LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 437 June 2014

Society Meetings and Events

2014

Monday 16 June
Midlands Regional Meeting, Loughborough
page 11

Friday 4 July
Graduate Student Meeting, London
page 8

Friday 4 July
Society Meeting
Hardy Lecture
London
page 9

Wednesday 9 July
LMS Popular Lectures
London
page 17

Tuesday 19 August
LMS Meeting and Reception
ICM 2014, Seoul
page 11

Saturday 6 September
Mathematics and the First World War Meeting, London

Wednesday 24 September
LMS Popular Lectures
Birmingham
page 17

Friday 14 November
LMS AGM
London
page 3

NEWSLETTER ONLINE:
newsletter.lms.ac.uk

SHEPHARD PRIZE: NEW PRIZE FOR MATHEMATICS

Following a very generous donation made by Professor Geoffrey Shephard, the London Mathematical Society will, in 2015, introduce a new prize. The prize, to be known as the Shephard Prize will be awarded biennially. The award will be made to a mathematician (or mathematicians) based in the UK in recognition of a specific contribution to mathematics with a strong intuitive component which can be explained to those with little or no knowledge of university mathematics, though the work itself may involve more advanced ideas.

The Society now actively encourages members to consider nominees who could be put forward for the award of a Shephard Prize when nominations open in late 2014. The prize may be awarded to either a single winner or jointly to collaborators. The mathematical contribution to which an award will be made must be published, though there is no requirement that the publication be in an LMS-published journal.

Professor Shephard himself is Professor of Mathematics at the University of East Anglia whose main fields of interest are in convex geometry and tessellations. Professor Shephard is one of the longest-standing members of the LMS, having given more than sixty years of membership. The Society wishes to place on record its thanks for his support in the establishment of the new prize.

FELLOWS OF THE ROYAL SOCIETY 2014

Among those elected to Fellowship of the Royal Society in 2014 were:

- **Tom Bridgeland**, Professor of Pure Mathematics, School of Mathematics and Statistics, University of Sheffield
- **Geoffrey Grimmett**, Professor of Mathematical Statistics, Statistical Laboratory, University of Cambridge, and Master, Downing College, Cambridge
- **Martin Hairer**, Regius Professor of Mathematics, Mathematics Institute, University of Warwick
- **Vladimir Markovic**, Sadleirian Professor of Mathematics, Department of Pure Mathematics and Mathematics Statistics, University of Cambridge

For further information visit the website at https://royalsociety.org/about-us/fellowship/new-fellows-2014/.

Contents

No. 437 June 2014

GENERAL MEETING

There will be a General Meeting of the Society on Friday 4 July 2014 at 3.30 pm, to be held at the Chartered Institute of Public Relations, 52-53 Russell Square, London WC1B 4HP. The business shall be:

- amendment to LMS By-Laws
- the appointment of Scrutineers
- announcement of Council's recommendation for Election to Honorary Membership
- announcement of LMS prize winners for 2014.

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

Fiona Nixon
Executive Secretary

ISAAC NEWTON INSTITUTE

Call for Proposals

The Isaac Newton Institute now invites proposals for one-, four- and six-month research programmes in any branch of the mathematical sciences. Please note a special case should be made for shorter proposals and there is no guarantee these will be held in the summer. The deadline for submission is **31 July 2014**, for consideration at the meeting of the Scientific Steering Committee in October 2014. Details on submitting proposals are at www.newton.ac.uk/callprop.html.

Anyone interested in making a proposal is encouraged to contact the Director, John Toland, by telephone or email, for advice and informal feedback (tel: 01223 335980, email: director@newton.ac.uk).

The Isaac Newton Institute is a national research institute based in Cambridge, UK. It attracts scientists from all over the world to research programmes in all areas of the mathematical sciences. At any time there are two visitor programmes at the Institute, each with about twenty participants. For more information visit the website at www.newton.ac.uk.

LMS LAUNCHES YOUTUBE CHANNEL

Visit the new LMS YouTube channel where you can view the Society's prestigious Popular Lectures free of charge. All of the lectures from 2009 onwards are now available and the remaining back catalogue of lectures will be added over the next few weeks. Once you have visited the site please bookmark it or share it with your friends, helping to spread the word about the beauty of mathematics.

The channel can be accessed at http://tinyurl.com/n849jv4.

Editorial team
http://newsletter.lms.ac.uk

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

Events calendar
Updates and corrections to calendar@lms.ac.uk

Articles
Send articles to newsletter@lms.ac.uk

Advertising
For rates and guidelines see www.lms.ac.uk/newsletter/ratecard.html

General Editor
Mr A.J.S. Mann (a.mann@gre.ac.uk)

Reports Editor
Professor R.A. Wilson (r.a.wilson@qmul.ac.uk)

Reviews Editor
Professor D. Singerman (d.singerman@soton.ac.uk)

Administrative Editor
S.M. Oakes (newsletter@lms.ac.uk)

Typeset by the LMS at De Morgan House; printed by Holbrooks Printers Ltd.

Publication dates and deadlines

Published monthly, except August. Items and advertisements by the first day of the month prior to publication, or the closest preceding working day. Notices and advertisements are not accepted for events that occur in the first week of the publication month.

Charity registration number: 252660.

MATHEMATICS POLICY ROUND-UP

May 2014

RESEARCH

Minister announces further investment in doctoral training
Postgraduate training in the UK's universities is to receive another injection of funding from EPSRC. This year EPSRC is investing £83.5 million through its Doctoral Training Partnerships (DTPs) (previously known as DTG). More information is available at www.epsrc.ac.uk/newsevents/news/2014/Pages/phdtraining.aspx.

Triennial Review of the Research Councils
The Department for Business, Innovation and Skills (BIS) has published its Triennial Review of the UK's seven Research Councils. 'The review, which examined the form, function and governance of the UK's Research Councils, has recognised that the Research Councils are working from a position of strength. The review has also confirmed that the current number and structure of the Research Councils is right'. The review is available at http://tinyurl.com/mch9j2h.

HIGHER EDUCATION

HEFCE Report: Higher Education in England 2014
The report aims to provide an overview of recent shifts and longer-term trends, building a picture of publicly-funded higher education in England in 2014 and a sense of how it got to where it is. It also considers possible further changes and continuities in the year ahead. The report shows that 'science, technology, engineering and mathematics subjects continue a trend of growth'.

The report and key facts publication are available at www.hefce.ac.uk/heineng land/2014/.

SCHOOLS AND COLLEGES

How standards should be set for new GCSEs
Ofqual has launched a consultation on how standards should be set for new GCSEs. The consultation runs until 30 June 2014.

Following a previous announcement that new GCSEs will be graded from 9 to 1, with 9 being the top grade, Ofqual is now asking for views on how performance standards should be set and maintained for them, and how the grading system could work. More information is available at http://tinyurl.com/paehodl.

Linked pair of GCSEs in mathematics (MLP) evaluation
Research into the effectiveness of the linked pair of GCSEs in mathematics in increasing pupil participation in mathematics beyond GCSE level has been published. More information is available at http://tinyurl.com/l33yqvd.

Core maths technical guidance consultation
The Department for Education (DfE) has published technical guidance for new core mathematics qualifications. The consultation closed on 26 May 2014. More information is available at http://tinyurl.com/odvspy2.

ACME note of round table on implementing the new National Curriculum
ACME convened a round table discussion in March 2014. The report is now published and summarises the main issues raised and identifies next steps for implementation of the National Curriculum for key groups. The report is available at http://tinyurl.com/mbzk56g.

Mathematics teachers Golden Hello scheme
From April 2014 a Golden Hello scheme will be implemented for new graduate mathematics teachers in further education (FE). This is part of the wider strategy to improve the quality of FE teaching and learning, announced by Matthew Hancock, the Skills and Enterprise Minister, in February 2014. A summary note is available at http://tinyurl.com/mznuxqb.

Exams for 15-19 year olds
The House of Commons Education Select Committee is holding a short inquiry to follow up its previous work on examinations for 15 to 19 year olds in England.

The inquiry covers issues relating to GCSEs and A levels as raised in the Committee's reports on the administration of examinations for 15 to 19 year olds in England (July 2012), *From GCSEs to EBCs: the government's proposals for reform* (January 2013) and *2012 English GCSE results* (June 2013). This includes current plans for the administration and structure of the new GCSEs and A levels.

Written comments were invited with a deadline of 21 May 2014. Oral evidence will be taken from Ofqual in June 2014, followed by evidence from the Secretary of State for Education at a later date, with further details being announced in due course.

More information is available at http://tinyurl.com/mcvd7fu.

The LMS's previous response is available at http://www.lms.ac.uk/sites/lms.ac.uk/files/files/reports/Parliamentary_Inquiry.pdf.

Maths and Physics Chairs Programme
This Programme is a new government initiative looking to increase the supply of mathematics and physics teachers with high-level subject expertise in non-selective state schools.

- Maths and Physics Chairs aims to recruit post-doctoral mathematics and physics trainees – known as Chairs – from September 2014.
- The long-term aim is to fuel the pipeline of 16-18 year olds progressing to study mathematics and science at university and/or into employment.
- Leading businesses sponsor individual Chairs, including contributing to their training costs.
- As well as building relationships with post-doctoral researchers, businesses that sponsor the Programme will offer opportunities to the schools and students.
- Each Chair will receive a significant salary increase that will take their total salary and benefit package to £40,000 in the first year.

More information is available at www.researchersinschools.org/researchers/maths-and-physics-uplift/.

OTHER

House of Lords Report: International STEM Students
An 'unwelcoming' UK has led to an unprecedented fall in international Science, Technology, Engineering and Maths (STEM) student numbers, according to a House of Lords Science and Technology Committee report. More information and the full report are available at http://tinyurl.com/nbqbvca.

Dr John Johnston
Joint Promotion of Mathematics

LMS COUNCIL DIARY

28 March 2014

A personal view

The agenda for the March Council meeting was unusually light, which left time to discuss the minutes of the previous meeting — not the content, but the question of how detailed they should be. There was a clear division between those who leant towards only recording decisions and those who would prefer to have a record of the debate. The one thing that I think everybody agreed upon was the legal right of Council members to ask for a dissenting voice to be recorded.

Under President's business, Terry Lyons reported on a meeting of the Executive Committee of the European Mathematical Society that had been held at De Morgan House. He had been surprised that he needed to explain to some European colleagues that the LMS was more than a publishing house. He had been interested to hear that the Deloitte report (http://www.cms.ac.uk/files/Submissions/article_EconomicBenefits.pdf) has been having an impact beyond the UK; in the Netherlands there has been a similar study.

