, 344 pp, pbk £11.95, US\$16.95, ISBN: 978-0-6911-5818-1.

This book provides an entertaining look at some simple and interesting mathematical models for a range of topics. One of its big-

AND OTHER ADVENTURES IN APPLIED MATHEMATICS

ROBERT B. BANKS

gest strengths is that it gives a very clear indication of (a) how pretty much anything can be turned into a mathematical model of some kind, and (b) how much aenuine insight and information can be gleaned from mathematical models of this sort. The choice of modelling subjects is imaginative, and includes many different sports, water iets and fountains, traffic flow, the towing and melting of icebergs, water waves and falling dominoes, and growth rates for the national debt, alligator eggs and the height of children. Every chapter is

interesting, and the self-contained nature of each section of the book means that one can happily 'dip in and out' without losing the thread of the text.

The mathematics involved in all of this modelling is deliberately kept fairly simple. Any undergraduate with a standard knowledge of elementary calculus, statistics, differential equations and Newton's laws should be able to follow the exposition without much difficulty. The text also includes a number of supplementary problems that the reader can use to test their knowledge and understanding of the modelling that has been covered: many of these problems add to the material covered in the text and could provide a launch pad for other, more detailed investigations.

I particularly liked the section on determining the wave speed of a row of falling dominoes – an interesting problem which was also linked to water waves and the falling of chimneys. The section on golf and the general motion of balls when struck in various ways was also interesting, but I was surprised that the author seemed to be unaware of the book by Bertie Daish (*The Physics of Ball Games*, part 1: English Universities Press, 1972) which is a remarkably insightful and modern analysis of everything connected with the physics and mechanics of ball movement.

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Finally, there are a couple of extra facts that

the prospective reader should know before deciding whether or not to purchase this book. First, the book is by no means new. This is a paperback version of a volume that was originally published in 1998: indeed, it is over 10 years since the author unfortunately died. The age of the book does not detract from the interest of the mathematics, but some parts of the book look dated (for example, there have been many Olympics since the 1996 Atlanta games. and exhortations to carry out experiments at the World Trade Centre now seem rather

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uncomfortable). Second, the book is very UScentric. Models of 'football' refer to gridiron, icebergs are being towed to Long Beach, all the wind turbines are in Texas, and the borrowings deficit is the US Federal Reserve. Again, this does not spoil the mathematics, but the world is a big place and some examples from outside the USA would have been welcome.

> Alistair Fitt Vice Chancellor's Office Oxford Brookes University

ROADS TO INFINITY: THE MATHEMATICS OF TRUTH AND PROOF by John Stillwell, 2010, AK Peters, 203 pp, £27.99, ISBN 978-1-5688-1466-7.

John Stillwell's *Roads to Infinity* deals with infinity in mathematics, especially the idea of large sizes of infinity (i.e. uncountable sets) and how it relates to other concepts in mathematics, such as computability and provability. In other words, this is a book about some of the most conceptually challenging and exciting topics in mathematics.

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It is a popular scientific book, rather than a textbook. No prior knowledge of graduate mathematics is assumed, the style is conversational whenever possible, and there are extensive historical sections (more on those later). The text is nicely presented, with many illuminating and/or entertaining quotes and diagrams. It is, however, not an easy read, since the topics covered are rather non-trivial, and I have to admit that I found some sections difficult to follow. On the whole, however, the author does rather well to balance ease and depth of understanding.

The rather wide scope of the book is necessary to fulfill the author's expressed aim which is to describe how "set theory interacts with logic, and both begin to affect mainstream mathematics". In this context, interactions does not just mean explicit use of a result from one area in another, but also includes more general cross-breeding of ideas. Consequently, the book has a good amount of historical discussions, taking great care to trace the developments of big ideas over time, pointing out how similar conclusions have been reached in

different ways, or showing how the same idea crops up in different contexts. Here is an

example of this sort of historical analysis of mathematical ideas. The first big idea, intro-



ROADS TO

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THE MATHEMATICS OF TRUTH AND PROOF

from 1891. This elegant and ingenious argument shows that there are uncountably many real numbers. Stillwell discusses the reception of this startling result and how it influenced the development of mathematics, as well as tracing back intuitive ideas about the truth of the result back to mathematicians such as Gauss and Aristotle.

In addition to discussing the result itself, the author considers the idea behind its proof: diagonalisation. He makes a good case for the diagonal method to be just as important as the result itself by pointing out how several proofs of famous results throughout the book are, explicitly or essentially, diagonal arguments. This includes two older proofs of the uncountability of the real numbers, one by Cantor himself and another by Harnack using measures, as well as Post's and Gödel's results on incompleteness. Even Euclid's proof of the fact that there are infinitely many primes is. in a sense, a diagonal argument against a finite list. While on the topic, Euclid's proof is missing a crucial "+1" in this book.

The wide scope of the work and the way that the author manages to show the connections between the different topics are the main strength of the book, making it a good place to start if you have some interest in logic, set theory, or just challenging ideas in general.

