

NEWSLETTER

No. 415 June 2012

Society Meetings and Events

2012

Wednesday 6 June Northern Regional Meeting, Newcastle

Tuesday 26 June LMS Popular Lectures, London [page 6]

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Friday 16 November Annual General Meeting, London

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GENERAL MEETING

There will be a General Meeting of the Society on Friday 29 June 2012, to be held at the Wilkins Old Refectory, University College London at 3.30 pm. The business shall be:

1) the appointment of scrutineers

- 2) announcement of Council's recommendation for Election to Honorary Membership
- 3) announcement of prize winners for 2012

The General Meeting will be followed by the Hardy Lecture (see page 5). I hope that as many members as possible will be able to attend.

> Fiona Nixon Executive Secretary

EUROPEAN LATSIS PRIZE

The European Science Foundation (ESF) invites nominations for the European Latsis Prize 2012. The prize, of a value of 100,000 Swiss Francs, is awarded each year by the Latsis Foundation through the ESF to a scientist or research group in recognition of outstanding and innovative contributions in a selected field of research. The research field for the 2012 Prize is mathematics.

The European Latsis Prize 2012 seeks nominations for

outstanding contributions to research in mathematics. Nominations are encouraged from all parts of mathematics, both pure and applied. The deadline for nominations is **15 July 2012**.

For more information visit the website at www.esf.org/ activities/european-latsis-prize-2012.html.

FELLOWS OF THE ROYAL SOCIETY

Amongst those elected to Fellowship of The Royal Society in 2012 were:

- Dominic David Joyce, Professor of Mathematics, Mathematical Institute, University of Oxford, and Senior Research Fellow, Lincoln College
- Richard Kerswell, Professor of Applied Mathematics, School of Mathematics, University of Bristol
- Chandrashekhar Bhalchandra Khare, Professor of Mathematics, Department of Mathematics, University of California, Los Angeles
- John Michael McNamara, Professor of Mathematics and Biology, School of Mathematics, University of Bristol

For further information visit the website at http://royalsociety. org/about-us/fellowship/newfellows-2012.

www.lms.ac.uk/newsletter

EUROPEAN WOMEN IN MATHEMATICS

European Women in Mathematics (EWM) is an international association of women working in the field of mathematics. The organization was founded in 1986 and has its office in Turku, Fin-

land. EWM has several hundred members in over 30 European countries. Its executive consists of a convenor and a standing committee. EWM holds a biennial scientific meeting and

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a general conference. Recent meetings have taken place in Cambridge, UK (2007), Novi Sad, Serbia (2009) and CRM Barcelona, Spain (2011).

EWM also sponsors or co-organizes various interim meetings and other activities, for example the ICM satellite meeting ICWM 2014 in Korea. EWM is independent from, but has links to, its sister organization, the Association for Women in Mathematics (AWM) based in the United States. It also has close links to various national level organizations, for example Femmes et Mathématiques in France.

6ECM activities

EWM is organizing the Joint EMS/EWM Survey Lectures on Sunday 1 July as a satellite to the Congress. Together with the EMS Women in Mathematics Committee, we are organizing a panel on *Redressing the gender imbalance in mathematics: strategies and outcomes.* Moreover, thanks to contributions from Google and the Foundation Compositio Mathematica, EWM is sponsoring the participation at the 6ECM for 20 to 30 young women who then also get to participate in the EWM satellite event on the Sunday.

Other activities

We publish an annual newsletter. Our members are connected by an e-mail network. Every

LMS Newsletter

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advertisements are not accepted for events that occur in the first week of the publication month. News items and notices in the *Newsletter* may be freely used elsewhere unless otherwise stated, although attribution is requested when reproducing whole articles. Contributions to the *Newsletter* are made under a non-exclusive licence; please contact the author or photographer for the rights to reproduce. The LMS cannot accept responsibility for the accuracy of information in the *Newsletter*. Views expressed do not necessarily represent the views or policy of the London Mathematical Society. Charity registration number: 252660. second year there is a general meeting with published proceedings. EWM participates and organizes sessions in international mathematical conferences. Activities and publicity within each country are organized by regional coordinators. Each country or region is free to form its own regional or national organization, taking whatever organizational or legal form is appropriate to the local circumstances.

EWM aims

- to encourage women to study mathematics
- to support women in their careers

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- to provide a meeting place for like-minded people
- to promote scientific communication
- to cooperate with groups and organizations with similar goals
- to gather and provide information on women in mathematics

Membership

Any woman who supports the purposes of the organization can become a member. The organization can have women or men, as well as organizations, as supporting members. To become a member, fill in the online registration form or contact your regional coordinator. For more information and for registration, please go to our website www.europeanwomeninmaths. org.

Lisbeth Fajstrup EWM Deputy Convenor

WOMEN IN MATHEMATICS

Grace Chisholm Young Fellowship

The London Mathematical Society offers two Grace Chisholm Young Fellowships each year to mathematicians who need support when their mathematical career is interrupted by family responsibilities, relocation of partner, or other similar circumstance. If you, or anyone you know might find the fellowship useful, please see www.lms.ac.uk/content/grace-chisholmyoung-fellowships for more information. The following is a brief report by Veronique Fischer on how she used the fellowship.

From October 2010 until December 2011, I was the LMS Grace Chisholm Young fellow at King's College London (KCL). I am deeply grateful to the London Mathematical Society and particularly to the Women in Mathematics Committee for giving me this opportunity to pursue my academic career in the UK while living with my partner in London. The title gave me an academic status within KCL's mathematics department and more widely in the mathematical community in London and in the UK. It considerably eased the process of applying for grants and positions, giving seminars, networking as well as going to conferences.

The application for the Grace Chisholm Young fellowship was simple (less than two pages) and their response was quick and clear. With this fellowship, my host institute KCL has provided me with excellent research facilities including an email address, a shared office, and access to research literature online and through the KCL library. It has also given me

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the opportunity to teach a course at the LTCC. The personal grant of the fellowship helped me to buy a collection of a dozen books on a new subject I was starting in the UK during my fellowship. Relying on the possibility of being reimbursed by my host institute against the grant money, I was confident to travel and register for conferences and workshops (although most of my expenses turned out to be eventually covered by the conference organisers).

In the course of the fellowship, I had three interviews: at the University of Cambridge, at Cardiff University and at the University of Padua (Italy). In January 2012 I started a postdoctoral position at the latter with the agreement that I would be able to work remotely from my home in London three weeks a month.

Retrospectively my time as the Grace Chisholm Young fellow has been academically very productive as well as personally balanced.

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STELIOS ANDREADAKIS

Professor Stelios Andreadakis, who was elected a member of the London Mathematical Society on 17 March 1960, died on 9 February 2012, aged 79.

Dimitrios Varsos writes: Stelios Andreadakis was born in Athens and graduated in Mathematics from the University of Athens in 1958. He obtained his doctorate from the (then called) Queen Mary College of the University of London under the supervision of Professor Philip Higgins. He then went on to hold an academic position at the University of Athens. He became Professor of Mathematics at the University of Ioannina in 1967 and of the University of Athens in 1973, where he remained until his retirement in 2001.

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Professor Andreadakis's contribution to the theory of infinite groups and in particular to the study of the automorphism group of a free group was quite significant. He served the mathematics community by participating in the organization of two very successful international conferences: *Group Theory and Related Areas* in 1984 in Crete, Greece and *Group Theory, Representation Theory and Related Topics* in 1993 in Spetses, Greece. He was actively involved for many years in the administration of the Hellenic Mathematical Society and the Department of Mathematics of the University of Athens.

He was a very warm and caring person with a delightful sense of humour. One of his side interests was both Greek and world history in which he had great erudition. He is survived by his wife Roula, two daughters and a grand-daughter.

DAVID STORVICK

Professor David A. Storvick, who was elected a member of the London Mathematical Society on 10 November 1970, died on 5 November 2011, aged 82.

Peter Olver writes: David was a distinguished member of the School of Mathematics at the

University of Minnesota, and a recognized researcher in the fields of complex analysis and mathematical physics. During his career, he published 39 papers in top level research journals, many of them written with another former colleague, Robert Cameron. David's research accomplishments led to many invitations to speak at conferences throughout the world.

David received a PhD degree in mathematics from the University of Michigan in 1956 as a student of Arthur Lohwater. After two years at lowa State University, he joined the University of Minnesota, where he spent the rest of his career, retiring in 2004. He served as Associate Head of the School of Mathematics 1964–70, Associate Dean of the Institute of Technology 1979–83 and then again 1993–94, and as Acting Director of the Gray Fresh Water Biological Institute 1989–90.

He enjoyed three sabbaticals, during which he visited the University of Wisconsin, Imperial College, London and the University of York. He will be missed by his colleagues and friends in Minnesota and throughout the world.

MATHEMATICIANS AND THEIR GODS

The historical interaction between mathematicians and theism is rich in culture and character. This September weekend event (15 to 16 September 2012 at Rewley House, Oxford) will be made up of talks which draw from the breadth of mathematical and theological history to consider topics including the sect of the Pythagoreans (Andy Gregory, UCL); Newton's views on the apocalypse (Rob Iliffe, University of Sussex); Edwin Abbott's faith and *Flatland* (Mel Bayley, University of Kingston); and Gödel's proof of the existence of God (Anthony Anderson, University of California).

The content of this weekend should be accessible to the intelligent layman. It is offered in conjunction with the British Society for the History of Mathematics. Further information can be found at www.conted.ox.ac.uk/O12P114MAR.

LONDON MATHEMATICAL SOCIETY

SOCIETY MEETING: HARDY LECTURE Friday 29 June 2012

Wilkins Old Refectory, Gower St, University College London, London WC1E 6BT (nearest tube: Euston Square)



3.30 Opening of the meeting and LMS business, including the announcement of the 2012 Prize winners (open to all)

> Vincent Borrelli (Lyon) Flat tori in three-dimensional space

- 4.45 Tea/Coffee
- 5.15 Étienne Ghys (CNRS, Lyon) **Hardy Lecture** On cutting cloth, according to Chebyshev
- 6.30 Reception at De Morgan House, Russell Square.

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

A reception will be held at the LMS at 6.30 pm with a dinner afterwards at the English Garden Restaurant, Grange Whitehall Hotel, Montague Street. The cost to attend the dinner will be \pm 35 per person. Those wishing to attend the dinner should contact Elizabeth Fisher (Imsmeetings@Ims.ac.uk) **before 20 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.

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LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2012

Celebrating 30 years

Institute of Education, London – Tuesday 26 June King Edward School, Birmingham – Wednesday 26 September



Professor Tim Gowers FRS University of Cambridge

Can anything be salvaged from the wreckage of Hilbert's dream?

Could we program a computer to do maths at least as well as we do it? This is a formidable challenge, for reasons that Tim Gowers will discuss, but despite the difficulties he will try to persuade you that the answer is yes

David Hilbert

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Professor Sir Roger Penrose FRS University of Oxford

On Attempting to Model the Mathematical Mind

In this talk, Roger Penrose introduces the idea of a 'cautious oracle' as a more human version of Turing's oracles (a way of modelling the mathematical mind). He reports on some startling new experiments, which appear to point to new insights into brain activity, and he speculates on how this might relate to the power of human understanding.