Amongst other matters that Terry raised was the recent budget announcement that the Chancellor had approved funding for a 'Turing Institute' aimed at promoting interaction between Mathematics, Science and Business.

A major item for this meeting was the half-year financial review in which Council receives a report of how income and expenditure are currently meeting the expectations of the budget. Treasurer Rob Curtis took us though a large, highly coloured spreadsheet. It was, he was pleased to say, a pretty bland document: most of the variances were explained by amounts being paid or received early or late. One notable exception was that spending on grants was currently above the revised budget. This had arisen because of a recent significant increase in applications (particularly for conferences and 'research in pairs'). Council was very happy to approve the reinstatement of the original budget. Similarly, increased catering and room-hire costs for October's BCS-FACS Evening Seminar (reported on in the April *Newsletter*) were entirely acceptable since the meeting had attracted an attendance of more than double that of previous years.

After lunch, Librarian June Barrow-Green gave us a fascinating report on the work of the Library Committee. I, at least, had not been aware of what a range of material the Society possesses. I was particularly interested to hear about the Plücker collection of wooden models of surfaces, now housed in the Science Museum.

As usual the final agenda item was Membership. Council approved another batch of new members, and the Treasurer reported, as an update on his presentation of membership demographics at the February meeting, that a further analysis of recent recruitment had shown a healthier perspective on the Society's gender balance than did the overall figures.

Francis Clarke

EUROPEAN NEWS

EU-MATHS-IN

We all know that mathematics has become a key enabling technology in all areas of science and applications. The development of new products or production processes today is dominated by the use of simulation and optimization methods that, based on a detailed mathematical modeling, support or even replace the costly production of prototypes and classical trial-and-error approaches.

Under the (false) assumption that the challenges which are identified today can be addressed by routine applications of the state-of-the-art mathematical results available, it may seem that further development of mathematics as a discipline is not a priority which can be justified by economically measured efficiency. Of course, just the opposite is true. Even more importantly, without such development, how will the challenges which will emerge twenty years from now be solved?

The new organization EU-MATHS-IN has been established to increase the impact of mathematics on innovations in key technologies and to foster the development of new modeling, simulation and optimization tools. It aims (both for companies and for scientists of other disciplines) to become a dedicated one-stop-shop and service unit to coordinate and facilitate the required exchanges in the field of application-driven mathematical research and its exploitation for innovations in industry, science and society. For this it will build an e-infrastructure that provides tailored access to information and facilitates communication and exchange by player-specific sets of services. It will act as facilitator, translator, educator and link between and among the various players and their communities in Europe.

For further information on the strategic and short-term goals of EU-MATHS-IN, on its structure and activity, you are invited to visit the website www.eu-maths-in.eu.

[Adapted from a document of the European Science Foundation www.esf.org]

Institut Mittag-Leffler

The Institut Mittag-Leffler in Djursholm, Sweden invites the submission of proposals for a one week mathematical conference, workshop, or summer school during the period 1 June to 17 July 2015. Deadline: **20 July 2014**. Further information available at: www.mittag-leffler.se/?q=call_for_conferences.

[Source: euro-math-soc.eu/news.html, 4 Apr 2014]

New call: Horizon 2020 - COFUND

A new call was issued under EU's programme HORIZON 2020. The COFUND scheme aims at stimulating regional, national or international programmes to foster excellence in researchers' training, mobility and career development, spreading the best practices of Marie Skłodowska-Curie actions. This will be achieved by co-funding new or existing regional, national, and international programmes to open up to, and provide for, international, intersectoral and interdisciplinary research training, as well as transnational and cross-sectoral mobility of researchers at all stages of their career. Further information available at: http://tinyurl.com/o6vauzb.

[Source: euro-math-soc.eu/news.html, 24 Apr 2014]

David Chillingworth
LMS/EMS Correspondent

THE INFINITE PUZZLE

The Institute of Art and Ideas hosts a debate with world-leading scientists and mathematicians on the topic of infinity. They ask, is infinity purely a mathematical concept, or can it be applied to the world of physics too?

The universe is infinite, or so we believe. But might it be a mistake to apply the mathematical concept of infinity to the universe? Would it be more helpful to see infinity as an ineffable notion, or should we accept that mathematics rules?

The Panel

Inflationary cosmologist Laura Mersini-Houghton from Carolina joins theoretical physicist Julian Barbour and award-winning mathematician Peter Cameron to make sense of the infinite.

For further information visit the website at http://iai.tv/video/the-infinite-puzzle.

GRADUATE STUDENT MEETING
Friday 4 July 2014
Russell Room, CIPR, 52-53 Russell Square, London WC1B 4HP

(Nearest tube: Russell Square)

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

Preliminary Programme

09.30	Coffee and Registration
10.00	**First Speaker (tbc)**
11.00	Coffee/Tea
11.15	Graduate student talks
12.45	Lunch
13.40	Award prizes
13.45	**Second Speaker (tbc)**
14.45	Close of Meeting
15.30	LMS General Meeting and Hardy Lecture at the CIPR (see below)

Registration

To register, please email Elizabeth Fisher (lmsmeetings@lms.ac.uk) by email by **27 June**. Places are free and all refreshments including lunch will be provided.

Student Talks

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

Travel

The lectures will be held in the Russell Room, CIPR, 52-53 Russell Square, London WC1B 4HP. For directions, see: www.cipr.co.uk/content/venue-and-room-hire/location

Travel grants of up to £50 are available for students who attend **both** the Graduate Student Meeting ***and*** the Annual General Meeting.

LMS General Meeting and Hardy Lecture

The LMS General Meeting is a Society Meeting, which is open to all.

Nina Snaith (Bristol) will give the first lecture and **Percy Deift (NYU)** will give the Hardy Lecture on *Universality in numerical computations with random data. Case studies*. (P. Deift, G. Menon, S. Olver and T. Trogdon). The meeting will also be held in the Russell Room at the CIPR.

After the meeting, there will be a reception at De Morgan House, 57-58 Russell Square.

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

GENERAL SOCIETY MEETING
Friday 4 July 2014
Russell Room, CIPR, 52-53 Russell Square, London WC1B 4HP

(Nearest tube: Russell Square)

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

3.30 Opening of the meeting and LMS business, including the announcement of the 2014 Prize winners (open to all)

Nina Snaith (Bristol)
Title tbc

4.45 Tea/Coffee

5.15 **Percy Deift (NYU)** - Hardy Lecturer
Universality in numerical computations with random data. Case studies. (P. Deift, G. Menon, S. Olver and T. Trogdon)

Abstract: Universal fluctuations are shown to exist when well-known and widely used numerical algorithms are applied with random data. Similar universal behavior is shown in stochastic algorithms and algorithms that model neural computation. The question of whether universality is present in all, or nearly all, computation is raised.

6.30 Reception - De Morgan House

7.30 Society Dinner

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

To register for your place at the meeting, contact Elizabeth Fisher (lmsmeetings@lms.ac.uk).

ICM 2014

The International Congress of Mathematicians 2014 will be held from 13 to 21 August 2014 in Seoul, Korea. The venue, COEX convention center, is located in the Gangnam area, the heart of Korean culture and business.

Numbers

- NAUM 2014 Program: travel grants to 1,000 mathematicians
- Abstracts Submission: 1,975 abstracts received from 110 countries
- Satellite Conferences: 53 conferences in Korea and neighboring countries

Registration

Scientific Program Schedules

The full list and schedule of the plenary speakers and sectional invited speakers is available from the website (www.icm2014.org).

Category	Advance registration by 10 July 2014	Onsite registration after 11 July 2014
Full Registration	$500	$550
Student	$250	$300
Accompanying person	$120	$150

Sponsorship

The SEOUL ICM 2014 welcomes any organizations or companies wishing to support this event. Package sponsorship and exclusive sponsorship are available and they offer various compensation models to meet different needs and to maximize exposure during the Congress. For more information, please visit the official SEOUL ICM 2014 website.

Family Friendly ICM

Seoul offers a wide range of family-oriented activities and programs. Join the SEOUL ICM 2014 with your family and have a memorable time with your loved ones in Seoul.

Deoksugung Palace

Teaism

N Seoul Tower

SOCIETY MEETING & RECEPTION

at the ICM 2014, Seoul, South Korea
Tuesday 19 August 2014

Grand Ballroom 101, COEX Convention Centre

5.00	Opening of the meeting **Jean-Pierre Bourguignon** *Title tbc*
6.00	Reception (ticket required)

LMS members will have the opportunity to sign the Membership Book which dates back to 1865.
For a ticket to the reception, please email Elizabeth Fisher: lmsmeetings@lms.ac.uk
The LMS will also be hosting a stand at the ICM and we would be delighted to welcome our members in Seoul.

LONDON MATHEMATICAL SOCIETY MIDLANDS REGIONAL MEETING

Loughborough University: Monday 16 June 2014

2.00 pm	Opening of the meeting **Werner Müller** (Bonn University)
3.00 pm	**Gigliola Staffilani** (MIT)
4.00 pm	Tea/Coffee
4.30 pm	**Alexander Pushnitski** (King's College London)
6.00 pm	Wine Reception/Dinner

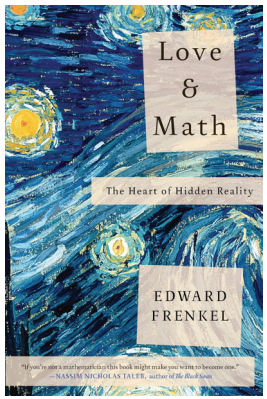
These lectures are aimed at a general mathematical audience. All interested, whether LMS members or not, are most welcome to attend this event.

For further details and to register and to reserve a place at the dinner, please visit http://homepages.lboro.ac.uk/~maeh/waves14/lms14.html. The cost of the dinner will be approximately £35, including drinks.

The meeting forms part of a workshop on *Scattering Theory and Wave Equations* from 16-18 June 2014. For further details visit: http://homepages.lboro.ac.uk/~maeh/waves14/index.html or contact the organiser (C.Garetto@lboro.ac.uk).

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

LOVE & MATH



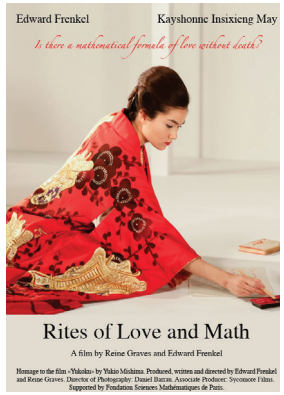
As part of the *Activities on Symmetries and Correspondences Conference* (*LMS Newsletter*, May 2014) there will be a public presentation of the new book *Love and Math* by Edward Frenkel (*LMS Newsletter* review November 2013).