> Yann Peresse University of St Andrews

THAT IS ALL YOU NEED TO KNOW Lowry Studio Theatre, May 2013

A Manchester friend's daughter came home from school recently, telling how she had found she was the only one in her GCSE class who had heard of Alan Turing. That is all you Need To Know is an engrossing, carefully researched play about Turing and Bletchley Park. alternately moving, informative, and poignantly funny. But for mathematicians, it comes with a health warning: Here (related through the eyes of Bletchley mathematician Gordon Welchman) Turing's visionary mathematics, a mental world the size of the Albert Hall, is neatly packaged TARDIS-like into a modestly proportioned 'Alan'. As hugely talented theatre company Idle Motion describe in their programme:

"... in 2011 we learnt of Alan Turing and were inspired to read about his life and work. He led us to Bletchley Park and the realisation that what happened there was bigger than one mathematician's genius, but was part of the collective memory of thousands of remarkable people whose quiet work changed the course of our history."

This marvelously creative recreation of wartime Bletchley Park is not so much about the "Alan Who?", still with us 101 years after Turing's birth. It is a dramatically sparky, and not undemanding, reminder of how much we owe to British geekiness, eccentricity - and mathematics. There is nothing much about the key role of Bayesian statistics or mathematical logic in the breaking of the Enigma code; but the Bletchley Park story, buried for decades, is brought beautifully to life. And the crucial role played by the earlier work of Polish mathematicians Marian Rejewski, Jerzy Różycki and Henryk Zygalski is duly credited. I was worried that those who were new to the history would be thoroughly confused by the accumulation of information, vividly dramatised for those in the know via cryptically inventive dramatic devices - images of wartime Bletchley Park projected onto opening filing cabinet drawers: voicesover from the (mainly women) who lived on to tell of the intensity of life at the secret decrypting centre; and clever cutting back and forth between the 1940s, and the 1990s campaign to keep the precious heritage from the developers. There were passing references to a mysterious 'Tony' and his Colossus rebuild, a nice nod in the direction of key figure Tony Sale, who sadly died just last year. At the Metro station near the Lowry Studio Theatre, I got the chance to ask a bright-eyed 14-year-old son of one of the Manchester mathematicians at the play what he made of it - I shouldn't have worried, he was full of enthusiasm, very much alive to the hidden world, hinted at by Idle Motion with such creativeness and clear affection.



Oh, and the actors were jolly good! Chris Bone's performance as Alan is an intensely committed one. As a mathematician, my own favourite performance was Sophie Cullen as the aspergerish Joy, the play's latter-day standardbearer for Turing amongst the neuro-typicals. You should of course go and see this talented company if you get the chance. The current Turing inspired mini-glut of productions dealing with mathematicians cannot last. This - along with The Universal Machine, recently playing at the New Diorama Theatre in London - is a very good addition to the list. And we cannot be that surprised if the mathematics is kept concealed in "Alan Who's" capacious mental TARDIS. Those stimulated by the play can enter and explore that through one of the many centennial books still appearing. And, of course, one can visit (or revisit) Bletchley Park itself.

For further dates see: www.idlemotion. co.uk/Tour_dates.html or catch it in August at the Edinburgh Festival Fringe from 2 to 24 August 2013.

LMS NEWSLETTER

http://newsletter.lms.ac.u

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 is given on the Society's website (www.lms.ac.uk/content/calendar). Please send updates and corrections to calendar@lms.ac.uk.

JUNE 2013

5 Using Real-Life Extended Mathematical Problems with Undergraduates, Bath (425)5 Combinatorics One Day Meeting, Oxford (426)

10 Open System Identification Conference, Aberstwyth (425)

10-11 Stochastic Differential Day Equations and Their Applications Workshop, Strath-

34 clyde (425)

10-14 LMS Invited Lectures, Fedor Bogomolov, Edinburgh (426) 11 LMS Midlands Regional Meeting, Leicester (426) 11-14 MAFELAP 2013, Brunel University

(426)

12-13 Uncertainty in Interaction Networks Meeting, Bath (425)

12-14 Advances in Surface Theory Workshop, Leicester (426)

17-19 Complex Analysis and Approximation Conference, National University of Ireland Maynooth

17-20 Young Researchers in Mathematics Conference, Edinburgh (426)

17-21 Differential Geometry and Continuum Mechanics ICMS Workshop, Edinburgh (425)19 Yorkshire Durham Geometry Day, Durham (426)

20-21 Conformal Geometry in Mapping, Imaging and Sensing Workshop, Imperial College London (424)

24-25 High-Dimensional Inference with Applications, University of Kent (424)

24-27 Relativistic Quantum Information Workshop, Nottingham (426)

24-28 Liquid Crystal Defects and their
Geometry INI Workshop, Cambridge (421)
24-28 Dynamics of Suspensions, Gels, Cells and Tissues INI Workshop, Cambridge (422)

