LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 417 September 2012

Society Meetings and Events

2012

Monday 3 September
Midlands Regional Meeting, Aberystwyth

Wednesday 26 September
LMS Popular Lectures, Birmingham [*page* 16]

Monday 1 October
SW & South Wales Regional Meeting, Bristol [*page* 13]

Friday 16 November
Annual General Meeting, London [*page* 5]

2013

Friday 1 March
Mary Cartwright Lecture, London

Monday 18 March
Northern Regional Meeting, Newcastle

Friday 5 July
LMS Meeting London

NEWSLETTER ONLINE:

Go to newsletter.lms.ac.uk

LMS ELECTIONS 2012

e-Voting option introduced

LMS elections have previously been undertaken via paper ballot only. In order to attract more voters, appeal to a wider range of members and offer a more modern approach to the election process the LMS Council considered a recommendation from the General Secretary that the Society moved to a system of electronic voting with a paper option for those who expressed a preference. The system recommended by the LMS Scrutineers was that provided by the Electoral Reform Services (ERS).

At its meeting on 29 June 2012 the LMS Council agreed that future elections to the LMS Council and Nominating Committee would be managed by ERS. The ERS has a long and successful history in the organising of elections for learned societies and other membership and public bodies, and will provide objectivity and impartiality to the Society's election processes with returns being made directly to the ERS. LMS Scrutineers will continue to be appointed annually by the LMS Membership at a General Meeting, on the recommendation of Council, to oversee the elections process on an ongoing basis. The ERS will operate to guidelines produced by the Society, through the LMS Scrutineers, on how the elections should be run, referencing the Society's current Single Transferable Vote System. Both current Scrutineers, Professor Peter Saunders and Dr Donald Collins, are actively involved in ensuring the security, probity and continuity of the system in this first year and beyond.

How do I vote?

From this year LMS members will be able to cast ballots electronically through the ERS website and, although paper votes will be available, it is hoped that members will make use of the e-voting option.

Ballot papers and candidate information will no longer be sent to members with a copy of the October *Newsletter*, as in previous years. Instead, members will be contacted directly by the ERS. Prior to this, an email will be sent by the Society to all members who are registered for electronic communication informing them that they can expect to shortly receive some election correspondence from the ERS. Those not registered to receive email correspondence will receive all communications in paper format, both from the Society and from the ERS. Members should check their post/email regularly in October for communications regarding the elections.

The electoral system used by the Society in calculating the results will not change, and information about the candidates will be available to members as agreed by Council. Results will continue to be

announced at the AGM in November. The Society will host an Elections Blog on the LMS website for use by candidates and members. The 2012 slate can be viewed at www.lms.ac.uk/content/london-mathematical-society-elections-2012.

Ensure that your contact details are current
All members are strongly encouraged to ensure that their email and postal contact details registered with the Society are up-to-date to enable the ERS process to run smoothly. The annual subscription form is enclosed with this *Newsletter* and members are asked to return this to De Morgan House as soon as possible. It is expected that further development of the LMS website will have been completed by September 2012 which will allow members to check and update their own details directly via the LMS website. Any changes would be required no later than **21 September 2012**.

Use your vote
It is hoped as many members as possible will vote in the 2012 LMS Elections. Results will be announced at the AGM on 16 November 2012.

Fiona Nixon
Executive Secretary

HONORARY MEMBERSHIP 2012

The London Mathematical Society has elected **Dr James Simons** of Renaissance Technologies, USA and **Professor Claire Voisin** of the Institute de Mathématiques de Jussieu at the University of Paris VI: Pierre et Marie Curie, France to Honorary Membership of the Society.

Dr James Simons is not only a distinguished mathematician but is one of the greatest worldwide benefactors of mathematics. His early work in differential geometry with his teacher Chern led to the famous 'Chern-Simons action' of quantum field theory. Subsequently, with his student Cheeger, he invented cohomology.

In the 1970s he left mathematics for the financial world where his success enabled him to set up the Simons Foundation, which funds mathematical research worldwide and has made large contributions to the Institute of Advanced Study in Princeton, MSRI at Berkeley, and the IHES in France, among other bodies. He has also endowed the new Simons Center for Geometry and Physics at Stony Brook University.

LMS Newsletter http://newsletter.lms.ac.uk

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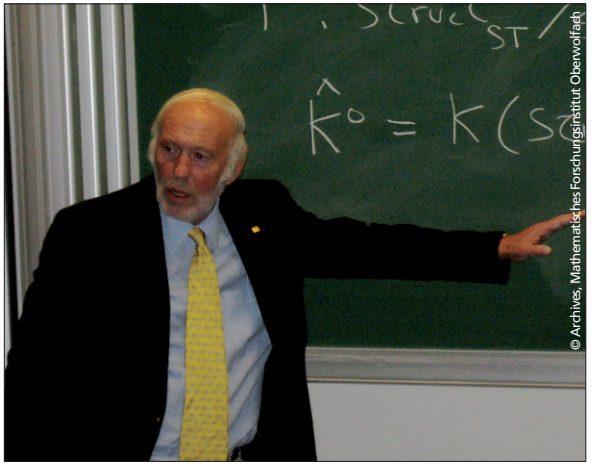
Claire Voisin



James Simons

Professor Claire Voisin works in complex algebraic geometry, using a mixture of algebraic and analytical methods. She is a leader in Hodge theory and the theory of algebraic cycles. She constructed the first examples of compact Kähler manifolds, which are not homotopy equivalent to any projective variety. She proved many of the strongest known results of the Hodge conjecture, and on Green's conjecture on algebraic curves. She is well known as the author of several books, including *Mirror Symmetry* and *Hodge Theory and Complex Algebraic Geometry.*

Full citations for Dr Simons and Professor Voisin will appear in the LMS *Bulletin*.

LMS HANDBOOK AND LIST OF MEMBERS 2013

A new edition of the Society's *Handbook and List of Members* will be published in 2013. The Society's *Handbook and List of Members* contains information about the Society's activities including publications, grants and events as well as a list of its members and their details. The *Handbook and List of Members* will be available to all members, both in print and online via the LMS website. The online version will also be available to the general public but the printed version will be available to members only.

The Society is seeking members' permission to include their personal details in the *Handbook and List of Members*. Members have the opportunity to choose which information they would like to be published (if any) when renewing their subscription to the Society by selecting the options given on the subscription form for 2012-13, which is enclosed with this *Newsletter*. Members may also choose whether their details may be published in the printed version and/or online via the LMS website.

The Society would like to include as many members as possible in the *Handbook and List of Members* and asks that all members return the subscription form with their current details and permission to publish by **8 December 2012**. (Any returns **after** this date may not be included in the printed edition).

The *Handbook and List of Members* will be available in early 2013.

Any queries regarding the *Handbook and List of Members* should be directed to membership@lms.ac.uk.

Elizabeth Fisher
Membership & Activities Officer

RAMANUJAN PRIZE

Fernando Codá Marques (Instituto Nacional de Matemática Pura e Aplicada, Rio de Janeiro, Brazil) has been named the winner of the 2012 Ramanujan Prize for Young Mathematicians from Developing Countries.

The prize is in recognition of his several outstanding contributions to Differential Geometry. Together with his co-authors, Fernando has solved long-standing open problems, and obtained important results, including results on the Yamabe problem, the complete solution of Schoen's conjecture, counterexamples to the rigidity conjecture of Min-Oo, connectivity of the space of positive curvature metrics on an orientable 3-manifold, and most recently, a proof of the Willmore conjecture.

The Ramanujan Prize is awarded jointly by the Abdus Salam International Centre for Theoretical Physics, Niels Henrik Abel Memorial Fund and the International Mathematical Union.

ABEL PRIZE 2013

Call for nominations

The Norwegian Academy of Science and Letters has called for nominations for the Abel Prize 2013. The Abel prize recognises outstanding scientific work in the field of mathematics, including mathematical aspects of computer science, mathematical physics, probability, numerical analysis and scientific computing, and also applications of mathematics in the sciences. The Prize may be awarded to a single person or shared for closely related fundamental contributions. The Abel Prize amounts to NOK 6 million (approximately €800,000 or US$1 million).

Letters of nomination should be sent no later than **15 September 2012** by email to abelprisen@dnva.no or by mail to The Norwegian Academy of Science and Letters, Drammensveien 78, NO-0271 Oslo, Norway. It is also possible to nominate candidates by using the online submission form. For further information and submission form, visit Abel Prize website at www.abelprize.no/.

LONDON MATHEMATICAL SOCIETY

ANNUAL GENERAL MEETING

16 November 2012

Jeffrey Hall, Institute of Education, 20 Bedford Way, London WC1H 0AL

(Nearest tube: Russell Square)

Programme:

3.00–3.30	**Annual General Meeting**
3.30–4.30	**Charles Stuart** (EPFL, Lausanne) *Bifurcation, asymptotic bifurcation and elliptic equations on* $\mathbb{R}^N$
4.30–4.55	Tea
4.55–5.00	**Announcement of Election Results**
5.00–6.00	**Bryce McLeod** (Oxford) Naylor Lecture *The wedge entry problem*

The meeting will include the presentation of certificates to the 2012 LMS prize winners.

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

The Society's Annual Dinner will be held in The Russell Hotel's Fitzroy Doll's Restaurant at 7.30 pm after the reception. Members and their guests are invited to attend the Annual Dinner. The cost to attend the dinner will be £45 per person. Those wishing to attend the dinner should contact Leanne Marshall (leanne.marshall@lms.ac.uk) before **8 November**.

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

ANNUAL LMS SUBSCRIPTION 2012-13

Members are reminded that their annual subscription, including payment for publications, for the period November 2012-October 2013 is due on **8 November 2012**.