Fig. 2.1. A strict Turing machine requires an infinite tape!

Full abstracts are available on the LMS website at www.lms.ac.uk/content/popular-lectures

LONDON: Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. **Register by Thursday 21 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 21 September.**

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

NEWS FROM ICMS

New Funding Announcement

In April, the Engineering and Physical Sciences Research Council (EPSRC) awarded a grant of £1.3 million to the International Centre for Mathematical Sciences (ICMS) in Edinburgh. Spanning four years in total, the funding will help the centre continue to attract the world's leading researchers in mathematics and related scientific fields to the UK and to showcase British research in the mathematical sciences.

Professor David Delpy, Chief Executive of EPSRC, said "The grant will introduce young researchers to senior figures from the UK and overseas and offer crucial training opportunities. It will also help the centre to communicate new ideas and techniques to workshop participants."

Professor Keith Ball, Scientific Director of ICMS, said "The EPSRC grant will help to nurture the next generation of mathematical scientists by encouraging the participation of young researchers in ICMS events, and to address the gender gap in mathematics by encouraging the participation of women. One of the aims is to coordinate workshops that involve scientists working in several different areas so as to enable the cross-fertilisation of ideas from one area to another."

Knowledge Transfer and Public Engagement

The last few years have seen an expansion of ICMS' interaction with business and industry and it continues to grow. In a typical year ICMS attracts around 500 of the world's most talented mathematicians and other scientists to its workshops in Edinburgh. An important aim of ICMS is to facilitate knowledge transfer between mathematical scientists and organisations outside academia, so that mathematics may be widely exploited by, and bring benefits to, the widest possible community. ICMS offers industry the opportunity



Undergraduate assistant Nicholas Neumann-Chun exhibits a four-sided 'tetrahedral' bubble at Professor Morgan's *Soap bubbles and mathematics* talk for school children

to participate in workshops through 'applied sessions' and appropriate networking events. To enable this participation, ICMS has a dedicated Knowledge Transfer (KT) officer, Dawn Wasley, whose job is to identify potential beneficiaries within industry, commerce and the public sector, and to involve them in the Centre's activities. In the past three years, some 50 of the world's largest companies covering healthcare, oil, finance, defence, engine manufacture and computing have sent representatives to ICMS meetings.

With access to an array of internationally renowned mathematicians, ICMS also runs a growing series of public engagement activities attached to workshops. These activities include public lectures, schools events and contributions to science festivals. For example, the recent workshop on *Isoperimetric problems, space-filling and soap bubble geometry* gave rise to a talk for school children on *Soap bubbles and mathematics*, including

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a guessing contest with demonstrations, explanations and prizes, by Professor Frank Morgan, Williams College, and a public lecture *Kelvin and me*, by Professor Denis Weaire, Trinity College, Dublin. A public lecture by Professor Robert Ghrist, University of Pennsylvania and an exhibition of mathematically-inspired art are planned as part of the workshop *Applied and computational topology* (ATMCS 5) in July.

Public events are also created in-house. This spring ICMS' communications officer Madeleine Shepherd researched and presented a walking tour *Edinburgh's Mathematical Past and Future* for the Edinburgh International Science Festival. The tour was a great success and needed an extra 'performance' to satisfy demand.

ICMS maintains a series of databases and mailing lists to facilitate these engagement activities. If you wish to be added to these lists, contact the KT officer, Dawn Wasley (Dawn.Wasley@icms.org.uk).

21 Years of Workshops

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2012 sees the twenty-first anniversary of ICMS' first workshop. To mark the occasion ICMS celebrated with an afternoon of lectures for the mathematical community and other invited guests, followed by an evening reception. The event brought together some of ICMS' founders, established and early-career researchers, members of the financial community and ICMS administrative staff for general networking – and fun!

The session was chaired by Professor Keith Ball, ICMS' Scientific Director, and began with a short talk from Sir Peter Burt, Chair of the ICMS Board, on the history of the Centre. Sir Peter and Professor Ball then ceremonially cut the anniversary cake. The next speaker was Dr David Acheson, University of Oxford. His talk, *What's the problem with mathematics*, looked at solutions to the problem of engaging school pupils with mathematics. Dr Acheson showed the audience several intriguing pieces of mathematics with which to beguile students, including 'proof by pizza'! The aforementioned cake was served with coffee between the lectures and proved to be delicious.

After the break Professor Damiano Brigo, Kings College London, spoke on *Randomness* and the future: mathematics and stochastic differential equations in finance. Among many other things Professor Brigo discussed how mathematics has been unjustly and superficially blamed for part of the financial crisis, highlighting some of the common misunderstandings concerning mathematical modelling work. The event concluded with a reception in the Atrium of 15 South College Street, where animated discussion and cheerful conversation continued until the building was closed for the night.



David Acheson discussing the Golden Section during his talk at the ICMS 20th Anniversary event

Forthcoming ICMS workshops 2012

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- Scale transitions in chemistry and biology, 4–8 June
- Multiscale modelling and techniques postgraduate conference day, 6 June
- Applied and computational topology (ATMCS 5), 2–6 July
- Cubical complexes and applications, 16–20 July
- INI satellite meeting: Tangled magnetic fields in astro- and plasma physics, 15–19 October
- Algebraic geometry, modular forms and applications to physics, 26–30 November
- For full details of these and all the events visit www.icms.org.uk or email info@icms.org.

FINITE GROUPS

A conference on *Finite Groups and Related Topics* on the occasion of John Thompson's 80th birthday will take place at the CMS in Cambridge, starting after lunch on Thursday 27 September and ending at lunchtime on Sunday 30 September 2012. The speakers will include Aschbacher, Capdeboscq, Flavell, Glauberman, Kessar, Liebeck, Malle, Robinson, Serre, Sin, Smith, Solomon and Tiep.

The conference dinner will take place at Gonville & Caius College on Thursday 27 September. For further information and to register see the website at www.dpmms.cam.ac.uk/Seminars/Conferences/Thompson80/. There will be support available for young mathematicians attending; for this you should contact J.Saxl@ dpmms.cam.ac.uk. The organisers are Bob Guralnick and Jan Saxl. The conference is supported by the DPMMS, the National Science Foundation and an LMS Conference grant.

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A Mathematician's Apology

G. H. Hardy C. P. Snow

This 'apology', written in 1940, offers a brilliant and engaging account of mathematics as very much more than a science; when it was first published, Graham Greene hailed it alongside Henry Jame's notebooks as the best account of what it was like to be a creative artist'. C. P. Snow's Foreword gives sympathetic and witty insights into Hardy's life, with its rich store of anecdotes concerning his collaboration with the brilliant Indian mathematician

Ramanujan, his idiosyncrasies and his passion for cricket. This is a unique account of the fascination of mathematics and of one of its most compelling exponents in modern times.

March 2012 | Paperback | 9781107604636 | 154 pages | £10.99

www.cambridge.org/hardy

Circuit Double Cover of Graphs

Cun-Quan Zhang, West Virginia University

Hardv

The famous Circuit Double Cover conjecture (and its numerous variants) is considered one of the major open problems in graph theory owing to its close relationship with topological graph theory, integer flow theory, graph coloring and the structure of snarks. It is easy to state: every 2-connected graph has a family of circuits covering every edge precisely twice. C.-Q. Zhang provides an up-to-date overview of the subject containing all of the techniques, methods and results developed to help solve the conjecture since the first publication of



the subject in the 1940s. It is a useful survey for researchers already working on the problem and a fitting introduction for those just entering the field. The end-of-chapter exercises have been designed to challenge readers at every level and hints are provided in an appendix.

Series: London Mathematical Society Lecture Note Series, No. 399 April 2012 | Paperback | 9780521282352 | 375 pages | £45.00

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LONDON MATHEMATICAL SOCIETY

LMS HARDY FELLOW 2012



G.H. Hardy, LMS President 1926-1928 and 1939 - 1941

The 2012 LMS Hardy Fellow is Professor Etienne Ghys (University of Lyon)

The Hardy Fellowship was founded in 1967 in memory of G.H. Hardy in recognition of outstanding contribution to both mathematics and to the Society. The Hardy Fellowship is a lecture tour of the UK by a mathematician with a high reputation in research.

Etienne Ghys will visit the UK twice in June 2012 and he will give talks at:

Aberdeen

The history of the uniformization theorem 11 June at 4pm Fraser Noble 156 Organiser: Meinolf Geck

Edinburgh

Monge and optimal transport 12 June at 4pm, Room 5327, James Clerk Maxwell Building Organiser: Andrew Ranicki

Sheffield

The history of the uniformization theorem 14 June at 4pm, Lecture Theatre E, Hicks Building Organiser: Kirill Mackenzie

Newcastle

On cutting cloth, according to Chebyshev 15 June at 4pm, LT1, Herschel Building Organiser: Sarah Rees

Bristol

Chirality in dynamics 25 June at 5pm, Room SM2, Maths Building Organiser: Lynne Walling

Warwick

The history of the uniformization theorem 26 June at 4.30-5.30pm, B3.03, Mathematics Institute, Zeeman Building Organiser: Saul Schleimer

Reading

Monge and optimal transport 27 June at 2pm Organiser: Beatrice Pelloni

London

On cutting cloth, according to Chebyshev 29 June at 3.30pm, Old Wilkins Refectory, UCL Organiser: LMS (Imsmeetings@Ims.ac.uk)

For further information on attending each lecture, please contact the local organisers. Abstracts for these lectures can be found on the LMS website: <u>http://www.lms.ac.uk/content/hardy-lectureship</u> For general enquiries about the Hardy Lectures, please contact Elizabeth Fisher (Imsmeetings@Ims.ac.uk).

IMA-LMS ZEEMAN MEDAL LECTURE 2012



Professor John Barrow with the Zeeman Medal, Robert MacKay (left) and Graeme Segal (right)

Professor John Barrow, FRS, was presented with the 2012 Christopher Zeeman Medal by the Presidents

of the IMA and the LMS on 21 March 2012 at The Royal Society.

The IMA President, Professor Robert MacKay, FRS, gave a brief history of the medal, which was created to recognise and acknowledge the contributions of mathematicians involved in promoting mathematics to the public and engaging with the public in mathematics in the UK. The award also demonstrates that such activities are valued by both Societies and the mathematical community at large, and are a part of a mathematician's roles and responsibilities.

It was also a great honour to have Sir Christopher Zeeman, FRS, for whom the medal was named, and his wife Rosemary in the audience.

Dr Graeme Segal, FRS, LMS President, then read the citation for Professor John Barrow. The full citation transcript is available at www.ima.org.uk/viewitem. cfm?cit_id=383955.

The medal was presented by Professor McKay, after which Professor Barrow gave his lecture on mathematics in sport, including triathlon, football, tightrope walking, gymnastics, cycling, tennis, diving, running, rowing, and weight lifting.

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This is an abridged version of a report by Rebecca Waters appearing in the June 2012 issue of *Mathematics Today*.