25 LMS Popular Lectures, London (426)

25-28 Number Theory for Cryptography Summer School, Warwick (425) 26-30 Continuity, Computability, Constructivity Workshop, Swansea University, Gregynog (426)

28 Cohomology in Profinite Groups Meeting, Royal Holloway, University of London (426)

30-5 Jul British Combinatorial Conference, Royal Holloway College, University of London (422)

JULY 2013

1-2 Spectral Analysis and Differential Equations Meeting, Cardiff (425)
1-2 Bifurcation Theory, Numerical Linear Algebra and Applications, Bath (424)
1-4 Postgraduate Group Theory Confer-

ence, Manchester (426) 1-4 Dense Granular Flows 2nd IMA Conference, INI, Cambridge (416)

1-5 Number Theory, Geometry and Cryptography Workshop, Warwick (425)

3-12 Polylogarithms as a Bridge between Number Theory and Particle Physics LMS-EPSRC Durham Symposium, Durham (426)

4-5 Quantum Information and Control Meeting, Nottingham (425)

5 LMS Meeting, London (426)

8-9 Biological Dynamics Workshop, Surrey (426)

8-10 Combinatorics, Algebra, and More: A Conference in Celebration of Peter Cameron, Queen Mary, University of London (425)

8-12 Intelligent Computer Mathematics 2013 Conferences, Bath (426)

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8-12 Discrete Integrable Systems INI
Follow-up Workshop, Cambridge (424)
8-12 O-Minimality and Diophantine
Geometry, LMS-EPSRC Short Course, Manchester (425)

8-12 Modern Nonlinear PDE Methods in Fluid Dynamics, LMS-EPSRC Short Course, Reading (425)

8-12 Banach Algebras and C*-algebras Meeting, IMPAN, Warsaw (423)

15-19 Polynomial Optimisation Summer School and Workshop, INI, Cambridge (420)

15-25 Graph Theory and Interactions LMS-EPSRC Durham Symposium, Durham (426)

29-2 Aug Computational Group Theory, LMS-EPSRC Short Course, St Andrews (426)

AUGUST 2013

3-11 Groups St Andrews 2013, St Andrews (426)

6-12 International Mathematics Competition, Blagoevgrad, Bulgaria (424)

12-15 Mathematical Models in Ecology and Evolution Meeting, York (426)

12-22 Geometric and Cohomological Group Theory LMS EPSRC Durham Symposium, Durham (426)

14-16 Postgraduate Combinatorial Conference, Royal Holloway, University of London (426)

18-24 Parallel Programming in GAP International Workshop, St Andrews

19-21 Fundamentals of Computation Theory Symposium, Liverpool (426)

19-23 Random Graphs, Geometry & Asymptotic Structure LMS-EPSRC Short Course, Birmingham (426)

26-30 Topology in Low Dimensions LMS-EPSRC Short Course, Durham (426)

SEPTEMBER 2013

2 Heilbronn Day, Groups and Their Representations, Manchester (423)
2-4 Advanced Decomposition Methods for

Partial Differential Equations Minisymposium, Kingston (424)

2-5 Algebra, Combinatorics, Dynamics and Applications Workshop, Queen's University Belfast (426)

2-6 New Mathematical Directions for Quantum Information INI Workshop, Cambridge (423)

3-6 Brauer's Problems in Representation

Theory – 50 years on, Manchester (423) 4-7 British Logic Colloquium and Dummett

Day, Leeds (426)

9-13 Spectral Geometry, Chaos and Dynamics, Loughborough (426)

10-11 Next Steps CETL-MSOR 2013 Conference, Coventry (425)

11-13 Mathematics of Surfaces 14th IMA Conference, University of Birmingham (416)

15-21 Quantum (semi)groups and (co)actions Meeting, Leeds (423)

16–20 Holography: From Gravity to Quantum Matter INI Workshop, Cambridge (424) **22-25** Zeta Functions of Groups and Related Algebraic Structures Workshop, University of Padova, Italy (426)

22-27 Heidelberg Laureate Forum, Heidelberg (422)

26 LMS Popular Lectures, Birmingham (426) 29–1 Oct The Navier-Stokes Equations and Related Topics Clay Research Workshop, Oxford (425)

30-4 Oct New Insights into Computational Intractability Clay Research Workshop, Oxford (425)

30-4 Oct Number Theory and Physics Clay Research Workshop, Oxford (425)

30-4 Oct Quantum Mathematics and Computation Clay Research Workshop, Oxford (425)

OCTOBER 2013

2 Clay Research Conference, Oxford (425)
3 University of Oxford's Mathematical Institute Opening Conference (425)

WOMEN IN MATHEMATICS DAY 2013

18 to 19 April 2013, Isaac Newton Institute in Cambridge (report on page 4)





Vijay Teeluck (University of Leeds) Topographic Rossby waves on a smooth and continuous slope

Discussion group

2013 Poster Competition Winner Tahel Ronel (University of Manchester)