Marcus du Sautoy, Simonyi Professor for Public Understanding of Science, Oxford University, will be the moderator of a short presentation and discussion taking place at Theatre L2, Mathematical Institute, Oxford from 4 pm – 5 pm on 7 July. Questions can be submitted by Twitter using the hashtag #loveandmath

Edward Frenkel is a professor of mathematics at the University of California at Berkeley, the winner of the Hermann Weyl Prize in mathematical physics, and a member of the American Academy of Arts and Sciences. His book *Love & Math* has been named one of the Best Books of 2013 by both Amazon and iBooks, and is currently being translated into nine languages. For more information about the book visit http://loveandmathbook.com/.

RITES OF LOVE AND MATH

A screening of the film *Rites of Love and Math* by Edward Frenkel and Reine Graves (26 minutes), followed by a panel discussion, will take place on 3 July 2014 at 6 pm at Somerset House, Strand, London.



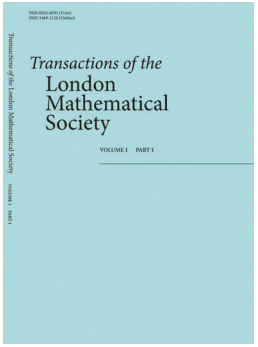
Edward Frenkel co-produced, co-directed, and played the lead in this film (*LMS Newsletter* review September 2010).

For more information visit http://riteso floveandmath.com.

TRANSACTIONS OF THE LMS

We are pleased to announce that the first paper has been published in the new journal *Transactions of the London Mathematical Society*. The paper, 'A weak*-topological dichotomy with applications in operator theory' by Tomasz Kania, Piotr Koszmider and Niels J. Laustsen, is freely available via http://dx.doi.org/10.1112/tlms/tlu001.

The *Transactions* is a fully open access online journal designed to accommodate those authors who prefer to publish in an open-access only journal, or who may be required by their funding grants to do so. The *Transactions* covers the same subjects as the *Bulletin*, *Journal* and *Proceedings of the London Mathematical Society* and shares the same Editorial Advisory Board. More information is available at www.lms.ac.uk/publications/tlms.



LMS HARDY FELLOW 2014

The 2014 LMS Hardy Fellow is **Professor Percy Deift** (NYU).

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


Professor Percy Deift

Percy Deift will visit the UK in June and July 2014 and he will give talks at:

Bristol
On the Asymptotic behavior of a log gas in the bulk scaling limit in the presence of a varying external potential (T Bothner, P Deift, A Its and I Krasovsky).
17 June at 4 pm
Powell Lecture Theatre, School of Physics
Organiser: Francesco Mezzadri

Reading
Asymptotics of Toeplitz, Hankel and Toeplitz+Hankel determinants with Fisher-Hartwig singularities (P Deift, A Its and I Krasovsky).
18 June
Organiser: Beatrice Pelloni

Oxford
Universality in numerical computations with random data. Case studies (P Deift, G Menon, S Olver and T Trogdon).
20 June
Organiser: Karin Erdmann

Edinburgh
Perturbation theory for infinite-dimensional integrable systems on the line. A case study (P Deift and X Zhou).
24 June
Organiser: Adri Olde Dalalhis

Leeds
Long-time asymptotics for solutions of the NLS equation with a delta potential and even initial data (P Deift and J Park).
25 June
Organiser: Will Anscombe

Loughborough
Toeplitz matrices and Toeplitz determinants under the impetus of the Ising Model: some history and some recent results (P Deift, A Its and I Krasovsky).
26 June
Organiser: Martin Hallnas

Cambridge
On the Asymptotic behavior of a log gas in the bulk scaling limit in the presence of a varying external potential (T Bothner, P Deift, A Its and I Krasovsky).
1 July
Organiser: Tadashi Tokieda

London
Universality in numerical computations with random data. Case studies (P Deift, G Menon, S Olver and T Trogdon).
4 July at 3.30 pm
CIPR, Russell Square
Organiser: LMS (lmsmeetings@lms.ac.uk)

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

RESEARCH VISIT TO SOUTH AFRICA

Report

Jacqueline Daykin after her talk at the *International Conference on Algorithms for Big Data*

I would like to thank the London Mathematical Society for the award of an International Short Visits Scheme 5 grant in support of a research visit to South Africa during autumn 2013.

The purpose of the trip was to collaborate with Professor Bruce Watson, Department Chair of Information Science, Centre for Knowledge Dynamics and Decision-making, University of Stellenbosch (SU). Meetings were also held at the Institute of Infectious Disease and Molecular Medicine, a postgraduate research institute within the Faculty of Health Sciences at the University of Cape Town (UCT). Informal seminars with academic staff and postgraduate students at SU and UCT expedited a common ground for research.

Professor Watson and I identified related key topics to pursue: specialized Burrows-Wheeler text transformations and associated suffix arrays; the design and analysis of predicate automata; and pattern inference, sorting and searching in big data. Postgraduates at UCT contributed knowledge on specific African viruses in relation to applications of the combinatorics of next generation sequence alignment and degenerate/indeterminate biological strings.

A Fest-colloquium was held at SU on 3 October 2013 in honour of Professor Derrick Kourie of the Department of Computer Science, School of Information Technology, University of Pretoria. I was invited to give a talk at this event: *A non-lexicographic data clustering scheme*. Researchers – postgraduate, early stage and experienced - from various South African and international institutions attended, allowing a stimulating exchange of ideas: string combinatorics, cellular & symmetric difference automata, large scale detection of repetitions in strings, and software design & tools. Colleagues later met in Cape Town to endorse the festschrift.

Research produced under this Scheme 5 grant has been collated into articles including, *A text transformation scheme for degenerate strings*, J.W. Daykin & B. Watson, presented at the 2nd *International Conference on Algorithms for Big Data* (ICABD 2014) in Palermo, Italy from 7 to 9 April 2014. The conference focused on the application of mathematical theories and methods to big biological data - DNA/RNA and proteomic sequences.

Participants of this South Africa–UK collaborative research network met again at the London *Stringology Days/London Algorithmic Workshop* (LSD & LAW 2014), King's College London from 6 to 7 February 2014*. Strategies were discussed for future activities including a Colloquium on Stringology at the University of Pretoria in autumn 2014.

Jacqueline Daykin
Royal Holloway & King's College
University of London

*A report of this meeting was published in the LMS *Newsletter*, May 2014, p18.

Signing the festschrift publication in Cape Town. Clockwise: Derrick Kourie, Costas Iliopoulos, Bruce Watson, Bill Smyth and Loek Cleophas

Derrick Kourie wearing his fest-colloquium gift (the hat)

KENT SPECTRAL THEORY MEETING

Report

The *Kent Spectral Theory Meeting* took place at the University of Kent from 14 to 17 April 2014. Around 40 participants from across Europe and the UK gathered in Canterbury to discuss spectral theory, operator theory, complex analysis and mathematical physics. Applications in various fields, such as scattering theory, hydrodynamics, quantum graphs, Riemann-Hilbert problems, elliptic differential operators, Toeplitz operators and Jacobi matrices were considered. One particular focus was the interaction between classical selfadjoint operator theory and modern non-selfadjoint operator theory.

The wide range of speakers included many established experts in the field. There were also seven talks by research students, giving these young mathematicians the chance to present their research to a sizeable audience. All the talks gave many interesting insights into recent developments in the area. The packed schedule included talks from 9.30 am until 6 pm on the first three days and finished with lunch on the Thursday. Each day lunch was served in Rutherford College with a beautiful view of the cathedral in the valley. Monday evening saw a wine reception sponsored by the School of Mathematics, Statistics & Actuarial Science at the University of Kent and there was a conference dinner at the Cafe du Soleil in the city centre on the Tuesday night. Together with the regular coffee breaks, this provided ample time for discussions, both of the mathematical and non-mathematical type.

The invited speakers at the meeting were Jussi Behrndt (Graz, Austria), B. Malcolm Brown (Cardiff), Christina Camara (Lisbon, Portugal), E. Brian Davies, FRS (King's College London), Plamen Djakov (Istanbul, Turkey), Des Evans (Cardiff), Daphne Gilbert (Dublin), Gerd Grubb (Copenhagen, Denmark), Jan Janas (Krakow, Poland), Stanislas Kupin (Bordeaux, France), Pavel Kurasov (Stockholm, Sweden), Heinz Langer (Vienna, Austria), Ari Laptev (Imperial College London), Marco Marletta (Cardiff), Boris Pavlov (St Petersburg/Auckland), Michael Plum (Karlsruhe, Germany), Roman Romanov (St Petersburg, Russia), Alexander Sobolev (UCL) and Christiane Tretter (Bern, Switzerland).

We thank the LMS, as well as EU Marie Curie Action and the University of Kent, Faculty of Science for financial support.

Sergey Naboko & Ian Wood
University of Kent

BOUNDED GAPS BETWEEN PRIMES

LMS-CMI Research School

Oxford 22-26 September 2014

Organisers: Ben Green and Roger Heath-Brown (Oxford)

In a spectacular breakthrough, Yitang Zhang proved that there are infinitely many pairs of primes differing by at most 70 million. Due to further advances of Maynard and Tao and the collaborative Polymath Project, 70 million has been reduced to a few hundred. This course will introduce attendees to the mathematics surrounding these developments. There will be four lecture courses:

- *Introduction to prime number theory. ζ- and L-functions, the prime number theorem* (Andrew Granville, Montreal)
- *The Bombieri-Vinogradov theorem about distribution of primes in progressions. Introduction to sieve theory* (Kannan Soundararajan, Stanford)
- *The methods of Goldston, Pintz and Yıldırım and Maynard-Tao* (James Maynard, Montreal/ Oxford)
- *Inputs from algebraic geometry* (Emmanuel Kowalski, ETH Zurich)

These lecture courses will be supplemented by tutorial sessions.

Distinguished guest lectures will be given by Terence Tao (UCLA) and Yitang Zhang (University of New Hampshire).

Applications: Research students, post-docs and those working in industry are invited to apply. The closing date for applications is **15 June 2014**. For further information, please visit the website: www.claymath.org/events/bounded-gaps-between-primes. Applications should then be made using the registration form available via the Society's website at: www.lms.ac.uk/events/lms-cmi-research-schools.

Fees: For participants from outside Oxford (except those working in industry), fees include conference fee, accommodation, meals and conference dinner. PhD students: £150; Early-career researchers: £250. For Oxford University participants, fees include conference fee, lunches and conference dinner only. PhD Students and Early Career Researchers: £100.