Sir Christopher Zeeman with Robert MacKay (left) and Graeme Segal (right)

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which provides a summary of the findings

MATHEMATICS POLICY ROUND-UP

May 2012

RESEARCH

Response to EPSRC announcement

The Council for the Mathematical Sciences (CMS) responded to the recent EPSRC announcement on Shaping Capability, fellowships and peer review. The response is available at http://tinyurl.com/cl3ocx2.

HIGHER EDUCATION

Response to Higher Education Commission inquiry

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The Council for the Mathematical Sciences (CMS) responded to the Higher Education Commission inquiry into Postgraduate Education. The response is available at http://tinyurl. com/bmlhdpp. Changes announced to the allocation of university places

Uncapped recruitment for high-achieving students will be further eased in 2013/14. The Alevel threshold will lower from AAB+ to ABB+. A further 5,000 places will be allocated through a competitive core and margin to universities and colleges offering good quality and value for money. It is expected that a further 35,000 students will now join the pool of unrestricted students which universities can recruit from. In total 120,000 places, one in three, are expected to be freed up. More information is available at http://tinyurl.com/caamcfl.

SCHOOLS AND COLLEGES

Mathematics within A-level science 2010 examinations

SCORE (Science Community Representing

NETHERLANDS, UTRECHT UNIVERSITY Two Full Professorships of Mathematics (0.8 – 1.0 fte)

The Mathematical Institute of Utrecht University invites applications for two full professorships. It is anticipated that one appointment will be made in the section of Fundamental Mathematics – currently comprising algebra, analysis and geometry –, and one in the section of Mathematical Modelling – currently comprising applied analysis, stochastics and mathematics of computation. The search, however, is not limited to the listed areas and, furthermore, in case of exceptional candidates, both appointments may be made in the same section.

We are looking for outstanding candidates who will invigorate and enrich the pool of expertise in the Institute and the university at large. The Institute has a long-standing tradition of crossing borders into other scientific fields. Interdisciplinary activity includes, but is not limited to, theoretical physics, theoretical biology, and life sciences. Appointees are expected to play an active role in all aspects of academic life. Candidates should demonstrate excellence in research, including grant-earning capacity, and be skilled in teaching and student supervision. Furthermore, we expect a willingness to take up administrative responsibilities.

The appointments are, in principle, permanent, at the level of full professor on a "Core Chair". However, the Institute may offer more junior candidates of exceptional promise a "Profile Chair", which is subject to review after a 5-year period. Utrecht University specifically encourages female candidates to apply.

Closing date for applications: 1 August 2012.

See <u>www.math.uu.nl/jobs</u> for a complete job description and <u>www.math.uu.nl/facts.html</u> for a fact sheet concerning the institute.

Education), a collaboration of leading science organisations, has published a report which analyses the *type, extent and difficulty of mathematics* within the 2010 A-level examination papers for the three sciences – biology, chemistry and physics. The full report is available at http://tinyurl.com/cuz7tlh.

The Nuffield Foundation has also published an analysis of the mathematical content in six other A-level subjects that require quantitative skills – business studies, computing, economics, geography, psychology and sociology. The full report is available at http:// tinyurl.com/ca4hget.

The reports consider whether the type of mathematics in the examinations was suitable for progression within the subject's field (*type*), the proportion of the examination that depended on mathematical knowledge (*extent*), and the complexity of the mathematical questions (*difficulty*).

Proposed A-level reforms

Ofqual has published an exchange of letters between Michael Gove MP, Secretary of State for Education, and Glenys Stacey, Ofqual's Chief Regulator, on proposed changes to A-levels.

Alongside the letters, Ofqual has also published research, which was commissioned to find out what higher education institutions, teachers and employers think about A-levels. The research aimed to find out the extent to which A-levels prepare young people for university and/or work, and identify any areas of concern. Both letters and the research findings are available at http://tinyurl. com/cd6pd5s.

Functional skills standards in mathematics

In 2011, Ofqual reviewed the specifications for 39 functional skills in mathematics qualifications across five levels and ten awarding organisations.

Ofqual has now published a report, Review of Functional Skills Standards in Mathematics,

which provides a summary of the findings and details of any actions awarding organisations have carried out since the review. The report is available at http://tinyurl. com/d8hboxt.

OTHER

Women in STEM report

The Royal Society of Edinburgh has published a report entitled *Tapping all our talents*. *Women in STEM: a strategy for Scotland*. The report recommends creating a strategy to increase the proportion of women in the workplace qualified in STEM subjects, and to increase the number that rise to senior positions in universities, research institutes, government, business and industry. A statement from the LMS on Women in Mathematics is published in the report.

The report was produced by an expert working group, chaired by astrophysicist Professor Dame Jocelyn Bell Burnell. The full report is available at http://tinyurl. com/c9b7epo.

New head of POST

Dr Chris Tyler, Executive Director of the Centre for Science and Policy, University of Cambridge, became the new Head of the Parliamentary Office of Science and Technology (POST) at the end of May 2012. More information is available at www.parliament. uk/post.

Academies challenge cuts to select committee

The Royal Society, The Academy of Medical Sciences, the British Academy and The Royal Academy of Engineering have written to the Prime Minister questioning the wisdom of proposals to slash the budget of the House of Lords Science and Technology Committee. A full copy of the letter is available at http:// tinyurl.com/cvg3x7l.

> Dr John Johnston Mathematics Promotion Unit

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LONDON MATHEMATICAL SOCIETY

6th European Congress of Mathematics Kraków, Poland

LMS MEETING AND RECEPTION Tuesday 3 July 2012

The London Mathematical Society will be holding a meeting and reception during the 6th European Congress of Mathematics (6ECM) which takes place in Kraków from 2 to 7 July 2012.

The Society meeting and reception will be held from 6:30 pm to 8.00 pm on Tuesday 3 July. LMS members will have the opportunity to sign the Membership Book which dates back to 1865.

LMS members who wish to attend the meeting and reception should apply for their free ticket to Elizabeth Fisher (Imsmeetings@Ims.ac.uk) no later than Friday 22 June 2012.

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The Society hopes to entertain as many as possible of its members, but numbers are limited by the capacity of the room.

HE CURRICULUM INNOVATION

Supporting Sector Priorities and Fostering New Ideas

Recently, with the IMA and sigma, I presented at the HoDoMS conference on my activity in HE curriculum innovation as part of the Mathematical Sciences Strand of the National HE STEM Programme. As we have now allocated all funding under the Mathematical Sciences HE Curriculum Innovation Fund, I was pleased to be able to report some figures on its distribution. Thirty-three projects involving thirty-six institutions have been supported with around £250k of funding; 94% of funding was allocated through competitive open calls and 63% of funding has been allocated to collaborative projects.

Seventy per cent of supported projects (by funding) result from the recommendations made at the HE Mathematics Curriculum Summit (LMS Newsletter 401, March 2011, p. 9).

Allocating funding to curriculum development priorities identified by departments in this way should ensure the projects do work which is relevant and needed, and therefore provide a useful and lasting impact. Leaving a minority portion to open call ensures that we remain sensitive to innovative ideas and issues that are important but not on the radar of heads of departments.

The breakdown of funding by topic (approximate percentage of total funding) is: Engaging with employers on curriculum work & making available industrial problems (30%); Problem solving (23%); Assessment (22%); Student-centred approaches (10%); Maths Arcade (6%); Developing graduate skills (5%); Audio-visual media in teaching and learning (3%); Evaluation methods (0.5%).

Another aspect of this project during the 2010/11 and 2011/12 academic years has been running workshops and seminars. More than 30 have taken place or are planned at the time of writing, with attendees so far from 46 institutions. Many of the supported projects will be presenting their findings at the CETL-MSOR Conference (12-13 July, University of Sheffield), for which registration is due to close on 21 June. Immediately following the conference (14-15 July) we are running the Ideas Exchange: HE Mathematics Curriculum workshop at the same location.

newsletter@lms.ac.uk

Typically at conferences I find myself in 30minute talks with time for one or two questions at the end, at which speakers present completed and evaluated work. There is good reason for this, of course, but I believe there is space in the calendar for a meeting at which new, undeveloped ideas are discussed in depth with other teaching enthusiasts, and collaborations are formed. The Ideas Exchange, which first took place in July 2011, is designed to meet this need. Participants are invited to bring an idea - well developed or half-formed - to present in a fiveminute talk followed by an extended discussion session (30 minutes or more). Places are limited to fifteen. To enquire whether places are still available please email p.rowlett@bham.ac.uk.

Learn more about the supported projects and events via www.mathstore.ac.uk/hestem.

> Peter Rowlett MSOR Network

NONLINEAR WAVES IN FLUIDS

A conference on Nonlinear Waves in Fluids will take place at Loughborough University from 12 to 14 September 2012. The meeting is dedicated to Roger Grimshaw on the occasion of his retirement. It will be devoted to all aspects of nonlinear waves with applications in geophysical fluid dynamics, thin films and complex fluids. The list of invited speakers currently includes:

Mark Ablowitz (University of Colorado, USA)

Triantaphyllos Akylas (MIT Cambridge, USA)

- Thomas Bridges (University of Surrey, UK)
- Oliver Bühler (Courant Institute, USA)
- Karl Helfrich (Woods Hole Oceanographic Institution, USA)
- Nalini Joshi (University of Sydney, Australia)
- Alfred Osborne (Università di Torino, Italy)
- Efim Pelinovsky (Institute of Applied Physics, Nizhny Novgorod, Russia)
- Victor Shrira (Keele University, UK) For further information visit the website at www-staff.lboro.ac.uk/%7emakk/NWF.html. The conference is supported by an LMS Conference grant, the Institute of Mathematics and its Applications, the Marie Curie MULTIFLOW Network and Loughborough University.

VISIT OF F. LUTSCHER

Professor Frithjof Lutscher (University of Ottawa, Canada) will be visiting the UK from 14 June to 2 July 2012. He specializes in applying mathematics as a scientific tool in biology and ecology. Specific interest areas include: river ecosystems modelling; invasion and conservation biology; modelling dispersal in discrete-time systems; individual movement behaviour, random walks and pattern formation. Professor Lutscher will give seminars at:

- University of Glasgow, Tuesday 19 June: Species persistence and spread in patchy landscapes
- Heriot-Watt University, Wednesday 27 June: Life in the flow: modeling river ecosystems
- Centre for Ecology and Hydrology, Wallingford, Oxford, Friday 29 June: Life in the flow: modeling river ecosystems

Whilst at Glasgow University from 14 to 28 June, Professor Lutscher will be working with Dr Christina Cobbold (Glasgow) and Professor Jonathan Sherratt (Heriot-Watt). Whilst in Oxford he will be working with Dr Steven White and will be visiting the Centre for Mathematical Biology. For further information about the visit of Professor Lutscher contact Dr Cobbold (Christina.Cobbold@glasgow.ac.uk). The visit is supported by an LMS Scheme 2 grant.