Rates

The annual subscription to the London Mathematical Society for 2012-13 is:

- Ordinary membership £56
- Concessions on Ordinary membership:
  - — Reciprocity £28
  - — Career break or part-time working £14
- Associate membership £14

Members also have the option to pay their European Mathematical Society subscription via the LMS and subscribe to the *Journal of the EMS:*

- EMS subscription (via the LMS) £20
- *JEMS* subscription (via the LMS) £94

The member prices of the Society's journals for 2013 are:

	Print	Online*	Print+Online*
Bulletin	£61	£48	£74
Journal	£110	£89	£132
Proceedings	£118	£95	£141
JCM (electronic)	—	free	—
Nonlinearity	except N. America £78		N. America £101

(*inclusive of VAT)

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

Renewal and Payment

A subscription form is included with this edition of the *Newsletter* for members to complete and return with payment in the enclosed envelope. Members will also be emailed a copy of the subscription.

Please note all members are asked to complete and return the subscription form as it also requests permission to include members' details in the Members' Handbook 2013.

The Society encourages payment by direct debit. If you do not already pay by this method and would like to set up a direct debit (this requires a UK bank account), please visit the LMS website to download the direct debit mandate form: www.lms.ac.uk/sites/default/files/Membership/Direct%20Debit%20Form.pdf.

The Society also accepts payment by cheque or credit/debit card.

Elizabeth Fisher
Membership & Activities Officer

LMS GRANT SCHEMES

Grants news – more funding available

Following a review of the LMS Grants Schemes, the Society is pleased to announce an increase in the maximum grant awards for the following grant schemes:

- Conferences held in the UK (Scheme 1): maximum award to support research students increased to **£2,000**, increasing the overall maximum award to **£7,000**.
- Visits to the UK (Scheme 2): maximum award increased to **£1,500**. The daily limit for accommodation and subsistence has been increased to **£70**.
- Joint Research Groups (Scheme 3): maximum award increased to **£500 per meeting**, with an overall maximum award of **£2,000**.
- Research in Pairs (Scheme 4): maximum award increased to **£1,200** for international visits and **£600** for visits within the UK. A daily limit of **£70** for accommodation and subsistence has been introduced.
- International short visits with the main focus on Africa (Scheme 5): maximum award increased to **£3,000** for visits to the UK and **£2,000** for visits abroad. The daily limit for accommodation and subsistence for visits to the UK has been increased to **£70**.
- Small Grants for Education: maximum award increased to **£800**.

For full details on each scheme, please visit the LMS website: www.lms.ac.uk/content/grants.

The maximum awards for the following grant schemes remain the same:

- Computer Science Small Grants (Scheme 7): maximum award **£500**
- Postgraduate conferences held in the UK (Scheme 8): maximum award **£4,000**
- Childcare Grants: maximum award **£200**

Next Closing Date for Research Grant Applications: 15 September 2012

Applications are invited for the following grants:

- Conferences and postgraduate research conferences held in the UK (Schemes 1 and 8)
- Celebrating new appointments (Scheme 1)
- Visitors to the UK (Scheme 2)
- Joint Research Groups (Scheme 3) (see below)
- Research in Pairs (Scheme 4)
- International short visits with the main focus on Africa (Scheme 5)

For full details of these grant schemes, and to download application forms, visit the LMS website (www.lms.ac.uk/content/research-grants).

- Applications received by **15 September 2012** will be considered at a meeting in October.
- Applications should be submitted well in advance of the date of the event for which funding is requested.
- Normally grants are not made for events which have already happened or where insufficient time has been allowed for processing of the application.

Queries regarding applications can be addressed to the Grants Administrators or the Programme Secretary (see below) who will be pleased to discuss proposals informally with potential applicants and give advice on the submission of an application.

- Grants Administrators: Sylvia Daly, Elizabeth Fisher and Barbara Graczyk (tel: 020 7291 9971/3, 020 7927 0808, email: grants@lms.ac.uk).
- Programme Secretary: Rob Wilson (email: r.a.wilson@qmul.ac.uk).

Joint Research Groups – Renewal grants (Scheme 3)

We would like to draw your attention to the following:

ALL renewal applications MUST be accompanied by a Financial and Academic Report for the previous year's activities. Please note that full reports should always be submitted ('light touch' refers to the application procedure only).

Grant holders wishing to renew their application may use the Light Touch Application Form if

the original or last full renewal application was made in the last TWO years, and NONE of the following have changed:

- the grant holder,
- the supporters, and
- the amount requested†

Grant holders MUST use the Full Renewal Application Form if

the original or last full renewal application was made THREE years ago, and/or ANY of the following have changed:

- the grant holder,
- the supporters or
- the amount requested

If a renewal application is unsuccessful, normally the grant will be terminated at the end of the calendar year. A supplementary grant will be available to cover actual expenditure for a meeting held during the autumn term. This will normally be the equivalent of the grant awarded for one meeting, e.g. £500, and will not usually exceed one third of the previous year's grant.

Other LMS Grants and Funding

Computer Science Small Grants (Scheme 7)

Funding for grants **up to £500** is available to support a visit for collaborative research at the interface of Mathematics and Computer Science either by the grant holder to another institution within the UK or abroad, or by a named mathematician from within the UK or abroad to the home base of the grant holder. The next deadline for applications is **15 September 2012** – please see the

† Please note that with the increased maximum awards, grant holders may still apply using the Light Touch scheme and request the increased award per meeting (£500), provided that **no other details have changed** and that the number of meetings has not changed.

website for further details: www.lms.ac.uk/content/computer-science-small-grants-scheme-7.

Childcare Supplementary Grants
Grants of **up to £200** are available to parents working in mathematics to help with the cost of childcare when attending a conference or research meeting. The Society believes that all parents working in mathematics should be able to attend conferences and research meetings without being hindered by childcare costs. Institutions are expected to make provision for childcare costs and parents are encouraged to make enquiries. However, where this is not available, the Society administers a Childcare Supplementary Grants Scheme. Further details can be found on the LMS website: www.lms.ac.uk/content/childcare-supplementary-grants.

Small Grants for Education
Funding for grants **up to £800** is available to stimulate interest and enable involvement in mathematics from Key Stage 1 (age 5+) to Postgraduate level and beyond. Anyone working/based in the UK is eligible to apply for a grant. If the applicant is not a member then the application must be countersigned by an LMS member or another suitable person such as a Head teacher or senior colleague. The next deadline for applications is **30 November 2012**. Please see the website for further details: www.lms.ac.uk/content/small-grants-education.

LMS-EPSRC Short Courses
The Society and EPSRC offer funding of **up to £12,200** (including honoraria for organisers) towards the cost of running a one-week Short Course which provides high quality training for postgraduate students in core areas of mathematics. For further information on Short Courses and how to submit a proposal, please visit www.lms.ac.uk/content/short-course-organisers.

Research Workshop Grants
The Society offers grants to support for Research Workshops held in the UK. Requests for support (for travel and subsistence of participants, and reasonable associated costs) **in the range £1,000-£10,000** will be considered. For further information and application forms, visit: www.lms.ac.uk/content/research-workshops-grants.

Spitalfields Days
Grants of **up to £500** are available to support an LMS Spitalfields Day, which have been run since 1987 and are in honour of the Society's predecessor, the Spitalfields Mathematical Society (1717-1845). A Spitalfields Day is a one-day meeting, which is usually associated with a long-term symposium on a specialist topic at a UK university. Selected participants, often distinguished experts from overseas, give survey lectures (or other types of lecture accessible to a general mathematical audience) on topics in the field of the symposium. Further details can be found on the LMS website: www.lms.ac.uk/content/spitalfields-days#applications.

Young British and Russian Mathematicians Scheme

Visits to Russia
Applications are invited from young British postdoctoral mathematicians who wish to spend a few weeks in Russia giving a series of survey lectures on the work of their school.

The LMS is offering grants of **up to £500** to meet the travel costs, while the host should apply to the Russian Academy of Sciences for funding towards local expenses for accommodation and subsistence. Please contact Sylvia Daly (grants@lms.ac.uk) for information before contacting the Russian Academy of Sciences for funding. Applications to the LMS should include the following:

1. A brief academic case for the visit, including a description of your current research interests, and an outline of your planned work during the visit (no more than one side of A4).
2. A brief CV (no more than one side of A4).
3. A brief budget.
4. An invitation from the host in Russia, which must state explicitly that your accommodation and subsistence expenses will be met by them. This should include provisional dates for the visit.

Financial and academic reports will be required after the visit.

In exceptional circumstances, applications may be considered from strong research students who are close to finishing their doctorates. Applications should include a strong case and the student should obtain a letter of recommendation from his/her supervisor.

Visits to Britain
Under this Scheme, applications may also be made by any mathematician in Britain wishing to host a visit by a young Russian postdoctoral mathematician who wishes to spend a few weeks in Britain giving a series of survey lectures on the work of their Russian seminar.

The LMS is offering grants to the host institution to meet the visitor's actual travel and accommodation costs of **up to £1,500**.Applications should include the following:

1. Name and brief CV of the visitor.
2. A brief description of the course of lectures.
3. A letter or email of agreement from the head of the host department, including the proposed dates of the visit.

Financial and academic reports will be required after the visit. Further details of the Scheme can be found on the LMS website: www.lms.ac.uk/content/international-grants#YBR. Applications made by **15 September 2012** will be considered at a meeting in October. Enquiries should be made to the Grants Administrators: Sylvia Daly, Elizabeth Fisher and Barbara Graczyk (tel: 020 7291 9971/3, email: grants@lms.ac.uk).