For all other participants (e.g. those working in industry), fee includes conference fee, lunches and conference dinner only. Registration fee: £250. (Accommodation and evening meals can be requested at a further cost of £650.) All UK-based participants must pay their own travel costs. For overseas-based participants, support will be available on application if contribution towards travel costs is required. Fees are not payable until a place on the course is offered but will be due by 1 August 2014.

These Research Schools are co-sponsored by the Heilbronn Institute.

LMS-CMI Research Schools *aim to provide training for young researchers in core areas of mathematics. Students and post-docs can meet a number of leading experts in the topic as well as other young researchers working in related areas.*

The LMS is the UK's learned society for mathematics. Registered charity no. 252660 (www.lms.ac.uk)
The CMI is charitable private operating foundation, incorporated in the USA.

LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2014

Institute of Education, London – Wednesday 9 July

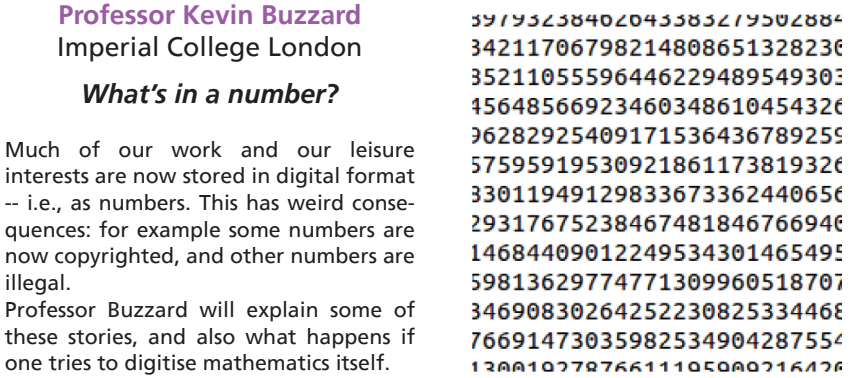
University of Birmingham – Wednesday 24 September

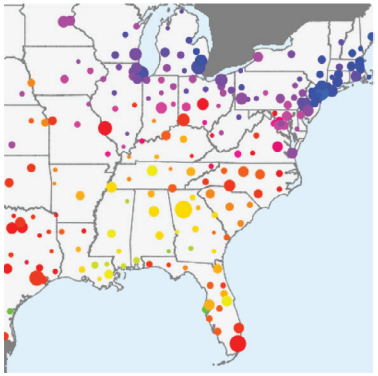
Professor Kevin Buzzard

Imperial College London

What's in a number?

Much of our work and our leisure interests are now stored in digital format -- i.e., as numbers. This has weird consequences: for example some numbers are now copyrighted, and other numbers are illegal.
Professor Buzzard will explain some of these stories, and also what happens if one tries to digitise mathematics itself.





Dr Julia Gog

University of Cambridge

Epidemics and viruses: the mathematics of disease

Dr Gog will look at how mathematics has been applied to help understand and control infectious diseases, from the scale of a single virus particle through to a global influenza pandemic, and considers some mathematical challenges for the future.

LONDON: Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm
Admission is free, with ticket. **Register by Thursday 3 July.**

BIRMINGHAM: Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm
Admission is free, with ticket. **Register by Thursday 18 September.**

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

ICFT 2014

Report

The 18th UK meeting on *Integrable Models, Conformal Field Theory and Related Topics* took place at the School of Mathematics and Statistics, University of Glasgow from 11 to 12 April 2014.

The Glasgow ICFT meeting followed the format of previous meetings in this series whose primary aims is to provide cohesion within a research community and to stay in touch with developments nationally and internationally. The style of these meetings is intended to be relaxed and give early career researchers the opportunity to network and built professional contacts to foster their future career prospects.

The programme included a mixture of presentations by some invited international speakers and early career researchers, i.e. PhD students in an advanced phase of their thesis and postdocs. Topics were loosely centered around the notion of quantum integrability, a term which is hard to define precisely as it covers a wide range of physical systems, such as quantum many-body-systems, statistical lattice models and low-dimensional quantum field theories. To the outsider it is best explained as systems, which – despite their complexity – allow for the application of sophisticated mathematical techniques that produce exact answers. This is in stark contrast to more conventional approaches where one often has to rely on approximations or perturbative methods. These exact techniques and the related algebraic structures provide a common ground for researchers working in this area rather than a particular class of physical systems or problems and it this general aspect that often leads to surprising connections between different areas with in this field.

The workshop covered a wide range of models showing the application of integrability in other areas such as random systems (O'Connell) and non-equilibrium physics (Pasquier). Talks by Adamopoulou and Ruijsenaars were concerned with more analytical questions, such as the connection between ODEs and integrable field theories and the hyperbolic Calogero-Moser systems, respectively. The connections with areas close to representation theory were also covered with talks on characters of W-algebras (Iles) or Drinfel'd bases of Yangians (Regelskis).

The informal structure of the meeting proved successful with the coffee breaks between talks and the discussion time on Friday being made good use of by the participants for follow-up discussions or engaging with some of the early career researchers who had presented posters. The relaxed and open setting in the Common Room of the Glasgow School of Mathematics and Statistics and the conference dinner further helped this networking activity along. Feedback on the meeting was very positive. The meeting was attended by a relatively high number of early career researchers (11 PhD students and five postdoctoral researchers of a total of 35 registered participants), which is an encouraging sign for the future of the subject and shows the continued demand for such meetings in coming years.

The complete programme of the workshop, including abstracts of the presentations as well as the online version of some of the posters and talks, can be found at the workshop website: www.maths.gla.ac.uk/~ck/ICFT2014.html. The meeting was supported by the Institute of Physics, the Glasgow Mathematical Journal Trust and an LMS Conference grant.

Invited speakers: Neil O'Connell (Warwick/Dublin) and Simon Ruijsenaars (Leeds)

Christian Korff
University of Glasgow

RECORDS OF PROCEEDINGS AT LMS MEETINGS

MARY CARTWRIGHT LECTURE AND SOCIETY MEETING

held on 28 February 2014 in the Ron Cooke Hub at the University of York. Over 40 members and visitors were present for all or part of the meeting.

The meeting began at 3.30 pm with The Vice-President, Professor Ken Brown, in the Chair.

25 members were elected to Ordinary membership: Frederick Allen, Jonathan Bober, Hung Bui, Corina Constantinescu, James Dodd, Christopher Fewster, Marianne Freiberger, Georgi Grahouski, Stuart Hall, Oleg Karpenkov, Gabor Kiss, Daniel Loughran, Ana Loureiro, John MacKay, Sean Prendiville, Tristan Pryer, Dmitry Savin, Matthew Scase, Roman Schubert, Jason Semeraro, Nicholas Shepherd-Barron, Chuong Tran, Pavel Tumarkin, Karen Vogtmann, Weiyi Zhang.

18 members were elected to Associate membership: Elizabeth Arter, Elisa Covato, Nicolas Jones, Luke Jordan, Thomas Kealy, Carl Kent, Lawrence Lee, Shiping Liu, David Meier, Simon Peacock, Calum Ross, Anthony Samuel, Dale Smith, Efthymios Sofos, Vinesh Solanki, Simon Stead, Richard Whyman, Ryan Wissett.

Four members were elected to Associate membership for Teacher Training Scholars: Simon Haines, David Helsby, Oriol Matas, Thandiwe Moyo.

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

The Treasurer, Professor Rob Curtis, also gave a short presentation on the benefits of joining the Society.

Professor Gwyneth Stallard introduced a lecture given by Professor Anne Taormina on *Moonshines*.

After tea, Professor Stallard introduced the Mary Cartwright Lecture given by Professor Reidun Twarock on *Viruses and geometry: hidden symmetries in virology*.

The Vice-President, Professor Brown, expressed the thanks of the Society to the Women in Mathematics Committee for putting on a successful meeting.

Afterwards, a reception was held in the Ron Cooke hub, followed by dinner hosted at 31 Castlegate.

VISIT OF PROFESSOR JIM AGLER

Professor Jim Agler (University of California at San Diego) will visit the School of Mathematics and Statistics at Newcastle University from 2 to 29 July 2014 for collaborative research with Dr Zinaida Lykova and Professor Nicholas Young.

Professor Agler is an expert on several branches of mathematical analysis, to which he has made highly original contributions. He has made important discoveries in operator theory and especially its applications to functions of several complex variables. His recent research is characterized by the effective use of operator-theoretic methods to strengthen and generalize classical results in several complex variables.

Further details can be obtained from Dr Zinaida Lykova (Zinaida.Lykova@ncl.ac.uk). This visit is supported by an LMS Research in Pairs Scheme 4 grant.

BIANCHI AND SIEGEL MODULAR FORMS

A workshop on *Bianchi and Siegel Modular Forms* will take place at the School of Mathematics & Statistics at the University of Sheffield from 14 to16 July 2014. Following great progress in automorphic forms over totally real fields, there has recently been renewed interest in the case of automorphic forms over imaginary quadratic fields (aka Bianchi modular forms). One way to study their arithmetic properties is to lift them to Siegel modular forms via the theta correspondence between O(3,1) and Sp(4).

This workshop brings together experts on automorphic forms, Galois representations and computational number theory to present their work on different aspects of Bianchi and Siegel modular forms. The workshop aims to inform participants of the latest developments as well as stimulate further work in this exciting area of research. The speakers will be:

- S. Böcherer (Mannheim)
- T. Bouganis (Durham)
- J. Brown (Clemson)
- L. Dembélé (Warwick)
- N. Dummigan (Sheffield)
- K. Klosin (New York)
- J. Marzec (Bristol)
- A. Pitale (Oklahoma)
- A. Rahm (Galway)
- A. Saha (Bristol)
- H. Şengün (Warwick)
- J. Tilouine (Paris)
- L. Walling (Bristol, TBC)

For further information visit the website at http://tberger.staff.shef.ac.uk/workshop.html. To register, contact the organiser, Tobias Berger (t.t.berger@sheffield.ac.uk). There will be a £30 registration fee to cover coffee/tea and lunches (payable on 14 July).

There is support available for UK based PhD students. Mention if you would like to apply for this in your registration email. Participants with childcare responsibilities should be aware of the supplementary grant offered by the LMS. The workshop is supported by an LMS Conference grant.

ADDITIVE COMBINATORICS @ BRISTOL

The School of Mathematics at the University of Bristol will be hosting a one-day *Additive Combinatorics Meeting* on Thursday 18 September 2014, showcasing the latest developments at the interface of combinatorics, harmonic analysis, number theory and graph theory. The provisional programme is as follows:

- Juanjo Rué (Freie Universität Berlin)
- Tom Sanders (University of Oxford)
- Thomas Bloom (Heilbronn Institute/University of Bristol)
- Mark Walters (Queen Mary University of London)
- Julia Wolf (University of Bristol)

Talks will be followed by a reception and a conference dinner.