NEWSLETTER

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THURSTON'S WORK ON SURFACES

Thurston's Work on Surfaces Albert Fathi,

François Laudenbach & Valentin Poénaru Translated by Djun M. Kim & Dan Margalit

This book provides a detailed exposition of William Thurston's work on surface homeomorphisms, available here for the first time in English. Based on material of Thurston presented at a seminar in Orsay from 1976 to 1977, it covers topics such as the space of measured foliations on a surface, the Thurston compactification of Teichmüller space, the Nielsen-Thurston classification of surface homeomorphisms, and dynamical properties of pseudo-Anosov diffeomorphisms.

Paper \$60.00 978-0-691-14735-2

Convolution and Equidistribution Sato-Tate Theorems

for Finite-Field Mellin Transforms Nicholas M. Katz Convolution and Equidistribution explores an important aspect of number theorythe theory of exponential sums over finite fields and their Mellin transforms-from a new, categorical point of view. The book presents fundamentally important results and a plethora of examples, opening up new directions in the subject.

Paper \$75.00 978-0-691-15331-5 Cloth \$165.00 978-0-691-15330-8

Mumford-Tate Groups and **Domains** Their Geometry and Arithmetic Mark Green, Phillip A. Griffiths

Mumford-Tate groups are the fundamental symmetry groups of Hodge theory, a subject which rests at the center of contemporary complex algebraic geometry. This book is the first comprehensive exploration of Mumford-Tate groups and domains. Containing basic theory and a wealth of new views and results, it will become an essential resource for graduate students and researchers.

Paper \$75.00 978-0-691-15425-1 Cloth \$165.00 978-0-691-15424-4

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& Matt Kerr

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STRING THEORY AND **ARITHMETIC GEOMETRY**

The aim of this Heilbronn workshop on String Theory and Arithmetic Geometry is to bring together people interested in motivic descriptions of physical ideas with those interested in symmetries and dualities of high-energy physics from an algebraic perspective. Whilst exploring the use of derived categories in both motivelike pursuits and their appearance in particle and string theories, it is hoped to emphasize the computational aspects of these areas so as to have as many concrete examples as possible.

The workshop will be held at the University of Bristol from 3 to 7 September 2012. The registration deadline is 1 August. The Invited Speakers include:

- David Broadhurst (Open University)
- Dirk Kreimer (Humboldt-Universität)
- Steve Lichtenbaum (Brown University)
- Matilde Marcolli* (Caltech)
- Andreas Recknagel* (King's College London)
- Ingo Runkel (Universität Hamburg)
- Ed Segal (Imperial College London)
- Balázs Szendrői (Oxford)
- Katrin Wendland (Universität Freiburg) * to be confirmed

Applications are invited for a limited number of contributed talks. Please send a title and abstract to the organisers by the registration deadline. There will be limited funding available to young researchers. Please request funding when registering.

Further information and registration forms may be found at http://tinyurl.com/dx8z982 or by contacting Oliver Gray (oliver.gray@bristol. ac.uk) or Owen Patashnick (o.patashnick@ bristol.ac.uk).

PROFINITE GROUPS

A one-day meeting on Hausdorff Dimension in Profinite Groups will be held on 22 June 2012 at the University of Southampton. The aim of the meeting will be to explore, in a range of settings, Hausdorff-dimension arguments in the theory of profinite groups. The speakers are:

- Y. Barnea (Royal Holloway Univ. of London)
- M. Abért (Alfréd Rényi Institute, Budapest)
- R. Camina (University of Cambridge)

 B. Klopsch (Royal Holloway Univ. of London) Limited funds are available to reimburse travel expenses of UK-based students and young mathematicians. Application for support can be made at the meeting. To register send your name and whether you need parking to Martin Kassabov (martin.kassabov@gmail. com). More information is available at www. ma.rhul.ac.uk/profinite_groups/meetings. html. The workshop forms part of the South England Profinite Groups Meetings which are supported by an LMS Scheme 3 grant. The workshop is also funded by the University of Southampton.

POSTGRADUATE GROUP THEORY CONFERENCE

The Postgraduate Group Theory Conference (PGTC) will this year be hosted at the University of York from 9 to 12 July 2012. This is a networking opportunity for PhD students and others with an interest in group theory and related areas (Lie algebras, representation theory, algebra in general) to give a short presentation about their research to a friendly and interested audience. The PGTC 2012 will include invited speakers Professor Robert Wilson (Queen Mary, University of London) and Dr David Craven (Birmingham University).

The conference itself will include three nights of ensuite bed-and-breakfast accommodation at the University of York campus and a conference dinner on the evening of Wednesday 11 July. To register your interest in attending the PGTC 2012, email Malcolm Connolly (mpc501@york.ac.uk). For further information visit the website at http://maths.york.ac.uk/ www/node/12393. The meeting is supported by an LMS Postgraduate Research Conference Scheme 8 grant.

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Mumford-Tate Groups

Their Geometry and Arithmetic

and Domains

No. 415 June 2012

An extended meditation on

Hadamard's famous dictum,

'The shortest and best way

through the imaginary one."

acquainted with analysis at

the first year graduate level.

between two truths of the

real domain often passes

Directed at an audience

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No. 415 June 2012

American Mathematical Society

COMPLEX PROOFS OF REAL THEOREMS

Peter D. Lax, Courant Institute & Lawrence Zalcman, Bar-Ilan University



Complex Proofs of Real Theorems Peter D. Lax

it aims at illustrating how complex variables can be used to provide quick and efficient proofs of a wide variety of important results in such areas of analysis as approximation theory, operator theory, harmonic analysis, and complex dynamics.

Mar 2012 90pp 978-0-8218-7559-9 Paperback £22.50 / €26.00

TENSORS: GEOMETRY AND APPLICATIONS

University Lecture Series, Vol. 58

J. M. Landsberg, Texas Ae3M University



Tensors are ubiquitous in the sciences. The geometry of tensors is both a powerful tool for extracting information from data sets, and a beautiful subject in its own right. This book has three intended uses: a classroom textbook, a reference work for researchers in the sciences. and an account of classical

and modern results in (aspects of) the theory that will be of interest to researchers in geometry.

Graduate Studies in Mathematics, Vol. 128 Jan 2012 438pp 978-0-8218-6907-9 Hardback £56.95 / €67.00

AN EPSILON OF ROOM, I: REAL ANALYSIS pages from year three of a mathematical blog Terence Tao, University of California



mathematical blog to cover a variety of topics, ranging from his own research and other recent developments in mathematics, to lecture notes for his classes, to nontechnical puzzles and expository articles. The first two years of the blog have already been published by the American

Mathematical Society. The posts from the third year are being published in two volumes. The present volume consists of a second course in real analysis, together with related material from the blog.

Graduate Studies in Mathematics, Vol. 117 2011 333pp 978-0-8218-5278-1 Hardback £47.50 / €56.00

TURBULENT TIMES IN MATHEMATICS The Life of J.C. Fields and the History of the **Fields Medal**

Elaine McKinnon Riehm & Frances Hoffman Provides a vivid account of J.C. Fields' life and his part in the founding of the highest award in mathematics. Filled with intriguing detail it is a richly textured story engagingly and sympathetically told.

2011 255pp 978-0-8218-6914-7 Paperback £34.50 / €41.00

A co-publication of the AMS and Fields Institute

For a discount on these and other AMS titles, visit booth 7 at the 6th European Congress of Mathematics, Kraków, July 2- 7, 2012

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LONDON MATHEMATICAL SOCIETY

SOUTH WEST & SOUTH WALES **REGIONAL MEETING**

Monday 1 October 2012

SM1, School of Mathematics, University Walk, University of Bristol

Programme:

2.00	Opening of the Meeting
	John Cremona (Warwick)

Unusual modular curves and elusive isogenies

- 3.00 Tea/Coffee
- 3.45 Tony Scholl (Cambridge) Special values of L-functions
- 5.00 Karl Rubin (Irvine) Ranks of elliptic curves
- 6.30 Dinner

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

For further details or to register or reserve a place for dinner, please email the organisers (tim.dokchitser@bristol.ac.uk). The cost of the dinner will be approximately £25, including drinks.

The LMS Regional Meeting is part of a three-day workshop on *L-Functions* of Curves from 1 to 3 October. For further details visit the website at www.maths.bris.ac.uk/~matyd/LMS2012.

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

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London Mathematical Society (LMS) MIDLANDS REGIONAL MEETING

Monday 3 September 2012

Physics Main Lecture Theatre, Physical Sciences Building Penglais Campus, Aberystwyth University, Aberystwyth SY23 3BZ

Scientific Advisory Committee David Evans (Cardiff) • Martin Lindsay (Lancaster) • Gilles Pisier (Texas A&M) • Dan Voiculescu (UC Berkeley)

> Local Organisers Rolf Gohm (Aberystwyth) . John Gough (Aberystwyth) . Claus Köstler (Aberystwyth)

Programme

13:45 Opening of the meeting 14:00 Roland Speicher (Saarland University) Quantum symmetries in free probability

Dan-Virgil Voiculescu (UC Berkeley) Noncommutative probability aspects of trace-class commutators

Tea/Coffee

- 16:30 Masaki Izumi (Kyoto University) Group actions on operator algebras
- 17:30 Matthias Christandl (ETH Zurich) The quantum marginal problem
- 18:30 Closing of the meeting
- 19:30 Dinner at MedRus Conference Centre Penbryn Building, Penglais Campus Aberystwyth University, SY23 3BY

Online Programme and Registration http://users.aber.ac.uk/cck/2012LMS/



Principal Organiser Contact Claus Köstler (cck@aber.ac.uk) Institute of Mathematics and Physics (IMAPS) Physical Sciences Building, Penglais Campus Aberystwyth University, Aberystwyth SY23 3BZ

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

For further details, to register or to reserve a place at the dinner, visit the online-registration website or contact the principal organiser. The cost of the dinner will be approximately £30, including drinks.

The meeting is embedded into a workshop on Quantum Probabilistic Symmetries from 3 to 7 September 2012. For further details and online-registration for the workshop visit the website at http://users.aber.ac.uk/cck/2012LMS/

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.



Wales Institute of LONDON MATHEMATICAL Mathematical and N. Computational Sciences SOCIETY





Aim & Topics

The topic of this meeting and workshop is located at the crossroad of several modern mathematical areas; guantum symmetries in free probability theory, quantum symmetries in subfactor theory, noncommutative de Finetti theorems, representations & combinatorics of large groups and symmetries in quantum information theory. The aim is to present recent progress in these areas and to explore new promising connections between them.

London Mathematical Society (LMS) Midlands Regional Meeting

Matthias ChristandI (ETH Zurich)

Roland Speicher (Saarland University)

Online registration is required for the dinner on 3 September 2012.

Teodor Banica (Cergy-Pontoise) · Edwin Beggs (Swansea) ·

Marek Bozejko (Wroclaw) • Tomasz Brzezinski (Swansea) •

Matthias ChristandI (Zurich) . Benoit Collins (Lyon / Ottawa) .