Sylvia Daly and Elizabeth Fisher
Grants Administrators

ROYAL SOCIETY SYLVESTER MEDAL

The Royal Society has awarded the 2012 Sylvester Medal to **Professor John Toland, FRS,** for his original theorems and remarkable discoveries in nonlinear partial differential equations, including applications to water waves. The medal is named after James Joseph Sylvester who was Savilian Professor of Geometry, Oxford, in the 1880s and LMS President 1866–68.

NEW BLOGS PAGE ON LMS WEBSITE

The purpose of the new blogs page (www.lms.ac.uk/content/lms-blogs-page) is to provide an area for members and others to engage in dialogue and express their views. On the blogs page can be found a number of different blogs, including a Members' Blog, which has been set up for members 'for discussion of all matters to do with the LMS, its role, activities, constitution, future development, and so on'.

The page can also be accessed from the LMS home page (www.lms.ac.uk) by clicking on the LMS Blogs title which appears as a header at the top right hand of the page.

VISIT OF T. TALIPOVA

Professor Tatiana Talipova (Institute of Applied Physics) will be visiting the UK from 1 to 14 October 2012. Her research concerns propagation of nonlinear dispersive waves in various media, such as ocean waves, waves in the atmosphere and in plasmas. Professor Talipova will give lectures at:

- University of Sheffield, Hicks Building
  Wave propagation in nonreflected media
- University of Loughborough
  Transformation of interface solitary wave on the bottom step
- University of Keele
  Variable-coefficient Gardner equation and its role in the nonlinear dynamics of the oceanic internal waves

Whilst in Sheffield she will be working with Professor Michael Ruderman on nonreflective wave propagation in magnetic field guides in the solar atmosphere. Whilst in Loughborough she will collaborate with Professor Roger Grimshaw on propagation of nonlinear internal waves. Whilst in Keele she will be studying properties of the Gardner equation with Professor Victor Shrira. For further information about the visit of Professor Talipova contact Professor Ruderman (M.S.Ruderman@sheffield.ac.uk). The visit is supported by an LMS Scheme 2 grant.

THOMAS WAGENKNECHT

Dr Thomas Wagenknecht, who was elected a member of the London Mathematical Society on 20 November 2009, died suddenly on 1 May 2012, aged of 37.

George Brassay, Roger Gair and Alastair Rucklidge write: Thomas was born in 1974 in Kharkiv (Ukraine) and read Mathematics at the Technical University of Ilmenau, in Germany. He remained at Ilmenau for his doctoral studies on *Homoclinic Bifurcations in Reversible Systems,* gaining his doctorate *magna cum laude* at the end of 2003.

Thomas came to the UK at the beginning of 2004 to take up a research position in dynamics and numerical analysis in the Bristol Laboratory for Advanced Dynamics Engineering at the University of Bristol. In January 2006, Thomas moved to the University of Manchester for a second post-doctoral research position.

Thomas came to Leeds as a Lecturer in the School of Mathematics in October 2007. From the outset, he settled harmoniously into his new environment. Centred on the application of dynamical systems and bifurcation theory to problems in physics and engineering, his research continued to flourish within the stimulating atmosphere of the School's Applied Nonlinear Dynamics research group. In recent years, his interests turned to the new area of dynamics on complex networks, bringing others along with him with his infectious enthusiasm. He was a lucid and penetrating speaker at seminars and scientific meetings.

Enviably bilingual, open-minded and a generous collaborator, Thomas was ideally suited to the needs of interdisciplinary research. His excellence as a communicator, his availability to spend time carefully explaining mathematical concepts, and his ready wit all made him popular with his students. He was a highly valued and respected colleague, always willing to help. His many friends enjoyed, among his many other qualities, his sense of humour and his affection for British culture and idiom.

Thomas is survived by his parents.

DORIS LAI CHUE CHEN

Dr Doris Lai Chue Chen, who was elected a member of the London Mathematical Society on 19 April 1951, died on 3 June 2012, aged 82.

Professor Kee Yuen Lam and Professor Man Keung Siu write: Dr Chen did her undergraduate work at the Sun Yat Sen University, Guangzhou, China. She obtained her BSc in 1949, having been one of the very few woman graduates in mathematics in China. Later that year she proceeded to King's College, University of London, to do postgraduate work under the supervision of Professor J.G. Semple in the area of algebraic geometry, subsequently obtaining a PhD in 1955. In 1953 she was appointed Assistant Lecturer in the Department of Mathematics at the University of Hong Kong. The department was then headed by the late Professor Yung Chow Wong. She was promoted to a Lectureship in 1960, and served the Department with all her heart until her retirement in 1985.

Many generations of undergraduates at the University learned modern algebra from Doris Chen. To them Doris, as she was fondly called, was a symbol of culture and elegance, and a person full of warmth and kindness. To many female students she was also a role model, being the only woman mathematician on the regular faculty throughout her years of tenure at the University.

Her book *Elementary Set Theory*, written jointly with her colleague Dr Kam Tim Leung, was published in 1967 by the Hong Kong University Press. Lucid and carefully written, it was for many years a must on the reading list of mathematics undergraduates in Hong Kong as well as pupils in matriculation classes who aspired to enter the Hong Kong University.

In her retirement years Doris lived in England but travelled extensively in Europe, Asia and Australia. She devoted a lot of time to theatre and music, especially to Wagnerian Opera. She used to say that Wagner was an acquired taste that she enjoyed tremendously. At her funeral on 18 June 2012, family members requested that the Fischer-Dieskau version of *Evening Star* in Tannhäuser be played. Friends, relatives and former students will always remember her to

be as serene and dignified as this fine piece of music portrays.

Dr Doris Chen is survived by her husband Shou Lum, her two sons William and John, daughter-in-law Lily, and two grandchildren Abigail and Samuel. William, like his mother, is a mathematician.

BILL BADE

Professor William G. Bade, Emeritus Professor of Mathematics at the University of California, Berkeley, who was elected a member of the London Mathematical Society on 20 November, 1987, died on 10 August 2012, aged 88.

Garth Dales writes: Bill Bade was born in Oakland, California, on 29 May 1924. His father was William Frederic Bade, a Professor of Old Testament and Semitic Languages, and the biographer of John Muir. After his father's death, his mother moved back to San Diego, and Bill attended San Diego High School. He entered Pomona College in 1942, but enlisted in the US Navy in 1943, and was sent to Cal Tech to study physics. As the war approached its end, Bill served in the Pacific Fleet, mainly on the Island of Truk. After his honourable discharge, Bill returned to California, and took a PhD in functional analysis at UCLA under Angus Taylor in 1951.

Bill taught at UC Berkeley in 1951-52, and in 1952 married Eleanor Barry. Soon afterwards, Bill drove with Elly across America to take up a position at Yale, funded by the US Navy, to be one of the two assistants to Nelson Dunford and Jacob Schwartz and to participate in the writing of the enormously influential work *Linear operators*, in three volumes.

At Yale, Bill and his family became close friends of Philip C. Curtis, Jr., and his family. After three very happy years in the east, Bill took up a position at Berkeley in 1955 (starting at the same time as Henry Helson), and Phil went to UCLA. Bill's and Phil's mathematical collaboration in the 1960s led to two seminal papers on homomorphisms from Banach algebras that laid the foundations of 'automatic continuity theory'; they wrote many further joint papers, while their mutual interest in the mountains, especially the beautiful Sierra Nevada, brought together their two sizable families. Later they bravely took their families to Europe, taking sabbaticals in Denmark and, later, in the UK.

Bill was a pillar of the Department at Berkeley, and a member of the extremely strong functional analysis group there; he had 26 successful PhD students, and acted as Vice-Chair for Graduate Studies for many years.

In 1974, Bill and Phil initiated at UCLA a sequence of conferences on *Banach algebras* that continues to this day.

The 1970s were a golden era when a well-funded UC system could host many visitors; I myself spent two years at UC in that decade, and am extremely grateful for the generous hospitality of Bill and Phil, and the welcome given to my whole family. These were very happy and fruitful years.

William Bade was a man of great kindness, overwhelming integrity and sound judgement, and of very substantial mathematical and professional achievements. He is survived by Eleanor, by six children, and by five grandchildren.

VISIT OF M. HOEFER

Dr Mark Hoefer (North Carolina State University, USA) will be visiting the UK during October 2012. His research area is fluid dynamics of dispersive media. Dr Hoefer will give the following talks:

- 4 October, University of Edinburgh: *Dispersive shock waves and instabilities*, contact Noel Smyth (N.Smyth@ed.ac.uk)
- 10 October, Loughborough University: *Excitation, propagation and control of nanoscale magnetic solitons*, contact Gennady El (g.el@lboro.ac.uk)
- 12 October, University of Cambridge: *Supersonic superfluids*, contact Natalia Berloff (N.G.Berloff@damtp.cam.ac.uk)

Further details can be obtained from Gennady El (G.El@lboro.ac.uk). The visit is supported by an LMS Scheme 2 grant.

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

7.00 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.