This meeting is generously supported by the Heilbronn Institute and an LMS Conference grant under the Celebrating New Appointments scheme. It is open to all, and there is no registration fee, but please help us plan by completing the registration form on the conference website at www.juliawolf.org/seminars/lmsheilbronn.shtml. Limited financial support is available to enable the participation of junior researchers (deadline for applications: **18 July 2014**).

As part of the ongoing BioDynamics initiative (www.bio-dynamics2013.org/) a two-day international workshop on *Emergent Dynamics of Complex Biological Networks* will take place at the University of Exeter from 23 to 24 June 2014. The aim of this event is to bring together biologists and mathematicians who are using cutting-edge techniques (theoretical and/or experimental) to understand the emergent dynamics of complex biological networks. The hope is that the meeting will stimulate multidisciplinary discussion, encourage the sharing of current ideas and approaches, and lead to rewarding future collaborations between theoretical and experimental scientists.

The workshop will consist of a number of keynote presentations delivered by world-leading scientists, who will talk about their cutting-edge current research and highlight important future challenges within their field. Confirmed keynote speakers include:

- Duccio Cavalieri (Fondazione Edmund Mach)
- Andrew Millar (University of Edinburgh)
- Viktor Jirsa (Aix-Marseille Université)
- Imogen Sparkes (University of Exeter)
- Krasimira Tsaneva-Atanasova (University of Exeter)

In addition to keynote presentations, the workshop will also feature a number of selected shorter talks and poster presentations. The organisers are encouraging abstract submissions from both students and post-docs. Registration for students and post-docs is £50 and for academics £100.

This workshop is sponsored by the Medical Research Council. For further information and to register, visit the website at https://emps.exeter.ac.uk/mathematics/staff/jw535/biodynamics.

CONTACT GEOMETRY

An international workshop on *Contact Geometry in Dimension Three and Higher* will take place at University College London from 28 July to 1 August 2014. The aim is to bring together researchers and students working in contact geometry and related areas in symplectic topology, including topics such as pseudoholomorphic curves, h-principles, confoliations, symplectic dynamics, mapping class groups, and Stein manifolds. While the majority of global results about contact manifolds known thus far are specific to dimension three, recent years have also seen considerable progress in higher-dimensional contact topology, and this workshop specifically aims at introducing high-dimensional techniques to participants who might be more familiar with low dimensions, or vice versa. The programme will be a mixture of ordinary research talks with more in-depth minicourses on topics of recent interest.

Confirmed speakers include:

- Peter Albers (Münster)
- Jonathan Bowden (Augsburg)
- Barney Bramham (Bochum)
- Roger Casals (ICMAT Madrid)
- Yakov Eliashberg (Stanford)
- Rémi Leclercq (Orsay)
- Patrick Massot (École Polytechnique)
- Maksim Maydanskiy (Jussieu)
- Will Merry (ETH Zürich)
- Emmy Murphy (MIT)
- Olga Plamenevskaya (Stony Brook)
- Richard Siefring (MPI Leipzig)
- Otto van Koert (Seoul National University)
- Thomas Vogel (LMU Munich)
- Andy Wand (Nantes)
- Chris Wendl (UCL)

The talks will also include three minicourses

that are specifically intended to be accessible to PhD students:

- *Orderability and Rabinowitz Floer theory* (Albers and Merry)
- *Flexibility in higher-dimensional contact geometry* (Massot and Murphy)
- *Intersection theory of punctured holomorphic curves and applications* (Siefring and Wendl)

There is no registration fee but all participants are asked to register in advance by following the link at www.homepages.ucl.ac.uk/~ucahcwe/workshop.html.

Financial support for travel and accommodation is available for early career researchers, and research students based in the UK are especially encouraged to apply. There is also some support available for participants from the LMS Scheme 5 countries (e.g. in Africa) or the former Soviet Union.

Participants applying for support should register as soon as possible; the absolute registration deadline otherwise is **13 July 2014**. For more information contact Chris Wendl (c.wendl@ucl.ac.uk). This meeting is funded by grants from EPSRC, the European Science Foundation 'CAST' network, and an LMS Conference grant.

KENT ALGEBRA DAYS YOUNG RESEARCHERS

The workshop *Kent Algebra Days Young Researchers* (KADYR) will be held at the University of Kent in Canterbury from the 21 to 24 July 2014. This will consist of three mini courses:

- *Cluster algebras and their quantum analogues* Jan Grabowski
- *Nilpotent orbits and finite W-algebras* Anne Moreau
- *Noncommutative algebraic geometry* Susan Sierra

There is funding for accommodation and travel allocated on a first come first serve basis. For registration and further information visit the website at http://tinyurl.com/m7uk4uh.

The workshop is supported by the Anglo-Franco-German Representation Theory Network and an LMS Conference grant.

BSHM MEETINGS

The following are up and coming British Society for the History of Mathematics (BSHM) meetings:

Counting and Calculation - a journey through practical mathematics

21 to 22 June 2014, Rewley House, Oxford

Our speakers will attempt to explain the history and the beauty of this sort of mathematics and some of the concepts that arose from it; and each of our speakers is well-known for their ability to convey sophisticated ideas to a general audience (several are well-known authors of popular books in mathematics).

For further information visit the website at www.conted.ox.ac.uk/courses/G100-46.

Famous Physicists and Mathematicians from Belfast

Wednesday 25 June 2014, Department of Physics, Queen's University Belfast

Belfast has provided a base for a significant number of famous physicists and mathematicians since the Victorian era. At this event a range of such figures will be considered, including Sir Joseph Larmor, the Nobel Laureate ETS Walton, Peter Guthrie Tait and Sir David Bates. The event is organised jointly by the BSHM, the Institute of Physics, and Queen's University.

For further information visit the website at www.dcs.warwick.ac.uk/bshm/meetings/PandMofBelfast2.pdf.

Non-Western Mathematics

27 June 2014, Mathematical Institute, Oxford

- Kim Plofker (Brown University, USA) *Indian mathematics*
- Joseph Dauben (City University, New York, USA) *Chinese mathematics*
- Glen Van Brummelen (Quest University, Canada) *Islamic mathematics*

For further information visit the website at www.dcs.warwick.ac.uk/bshm/meetings/ClayNoticeJune2014.pdf.

History of Statistics

Thursday 20 October 2014, BSHM–Gresham College Joint Meeting, Gresham College, London

The meeting will explore the history of statistics from various novel standpoints. Professor Lynn McDonald (University of Guelph) will discuss Florence Nightingale and her Crimean War Statistics, Professor R.A. Bailey (University of St Andrews and Queen Mary London) will consider some history of Latin squares in experiments and Dr Eileen Magnello (University College London) will present the annual Gresham-BSHM lecture on *Karl Pearson's Gresham Lectures on Geometry* (1890-1894).

For further information visit the website at www.dcs.warwick.ac.uk/bshm/events.html#Stats.

ORTHOGONAL POLYNOMIALS

Recent Advances in Orthogonal Polynomials and its Interactions with Integrable Systems is a one-day meeting to be held in the School of Mathematics, Statistics and Actuarial Sciences (SMSAS) at the University of Kent on Thursday 18 September 2014. All talks will be held in the Mathematics Lecture Theatre, Cornwallis Building, starting at 11 am (coffee will be available beforehand from 10.30 am) and finishing by 6 pm. The event will conclude with a dinner for participants.

The meeting aims to discuss recent trends on orthogonal polynomials with a special emphasis on its interactions with integrable systems. Over the last years, an intensive activity was focused on the study of analytic and algebraic properties of orthogonal polynomials alongside with the vast plank of applications across mathematics. There is nowadays an intradisplinary approach to the subject where many branches of mathematics are very useful. One particular new development is the interaction between orthogonal polynomials and integrable systems.

The idea of this meeting is to promote the debate and exchange of information between international experts and people in the UK working in these areas. It is expected that this will be fruitful for both of these branches of mathematics. The invited speakers are:

- Beatrice Pelloni (Reading)
- Sara Lombardo (Northumbria)
- Walter van Assche (Leuven)

Anyone interested is welcome to attend. Some funds may be available to contribute to the expenses of UK-based research students who wish to attend the meetings. Further details can be obtained from the webpage at www.kent.ac.uk/smsas/events/OrthogonalPolynomials or from Ana Loureiro (afs@kent.ac.uk). There is a £15 registration fee which will cover the buffet lunch, coffee breaks and conference material. There are also some funds available from the London Mathematical Society for help with childcare costs (details can be found on the LMS website www.lms.ac.uk/content/childcare-supplementary-grants). The meeting is supported by an LMS Conference grant.

STABLE HOMOTOPY THEORY

A conference on *Stable Homotopy Theory: structured ring spectra and their invariants* will take place at MIMS, School of Mathematics, University of Manchester from 3 to 5 September 2014. The theory of highly structured ring spectra has been actively investigated by algebraic topologists since the 1960s, and progress has been especially spectacular over the past two decades. These advances have been driven by the development of symmetric monoidal model categories of spectra, obstruction theories for the existence of multiplicative structures, and computational programmes leading to dramatic new insights and applications. Related activity on model categories and infinity categories has also been important, in terms of developing theoretical background and applicable technology. The themes of the conference involve several important areas of progress since the turn of the millennium, including (co)homological invariants for E_n ring spectra, spaces of units for E-infinity ring spectra, and relevant aspects of the theories of model and infinity categories.

The confirmed speakers are:
- Gunnar Carlsson (Stanford University)
- Bjřrn Dundas (University of Bergen)
- John Greenlees (Sheffield University)
- Ayelet Lindenstrauss (Indiana University)
- Constanze Roitzheim (University of Kent)
- Steffen Sagave (University of Bonn)
- Stefan Schwede (University of Bonn)
- Vesna Stojanoska (Massachusetts Institute of Technology)
- Sarah Whitehouse (University of Sheffield)

For details and registration form see the conference webpage at www.maths.manchester.ac.uk/news-and-events/events/ringspectra2014/ or contact one of the organisers: Andrew Baker (Andrew.J.Baker@glasgow.ac.uk), Nigel Ray (nigel.ray@manchester.ac.uk), Birgit Richter (birgit.richter@uni-hamburg.de).

The conference may be able to offer some degree of financial support to participants giving contributed talks, to postgraduate students, and to others unable to cover costs from their own sources. The conference is supported by an LMS Conference grant, the Edinburgh Mathematical Society, MIMS and the University of Glasgow.