Stephen Curran (Los Angeles) • David Evans (Cardiff) • Uwe

Franz (Besancon) · Andreas Gärtner (Darmstadt) · Alexander

Gnedin (London) · Madalin Guta (Nottingham) · Robin Hudson

Dan-Virgil Voiculescu (UC Berkeley)

Masaki Izumi (Kyoto University)

Workshop on Quantum Probabilistic Symmetries

Confirmed Speakers Include:

Speakers of the LMS Regional Meeting

3 September 2012 from 13:45 to 18:30 The meeting is embedded into the workshop.

Location Physics Main Lecture Theatre

Physical Sciences Building, Penglais Campus Aberystwyth University, SY23 3BZ

Programme and Online Registration http://users.aber.ac.uk/cck/2012LMS/

Begin: 3 September 2012 at 09:00 End: 7 September 2012 at 15:00

Location

Physics Main Lecture Theatre Physical Sciences Building, Penglais Campus Aberystwyth University, SY23 3BZ

Registration

The registration fee for the workshop is £80. All participants are requested to register online at http://users.aber.ac.uk/cck/2012LMS/

Further Information and Programme http://users.aber.ac.uk/cck/2012LMS/

Principal Organiser Contact

Claus Köstler (cck@aber.ac.uk) Institute of Mathematics and Physics (IMAPS) Physical Sciences Building, Penglais Campus Aberystwyth University, Aberystywyth SY23 3BZ





Vales Institute of EPSRC Mathematical and Computational Sciences





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16:00

(Loughborough) · Masaki Izumi (Kvoto) · Burkhard Kümmerer (Darmstadt) · Daan Krammer (Warwick) · Franz Lehner (Graz) · Martin Lindsay (Lancaster) . Hans Maassen (Nijmegen) . James Mingo (Kingston) . Graeme Mitchison (Cambridge) . Mathew

Pugh (Cardiff) · Walter Reusswig (Darmstadt) · Michael Schürmann (Greifswald) · Adam Skalski (Warszawa) · Piotr Sniady (Wroclaw) . Roland Speicher (Kingston / Saarbrücken) . V. S. Sunder (Chennai) . Otgonbayar Uuve (Cardiff) . Anatoly Vershik (St. Petersburg) . Michael Walter (Zurich) . Reinhard Werner (Hannover) · Quanhua Xu (Besancon)

LONDON SOCIETY

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University of BRISTOL

Heilbronn Research Fellows (Quantum Information) £33,884 - £44,166

The Department of Mathematics invites applications for one or more Research Fellowships in association with the Heilbronn Institute for Mathematical Research. You will divide your time equally between your own research and the research programme of the Heilbronn Institute. We seek candidates with skills in the general area of quantum information: however, your own research need not be directly in this area.

The Fellowships will be for three years, with a preferred start date in January 2013, though another date may be possible by agreement. Due to the nature of the Heilbronn Institute's work, you must satisfy vetting before appointment. UK resident UK nationals will normally be able to meet this condition: other potential applicants should consult the Director about their eligibility before applying. You may become a member of the USS pension scheme. Research expenses of at least £2,000 per annum will also be available. There is a salary supplement of £3,500 pa, in recognition of the distinctive nature of these Fellowships. Payment of this supplement is conditional on a finished thesis having been accepted in final form, because we expect Heilbronn Fellows to hold PhDs before working at the Heilbronn Institute.

Enquiries about the fellowship may be addressed to Dr Oliver Johnson, School of Mathematics, telephone +44 (0)117 928 8632, e-mail: assoc-director-himr@bristol.ac.uk and enquiries about the work of the Heilbronn Institute may also be addressed to the Director of the Institute, Professor Malcolm MacCallum, telephone +44 (0)117 980 6303, e-mail: m.a.h.maccallum@bristol.ac.uk

Applications should include a statement of proposed research (not more than one side of A4). You should ask three referees to send references by the closing date to: Ms Chrystal Cherniwchan, School of Mathematics, University of Bristol, BS8 1TW, telephone +44 (0) 117 331 5260 or e-mail: Chrystal.Cherniwchan@bristol.ac.uk It is your own responsibility to ensure that the reference letters are received by the closing date (these may be sent by email also).

For further details and an application form please visit www.bristol.ac.uk/jobs Alternatively you can e-mail recruitment@bristol.ac.uk or telephone +44 (0) 117 954 6947, quoting the reference number 17151.

The closing date for applications is 9.00am, 10 July 2012.

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Isaac Newton Institute for Mathematical Sciences

TANGLED MAGNETIC FIELDS IN ASTRO- AND PLASMA PHYSICS

(A satellite meeting at ICMS, Edinburgh)

15-19 October 2012

in association with the Newton Institute programme Topological Dynamics in the Physical and Biological Sciences (16 July – 21 December 2012)

Organisers: Konrad Bajer (University of Warsaw), Mitchell Berger (University of Exeter), Steve Cowley (Culham Fusion Science Center), Andrew Gilbert (University of Exeter), Gunnar Homig (University of Dundee) and Clare Parnell (University of St Andrews).

The workshop will focus on research exploiting topological and geometrical concepts in the study of the morphology and evolution of magnetic fields in astrophysics and plasma physics. Magnetic fields are all-pervasive in astrophysics. Such fields generally have non-trivial topology. This results through various mechanisms such as dynamo action within stars which generates and maintains the magnetic field, and also the movement and stressing of the magnetic field by plasma motions that can lead to extremely complex topologies in, for example, stellar coronae. These fields play a crucial role in relation to many observed phenomena in the sun and the solar atmosphere, and similarly in stars and in the interstellar medium. Likewise, the magnetic field is the crucial ingredient in toroidal fusion plasma containment devices like the Tokamak, for which the simplest magnetostatic equilibria are helical in character. More complex equilibria may exhibit current sheet singularities, the site of potential resistive instabilities.

Deadline for applications is **30 June 2012**. For more information and application forms visit the website at www.icms.org.uk/workshops/tangled.

PHYSICS AND COMPUTATION

The *Physics and Computation 2012* workshop will take place from 29 to 31 August 2012 at Swansea University. The workshop is an interdisciplinary meeting on the frontiers of mathematics, physics, computer science, engineering and biology. The invited speakers include:

- Andy Adamatzky (UWE)
- Hajnal Andréka (Alfréd Rényi, Budapest)
- Ed Blakey (Oxford)
- Barry Cooper (Leeds)
- Arun Holden (Leeds)
- Martin Ziegler (Darmstadt)

The Keynote Lecture will be given by Tony Hey (Microsoft Research). The meeting will commence in the evening of Tuesday August 28 with registration and a welcome reception. Talks start at 9 am on Wednesday morning and finish at 2 pm Friday afternoon. For further information email the Local Organizing Committee (pc2012@swansea.ac.uk) or visit the website at www.cs.swansea.ac.uk/pc2012. The workshop is receiving support from EPSRC, the Institute of Physics, the Learned Society of Wales, the Turing Centenary, and an LMS Conference grant.

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Isaac Newton Institute

for Mathematical Sciences

STOCHASTIC PARTIAL DIFFERENTIAL EQUATIONS

(Follow-up meeting)

10-14 September 2012

Organisers: Zdzislaw Brzezniak (York), David Elworthy (Warwick), Michael Röckner (Bielefeld), Panagiotis Souganidis (Chicago) and Roger Tribe (Warwick)

This workshop on *Stochastic Partial Differential Equations* is a follow-up meeting to the six-month programme at the Isaac Newton Institute in 2010. The following themes are expected to be part of the follow-up meeting:

- Stochastic conservation laws
- Stochastic interface models
- Infinite-dimensional analysis
- Equations driven by Levy noises
- Large deviations problems for SPDEs
- Numerical approximations
- Stochastic models in hydrodynamics and other physical applications

For more information visit the website at www.newton.ac.uk/programmes/SPD/spdw07. html.

POSTGRADUATE COMBINATORIAL CONFERENCE

The 22nd Postgraduate Combinatorial Conference (PCC) will be held at the University of Warwick from 15 to 17 August 2012. 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 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 pre-eminent researchers in their area. Each student is encouraged to contribute by giving a talk which will last 20 minutes (including five minutes question-and-answer time). Speakers will include:

- Stefanie Gerke (Royal Holloway, University of London)
- Konrad Swanepoel (LSE)
- Andrew Thomason (University of Cambridge)

For further details visit the website at www2.warwick.ac.uk/fac/cross_fac/dimap/ events/pcc2012.

The conference is supported by an LMS Postgraduate Research Conference Scheme 8 grant and a grant from the British Combinatorial Committee.

Heilbronn Research Fellows (Statistical Data Mining) £33,884 - £44,166

The Department of Mathematics invites applications for one or more Research Fellowships in association with the Heilbronn Institute for Mathematical Research. You will divide your time equally between your own research and the research programme of the Heilbronn Institute. We seek candidates with skills in areas of statistical data mining. Topics of interest include semi-supervised learning, recommender systems, time series and streaming data analysis, and data mining for dynamic graphs and networks: however, your own research need not be directly in these areas.

The Fellowships will be for three years, with a preferred start date in January 2013, though another date may be possible by agreement. Due to the nature of the Heilbronn Institute's work, you must satisfy vetting before appointment. UK resident UK nationals will normally be able to meet this condition: other potential applicants should consult the Director about their eligibility before applying. You may become a member of the USS pension scheme. Research expenses of at least £2,000 per annum will also be available. There is a salary supplement of £3,500 pa, in recognition of the distinctive nature of these Fellowships. Payment of this supplement is conditional on a finished thesis having been accepted in final form, because we expect Heilbronn Fellows to hold PhDs before working at the Heilbronn Institute.

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Applications should include a statement of proposed research (not more than one side of A4). You should ask three referees to send references by the closing date to: Ms Chrystal Cherniwchan, School of Mathematics, University of Bristol, BS8 1TW, telephone +44 (0) 117 331 5260 or e-mail: Chrystal.Cherniwchan@bristol.ac.uk It is your own responsibility to ensure that the reference letters are received by the closing date (these may be sent by email also).

For further details and an application form please visit www.bristol.ac.uk/jobs Alternatively you can e-mail recruitment@bristol.ac.uk or telephone +44 (0) 117 954 6947, quoting the reference number 17150.

The closing date for applications is 9.00am, 10 July 2012.

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BRITISH TOPOLOGY MEETING

The 27th British Topology Meeting will take place in Cambridge from 6 to 8 September 2012. The conference is primarily aimed at graduate and postgraduate students in topology, geometry and cognate fields. It is designed to showcase recent activity in a broad range of areas in topology, including algebraic topology, geometric group theory, low-dimensional topology and symplectic geometry. This year's invited speakers are:

• Paul Biran (ETH)

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- Dorothy Buck (Imperial)
- Danny Calegari (Cambridge)
- Simon Donaldson (Imperial)
- Marc Lackenby (Oxford)
- Zoltán Szabó (Princeton)
- Nathalie Wahl (Copenhagen)

There will also be a number of shorter talks, selected from abstracts submitted by participants on registration; all participants should register, and those wishing to offer a talk are encouraged to register by the end of July. For further information, in particular to register or to submit an abstract for a presentation, visit the website at www.dpmms.cam. ac.uk/seminars/Conferences/BTM2012/index. html or contact the organizers Jake Rasmussen (J.Rasmussen@dpmms.cam.ac.uk) and Ivan Smith (I.Smith@dpmms.cam.ac.uk). The meeting is supported by an LMS Conference grant and the Foundation Compositio Mathematica.