VISIT OF Y. HU

Professor Yaozhong Hu (Kansas University, USA) will be visiting the Department of Mathematical Sciences at Loughborough University from 7 to 20 October 2012. His main research area is stochastic analysis with research interests covering a wide range of research topics including stochastic partial differential equations, fractional Brownian motions, Lévy processes, rough path analysis, Malliavin calculus, statistics of stochastic differential equations, backward stochastic differential equations, self-intersection local times, numerical analysis of SDEs and applications in mathematical finance. During his visit Professor Hu will give the following seminars:

- 9 October, Loughborough University, *Feynman-Kac formula for stochastic partial differential equations driven by fractional Brownian fields*; contact Huaizhong Zhao (h.zhao@lboro.ac.uk)
- 10 October, University of Warwick, *Convergence in density of some nonlinear Gaussian functional*; contact David Elworthy (kde@maths.warwick.ac.uk)
- 16 October, Loughborough University, *Rough path analysis and multiple integrals*; contact Huaizhong Zhao (h.zhao@lboro.ac.uk)
- 17 October, University of Manchester, *Central limit theorem for an additive functional of the fractional Brownian motions*; contact Tusheng Zhang (Tusheng.Zhang@manchester.ac.uk)

For further details contact Huaizhong Zhao (h.zhao@lboro.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF S. ROBINS

Professor Sinai Robins (NTU, Singapore) will be visiting the UK from 6 to 16 October 2012. His main field of interest is harmonic analysis, discrete geometry, number theory and modular forms. During his visit he will give seminars at:

- Oxford, 9 October
- Cambridge, 11 October
- University College London, 15 October

For further information contact Professor Imre Bárány, UCL (barany@math.ucl.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF L. TUROWSKA

Professor Lyudmila Turowska (Chalmers University of Technology, Sweden) will be visiting the UK from 2 to 12 October 2012. Her research area is functional analysis, especially spectral synthesis and operator synthesis for compact groups. Recently she investigated the spectral theory of Beurling-Fourier algebras on compact groups, and C*-algebras of the Heisenberg group and threadlike Lie groups. Professor Turowska will give talks at

- Lancaster, Wednesday 3 October at 4 pm: *Sets of multiplicity and closable multipliers on group algebras*
- Newcastle, Thursday 4 October at 4 pm: *Sets of multiplicity and closable multipliers on group algebras*
- London Analysis Seminar in UCL, Thursday 11 October at 3 pm: *Schur multipliers and closability properties*

Further details can be obtained from Dr Zinaida Lykova (Z.A.Lykova@ncl.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF V. H. VU

Professor Van H. Vu (Yale University, New Haven, CT) will be visiting the UK from 21 to 28 October. His research interests include combinatorics, probabilistic methods, random structures, additive number theory, and random matrices. During his visit he will give lectures at:

- University College London, 22 October
- Oxford, 23 October
- Cambridge, 25 October

For further information contact Professor Imre Bárány, UCL, (barany@math.ucl.ac.uk). This visit is supported by an LMS Scheme 2 grant.

EMS PRIZES

The 2012 prizes of the European Mathematical Society (EMS) were announced at the 6ECM in Kraków.

EMS Prizes
The prize is awarded to mathematicians under 35 years of age of European nationality or working in Europe. The monetary value of each prize is €5,000 endowed by the Foundation Compositio Mathematica. The ten winners were:

- Simon Brendle (Stanford University)
- Emmanuel Breuillard (Université Paris-Sud)
- Alessio Figalli (University of Texas at Austin)
- Adrian Ioana (University of California, San Diego)
- Mathieu Lewin (University of Cergy-Pontoise)
- Ciprian Manolescu (UCLA)
- Grégory Miermont (Université Paris-Sud)
- Sophie Morel (Harvard University)
- Tom Sanders (University of Oxford)
- Corinna Ulcigrai (University of Bristol)

Felix Klein Prize
The prize was awarded to Emmanuel Trélat (Université Pierre et Marie Curie, Paris 6). The prize is awarded to a young scientist or a small group of young scientists (normally under the age of 38) for using sophisticated methods to give an outstanding solution, which meets with the complete satisfaction of industry, to a concrete and difficult industrial problem.

Otto Neugebauer Prize
The prize was awarded to Jan P. Hogendijk (Utrecht University). The prize is awarded for highly original and influential work in the field of history of mathematics that enhances the understanding of either the development of mathematics or a particular mathematical subject in any period and in any geographical region.

Full citations are at www.6ecm.pl.

CLAY MATHEMATICS INSTITUTE

CMI Workshops Call for Proposals

The Clay Mathematics Institute (CMI) is currently seeking proposals for funded workshops to be held in the Mathematical Institute in Oxford, UK. CMI intends to conduct a programme of workshops, generally ten to twenty persons, the aim of which is to bring a set of researchers together quickly, outside the usual grant and application cycle, when this is likely to result in significant progress. An application submitted three months before the workshop is sufficient. Funding for at least ten people is available for each workshop. Proposals should be sent to Nick Woodhouse (nwoodh@maths.ox.ac.uk), copied to Naomi Kraker (kraker@maths.ox.ac.uk).

CMI Research Fellows Call for Nominations

The Clay Mathematics Institute (CMI) invites nominations for 2013 Clay Research Fellowships. Fellows are selected for their research achievements and their potential to become leaders in research mathematics. All are recent PhD's, and most are selected as they complete their thesis work. Most recent appointees were finishing graduate students at the time of their selection, though other mathematicians under age thirty occasionally have been appointed. Terms range from one to five years, with most given in the upper range of this interval. The primary selection criteria for the Fellowship are the exceptional quality of the candidate's research and the candidate's promise to become a mathematical leader. Selection decisions are made by the Scientific Advisory Board. Nominations should be submitted by **30 October 2012** and should include letter of nomination, names and contact information for two other references, *curriculum vitae* and list of publications. Nominations should be sent to Nick Woodhouse (nwoodh@maths.ox.ac.uk), copied to Naomi Kraker (kraker@maths.ox.ac.uk).

LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2012

Celebrating 30 years

King Edward School, Birmingham
Wednesday 26 September

David Hilbert

Professor Sir 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

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.

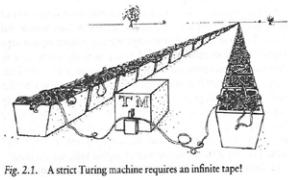


Fig. 2.1. A strict Turing machine requires an infinite tape!

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

TIME: Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm

TICKETS: Admission is free, with ticket. To register for tickets, please email Lee-Anne Parker (popular.lectures@lms.ac.uk) or visit the LMS website for a registration form (http://www.lms.ac.uk/content/popular-lectures). **Register by Friday 21 September.**

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

ART AND TOPOLOGY AT ICMS

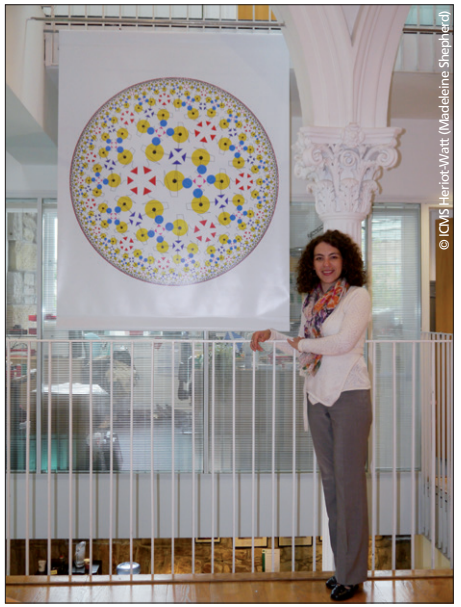
As part of *Applied and Computational Topology: ATMCS 5*, the International Centre for Mathematical Sciences (ICMS) played host to a 'pop-up' art exhibition for the first week of July. Prompted by the offer of exhibits from local organiser Mikael Vejdemo-Johansson (University of St Andrews) and delegate Radmila Sazdanovic (University of Pennsylvania), we invited contributions of artwork from the UK, USA and Republic of Ireland on the broad themes of topology and computation and were rewarded with a diverse selection of submissions.

Radmila's prints were, in fact, large vinyl banners and turned out to be ideally suited to the internal architecture of the ICMS building. The images are derived from the Poincaré disk model of the hyperbolic plane, manipulated in different ways to evoke quite different moods. Mikael Vejdemo-Johansson also featured the Poincaré disk in his laser-etched glass coasters – very striking on their black table cloth. The coasters were complemented by a set of small 3D-printed sculptures of the double torus Klein bottle

More hyperbolic planes were in evidence in the work of Julia Collins and Madeleine Shepherd, whose *Mathematician's Shirts* project was commissioned in summer 2011 by ASCUS Art Science Collaborative. Three of the resulting shirt sculptures use patchwork to demonstrate spherical, Euclidean and hyperbolic geometries.

Mathematician and knitter sarah-marie belcastro contributed knitted surfaces: *Spring Forest* (*5, 3*), a torus knot co-incidentally worked in the colours of the ICMS logo, and a set of *Nonorientable Surfaces of Low Genera*.

Local printmaker Sam Stead submitted three etchings, all expressions of the Voronoi diagram, which were much admired by ICMS staff as well as the public. Further work on paper came from graduate student, Radhika Gupta who sent a beautiful oil pastel drawing of the *Shrinking Wedge of Circles*.



Radmila Sazdanovic and her *Hyperbolic Twittering Machine* (2003). The piece is an homage to Paul Klee's *Twittering Machine* painting and predates the Twitter website.

Paul Terry's *Shoal Thing* was shown on our plasma screen and projected in a dimly-lit corner as the artist intended. It is an animation of the shoal model, mapping relationships between each member's small group of neighbours. Each member of the shoal also makes a sound whose pitch changes in response to the closeness of their neighbours.

The work was on display for the duration of the conference but only open to the public during the delegates' free afternoon. Feedback from those who attended was enthusiastic and there were several requests to extend the show. To this end we have retained the bulk of the exhibits and will create a similar display when our building takes part in Doors Open Day on 22 September 2012. More photographs from the original show are available via http://icmsnews.wordpress.com/2012/07/03/mathematical-art-at-icms.