GALWAY TOPOLOGY COLLOQUIUM

This is the seventeenth in a series of annual events taking place at institutions in Great Britain, Northern Ireland and the Republic of Ireland. This year the colloquium will be held in the School of Mathematics at the University of Birmingham, from the 30 June to 2 July 2014. The Colloquium aims to encourage links between general topologists and dynamicists in the UK, Ireland and the rest of the world. Graduate students are particularly encouraged to attend. We hope that the relaxed, informal atmosphere will generate discussion of research and provide greater awareness of the different areas of study in the UK and Ireland.

The three day programme consists of 20 or 50 minute talks given by participants, together with ample time for discussion. Speakers may present new results, discuss recent progress on open problems, or give expository lectures on some technique or area of interest. Graduate students are encouraged to present their own work. The invited speakers will give a 50 minute talk each and other participants will give 20 minute talks. There are no parallel sessions and participants would usually attend all presentations. This year the invited speakers are:
- Alexander Clark (University of Leicester)
- Mirna Džamonja (University of East Anglia)
- Klaas Pieter Hart (TU Delft)
- Jonathan Meddaugh (Baylor University, Texas)

For further information visit the website at http://web.mat.bham.ac.uk/galway17/ or contact the organisers at 17galway@gmail.com. The workshop is supported by an LMS Conference grant.

OPERATOR METHODS IN HARMONIC ANALYSIS

This four day workshop will be held at Queen's University Belfast from 18 to 21 August 2014 focussing on the interactions between abstract harmonic analysis and operator algebras. Its aim is to enhance the interchange of ideas in the area and inform the participants about latest developments in this exciting part of modern mathematics. The programme of the workshop will comprise ten invited lectures as well as contributed talks. Afternoon research sessions will be scheduled with the aim of research collaboration and informal interactions. Invited are speakers:
- R. Archbold (Aberdeen)
- M. Daws (Leeds)
- Y.-F. Lin (Belfast)
- J. Ludwig (Metz)
- M. Neufang (Lille/Ottawa)
- N. Ozawa (Kyoto)
- V.I. Paulsen (Houston)
- Z.-J. Ruan (Urbana)
- V.S. Shulman (Vologda)
- N. Spronk (Waterloo)

The workshop is open to everyone interested. If you wish to give a talk at the meeting contact one of the organisers: Ivan Todorov (i.todorov@qub.ac.uk) or Lyudmila Turowska (turowska@chalmers.se). Financial support is

available for postgraduate students studying in the UK.

For further information visit the website at https://sites.google.com/site/omha2014/. The workshop is funded by an LMS Conference grant and Queen's University Belfast.

PANDA

The next meeting in the PANDA series on *Patterns, Nonlinear Dynamics and Applications* will be held in the Department of Mathematical Sciences, University of Bath on Tuesday 3 June 2014. Speakers will include:
- Tanniemola Liverpool (Bristol)
  Synchronization and liquid crystalline order in soft active materials
- Sebastian Wieczorek (Exeter)
  Rate-induced bifurcations: critical rates, non-obvious thresholds, and adaptation failure

Further details can be found at http://people.bath.ac.uk/jhpd20/panda/ or by contacting Jonathan Dawes (J.H.P.Dawes@bath.ac.uk).

There is no registration fee. Reimbursement of travel and childcare expenses is available through support from the LMS Scheme 3 grant, for which the organisers are very grateful. The PANDA network is organised by Jonathan Dawes (Bath), Rebecca Hoyle (Surrey), Paul Matthews (Nottingham) and Alastair Rucklidge (Leeds).

PROJECTION AND SLICING THEOREMS IN FRACTAL GEOMETRY

A two day meeting on *Projection and Slicing Theorems in Fractal Geometry* will take place at the University of Bristol from 17 to 18 July 2014. The meeting is to mark 60 years since Professor John Marstrands seminal papers on the subject *Some fundamental geometrical properties of plane sets of fractional dimensions* and *The dimension of Cartesian product sets*. The speakers will be:
- Francois Ledrappier (Notre Dame)
- Julia Romanowska (Warsaw)
- Kenneth Falconer (St Andrews)
- Pertti Mattila (Helsinki)
- Tuomas Orponen (Edinburgh)
- Olga Maleva (Birmingham)
- Robert Kaufman (Illinois)
- Jimmy Tseng (Bristol)
- Henna Koivusalo (York)
- Thomas Kempton (St Andrews)
- Michal Rams (Warsaw)
- Károly Simon (Budapest)

Funds are available to contribute to the expenses of UK based research students who wish to attend the meeting. Further details can be obtained from the web page at www.maths.bris.ac.uk/~matmj/projections.html. The meeting is supported by an LMS Conference grant and the Heilbronn Institute for Mathematics Research.

SET THEORY: INNER AND OUTER MODEL THEORY

This meeting will take place in the School of Mathematics at the University of Bristol from Sunday 6 to Monday 7 July 2014. The focus of the meeting will be on the set theory of outer models obtained by forcing and their fine structure, as well as inner model theory. The speakers are:
- Radek Honzik(Charles University, Prague)
- Vera Fischer (Kurt Gödel Research Center, Vienna)
- Mirna Dzamonja (University of East Anglia)
- David Aspero (University of East Anglia)
- David Schrittesser (University of Copenhagen)
- Ralf-Dieter Schindler (University of Münster)
- Andrew Brooke-Taylor (University of Bristol)
- Peter Holy (University of Bristol)

There is a £10 registration fee. Some funding is available to contribute to the travel expenses of research students. For more information, including how to register, see the meeting website http://tinyurl.com/kqt5x4e, or contact the organiser, Peter Holy by email (maxph@bristol.ac.uk). The meeting is supported by an LMS Conference grant, and by the EPSRC.

REPRESENTATIONS OF HECKE ALGEBRAS

A workshop on *Representations of Symmetric Groups, Hecke Algebras and KLR Algebras* will take place at the University of Birmingham from 14 to 16 July 2014. The workshop will focus on a variety of topics in representation theory of symmetric groups and Hecke algebras, including the recent spectacular developments associated with Khovanov–Lauda–Rouquier algebras. The speakers include:

- Christine Bessenrodt (Leibniz Universität Hannover)
- Joseph Chuang (City University London)
- Matthew Fayers (Queen Mary University of London)
- Nicolas Jacon (Université de Reims Champagne-Ardenne)
- Alexander Kleshchev (University of Oregon)
- Sinéad Lyle (University of East Anglia)
- Ivan Marin (Université de Picardie Jules Verne)
- Vanessa Miemietz (University of East Anglia)
- Mark Wildon (Royal Holloway, University of London)

There will be a registration fee of up to £15 (research students are exempt). Some funds are available to contribute to travel and accommodation expenses of research students. For further information, including the registration procedure and deadlines, visit the workshop website http://web.mat.bham.ac.uk/A.Evseev/workshop/. The workshop is supported by an LMS Conference grant and the Anglo-Franco-German Representation Theory Network. The organizers are David Craven (D.A.Craven@bham.ac.uk) and Anton Evseev (A.Evseev@bham.ac.uk).

Isaac Newton Institute
for Mathematical Sciences

SUMMER SCHOOL ON WATER WAVES

6 – 8 August 2014

in association with the Newton Institute programme
Theory of Water Waves
(14 July – 8 August 2014)

Workshop organiser: Tom Bridges (Surrey).

Background: The mathematical modelling and analysis of water waves poses rich challenges. The governing equations for water waves are a widely accepted model and they have been the subject of research for over 150 years. However, the equations are highly nonlinear and the level of difficulty is so great that theory has yet to scratch the surface of the subject. The solutions to the equations that describe fluid motion are elusive and whether they even exist in the most general case is one of the most difficult unanswered questions in mathematics.

This summer school will introduce the beginning researcher to a range of mathematical issues in the theory of water waves, including the initial value problem, singularities, shallow water hydrodynamics, numerics, mapping techniques, variational principles, effect of topography and modulation.

Closing date of the receipt of applications is **15 June 2014**.

Further information and application forms are available from the website at
www.newton.ac.uk/programmes/TWW/twww04.shtml

Isaac Newton Institute
for Mathematical Sciences

INTERDISCIPLINARY APPROACHES TO UNDERSTANDING MICROBIAL COMMUNITIES

10 – 12 September 2014

in association with the Newton Institute programme
Understanding Microbial Communities; Function, Structure and Dynamics
(11 August – 19 December 2014)

Workshop organisers: Rosalind Allen (Edinburgh), Thomas Curtis (Newcastle), Thomas Pfeiffer (Massey), William Sloan (Glasgow), Orkun Soyer (Warwick) and Carsten Wiuf (Copenhagen).

Background: Microbial communities constitute a new frontier of biological enquiry. They present fundamental scientific questions and challenges in relation to complex dynamical systems, ecological and evolutionary trade-offs, and synthetic (re)engineering of microbial communities. Answering these scientific questions will only be possible by application of interdisciplinary approaches combining empirical and theoretical methods. At the same time, the study of microbial communities can result in the development of new theories and approaches.

Aim: This workshop aims to bring together empirical and theoretical scientists to discuss open problems and potentials in the study of microbial communities. Key note speakers will include world-leading experts from diverse areas such as systems biology, mathematics, microbial ecology and genetics, and will facilitate discussions among participants. The workshop will take place at the Isaac Newton Institute, Cambridge, UK, as part of a larger research programme on the study of function and structure of microbial communities.

Closing date of the receipt of applications is **20 July 2014**.

Further information and application forms are
available from the website at:
www.newton.ac.uk/programmes/UMC/umcw01

MEMBERS' OPINIONS ..... have your say

All opinions submitted to this section are strictly those of the contributor and do not necessarily represent the views of the London Mathematical Society. If you would like to respond to any of the opinions published below, or have a separate contribution which you would like published on matters relevant to mathematics please contact newsletter@lms.ac.uk. Items are accepted at the discretion of the Editor and subject to available space in any given edition.

SHOULD MATHEMATICIANS COOPERATE WITH GCHQ?

Answering Dr Leinster's letter about GCHQ (April LMS *Newsletter*) presents several difficulties. Detailed responses to polemics with multiple contentious statements always seem weaker and less convincing than the polemic itself, partly because they are much longer and more nuanced.

A second difficulty is that allegations about GCHQ's activities are necessarily not going to be confirmed or denied. Either would be helpful to hostile nation states, terrorists or criminals. A completely open debate is thus impossible, unless one takes the extreme view that all intelligence agency work should be public (which logically would have meant telling the Germans in WWII that Bletchley had broken their codes).

Public debate about the balance between protecting people from crime and terrorism and potential invasion of privacy is also handicapped by the lack of trust in those who do have access to what really happens, i.e. public servants and ministers. As the former Director of GCHQ's Heilbronn Institute, I fully agree with Richard Pinch (May LMS Newsletter) that Leinster's picture of GCHQ is not one I recognize, and with the Director's claim that many staff would leave if asked to snoop on the general public. But will we be believed?