LOGIC COLLOQUIUM 2012

Logic Colloquium 2012 will be held at the University of Manchester from 12 to 18 July 2012. Invited plenary speakers include:

- Jeremy Avigad (Carnegie Mellon University)
- Andreas R. Blass (University of Michigan)
- Samuel R. Buss (UC San Diego)
- Harvey Friedman (Ohio State University)
- Gareth Jones (University of Manchester)
- Péter Komjáth (Eötvös Lorand University)

- Leonid Levin (Boston University)
- Giuseppe Longo (École Normale Supérieure, Paris)
- Angus Macintyre (Queen Mary, University) of London)
- Menachem Magidor (Hebrew University)
- Zlil Sela (Hebrew University)
- V. Yu. Shavrukov (University of Amsterdam)
- Alexandra Shlapentokh (East Carolina University)
 - Mariya I. Soskova (Sofia University) There will be tutorial courses on set theory (Ilijas Farah), computability theory (Antonio Montalbán) and model theory (Boris Zilber). Special sessions topics include:
 - Philosophy of Mathematics and Computer Science
 - Computability, Logical and Physical
- Model Theory
 - Homotopy Type Theory
 - Set Theory

For further information visit the website at www.mims.manchester.ac.uk/LC2012/. The meeting is held under the auspices of the Association for Symbolic Logic, and incorporates this year's meeting of the British Logic Colloquium. The meeting is supported by an LMS Conference grant, the ASL, the BLC and the Manchester Institute for Mathematical Sciences.

LATTICES AND RELATIONS

A workshop on Lattices and Relations will take place from 12 to 14 September 2012 at the Institute for Logic, Language and Computation, University of Amsterdam.

Relation algebra in its modern form has been developed in fruitful exchange with neighbouring disciplines such as lattice and order theory, universal algebra, category theory, topology and model theory. Relational and latticetheoretic methods are important to the semantic study of many non-classical logics, as well as in the foundations of computer science, where they have widespread applications. This has led to the formation of a research area that is defined by a guite liberal attitude in which results, tools and techniques from neighbouring fields are freely transported and combined. The area thus serves as an interface between fields such as logic, universal algebra, topology, category theory, order, and model theory.

The workshop is aimed to bring together researchers from various countries who are active in different facets of this area. This is the second workshop in the series: the first was at University College London in 2010. While lattices and relations are the main thread of these workshops, this second workshop particularly welcomes contributions about connections with topics such as semigroups, semirings, guantales, Kleene algebras and fixpoint calculi.

Title and abstract of submissions should be sent to Szabolcs Mikulas (szabolcs@dcs. bbk.ac.uk) by 15 June 2012. Communication of attendance should be sent to Alessandra Palmigiano (lattices-relations-science@uva.nl) by 8 July 2012.

For further information visit the website at www.illc.uva.nl/Workshops/LR2012.



HEILBRONN ANNUAL CONFERENCE

The 2012 Heilbronn Annual Conference will be held at the University of Bristol from 20 to 21 September. A number of distinguished mathematicians are invited to present lectures, intended to be accessible to a mixed audience of mathematicians. The topics will cover the range of the Institute's interests as outlined on its web page at www.maths. bris.ac.uk/research/Heilbronn institute/. Confirmed speakers include:

- Eva-Maria Feichtner (Bremen)
- Kristin Lauter (Microsoft and Washington)
- Mark Maloof (Georgetown)
- Andrew Odlyzko (Minnesota)
- Toby Stafford (Manchester)
- Wendelin Werner (Paris-Sud)

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All interested mathematicians are invited to attend. There is no registration fee but to enable estimation of numbers, intending participants are requested to inform Alice Adams

(heilbronn-coordinator@ bristol.ac.uk). All participants are invited to take part in the conference dinner, for which there will be a charge of £25: this can be booked through Alice.

UK graduate students and postdoctoral fellows who would like to attend and need support should contact Alice before 15 July 2012 detailing their requirements, enclosing a brief CV, and explaining why other support is not available. The final programme and additional details will be posted on the Institute website in due course.

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LMS INVITED LECTURES 2012

Report

The LMS Invited Lectures took place at the School of Mathematics and Statistics, University of Glasgow from 26 to 30 March 2012. Professor Alexei Borodin gave a total of 10 lectures on *Determinantal point processes and representation theory*. In the lecture course Alexei presented a remarkable mixture of ideas and methods from probability theory and representation theory of the infinite symmetric and infinite-dimensional unitary groups.

Alexei started the lectures from the representation-theoretic side. The infinite symmetric group was introduced and Alexei discussed its character theory. The corresponding representations were explained and probabilistic interpretations of characters were given. Then the generalized regular representation in the space of virtual permutations was introduced and it was explained how it decom-

> poses into the irreducible representations. In the second day of the lectures Alexei started to discuss probabilistic problems. In an entertaining lecture he demonstrated how the famous problem of finding the length

of the longest increasing subsequence in a random permutation is related to calculating the time the passengers need to board a plane and to the 'patient sorting algorithm' of ordering playing cards. The Baik-Deift-Johansson theorem was stated. This describes the fluctuations of the length of the longest increasing subsequence; the answer is known as the Tracy–Widom distribution which arises in random matrix theory. Alexei also introduced the probabilistic

Polynuclear Growth Model. The combinatorial data of this model gives rise to Young diagrams distributed with the Plancherel measure, with the longest increasing subsequence corresponding to the largest part of the diagram. The Plancherel measure of a diagram is proportional to the squared dimension of the corresponding irreducible representation of the symmetric group, so it is fundamental from the representation-theory point of view as well.

Alexei reviewed character theory of the infinite-dimensional unitary group in the third day of the event. He emphasized the doubling of data encoding its characters in comparison with the case of the infinite symmetric group. He also explained connections with the theory of random matrices. Characters correspond to probability measures on the space of infinite Hermitian matrices invariant under conjugation by finite unitary matrices. In this way irreducible characters correspond to the ergodic measures with respect to the action of the infinite-dimensional unitary group. The presence of the infinitedimensional unitary group behind both the infinite symmetric group and random matrices provided some justification of the appearance



Professor Alexei Borodin

of the Tracy–Widom distribution in the problem of the longest increasing subsequence.

In the subsequent lectures Alexei introduced determinantal random point processes and he developed techniques to work with them. This part of the course was most detailed and concrete. Alexei introduced a large class of Schur measures on the point configurations on a lattice and he showed that the correlation functions are determinantal with an explicit correlation kernel. This culminated in a complete proof of the Baik–Deift–Johansson theorem.

The lecture course was supplemented by single lectures given by Professors Ivan Corwin, Patrik Ferrari and Neil O'Connell. These lectures were mostly on the probabilistic side of the main lecture course. In particular, they dealt with the partition function of the semidiscrete polymer model and the large time limit shape for totally asymmetric simple exclusion processes on the line. These single lectures were supported by the Edinburgh Mathematical Society

In the final part of the course Alexei considered Schur and Macdonald processes that are measures on the sequences of Young diagrams and he also discussed the associated Markov chains. This provided connections to the topics of the supplementary lectures and unified all the material.

Alexei's lectures were scheduled in the mornings while afternoons were left for the three supplementary lectures and free time and discussions. Throughout the entire week participants were able to enjoy extraordinarily warm weather by taking advantage of walking in the parks surrounding the university.

Thoughtful combination of material and excellent explanations by Alexei made the lectures a success. I would like to thank the LMS, the Edinburgh Mathematical Society, Alexei and all the lecturers and participants for the event.

> Misha Feigin University of Glasgow

A comment from Alexei Borodin: 'Delivering the LMS lectures was a unique experience. Intense schedule, inquisitive and well-prepared audience, and excellent supplementary lectures created a very friendly and productive atmosphere that I thoroughly enjoyed. I am very grateful to the LMS, Misha Feigin and all the participants for making this possible.'

CATEGORICAL METHODS IN REPRESENTATION THEORY

A five-day conference/workshop on Categorical Methods in Representation Theory will take place at the University of Bristol from 24 to 28 September 2012. It will focus on categorical approaches to various aspects of the representation theory of finite groups and finite-dimensional algebras. The week will consist of three short lecture courses and roughly 12 one-off lectures given by experts in the field, as well as several contributed talks. The short courses will be:

- Dave Benson (Aberdeen) The stable category
- Michel Broué (Paris 7) The derived category
- Mike Prest (Manchester) The functor category Other speakers will include Paul Balmer,

Serge Bouc, Joe Chuang, Osamu Iyama, Radha Kessar, Henning Krause, Markus Linckelmann, Raphaël Rouquier (tbc), Peter Symonds, Will Turner and Peter Webb.

The conference is supported by an LMS Conference grant to provide financial assistance to postgraduates and young researchers and by the Heilbronn Institute. For further information email CMRT2012@gmail.com or visit the website at www.maths.bris.ac.uk/ ~majwm/CMRT/start.php.

LMS CONFERENCE FACILITIES

Organising a conference in central London? Meeting rooms and catering are available in De Morgan House. For terms and availability, please call 020 7927 0800 or email roombookings@demorganhouse.co.uk.

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ASYMPTOTIC GROUP THEORY AND MODEL THEORY

Report

Over the last thirty years model-theoretic constructions and techniques have had a significant impact in areas such as number theory, algebraic geometry and group theory. Important roles are played, for instance, by various limit constructions and methods from *p*-adic and motivic integration. Asymptotic and geometric group theory are closely inter-linked with these ideas.

For instance, the original proof of Gromov's celebrated Polynomial Growth Theorem uses an ingenious limit construction. The theorem, which is a cornerstone of geometric group theory, characterises finitely generated groups with polynomial word growth as those which are virtually nilpotent. Both the theorem and its proof continue to serve as an important source of inspiration. Current research connects Gromov's theorem with advances in non-commutative additive combinatorics, in particular regarding the study of approximate groups.

Limit groups arise naturally in the exploration of the 'algebraic geometry' and firstorder theory of groups. They are a crucial feature of Sela's work on the Tarski problems, concerning the elementary theory of finitely generated non-abelian free groups and more generally torsion-free word-hyperbolic groups.

In the study of zeta-functions of groups and rings, one encounters *p*-adic integrals which generalise Igusa local zeta-functions. In this context quantifier elimination results can be used to prove the rationality of Poincaré series arising from the study of integer solutions to polynomial equations. These kinds of results and techniques have been generalised to the context of motivic integrals.

The workshop held at Royal Holloway, University of London from 26 to 27 March 2012 focused on some of the current trends at the interface of model theory and group theory.

It attracted about 40 participants from the UK and overseas, including many research students and young researchers. With a view toward applications in asymptotic and geometric group theory, the eight invited talks of the workshop focused on three broad topics, partly alluded to above:

- 1. Approximate groups and Gromov's polynomial growth theorem
- 2. Limit groups and group equations
- 3. Motivic and p-adic integration with applications to groups

The speakers presented not only results, but also key methods and open problems, initiating further discussions amongst the participants. More detailed information on the academic programme and additional resources (e.g. lecture slides for some of the talks) can be found on the workshop's dedicated website at www.ma.rhul.ac.uk/model-theory.