Madeleine Shepherd
ICMS Communications Officer

MATHEMATICS POLICY ROUND-UP

August 2012

HIGHER EDUCATION

Higher education in STEM subjects
The House of Lords Science and Technology Committee has published its report entitled *Higher Education in Science, Technology, Engineering and Maths* (*STEM*) *subjects.* The report calls for immediate action to ensure that enough young people study STEM subjects at both undergraduate and postgraduate level. With respect to mathematics the report recommends that, 'mathematics should be compulsory for all students post-16 and calls on universities to toughen up their mathematics requirements for entry onto STEM courses, and to get involved in setting up the [school] mathematics curriculum'.

The full report is available at http://tinyurl.com/cn6vfph. The Council for the Mathematical Sciences – of which the LMS is a constituent body – submitted written evidence to inform this report. This written evidence is available on the CMS website at http://tinyurl.com/cqvnvac.

Reforms to higher education sector announced
David Willetts, the universities and science minister, has announced the government response to the Higher Education White Paper – *Students at the Heart of the System*. More than 200 responses were received for the consultation. The full report is available at http://tinyurl.com/c6opfuu.

David Willetts gave evidence to the Business, Innovation and Skills committee on 12 June 2012. A transcript of the evidence is available at http://tinyurl.com/crttvyg.

The government has written to Hefce and the Student Loans Company. The letter sets out the next steps in the government's higher education reform programme. The letter is available at http://tinyurl.com/d3ljk8t.

Call for evidence on Future of Higher Education in England
The Institute for Public Policy Research has put out a call for evidence for its Commission on the Future of Higher Education in England. 'This call for evidence is aimed at higher education managers, academics, organisations and individuals who wish to contribute their research, analysis and policy ideas to the commission and be part of the process to shape the future of higher education in England'. The consultation closes on **Friday 28 September 2012**. The full consultation document is available at http://tinyurl.com/cobw46o.

SCHOOLS AND COLLEGES

ACME Annual Conference
The Schools Minister Nick Gibb spoke at the recent ACME annual conference. A transcript is available at http://tinyurl.com/cy5bzld.

Examinations for 15-19 year olds in England
The Education Select Committee has published its First Report on *The administration of examinations for 15–19 year olds in England*. 'After a long inquiry the Committee concludes that competition between exam boards creates significant pressure to drive down standards in exams and that the time is right for fundamental reform. However, the Committee rejects moves to a single national exam board or to single boards for each subject.' The full report is available at http://tinyurl.com/clk6qj9.

Ofqual launches A-level consultation
Following its recent international and national research into A-levels, Ofqual has launched a consultation on the structure and assessment arrangements of the qualification. The consultation also outlines plans for universities to determine the content of A-levels.

Ofqual would like views on the full range of proposed changes to the qualification, including:

- ensuring involvement of higher education in the design and sign-off of A-levels;
- abolition of January exams and limiting resits; and
- whether or not AS should continue, with a range of options put forward.

Following the consultation, any changes will take place from September 2013 to 2018. The consultation document is available at http://tinyurl.com/bpxvfxv. The consultation runs until 11 September.

A-level reform: The view from the inside
The AQA Centre for Education Research and Policy has compiled a series of evidence summaries on issues relevant to the current discussions on A-level reform. The full paper is available at http://tinyurl.com/cfyu34g.

Primary National Curriculum Review
Draft Primary National Curriculum Programmes of Study for English, mathematics and science have been published. The draft Programme of Study for mathematics is available at http://tinyurl.com/dya23so. The draft for mathematics includes the following.

- Students will be expected to be able to add, subtract, multiply and divide fractions in primary school so they can progress to more advanced topics like algebra when they go to secondary school. These four operations are not in the current primary curriculum. The proposed change is consistent with expectations in the high-performing education jurisdictions of Singapore and Hong Kong.
- By age nine, students should know their times tables up to 12x12. This is in line with expectations in the high-performing jurisdiction of Massachusetts. Currently students only need to know up to 10x10 by the end of primary school.
- By age seven, students should know 'number bonds' up to 20. These are simple addition and subtraction facts that students should be able to recognise and use instantly (eg 9+9=18 or 16–7=9).

ACME writes to Secretary of State for Education
ACME has written to Michael Gove, the Secretary of State for Education, to raise concerns about the development process of the National Curriculum Review. ACME recommended to the Secretary of State that a more open and transparent approach should be taken in the next steps of the review. The letter is available at http://tinyurl.com/c2c6ddn.

Science Community Representing Education (SCORE) has also written to the Secretary of State for Education to express concern about the pace and transparency of the Review of the National Curriculum. The letter is available at http://tinyurl.com/c45ebbo.

CBI survey on education and skills
The latest CBI/Pearson Education & Skills survey – *Learning to grow: what employers need from education and skills* – has been published. In one section of the report employers were asked which areas of education they think primary schools should focus on. 61% said numeracy, 58% writing, 45% reading and 42% said communication skills. For secondary schools, employers say the main focus should be on developing broader skills for working life:

- Employability skills – 71%
- Literacy – 50%
- Numeracy – 45%

However, the survey finds that no one current qualification addresses the combination of literacy, numeracy and employability requirements effectively. While employers think that for numeracy, GCSE mathematics is the best qualification, they say that vocational qualifications best equip young people with broader employability skills. The full report is available at http://tinyurl.com/c7dl6h5.

OPEN ACCESS PUBLISHING

Finch Report on Open Access Publishing
Professor Dame Janet Finch was asked by the government to consult academics and publishers on how the UK could make the scientific research funded by taxpayers available free of charge while maintaining high standards of peer review, and without undermining the UK's successful publishing industry. The report was published in June and is available at http://tinyurl.com/ccw79gp.

Government response to Finch Report
'The government will widely accept the recommendations in a report on open access by Dame Janet Finch, a move which is likely to see a major increase in the number of taxpayer funded research papers freely available to the public'. The full response is available at http://tinyurl.com/bwjtp2r.

RCUK announces new Open Access policy
Research Councils UK (RCUK) has published its new Open Access policy, informed by the work of the National Working Group on Expanding Access to Published Research Findings, chaired by Professor Dame Janet Finch. The new policy is available at http://tinyurl.com/d4xosk8.

HEFCE statement on Open Access
HEFCE has announced plans to make publicly-funded research more freely available. The Council intends to consult the higher education sector on how to implement a requirement that research outputs submitted to any future Research Excellence Framework (REF) should be as widely accessible as possible at the time. This does not affect the current REF due to complete in 2014. The full statement is available here http://tinyurl.com/cvbzpr5.

OTHER

New chief scientific adviser
Sir Mark Walport, Director of the Wellcome Trust, has been appointed as the UK's next chief scientific adviser. Sir Mark will take over from Sir John Beddington in April 2013.

New Vice-Chancellor for the University of London
Professor Sir Adrian Smith FRS, currently Director General, Knowledge and Innovation, at the Department of Business, Innovation and Skills (and a past-President of the Royal Statistical Society), is to be the new Vice-Chancellor of the University of London. He will take up his post on 1 September 2012. More information is available at http://tinyurl.com/d72jy7w.

Bringing more diversity to the scientific workforce
The Royal Society has announced a new BIS-funded programme focused on increasing diversity in the scientific workforce. The programme will run over four years with total funding of £700,000 and in joining a parallel programme being run by the Royal Academy of Engineering, now provides an integrated diversity programme for the science technology, engineering and mathematics (STEM) workforce. More information is available at http://royalsociety.org/news/more-diverse-scientific-workforce.

House of Lords reforms and expertise
With reform of the House of Lords recently on the political agenda the Campaign for Science and Engineering (CaSE) produced a report that 'considers what the potential implications of reform are on the current level of science and engineering expertise in the House of Lords and how this expertise can be easily accessed and deployed'. The report is available at http://tinyurl.com/d73ya87.

Dr John Johnston
Mathematics Promotion Unit

MATHEMATICAL TECHNIQUES FOR QUANTUM PHYSICS

A postgraduate student conference on *Mathematical Techniques for Quantum Physics* will take place in Nottingham from 7 to 9 November 2012. The conference will emphasise quantum information, quantum gravity and quantum disordered systems. Respectively, the invited speakers from each area are:

- Nilanjana Datta (Cambridge)
- Samuel Braunstein (York)
- Karoline Wiesner (Bristol)

Students are encouraged to participate and contribute talks. For more information visit quantumsquare.weebly.com or email pmxsr3@nottingham.ac.uk or pmxdg1@nottingham.ac.uk. The meeting is supported by an LMS Postgraduate Research Conference Scheme 8 grant.

HE CURRICULUM INNOVATION PROJECT

Final Update

For two years I have been working in 'HE curriculum innovation' for the Maths, Stats and OR Network as part of the Mathematical Sciences Strand of the National HE STEM Programme (funded by HEFCE and HEFCW). This inherited the HE STEM curriculum aim to generate: "Higher Education curriculum developments focusing upon course delivery and design, to enhance student knowledge, progression and skills".

As part of this work, we distributed over £250k of funding to 33 projects involving work from over 120 people at 41 UK higher education institutions. These projects have lots to share – good practice advice, evaluated innovative approaches, problem banks and other curriculum resources you can pick up and use right away, and much more. In addition, we ran or took part in nearly fifty workshops and other events.

It is not possible to describe all of our activity in any detail in this short piece so please investigate the resources, including a full project index, under www.mathstore.ac.uk/hestem.

In order to establish community priorities for curriculum development, we ran the HE Mathematics Curriculum Summit in January 2011, bringing together heads of department, professional bodies and others for debates and discussions on this theme (*LMS Newsletter*, 401, p. 9). Around 70% of the funding we allocated was directed to the priorities identified by the Summit so I am confident that this work addresses genuine need.

In order to allow for interesting innovation which could not be predicted, calls for funding always included an open call for projects fitting the National HE STEM Programme aims. Around 30% of the funding we allocated was for new innovations discovered this way.