I see GCHQ's work as stopping innocent people being killed and putting guilty people in gaol. For example, the gang behind a close family member (and 25 others) being carjacked at knifepoint were convicted partly on mobile phone billing evidence. Deaths at 9/11 and 7/7 were narrowly avoided by, respectively, another close family member and a graduate student's partner, so I was pleased to hear, in the public session Richard Pinch's response refers to, that 34 terrorist plots had been thwarted in recent years by the intelligence agencies. Had deaths resulted from those plots there would no doubt have been criticism of intelligence agency failures (as indeed there were, to some extent, in 7/7). A recent radio program said that some of the people best at hiding themselves on the internet are paedophile rings.

The powers allowed to intelligence agencies have to enable them to investigate such matters while protecting privacy. Leinster does not address this difficult balance, which I see as the fundamental issue. Meaningful public debate will be difficult for reasons already cited.

Although I cannot comment on the allegations about GCHQ's actions, let me respond to some of Leinster's other points.

The unwary reader may think Leinster's statement that GCHQ is 'accused of law-breaking on an industrial scale' means that its staff intentionally break the law. In fact it refers to a legal opinion of a possible conflict between the acts governing GCHQ's work, and their application, and human rights legislation. This has not, as far as I know, been tested in court, and certainly does not justify any imputation of deliberate law-breaking. The quoted opinion is presumably not shared by the many lawyers involved in framing and applying the laws concerned, and I understand that GCHQ and its oversight bodies have obtained substantial and independent contrary legal opinions.

Having been a political radical in the 1960s, convinced at that time that our group was under surveillance, I approached my time at GCHQ with caution. I was pleasantly surprised that my first substantial briefing session was on the legal framework, including human rights laws, within which GCHQ operates. The need for legal authorization of any action which could not be equally undertaken by any citizen was repeatedly referred to during my time there. I have no doubt it was carefully adhered to.

Both GCHQ and its mathematics staff will be amused by the accusation that mathematicians there have little idea how their work will be used. The capabilities being provided by all the work I knew about were very clear to all concerned. Access to specific intelligence gained thereby was limited by 'need to know'; nevertheless, GCHQ took pains to tell all security-cleared staff as much as possible about what successes it had had.

As for the independent scrutiny of GCHQ, those convinced of GCHQ's wrongdoing see the absence of criticism from the oversight agencies as evidence of those agencies' weakness or credulity. They cannot entertain, as they should, the alternative proposition that there is no wrongdoing to find.

I hope mathematicians thinking of working for GCHQ will not be deterred by Leinster's rhetoric, but, in trying to discern how they see the balance between reasonable intelligence gathering and oppressive measures, will be swayed by those who have worked for GCHQ and have come away, like me, reassured by what they found.

Malcolm MacCallum
Queen Mary, University of London

OBITUARY

JAMES ALEXANDER (SANDY) GREEN

Professor James Alexander Green, FRS, FRSE, who was elected a member of the London Mathematical Society on 19 June 1958, died on 7 April 2014, aged 88.

Karin Erdmann writes: J.A. Green, known as Sandy, did his undergraduate studies at St Andrews, but interrupted in the middle by work at Bletchley Park. Sandy moved to Cambridge for his graduate work, supervised by D.E. Littlewood, Philip Hall and David Rees. From 1950 to 1963 he held a teaching position at the University of Manchester, and then a readership at the University of Sussex for two years. From 1965 until his retirement in 1991 he was a Professor at the University of Warwick. After that he moved to Oxford, and became an associate member of the Department, and had MA status in the University. Until last summer he regularly came to the Department for seminars, or to discuss mathematics. Throughout his career, Sandy had a lot of serious health problems, but thanks to the care and support of his wife, Margaret, and his family, Sandy was able to continue his research.

In his PhD thesis, Sandy worked on semigroups. He introduced fundamental relations, now known as 'Green's relations'. Soon after moving to Manchester, Sandy got interested in representation theory. In 1955 he published his paper *The characters of the finite general linear groups*. This was completely unexpected in view of the very incomplete information available prior to his work. Sandy then turned to representations of finite groups over fields of prime characteristic and proved many important results. In particular he introduced new invariants, vertices and sources of indecomposable representations, and developed a fundamental correspondence for representations of a group with representations of its p-local subgroups. This 'Green correspondence' has become one of the most important tools of the area.

The monograph *Polynomial Representations* GL_n, published in 1980, introduces what Sandy called 'Schur algebras'. Around this time highest weight modules became objects of central interest in algebraic Lie theory. These can be studied via finite dimensional algebras; and Schur algebras are prototypes for such algebras.

More recently, Sandy was involved in the development of the classical Hall algebra theory. In his 1995 paper, he constructed a comultiplication on the Hall algebra of a finite directed quiver, and showed that this can be used to show that the Hall algebra is isomorphic to the positive part of the corresponding quantum group.

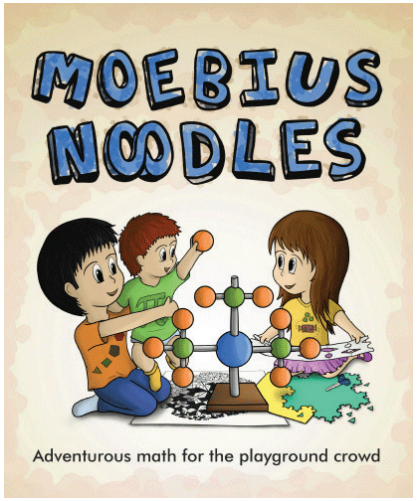
Sandy was awarded the Senior Berwick Prize in 1984 and the De Morgan Medal in 2001. He was elected to a Fellow of the Royal Society of Edinburgh in 1968, and to a Fellow of the Royal Society of London in 1987.

REVIEWS

MOEBIUS NOODLES: ADVENTUROUS MATH FOR THE PLAYGROUND CROWD

Delta Stream Media, 2013, 90 pp, $15 pb, ISBN 978-0-9776939-5-5.

This nice little book is composed by more than 100 authors. *Moebius noodles* is an internet community of enthusiastic parents and teachers who are involved in various mathematical activities with very young, mainly preschool children. The keyword in the above sentence is *enthusiastic*, the proof of which is the number of exclamation marks scattered all over the text. More important, it also shows in the exuberant fantasy in inventing all sorts of games and activities which confront a child with various mathematical ideas. The authors find ways to introduce these ideas everywhere: in a classroom but also at home, on the playground, in the kitchen, etc.



Four main topics discussed in the book are symmetry, numbers, functions, and classification. For example, the activities concerning symmetry are paper cutting, games with mirrors, observing symmetry in nature, performing dances with children mirroring one another, and even baking symmetric cookies and trying to eat them in a way preserving their symmetry. Certain topics are rather advanced: for example, more than once the authors speak about fractals. Sometimes, their imagination strikes even a reader well prepared to extravagant mathematical ideas. Just imagine that every finger on you hand has a little hand at its end! This is the first step in constructing a fractal, your hand being a starting point. (As you can see, I wasn't able to refrain from an exclamation mark either.) Beside a mathematical knowledge as such, the book describes diverse manipulatives, gives advice to parents ready to embark in this "adventurous math" journey, etc.

Sometimes, the authors' enthusiasm makes them exceedingly optimistic. They say, "In general, the answer to 'Can young children understand the concept of… ?' is always 'Yes!'", and go on: "But seriously, can you teach any concept at any age?" Apparently, their answer is once again yes. This conviction, if we consider it as a purely scientific statement in the realm of developmental psychology, is certainly wrong. But such ideas should not be judged only as right or wrong. In the first place, this idea is *productive*. This means that it is not so much a statement as it is a challenge, an appeal to dare, to go ahead without fear and try to invent new activities, new games and circumstances which could eventually acquaint your child with the concept you have in mind. And, indeed, it makes no harm to try, if only you do not create a frustration and a feeling of helplessness in your child, and the authors of this book are certainly not of the kind to do so. Their objective is not as much teaching mathematics as *teaching to be curious*.

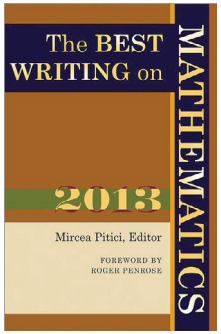
The only reproach I can make to this book concerns its graphical design. There is a wealth of pictures in the book, they are funny and maybe attractive, but they do not illustrate the text, and even when they do, it is not that easy to guess how the picture is related to the subject matter. The book is rich with scientific ideas which are in no way common knowledge; the text is often extremely succinct. A well thought illustration might be of a great help in understanding this material. Instead, we see something which is only very vaguely related to the contents of the book.

The authors' enthusiasm is contagious. The book may be recommended to parents, educators and all people who are in frequent contact with young children. Another project of the Moebius Noodles community is apparently under way, and it should be met with a hearty welcome. However, one disclaimer is in order: the style of teaching described in this book is a valuable addition to the systematic study of mathematics provided by regular school but should not in any way be considered as its replacement.

Alexander Zvonkin
University of Bordeaux, France

THE BEST WRITING ON MATHEMATICS 2013

edited by Mircea Pitici, foreword by Roger Penrose, Princeton University Press, 2014, pp 272, £14.95, $21.95, ISBN 978-0-691-16041-2.



The list of titles of the essays reprinted in this volume would be almost enough to persuade many people that they will enjoy reading it, and indeed that they could profitably put it in front of anyone who wants to know what mathematics is about. It's a partial and selective picture, of course, but it's fresh, varied, and as its title might suggest, well written. Some of the authors are provocative: Philip Davis on 'The prospects for mathematics in a multimedia civilisation' offers a wide-ranging perspective on mathematics in the coming era of ubiquitous computing. Some are surprising: Kelly Delp finds orbifolds in high fashion, David Lloyd suggests that the Platonic solids may have been known in Neolithic times (well before Plato). Several reflect on the life of the mathematics student: Anna Sfard writes on why we should learn mathematics and Erin Maloney and Sian Beilock on math anxiety; Frank Quinn on how mathematics changed into its modern form a century ago and why that matters today. Terence Tao writes on the intriguing fact that large complex systems can obey universal laws, and on the crossover from statistical mechanics to random matrices and recent work on the Riemann hypothesis. In fact, a number of probabilistic and statistical themes are aired in this book, and, as Roger Penrose notes in his introduction, no major topics from mathematical physics get an outing, which I suppose may be a random event or an indication of fashion, or even intellectual drift, in mathematics as a whole. Three essays illuminate topics that make mathematics fun and useful at the same time: Ian Stewart on patterns in animals, Renan Gross on Bézier curves, and Daniel Silver on 'Slicing a cone for art and science', with its investigation of why Albrecht Dürer thought that an ellipse was egg-shaped. At the other extreme, but no less accessibly, Kevin Hartnett brings us up-to-date on the abc conjecture and the uncertain state of play with Shinichi Mochizuki's proposed proof.