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The attendance and talks by model theorists and mathematicians applying model theory to problems in algebra and number theory rendered the meeting very fruitful. There were ample opportunities for informal interactions. Photographs from the event can be found on the back cover of this *Newsletter*.

The organisers of the event gratefully acknowledge the support provided by the London Mathematical Society, the EPSRC and Royal Holloway. The workshop formed part of the South England Profinite Groups Meetings. This LMS joint research group has been organising regular meetings (three per year) since 2007. The next meeting, dedicated to Hausdorff dimension in profinite groups, will take place at the University of Southampton on 22 June 2012. Further information on past and future events can be found at www.ma.rhul.ac.uk/profinite_ groups/meetings.html.

> Benjamin Klopsch Royal Holloway, University of London

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BIOLOGICAL FLOW – TJP FEST Report

One hundred delegates gathered in Cambridge from 2 to 3 April 2012 for TJP Fest, a conference to celebrate the 70th birthday of Tim Pedley, FRS, Emeritus G.I. Taylor Professor of Fluid Mechanics at the University of Cambridge. The meeting was hosted in the Centre for Mathematical Sciences and financial support was provided by the LMS. The theme of the meeting was Biological Flow and the 47 talks and 11 posters reflected the breadth of topics to which Tim Pedley has contributed over his career. Among the speakers were many of his former PhD students, who now populate mathematics departments across the UK. Professor Pedley is well known for his contributions in fluid mechanics and for his service to UK mathematics (for example as Chair of the RAE 2008 Applied Mathematics sub-panel and former President of the IMA). The numerous overseas delegates at the meeting demonstrated how his influence extends significantly beyond this, particularly into disciplines such as biology and bioengineering.

A very brief survey of the topics presented by the meeting's overseas contributors indicates the breadth of topics discussed. The human cardiovascular system inspired talks on pulse propagation in networks of arteries (Mette Olufsen, North Carolina State), transport in the lymphatic system (Jimmy Moore Jr., Texas A&M), the performance of artificial heart valves (Ajit Yoganathan, Georgia Tech), gas embolisms for targeted drug delivery to tumours (Joseph Bull, Michigan) and the motion of red blood cells or biological capsules through narrow vessels (Dominique Barthès-Biesel, Compiègne: Tim Secomb, Arizona: Takami Yamaguchi, Tohoku; Sheldon Weinbaum, City College New York). Other applications of 'internal' biological fluid mechanics included transport across epithelium via electroosmosis (Jorge Fischbarg, Buenos Aires), olfaction in the nose (Michael Borgas, CSIRO,

Australia) and problems concerning lung airway recruitment (Don Gaver, Tulane; James Grotberg, Michigan).

The other major focus of the meeting was 'external' flows generated by organisms that swim and feed in a liquid environment. At the smallest length-scales, single-cell microorganisms (bacteria, algae or spermatozoa) propel themselves with one or more cilia or flagella. Roman Stocker (MIT) showed how mathematical models give insights into the mechanical properties of such structures at nanometre length-scales. Other talks (including one from Professor Pedley) discussed models for microscopic swimmers under the influence of light, external shear and nearby boundaries. Sébastian Michelin (École Polytechnique) addressed an optimisation problem concerning swimming and feeding strategies of 'squirming' organisms. At larger length-scales, Houshuo Jiang (Woods Hole Oceanographic Institution) and Thomas Kiørboe (Technical University of Denmark) described models for marine copepods that ambush their planktonic prey through intermittent jumps or by generating feeding currents. Professor Pedley has long-standing collaborations with Indian researchers, represented at the meeting by Girija Jayaraman (IIT Delhi), who described how mathematical models are used to describe the ecology of plankton populations in Indian ocean systems. Further contributions included studies of thrust generation by a flapping foil (Anders Andersen, Technical University of Denmark) and a survey by John Bush (MIT) of drinking strategies in organisms ranging from desert beetles to wading birds. A photograph from the conference can be found on the back cover of this Newsletter.

Many of the topics described at the meeting by UK and overseas contributors will appear shortly in a special issue of the *Journal of Fluid Mechanics*.

> Oliver E. Jensen University of Nottingham

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SCULPTURE UNVEILING: YORKSHIRE AND DURHAM GEOMETRY DAY

Report

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On the afternoon of 14 March 2012, a sculpture in stone inspired by a 4-lobed Willmore torus was unveiled on the Science Site of Durham University. This major work of art celebrates the impact on mathematics of the work of Tom Willmore, who was Professor of Pure Mathematics at Durham from 1965 until his retirement in 1984.

Tom Willmore instigated the study of surfaces of minimal value with respect to a global extrinsic curvature measure for a surface, now called its Willmore energy, by contributing relevant results and stating a challenging conjecture for tori. Efforts stimulated by this have led to the study by mathematicians worldwide of surfaces with stationary Willmore energy, now called Willmore surfaces. The 4-lobed Willmore torus is one of the particularly beautiful, symmetric Willmore surfaces discovered by Dirk Ferus (Technical University of Berlin) and Franz Pedit (Amherst and Tübingen).

This surface inspired the artist Peter Sales to create the sculpture. Its unveiling was preceded by a public lecture, attended by about 180 people, by Professor Pedit. In his lecture, entitled *The Willmore Conjecture – the first* 50 years, Franz explored the significance of Willmore surfaces and their relation to Tom and Durham. Franz is particularly well qualified to give this lecture, since he has played a prominent role in the study of Willmore surfaces since his first extended visit to Durham in 1987 as a post-doc of Tom Willmore.

After speeches from the Vice-Chancellor of Durham University, Professor Chris Higgins, and Tom's widow, Dr Gillian Boughton, the unveiling itself was performed before a crowd of several hundred people by some of the Willmore Pure Mathematics Postgraduate Fellows. These fellowships are funded from the Willmore Scholarship Fund, which was set up by Gillian, and are awarded to promising PhD students working in pure mathematics at Durham University. After the sculpture unveiling,



From left to right: Peter Sales (the artist); Dr Gillian Boughton (Tom's widow); the sculpture; Professor Chris Higgins (Vice-Chancellor of Durham University).

Portrait of Professor T.J. Willmore (1919–2005) by Christine Choa, 1998.

approximately 300 cupcakes (each decorated with a picture of a Willmore surface!) were consumed at a reception held to mark the event.

These celebrations were embedded in a momentous and well-attended meeting in the series of the Yorkshire and Durham Geometry Days. In addition to Professor Pedit, the speakers were Brendan Guilfoyle (Tralee) and André Neves (Imperial).

André's talk *Min-max methods and the Willmore conjecture* was particularly appropriate since he described the ideas behind his recent preprint with Fernando Marques (IMPA), proving Tom Willmore's conjecture. This work (http://arxiv.org/abs/arXiv:1202.6036), which uses the calculus of variations and geometric measure theory, follows progress on the regularity problem by Kuwert and Schätzle and by Rivière. This was the first talk André had given on his solution of the conjecture.

Brendan's talk A capillary problem in codimension two with application described aspects of the proof, by himself and Wilhelm Klingenberg (Durham), of a conjecture of even longer standing, made by Caratheodory in 1921. This work (http://arxiv.org/abs/0808.0851) uses geometric evolution equations, as was the case in the proof in 2003 of the Poincaré Conjecture.

Further details of the day's proceedings, including videos of all three talks, may be found at www.maths.dur.ac.uk/events/Meetings/ Willmore2012.

Further information about Tom Willmore and the Willmore Foundation, including a list of the Willmore Pure Mathematics Postgraduate Scholars, may be found at www.dur.ac.uk/ mathematical.sciences/postgrads/willmore.

The universities of Durham, Leeds and York gratefully acknowledge the long-standing financial support of the London Mathematical Society for the series of *Yorkshire and Durham Geometry Days*. A record of previous meetings in this series is available at www1.maths.leeds. ac.uk/pure/geometry/ydgd/old.html.

> John Bolton & Wilhelm Klingenberg Durham University

REVIEWS

The Big Questions – Mathematics by Tony Crilly, Quercus Publishing, 2011, 208 pp, £12.99, ISBN 978-1-8491624-0-1.

This book is the fourth in the *The Big Questions* series published by Quercus and edited by Simon Blackburn. The book under review is a nifty-looking little blue-cloth hard cover with an elasticised black-band page marker attached to the back. As one of my students put it, the book just feels 'cool'. All of the texts of the series make excellent travelling books and are very entertaining reads for the layperson, with the prior books in the series generally receiving very positive reader reviews on Amazon.com. To date, the titles in the series include *Philosophy*, *Physics, The Universe* and the book under review, *Mathematics*.

This book, written by Tony Crilly, continues the strong tradition of the series; it is very entertaining and puts twenty questions of and about mathematics on the table, addressing each with a compact essay, and with interconnections between topics well crossreferenced. The author's expertise in the history of mathematics shows in his ability to place the discussion of his selected Big Ouestions into context. Laypersons reading the text will be entertained and enlightened as to the 'why's and 'how's of the appearances of mathematics in everyday life, and if mathematics students at university read this text early on in their coursework, then likely they would be much improved; perhaps even understand why we recommend the studies we do, and how it is we claim that mathematics is the lively, organic and dramatically growing field that it is today. In short, I must give this little blue book a strong positive review.

The author applies high art in order to discuss the development of real mathematics within entertainingly titled chapters like 'What is mathematics for?', 'How big is infinity?', or `Can a butterfly's wings really cause a hurricane?'. For the reviewer, favourite

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chapters included 'Are statistics lies?', 'Is mathematics true?' and 'Is there anything left to solve?'. Ironically, two of these last chapters also played host to the few minor issues I had with the text.

Lest I sound too positive, let me now mention those few minor guibbles. Firstly, I felt that some mention should have been made. within the discussion on the debates between intuitionists and formalists in the early 1900s, of Poincaré's wonderful contributions to those discussions. Secondly, perhaps the discussion of the Navier-Stokes equations was a bit light in the context of the rest of the discussions of the Clay Prize guestions in the chapter 'Is there anything left to solve?'. And, finally, after doing an excellent job covering the difficult Gödel's Incompleteness Theorem, the text ends the discussion of 'Is mathematics true?' with a bit of a sad poetic bailout into

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academic relativism ending with the phrase '... it could be said that mathematicians today pursue truth as they see it.' Well, let me say that this, perhaps, is not how I interpret the meaning of that amazing theorem.

All in all, a nifty and fun book that does out the Victorian period. more than this reviewer expected.

> Collin Bleak University of St Andrews

Mathematics in Victorian Britain edited by Raymond Flood, Adrian Rice and Robin Wilson, Oxford University Press, 2011, 466 pp, £29.99, ISBN 978-0-19-960139-4.