As this work draws to a close, my thoughts are very much focused on sharing what our projects have produced in a way that is useful. To help you discover these outputs we have published a series of booklets on different themes.

Developing graduate skills: A booklet was published collecting case studies of successful methods to improve graduate skills development within a mathematical context. Three mini-projects were commissioned based on these case studies and these demonstrated that at least some of this practice was suitable for transfer elsewhere. In addition, mathematics-specific resources and teaching practice was developed and shared on speaking and writing skills. A second booklet containing the three additional case studies and mathematics-specific skills resources is available.

Employer engagement: Projects worked with employers, employees or professional bodies, either in delivery of a curriculum approach or providing input to develop good practice advice or curriculum resources you can use. Major projects saw the development of undergraduate problems based on real world industrial problems, resources giving an idea of what it is like to work as a mathematician and a survey of graduates' views of the mathematics HE curriculum. Booklets on 'Employer Engagement', 'Graduates' Views' and 'Being a Professional Mathematician' are available.

Assessment: A major project conducted research to answer questions about what alternative methods of assessment can offer, evidence of validity and guidance on the process of changing your teaching to adopt a new assessment type. This project published a good practice book containing a literature survey and set of case studies.

Problem solving: Two projects worked to share good practice and develop curriculum resources on the teaching and assessment of problem solving. We say mathematics develops problem solving but do we actually know how to develop problem solving as a skill in our students? These projects produced banks of problems and published a good practice book.

Maths Arcade: An innovative practice involving developing mathematical thinking, providing student support (particularly at the transition) and building a staff and student mathematical community. A case study booklet gives details of its implementation at eight universities.

Student-centred approaches: Projects working to accommodate student needs or taking a student-centred view on improving the undergraduate experience, including methods for supporting students in different contexts, helping engineers better understand their mathematics and providing adjustments for students with disabilities. Booklets on 'Student-centred Approaches' and 'Inclusive Curricula' are available.

Media Enhanced Teaching and Learning: Projects considered use of audio and video recordings in teaching, learning and assessment. A good practice guide is available.

History of Mathematics in the Higher Education Curriculum: A booklet is available giving case studies of use of history of mathematics in various contexts.

This was a substantial set of projects in curriculum development which have produced outputs with the potential to be very useful. Please use them!

Peter Rowlett
Maths, Stats and OR Network

CECIL KING TRAVEL SCHOLARSHIP

Cecil Harmsworth King was of northern Irish stock. His middle name betrays the family press connection. King landed up buying the *Daily Mirror* and expanding circulation to more than 5 millions copies each day. He married Ruth Railton, who started the National Youth Orchestra: hence much of his Foundation is concerned with young musicians. But King also had a bee in his bonnet about young mathematicians. Exactly why is unclear. He may have seen this as encouraging prodigious calculators. But in putting flesh on the bones of his idea, Ruth Railton naturally consulted the early NYO Leader, Colin Gough (professor of physics in Birmingham). Colin translated the idea of 'calculating prodigies' into 'olympiads' and so involved me. I managed to further divert this revised focus onto what I saw as a gap at postgraduate level – to encourage someone making significant progress as a postgraduate to consider spending three months or so visiting a different institution/researcher, and so to broaden their horizons.

Members may be interested in looking up past recipients:

2001 Kevin Costello
www.math.northwestern.edu/~costello/
2002 Toby Gee
www2.imperial.ac.uk/~tsg/
2003 Caucher Birkar
www.dpmms.cam.ac.uk/~cb496/
2004 Anna Mills
www.maths.manchester.ac.uk/~amills/
2005 Alexander Paulin www.maths.nottingham.ac.uk/personal/pmzap
2006 Malcolm Bovey http://uk.linkedin.com/pub/malcolm-bovey/27/a4/5aa
2007 Michael Wemyss
http://www.maths.ed.ac.uk/~mwemyss/
2008 Matthew Morrow
http://math.uchicago.edu/~mmorrow/
2009 Gwyn Bellamy http://personalpages.manchester.ac.uk/staff/gwyn.bellamy/index.htm
2010 Erik Pickett
http://alg-geo.epfl.ch/~pickett
2011 Jessica Banks
http://users.ox.ac.uk/~lady2191/

Tony Gardiner
LMS Education Secretary

Comment from a past recipient

"The Cecil King Travel Scholarship is a fantastic opportunity to gain independence, establish contacts, and to start collaborations. Interacting with a whole new group of mathematicians extended my knowledge of other areas of mathematics, and crucially it helped put my research ideas into a much broader framework. The collaborations that began during my Cecil King Scholarship have developed into a series of works, and it is hard to imagine how this could have started without the Cecil King. I have benefitted enormously from this scholarship, and would very much encourage others to apply."

Michael Wemyss
Cecil King Travel Scholarship, 2007

MATHEMATICAL CULTURES

The UK Arts and Humanities Research Council has agreed to fund a research network on mathematical cultures. Here, I describe this project and what we hope to learn from it.

Why study mathematical cultures? Why now?
Mathematics has universal standards of validity. Nevertheless, there are local styles in mathematics. These may be the legacy of a dominant individual (e.g. the Newtonianism of 18th century British mathematics). Or, there may be social or economic reasons (such as the practical bent of early modern Dutch mathematics).

These local mathematical cultures are scientifically important because they can affect the direction of mathematical research. They also matter because of the cultural importance of mathematics. Mathematics enjoys enormous intellectual prestige, and has seen a growth of popular publishing, films about mathematicians, at least one novel and plays. However, this same intellectual prestige encourages a disengagement from mathematics. Ignorance of even rudimentary mathematics remains socially acceptable. Policy initiatives to encourage the study of mathematics usually emphasise the economic utility of mathematics (for example the 2006 *STEM Programme Report*). Appeals of this sort rarely succeed with students unless there is a specific promise of employment or higher remuneration

What these political anxieties call for is a re-presentation of mathematics as a human activity, which means, among other things, that it is part of culture. The tools and knowledge necessary for this have been developing in recent years. Historians of mathematics have begun to consider mathematics in its social, political and cultural contexts. There is now an established sociology of science and technology, published in journals such as *Science as Culture* and the *Journal of Humanistic Mathematics*. Mathematics educationalists have begun to draw on some of these developments (particularly historical research).

In the philosophy of mathematics, there is now a sub-field devoted to the philosophy of mathematical practice. So far, this has mostly emerged in continental Europe, and to a lesser extent in North America. The Brussels-based Perspectives on Mathematical Practice initiative met in 2002 and 2007 and published proceedings. The PhiMSAMP network (2005-2010) was a collaboration of researchers in several countries. The annual Novembertagung on the history and philosophy of mathematics serves beginning researchers in philosophy and history of mathematics. In France, there is a thriving Parisian history and philosophy of mathematics scene, and a mathematics thread in the studies of scientific practice at the Laboratoire d'Histoire des Sciences et de Philosophie (Nancy). So far, philosophy of mathematical practice has not focussed on mathematics as culture. This has prevented it from elaborating one possible answer to the student's question, 'why should I study mathematics?', namely, 'Because it is beautiful, glorious and deep'. Grounding this answer requires an exploration of the value of mathematics and the values of mathematicians, and communicating this answer requires an understanding of mathematics as part of our larger contemporary culture.

What exactly will this project do?
This project will host three conferences. The **first** (10-12 September 2012, at De Morgan House, London) will explore and begin to map the variety of and connections among contemporary mathematical cultures. These can be research cultures, but also include mathematical cultures among instructors and students. The programme for the first conference is on the project website.

The **second** (17-19 September 2013) conference will articulate and classify mathematical values. When mathematicians award or withhold prizes, scholarships,

PhDs and grants, correctness is almost never the decisive criterion. Rather, the question is whether the work is worthwhile, interesting, elegant, promising, insightful, etc.. If these judgments are not arbitrary, they should refer to some standards or values. Are these standards or values common across all mathematical cultures? How are they taught? How do they evolve? What do mathematicians mean when they use terms such as 'deep', 'elegant', 'explanatory', etc.? What is the rational structure of the deliberations mathematicians use to reach value judgments (in PhD examinations, book reviews, journal referee reports, **etc**.)? This conference will build on the first conference by referring these questions to the various mathematical cultures identified at that first event.

The **third** conference (Easter 2014) will discuss mathematics in public culture and mathematics as part of cultural wealth. Amongst other topics, it will explore the question "why should I study mathematics?" This third meeting will build on the first conference by identifying the contributions from and audiences in the various mathematical cultures. It will build on the second conference by drawing on the articulations and explorations of mathematical values.

What will this achieve?

The main aim is to connect researchers on mathematical cultures who may not have encountered each other before. The various disciplines (history, sociology, philosophy, cognitive science) have their distinct circuits and there are national and linguistic barriers too.

We also want to encourage some thinking about the methodological challenges facing the study of mathematics as culture. Much of the philosophical interest in this area is in the question of how mathematics can be simultaneously culture and knowledge.

So far, we have established a programme for the first conference (10-12 September 2012). Thanks to the AHRC, it will be very cheap to attend. So if you are near London in September, do come along.

Brendan Larvor
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Reference

A. Adonis, B. Rammell and D. Sainsbury, *The Science, Technology, Engineering, and Mathematics Programme Report*, 2006, available from the Department for Education and Skills Mathematical Cultures website: https://sites.google.com/site/mathematicalcultures/home.

SELMER GROUPS, DESCENT AND THE DISTRIBUTION OF RANKS

A workshop on the subject of *Selmer Groups, Descent and the Distribution of Ranks* will take place at the University of Warwick from 24 to 28 September 2012. This is the opening workshop of the 2012–2013 EPSRC *Warwick Number Theory Symposium*, and is organised by John Cremona (Warwick), Tim Dokchitser (Bristol), Tom Fisher (Cambridge) and Samir Siksek (Warwick). Invited speakers include:

- Manjul Bhargava (Princeton)
- Bryan Birch (Oxford)
- Nils Bruin (Simon Fraser)
- Brian Conrey (American Institute of Mathematics)
- Vladimir Dokchitser (Cambridge)
- Victor Flynn (Oxford)
- Wojciech Gajda (Poznan)
- Wei Ho (Columbia)
- Karl Rubin (UC Irvine)
- Alice Silverberg (UC Irvine)
- Peter Swinnerton-Dyer (Cambridge)
- Michael Stoll (Bayreuth)
- Damiano Testa (Warwick)
- Mark Watkins (Sydney)
- Christian Wuthrich (Nottingham)

For further information, including how to register, visit the website http://tinyurl.com/crlua85. This meeting is supported by EPSRC and the Warwick Mathematics Research Centre.

RECORDS OF PROCEEDINGS AT LMS MEETINGS

ORDINARY MEETING

held on *6 June 2012* at University of Northumbria, Newcastle as part of the Northern Regional Meeting. Over 50 members and visitors were present for all or part of the meeting.

The meeting began at 1.45 pm with the Programme Secretary, Professor Rob Wilson, in the Chair.

Fifteen people were elected to Ordinary Membership: Andrew Archer, Catarina Carvalho, Jerome Gauntlett, Simon Guest, Paul Mansfield, Daniel Mayenberger, Nikolay Nikolov, Maura Paterson, Natalia Petrovskaya, Domingos Romualso, Gregory Sorkin, Alexander Stasinski, Amanda Winn, Djoko Wirosoetisno and Richard Woolfson; Four were elected to Associate Membership: Nudrat Aamir, Konrad Dabrowski, Martin Dickson and Nikesh Solanke; and two were elected to Reciprocity Membership: Georgios Kouroussias and Martin Lorenz.

One member signed the book and was admitted to the Society.

Professor Maia Angelova introduced a lecture given by Professor Michael Mackey on *A mathematical modeling study of neutrophil dynamics in response to chemotherapy and G-CSF*.

Professor Angelova then introduced a second lecture given by Professor Anthony Shannon on *Empirical approaches to the application of mathematical techniques in health technologies*.

After tea, Professor Angelova introduced a lecture given by Professor Eytan Domany on *Complex dynamics of cellular transcriptional response: how do cells get on the fast lane?*

The Programme Secretary, Professor Wilson, expressed the thanks of the Society to the local organisers for putting on such an interesting meeting.

Afterwards, a dinner was held at The Assembly Rooms.

PANDA

The next meeting in the LMS-supported PANDA (Patterns, Nonlinear Dynamics and Applications) series will be held on Friday 21 September 2012 at the University of Bath.

Pedagogical review talks of general interest to students and researchers in applied mathematics will be given by Christian Kuehn (TU Vienna) and Paul Milewski (Bath), on slow-fast dynamical systems and nonlinear waves, respectively. There will also be a number of shorter contributions across a range of topics in applied dynamical systems.

A limited amount of funding is available for the reimbursement of childcare and travel expenses. Further details can be found at http://people.bath.ac.uk/jhpd20/panda/. Please contact Jonathan Dawes if you have questions.

The PANDA network is organised by Rebecca Hoyle (Surrey), Jonathan Dawes (Bath), Paul Matthews (Nottingham) and Alastair Rucklidge (Leeds), and is supported by an LMS Scheme 3 grant.

RECORDS OF PROCEEDINGS AT LMS MEETINGS

GENERAL MEETING

held on *29 June 2012* at UCL, London included the Hardy Lecture. Over 50 members and visitors were present for all or part of the meeting.

The meeting began at 3.30 pm with the President, Dr Graeme Segal, FRS, in the Chair.

Three people were elected to Ordinary Membership: Rolf Gohm, Dirk Schuetz and Jan Van lent; three were elected to Associate Membership: Katie Gittins, Barry Nichols and Raffaele Rainone; and one was elected to Reciprocity Membership: Ian Walker.

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

On a recommendation from Council it was agreed to elect Dr D. Collins and Professor P.T. Saunders as Scrutineers in the forthcoming Council elections.

The President, on Council's behalf, proposed that Professor Claire Voisin of University of Paris VI: Pierre et Marie Curie and Dr James Simons of Renaissance Technologies be elected to Honorary Membership of the Society.

The President then announced the awards of the prizes for 2012:

Pólya Prize	Professor Dan Segal (University of Oxford)
Fröhlich Prize	Professor Trevor Wooley, FRS (University of Bristol)
Senior Berwick Prize	Professor Ian Agol (University of California at Berkeley)
Whitehead Prizes	Dr Toby Gee (Imperial College London)
	Dr Eugen Vărvărucă (University of Reading)
	Dr Sarah Waters (University of Oxford)
	Dr Andreas Winter (University of Bristol)

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

The President introduced a lecture given by Professor Vincent Borrelli on *Flat tori in three-dimensional space*.

Following a break for tea, the President introduced a lecture by Professor Étienne Ghys, the 2012 Hardy Fellow, *On cutting cloth, according to Chebyshev*.

At the end of the meeting, the President thanked both speakers for their brilliant lectures.

After the meeting, a reception was held at De Morgan House, followed by a dinner at the English Garden Restaurant in the Grange Whitehall Hotel.

ARITHMETIC GEOMETRY AND HOMOTOPY THEORY

Report

A two-day workshop on *Arithmetic Geometry and Homotopy Theory* was held at Imperial College London from 31 May to 1 July 2012, the first meeting on this topic in UK. It aimed to bring together those who study algebraic varieties over arithmetically interesting fields using the methods of homotopy theory. The workshop, supported by the LMS (through a conference grant) and EPSRC (through a platform grant), had around 30 participants, including a dozen graduate students.

The meeting commenced with a lecture by Tomer Schlank, providing an excellent introduction for the newcomer to the etale homotopy theory of Artin and Mazur. Tomer explained the basic idea behind the construction, and also gave an overview of how etale homotopy theory has been used in arithmetic geometry recently. The second lecture was given by Behrand Noohi, who explained the concept of model structures, the modern framework for abstract homotopy theory, and illustrated it with many examples. In the next lecture Rick Jardine talked about the application of homotopy theory to study Galois descent. On the last lecture of the first day Ilan Barnea used model categories to construct a vast generalization of the Artin-Mazur construction, which has been already applied successfully to arithmetic problems. The day concluded with a dinner for the speakers.

The second day started with a lecture by Jon Pridham, who spoke about finding Hodge structures on the etale homotopy type of algebraic varieties. In the next lecture Kirsten Wickelgren described her results on the section conjecture over the reals. The section conjecture is one of the main motivations to introduce homotopical methods to this subject. The morning section was concluded by Yonatan Harpaz, who talked about the arithmetic applications of the generalized homotopy theories introduced the day before by Barnea. After lunch I gave a talk on the analogue of the section conjecture for finite group actions. The meeting concluded with a talk by Gereon Quick who talked about how to consider the existence of rational points as a homotopy limit problem.

Further information on the mini-conference can be accessed from the home page: http://www2.imperial.ac.uk/~anskor/homotopy/workshop.html.

Pál Ambrus
Imperial College London

Behrand Noohi

Kirsten Wickelgren

Yonatan Harpaz

RECORDS OF PROCEEDINGS AT LMS MEETINGS

ORDINARY MEETING

held on *3 July 2012* at the Jagiellonian University, Kraków during the 6ECM. Over 120 members and visitors were present for all or part of the meeting.

The meeting began at 6.00 pm with the President, Dr Graeme Segal, FRS, in the Chair.

The Programme Secretary, Professor Rob Wilson, presented a report on the Society's activities.

No members were elected to membership

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

The President introduced a lecture given by Professor José Francisco Rodrigues on *Mathematics of Planet Earth 2013: A Challenge and an Opportunity for Mathematicians*.

At the end of the meeting, the President thanked the speaker for his interesting lecture.

After the meeting, a Society reception was held in the Auditorium Maximum.

LMS MEETING AT 6ECM

Report

An Ordinary meeting was held on Tuesday 3 July 2012 at the Auditorium Maximum of the Jagiellonian University, Kraków, during the 6th European Congress of Mathematicians. At least 120 members and guests were present.

The meeting began at 6.00 pm, with Dr Graeme Segal, FRS, the LMS President, in the Chair. Professor Segal welcomed members and guests, including Professor Marta Sanz-Solé, President of the European Mathematical Society. The meeting provided an opportunity for overseas members to meet other members of the Society.

Professor Rob Wilson, Programme Secretary for the London Mathematical Society, gave an overview of the work of the LMS, including its support for both research and education and outreach, the prizes it awards each year, the publications of the London Mathematical Society and the role of the publications in supporting the other work of the Society, and the work being done in terms of policy discussions at both national level (for instance, in response to the recent White Paper on Higher Education) and international level (including the recent International Review of Mathematics) and public affairs.

Five members signed the membership book. The meeting was followed by a lecture entitled *Mathematics of Planet Earth 2013: A Challenge and an Opportunity for Mathematicians* by Professor José Francisco Rodriques from the University of Lisbon. He introduced the meeting to Mathematics of Planet Earth 2013 (MPE2013), a broad international initiative aimed at dedicating 2013 as a special year of mathematics related to modelling the various aspects of the natural and man-made planet.