According to its editors, Mathematics in Victorian Britain is the first general survey of Victorian mathematics. The editors are right. Other major English-language surveys of mathematics include Eleanor Robson's and Jacqueline Stedall's The Oxford Handbook of the History of Mathematics, which offers short chapters covering varying cultures in mathematics from antiquity to modernity, as well as Ivor Grattan-Guinness's Landmark Writings in Western Mathematics: 1640–1940, which offers snippets of key texts published in the history of mathematics over the past 300 years. But neither of those previous publications focuses specifically on British mathematics.

With an A-list of contributors, Mathematics in Victorian Britain meets high expectations. The intention of the compendium is to provide an overview of the breadth, scope and nature of mathematics through-

It was a time during which Britain was transformed politically, culturally, industrially, and mathematically. As is argued

> tion, the legacy of Victorian mathematics resides in mathematical physics. Names such as William Thomson, George Gabriel Stokes, Peter Guthrie Tait and James Clerk Maxwell serve as thematic descriptors of the period in general, in particular in theories of heat, thermodynamics and electromagnetism. Iron, steel and steam engine industries propelled applied mathematics into an era

of great scientific innovation, including the mathematisation of 'energy' and the formalisation of vectors.

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In pure mathematics, on the other hand, British mathematicians performed weakly. Arthur Cayley, James Joseph Sylvester and their Oxford colleague Henry Smith did help to transform the notion of matrices into a full-blown theory of linear algebra. Cayley and Sylvester further worked to develop invariant theory. Yet, despite Cayley's and Sylvester's prolific and productive engagements, pure mathematics in Britain failed to rival its European counterparts.

In the opening chapters, Tony Crilly, Keith Hannabuss, Adrian Rice, Raymond Flood and June Barrow-Green cover the development of Cambridge's Tripos mathematics system, Oxford's lack of mathematical culture, and attitudes towards mathematics in universities in Scotland, Ireland and throughout the Commonwealth, Sloan Evans Despeaux then explores the publications through which Victorian mathematics was disseminated.

A.D.D. Craik, Allan Chapman, Doron Swade, and M. Eileen Magnello describe areas of applied mathematics that were especially strong throughout this period. including astronomy, calculating engines, as well as vital and mathematical statistics. Magnello's chapter, 'Vital Statistics: The measurement of public health', explores Florence Nightingale's use of statistics in tracking illness and hygienic standards. It stands out as a colourful account of nursingas-statistics in the Victorian period.

The final chapters provide readers with a survey of pure mathematics in Britain from the development of rigorous calculus, geometry, and algebra to the rise of logic and combinatorics. Two chapters stand out as especially technical, namely Karen Hunger Parshall's 'Victorian Algebra: The freedom to create new mathematical entities', and I. Grattan-Guinness's 'Victorian Logic: from Whately to Russell'. Yet both contributions

still appeal to the general reader, as they contextualise algebra and logic by placing them within the fluctuating social conditions of Britain at a time when citizens were questioning absolutist norms of truth and veracity in politics, religion and, most especially, science.

The compendium ends on a contrarian note, however, with Jeremy Gray's 'Overstating their case? Reflections on British pure mathematics in the nineteenth century'. Gray argues that Victorian-era mathematicians in Britain are often over-rated. Vis-à-vis their European and continental colleagues, British mathematicians underperformed and under-innovated. The supposed 'Greats', including Cavley, Sylvester and perhaps the young William Kingdon Clifford, whose work on guaternions and non-Euclidean geometry was cutting edge, did not meet European standards. "British pure mathematicians of the nineteenth century have been overrated, to the detriment of historical writing on the subject," Grav writes, adding "what is striking about so many British mathematicians is their belief that they were the equals of their Continental peers, when no such comparison can be entertained".

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At 466 pages, the compendium is worth the read and certainly worth the price for both the mathematical dabbler and the historical debutant. For specialist researchers in the history of mathematics, the most valuable component is its brilliant 'Notes, References, and Further Reading', which provides thorough literature reviews of each topic discussed on a chapter-by-chapter basis.

Similar compendia exploring mathematics throughout the seventeenth, eighteenth and twentieth centuries would be welcome additions to the libraries of mathematical historians.

Josipa Petrunic SSHRC Research Fellow, History of Mathematics University of Alberta

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THE BIG

Tony Crilly



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CALENDAR OF EVENTS

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

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

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 Yorkshire and Durham Geometry Day, Leeds (414)
 Recent Developments in Lie Theory Workshop, Manchester (414)
 Scale Transitions in Chemistry and Biology ICMS Workshop Edinburgh (415)
 Higher Order Problems in Geometric Analysis Workshop, Bath (409)
 LMS Northern Regional Meeting, Northumbria University, Newcastle (414)
 Multiscale Modelling and Techniques Postgraduate Conference, ICMS, Edinburgh (415)
 Mathematics of Human Biology Work-

shop, Northumbria University, Newcastle (414) 6-9 Banach Spaces Workshop 2012, Birmingham (413) 7-8 Essex-Greenwich-Hertfordshire Workshop on Applied and Numerical Mathematics, Greenwich (414)

7-9 Beauville Surfaces and Groups Conference, Newcastle (414) **8** Spectral Theory of Hankel Operators and Related Topics Workshop, King's College

London (414) **10-16** SIDE10 International Conference on Symmetries and Integrability of Difference Equations, Ningbo, P.R. China **11-12** Stochastic Modelling in Ecosystems Workshop, Glasgow (414) **11-12** Numerical Analysis of Stochastic PDEs Workshop, Warwick (413) **12-15** The Incomputable Workshop, Chicheley Hall, North Buckinghamshire (407) **12-15** Chaotic Modeling and Simulation International Conference, Athens, Greece 16-17 Combinatorics Colloquia, London (414)
17-22 Continuum Mechanics in Biology and Medicine LMS–EPSRC Short Course, University College London (413)
18-19 Clay Research Conference, Oxford (414)

18-20 Frontiers of Nevanlinna Theory 4: Nevanlinna Theory and Number Theory. University College London (414) 18-22 Topology and Groups Summer School, Berlin, Germany (412) 18-22 Singularity Theory, its Modern Applications and Future Prospects Workshop, Liverpool (414) 18-22 IUGG Conference on Mathematical Geophysics, Edinburgh (414) 18-22 Coarse Geometry of Infinite Groups Conference, Lille, France 18-23 Turing Centenary Conference, Cambridge (407) 21-23 Geometry, Representation Theory and Clusters Workshop, Leicester (413) 21-23 Wales Mathematics Colloquium. Gregynog Hall, Powys (414) 22 Alan Turing Satellite Workshops, Manchester (414) 22 Hausdorff Dimension in Profinite Groups Meeting, Southampton (415) 22-25 Alan Turing Centenary Conference, Manchester (414) 23-24 Turing's Worlds, Oxford (414) 25-29 Topology and Groups Conference, Berlin, Germany (412) 25-29 String Phenomenology INI Workshop, Cambridge (411) 26 LMS Popular Lectures, London (415)

29 LMS Meeting and Hardy Lecture, London (415)

JULY 2012

2-3 Numerical Linear Algebra, Control Theory and Data Assimilation Conference, Reading (414)
2-3 Branes, Supergravity and M-Theory Conference, Cambridge (414)
2-6 Applied and Computational Topology ICMS Workshop, Edinburgh (415)
2-7 6th European Congress of Mathematics, Kraków, Poland (409)

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2-7 Interactions of Birational Geometry with Other Fields LMS Durham Symposium, Durham (413)
3 LMS Meeting, 6ECM, Kraków (415)
8-15 ICME12, Seoul, Korea
9-11 15th Galway Topology Colloquium,

9-17 For Galway Topology Conocuum, Oxford (414) 9-12 Postgraduate Group Theory Conference, York (415) 9-13 Additive Combinatorics in Paris 2012 Conference, Paris, France (409)

9-17 Grand Biological Challenges for Mathematicians LMS Durham Symposium, Durham (413)

12-13 CETL-MSOR Conference 2012, Sheffield (414)

12-18 Logic Colloquium 2012, Manchester (415)

16-20 Cubical Complexes and Applications ICMS Workshop, Edinburgh (415)
23-27 Topological Fluid Dynamics IUTAM Symposium, INI, Cambridge (414)
23-27 Probability at Warwick Young Researchers Workshop, Warwick (414)
23-27 Enhancing Mathematics Research in African Universities through International Collaboration Meeting, Strathmore University, Nairobi, Kenya (414)
26-1 Aug International Mathematics Competition for University Students, Blagoevgrad, Bulgaria (413)
30-3 Aug New Developments in Relativistic Quantum Mechanics and Applications INI

AUGUST 2012

Workshop, Cambridge (412)

15-17 Postgraduate Combinatorial Conference, Warwick (415)
20-24 Finite Groups, Representations and Related Topics, Oxford
26-28 Modern Mathematical Methods in Science and Technology Conference, Kalamata, Greece (411)
27-30 Algebra, Combinatorics, Dynamics and Applications Workshop, Queen's University, Belfast (410)
29-31 Physics and Computation 2012
Workshop, Swansea University (415)

SEPTEMBER 2012

1-3 International Pure Mathematical Conference 2012, Islamabad, Pakistan (412) 3 LMS Midlands Regional Meeting, Abervstwyth (415) 3 Function Theory Meeting, De Morgan House, London 3-7 Quantum Probabilistic Symmetries Workshop, Aberystwyth (415) 3-7 Topological Aspects of DNA Function and Protein Folding INI Workshop, Cambridge (412) 3-7 Geometry, Mechanics and Control Iberoamerican Meeting, Salamanca, Spain **3-7** String Theory and Arithmetic Geometry Heilbronn Workshop, Bristol (415) 4-9 British Science Festival, Aberdeen (408) 5-7 Stochastic Methods and Nonlinear PDEs, Cardiff 6-8 British Topology Meeting, Cambridge (415) 6-8 Future Directions for Quantum Groups Conference, Lancaster (414) 7-12 Stochastic and PDE Methods in Financial Mathematics Workshop, Armenia 10-13 Nonlinear PDE Conference, Oxford (414) 10-14 Stochastic Partial Differential Equations INI Workshop, Cambridge (415) 12-14 Lattices and Relations Workshop, Amsterdam (415) 12-14 Nonlinear Waves in Fluids Conference, Loughborough (415) 14-15 Free Surface and Interface Problems Workshop, Oxford (414) 15-16 Mathematicians and their Gods. Oxford (415) 20-21 Heilbronn Annual Conference, Bristol (415) 9-22 Topological Solitons Conference, Cambridge (412) 24-28 Categorical Methods in Representation Theory Conference/Workshop, Bristol (415) 26 LMS Popular Lectures, Birmingham (415) 27-30 Mathematics of John Thompson, CMS 27-30 Finite Groups and Related Topics Conference (415)

No. 415 June 2012

LMS-FUNDED MEETINGS

Asymptotic Group Theory and Model Theory Workshop held at Royal Holloway, University of London from 26 to 27 March 2012 (report on page 31)



Speaker Dugald Macpherson (Leeds)

Organiser Ben Klopsch (Royal Holloway) and Speaker Nick Gill (Open University)

Biological Flow – TJP Fest held at the University of Cambridge from 2 to 3 April 2012 (report on page 33)