Professor Rodrigues began his lecture by using the work of Eratosthenes on the size of the Earth, Nunes on loxodromes and their relationship to Mercator's cartography, d'Alembert on waves, Sobolev on seismology and Fourier on heat as illustrative examples of the mathematics that has in the past arisen from attempts to model natural phenomena. He closed with a brief discussion of the purpose and goals of the MPE2013 initiative, using the specific example of the issues involved in modelling avalanches and the related 'toy problem' of the mathematics of sand piles. More information about the initiative can be found at http://mpe2013.org.

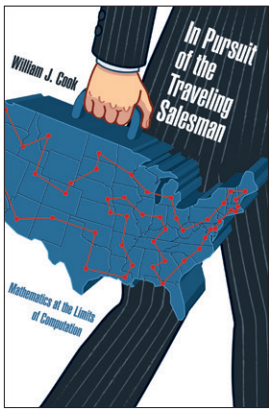
The meeting and lecture were followed by a reception. Photographs can be found on the back cover of this *Newsletter*.

Jim Anderson
Southampton University

REVIEWS

In Pursuit of the Traveling Salesman: Mathematics at the Limits of Computation by William J. Cook, Princeton University Press, 2012, 272 pp, £19.95, $27.95 ISBN 978-0-6911-5270-7.

The Travelling Salesman Problem (TSP) – finding a lowest weight Hamilton circuit in an edge-weighted complete graph, is the poster child of an NP-complete problem - eminently relevant in practice, easy to explain to your neighbor, and incredibly hard in practice. Its tentacles are all over mathematics - from the theoretical question of P versus NP over algorithms and heuristics to computer code and heroic feats of large examples.



Much of this is discussed in this book, written by William Cook (not to be mistaken with Stephen Cook of NP fame), a researcher in combinatorial optimization and co-author of one of the standard TSP software solvers.

As the reader will likely surmise from the title (and pricing), this book is primarily aimed at the popular science market. They will find plenty of background material and diversions to questions of intelligence and art, while not having to face more advanced mathematics than a basic linear inequalities that are used to explain linear programming. In that, the book will be accessible to the interested layperson. It would make for an excellent gift for the A-level student who needs a nudge to realize that mathematics is a far sexier discipline than software engineering.

But for the self-proclaimed professional (such as this reviewer) this book is well worth the read. There is much to learn about the historical background of topics that are not found in the typical discrete mathematics textbook (such as the commercial failure of Hamilton's dodecahedron game or the practices of 19th century travellers), about the history of solving TSP concretely on the computer, and about the methods used in solving. (While the book touches on P versus NP, it is more interested in solving problems than establishing that they are hard.)

The book's meaty core is in Chapters 5 to 7 which describe the linear programming approach towards solving TSP. Besides the reduction to a widely studied and in general well behaving problem, this also provides a lower bound that can be used to establish optimality of a solution without the need to enumerate all possibilities. The initial price to pay is that initially a solution of a linear program, being rational and not 0-1, does not necessarily yield a Hamilton circuit. Cook describes nicely how to introduce further inequalities to eliminate such forbidden artifacts and how to use geometric constraints of the problem (such as clusters of towns away from the rest) for further improvements.

The book is generously illustrated, not only with diagrams describing the strategies, but also with many photographs (alas often quite small) of the protagonists and of applications. It will be a rich resource for anyone teaching a course on optimization or algorithms.

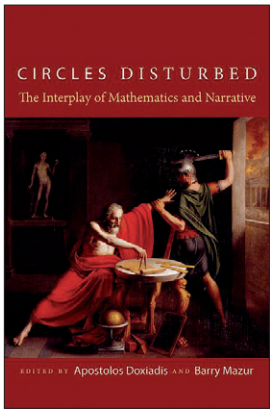
The book's author maintains an attractive companion web page which among others offers an iPhone application that implements his "Concorde" TSP solver with a nice graphical interface that lets the reader investigate the methods described in further examples.

Alexander Hulpke
Colorado State University

Circles Disturbed: The Interplay of Mathematics and Narrative edited by Apostolos Doxiadis & Barry Mazur, 2012, 552 pp, £34.95, ISBN: 978-0-69-114904-2.

'Essays on the interplay of mathematics and narrative.' What could this mean? Is it a blow against the timeless, Platonic view of mathematics? or about finding mathematical structure in literary plots, as in Proust? or stories containing mathematical objects, such as those of Borges? or just finding analogies between the two disciplines? (One of the editors, Barry Mazur, said, in an interview in *Nature*, that the common thread in mathematics and literature is urgency.)

Actually, it is all of the above. As a result, it is a long book, with much food for thought, but in places heavy going. I found the essays about mathematics the most satisfying, but I am not at home in the discourse of literary criticism, and people on the other side (including at least one contributor) find the mathematics hard.



The driving force behind the project was Apostolos Doxiadis, and his long essay was (for me) the best. Where does mathematical proof come from? Doxiadis traces its roots in the narrative poetry of the Homeric epics; the most important station on the streetcar line leading from epic narration to mathematical proof is rhetoric, in particular forensic rhetoric (the style of argument used in law courts). The forensic rhetorician has to show that a certain course of events probably happened, maybe because the alternatives are ruled out by the evidence; this recalls the mathematician's proof by contradiction. There are several specifics in which mathematics resembles narration or rhetoric: notably, technical features known as *chiasmus* and *ring-composition* are ubiquitous at all levels in epic verse, rhetoric and Euclid's proofs. (Readers who enjoyed the partisan account of the struggle between rhetoric and dialectic in Robert M. Pirsig's *Zen and the Art of Motorcycle Maintenance* will welcome this analysis.)

Among the best articles are those that tell the story behind the production of some piece of mathematics. The primary title of the book refers to the fatal encounter between Archimedes and the Roman soldier to whom he said, 'Do not disturb my circles!'

Colin McLarty tackles Gordan's (possibly mythical) remark on reading Hilbert's proof of the finite basis theorem: 'This is not mathematics, it is theology!'. This remark could be interpreted in many different ways, not all of them meaning a rejection of Hilbert's proof by Gordan. (In fact, Gordan refereed Hilbert's paper, and, while recognising the importance of the result, was critical of imprecision in the proof, saying memorably that 'It is not enough that the author make the matter clear to himself. One demands that he build a proof following secure rules.'

Another remarkable story is told by Michael Harris, concerning Robert Thomason's paper on which his dead friend Tom Trobaugh is a co-author. Trobaugh's ghost appeared to Thomason in a dream and gave him an instruction which Thomason, on waking, knew could not work; yet it led to the key result of the paper. Harris bases a discussion of artificial intelligence in mathematical proofs on this incident. An android mathematician could not cooperate with us unless it could understand the message from Trobaugh's simulacrum in Thomason's dream.

From the other side, Jan Christoph Meister speculates on a story-telling algorithm which could pass the Turing test: 'Tell me a story, and I will tell you whether you are human or a machine.' Sometimes I wonder whether some blockbusters are already produced by such an algorithm…

Peter Cameron
Queen Mary, University of London

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.

SEPTEMBER 2012

1-3 International Pure Mathematical Conference 2012, Islamabad, Pakistan (412)
3 LMS Midlands Regional Meeting, Aberystwyth (416)
3 Function Theory Meeting, De Morgan House, London (416)
3-7 Quantum Probabilistic Symmetries Workshop, Aberystwyth (416)
3-7 Topological Aspects of DNA Function and Protein Folding INI Workshop, Cambridge (412)
3-7 Geometry, Mechanics and Control Ibero-american Meeting, Salamanca, Spain
3-7 String Theory and Arithmetic Geometry Heilbronn Workshop, Bristol (415)
4-9 British Science Festival, Aberdeen (416)
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
10-12 Numerical Linear Algebra and Optimisation 3rd IMA Conference, Birmingham (416)
10-12 Mathematical Cultures Conference, De Morgan House, London (417)
10-13 Nonlinear PDE Conference, Oxford (416)
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)
17-19 Mathematics of Medical Devices and Surgical Procedures IMA Conference, University College London (416)
19-22 Topological Solitons Conference, Cambridge (412)
20-21 Heilbronn Annual Conference, Bristol (415)
21 PANDA, Bath (417)
22 De Morgan House Open Day, London (416)
24-28 Categorical Methods in Representation Theory Conference/Workshop, Bristol (415)
24-28 Selmer Groups, Descent and the Distribution of Ranks Workshop, Warwick (417)
25 *Ghosts of Departed Quantities: Calculus and Its Limits,* Gresham College London
26 LMS Popular Lectures, Birmingham (417)

OCTOBER 2012

1 LMS South-West and South Wales Regional Meeting, Bristol (417)
1-3 *L*-Functions of Curves Workshop, Bristol (417)
3-6 International Conference on Applied and Computational Mathematics, Ankara, Turkey
15-19 Tangled Magnetic Fields in Astro- and Plasma Physics INI Satellite Meeting, ICMS Edinburgh (415)
22-25 Weather and Climate Prediction on Next Generation Supercomputers INI Satellite Meeting, Met Office, Exeter (413)

NOVEMBER 2012

6 *The Mathematical Objection,* BCS-FACS Evening Seminar, London
6 *Polynomials and their Roots,* Gresham College London
7-9 Mathematical Techniques for Quantum Physics Postgraduate Student Conference, Nottingham (417)
16 LMS AGM, London (417)
24 Early Career Mathematicians' Autumn Conference, University of Greenwich (416)
26-30 Algebraic Geometry, Modular Forms and Applications to Physics ICMS Workshop, Edinburgh (415)

London Mathematical Society at the *6th European Congress of Mathematics* 2–7 July 2012

EMS President Marta Sanz-Solé and LMS President Graeme Segal

Members and guests at the LMS reception

Members and guests at the LMS reception

LMS stand