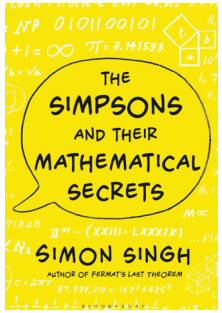
Mathematics will always have a problem explaining its deepest results to a wide audience, and with illustrating its great range and variety without looking trivial at times. What these essays demonstrate is that mathematicians have a lot to say about many different things, and we should not agonise too much about it. We should instead, have confidence in what we do, and when possible go out and talk about it. Even the pictures in this book tell interesting stories: a map of a solution to the travelling salesman problem in Sweden, several artistic responses to the Jordan curve theorem, bond percolation at the critical threshold on a square lattice, the Jerusalem chords bridge. How remarkable it is that mathematics has good things to say about all of these – and how satisfying it is that we have in this book good guides to all of them and more.

Jeremy Gray
Open University

THE SIMPSONS AND THEIR MATHEMATICAL SECRETS

Simon Singh, Bloomsbury, 2013, 253 pp, £12.72, ISBN 978-1-4088-35302.

From Homer Simpson's blackboard:
$3987^{12} + 4365^{12} = 4472^{12}$.



So Andrew Wiles was mistaken! If you get out your calculator and if it works to less than 10 significant figures then you will find that this equation is true. (Compute the twelfth root of the LHS.) Only a more accurate computation shows this equation to be false.

This is one of many curious facts that you will find in this book. Of course, as a lot of this book is written for Simpsons' fans, much of the mathematics is very well known to most mathematicians, but certainly not all of it.

Singh points out that many of the writers of the Simpsons have advanced degrees in mathematically related disciplines with degrees from Harvard, Princeton or Berkeley, so they often introduce Maths or Science into their scripts. For example, in one episode which takes place at a baseball game the spectators are asked to guess the number of people attending. It is presented as a multiple choice question. The possible numbers are 8191, 8128 and 8208. All of these are arithmetically interesting; 8191 is a Mersenne prime, 8128 is a perfect number and 8028 is a so-called narcissistic number. (I will let you google this to find the definition, but here I just point out that $8208 = 8^4 + 2^4 + 0^4 + 8^4$.) Now the author has a good excuse to explain to the readers about Mersenne primes and perfect numbers. He explains that they are related but doesn't tell us how.

The most mathematically talented of the Simpsons is Lisa, Homer's daughter. In the episode "Girls just want to have sums" Lisa is frustrated, because being a girl, she is not taught proper maths. She disguises herself as a boy and attends a real maths class in the boys' school. At the end of the course she is awarded the maths prize and then reveals reveals her true identity. "That's right everyone! The best math student in the whole school is a girl! Singh uses this to tell the real story of Sophie Germain who, when she was telling of her discoveries in number theory to Lagrange and Gauss, changed her name to Mr. Leblanc. Both these mathematicians were pleased when they found out that their correspondent was a woman. Throughout this book Singh, when telling of some of the Maths in the Simpsons will follow it up with a commentary on the actual maths involved, usually explained in an elementary way. Among these topics are prime numbers, perfect numbers, topology, higher dimensional geometry, P v NP, countability. The number pi occurs as the basis of two chapters, the second being called "another slice of pi". In the first one he tells of Archimedes' polygon method of approximating pi and in the second he gives some well-known infinite series involving pi.

My favourite bit of mathematical quirkiness in this book regards taxicab numbers. Every mathematician knows the story of Hardy visiting Ramanujan in Hospital and telling him that the number of the taxi was 1729, not an interesting number, Ramanujan replies "Indeed it is, as it is the smallest integer that is the sum of two cubes in two different ways." Another cartoon written by the writers of the Simpsons is Futurama which is also discussed. In it someone gets into a taxi whose number is 87539319. This (apparently) is the smallest number that can be written as the sum of two cubes in three different ways! ($167^3 + 436^3 = 228^3 + 423^3 = 255^3 + 414^3$) An obscure joke that no one, even the most ardent number theorist, would get.

What of all these mathematical references? Singh says dismissing them would insult the writers who are "the most mathematically gifted writing teams in the history of television". With the majority of contemporary media dumbed down to the lowest common denominator, it is laudable that there are deep and complex ideas both hidden and apparent in The Simpsons.

So a really fun book, which would make an ideal present for a mathematician to buy for their children or indeed any friend with an interest in comedy.

David Singerman (University of Southampton)
Daniel Singerman (Reason Factory Ltd.)

CODEBREAKER: A LIFE IN MUSIC

by James McCarthy

Over the past few years, there's been a lot more about mathematics and mathematicians in the theatre than there used to be. So I wasn't as surprised as I might have been to hear there was going to be a performance of a new work called *Codebreaker* and that it was about Alan Turing. It had been composed by James McCarthy for the Hertfordshire Chorus and was being given its world premiere on 26 April 2014 at the Barbican with the Hertfordshire Chorus and the London Orchestra da Camera conducted by David Temple.

Before the concert began, Temple and McCarthy discussed the origin of the work. We learned that when Temple first thought of commissioning it he had very little idea who Turing was. For the benefit of those in the audience who also didn't know, James Grime provided a short account of the work on the Enigma code.

Codebreaker is about the tragedy of Turing's death, not about him as a mathematician. There is nothing representing mathematics in the music, or if there is, it went over my head. At one point the chorus sing, "I propose to consider the question 'Can machines think'," but this is immediately followed by a recording of Chamberlain's famous announcement of the beginning of the War.

The text includes quotations from Turing's mother, sung by the soprano Naomi Harvey, and a few lines from Turing himself. McCarthy explained in his introduction that he had decided to concentrate on three aspects of Turing's life: his friendship with his schoolmate Christopher Morcom, his work on breaking the German naval code, and his death. Instead of describing these explicitly, he chose poems to capture the spirit: Wilfrid Owen on love, Sara Teasdale on the dangers of the sea, Edward Thomas and Robert Burns on death. And Oscar Wilde's De Profundis as well.

I enjoyed the performance and it was certainly warmly received by the audience, so I expect it will take its place in the repertoire

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

JUNE 2014

2–3 Mathematics of String Theory (MOST) Workshop, King's College London (436)
3 PANDA, Bath (437)
5 Combinatrics in Oxford, Oxford (436)
5 Belfast Harmonic Analysis Day, Queen's University Belfast (435)
5 Rings of Differential and Integral Operators Meeting, Plymouth (436)
12-18 Curves and Surfaces Conference, Paris
13 Mathematical Modelling of Biological and Cultural Evolution, City University London (436)
16 Midlands Regional Meeting, Loughborough (437)
16–20 Interactions between Dynamical Systems and PDEs, EMS Summer School, Barcelona
16 Scattering Theory and Wave Equations Workshop, Loughborough (435)
21–22 Counting and Calculation - A Journey through Practical Mathematics, Rewley House, Oxford (437)
23–24 Emergent Dynamics of Complex Biological Networks, Exeter (437)
23–27 European Women in Mathematics 6th Summer School, Institute Mittag-Leffler, Sweden
23–27 Random Interacting Systems School and Workshop, Bath (436)
23–27 Free Boundary Problems: Theory and Applications INI Conference, Cambridge (436)
23–28 Centralized and Distributed Multi-agent Optimization: Models and Algorithms, CIME-EMS Summer School, Cetraro
24–27 Postgraduate Group Theory Conference, Birmingham (346)
25 Famous Physicists and Mathematicians from Belfast, Queen's University Belfast (437)
27 Non-Western Mathematics, Oxford (437)
29–5 Jul Category Theory 2014 Meeting, Cambridge (436)
30–2 Jul Galway Topology Colloquium, Birmingham (437)
30–2 Jul Filtering High Dimensional Complex Systems Meeting, Warwick (436)
30-3 Jul Young Researchers in Mathematics Conference, Warwick (436)
30–4 Jul Groups, Numbers, and Dynamics INI Workshop, Cambridge (436)
30–4 Jul First Joint International Meeting RSME-SCM-SEMA-SIMAI-UMI, Bilbao
30–5 Jul Building Bridges, LMS–CMI Research School, Bristol (434)

JULY 2014

3–4 Higher Structures in Number Theory Workshop, Nottingham (436)
4 Hardy Lecture, LMS Meeting, London
4 LMS Graduate Student Meeting, London
5–10 Activities on Symmetries and Correspondences Conference, Oxford (436)
6–7 Set Theory: Inner and Outer Model Theory Meeting, Bristol (437)
7–11 Symmetries in Graphs, Maps and Polytopes Workshop, ELIM Conference Centre, West Malvern (436)
7–11 An Invitation to Geometry & Topology Via G_2, LMS–CMI Research School, Imperial College London (436)
9 LMS Popular Lectures, London (437)
13–15 Modelling in Industrial Maintenance and Reliability IMA Conference, Oxford
14–16 Representations of Symmetric Groups, Hecke Algebras and KLR Algebras, Birmingham (437)

14–16 Bianchi and Siegel Modular Forms, Sheffield (437)
17–18 Projection and Slicing Theorems in Fractal Geometry, Bristol (437)
21–24 Kent Algebra Days Young Researchers, University of Kent (437)
23–25 ISSAC 2014 Kobe University, Japan
28–1 Aug Mathematical Relativity, ESI-EMS-IAMP Summer School, Vienna
29–4 Aug International Mathematics Competition for University Students, Blagoevgrad, Bulgaria (435)
28–1 Aug Contact Geometry in Dimension Three and Higher Workshop, University College London (437)

AUGUST 2014

4–8 Principles and Applications of Control to Quantum Systems INI Workshop, Cambridge (436)
6–8 Water Waves INI Summer School, Cambridge (437)
12 & 14 International Congress for Women in Mathematics 2014, Seoul, Republic of Korea (433)
13–21 ICM 2014, Seoul, Republic of Korea (437)
17–19 Mathematical Cultures Conference, De Morgan House, London (417)
18–21 Operator Methods in Harmonic Analysis Workshop, Queen's University Belfast (437)
19 LMS Meeting and Reception, ICM, Seoul, Republic of Korea (437)
25–29 Algebraic Lie Theory and Representation Theory, LMS–CMI Research School, Glasgow (435)
28–30 15th International Pure Mathematics Conference, Islamabad

SEPTEMBER 2014

1 Function Theory Meeting, London
3–5 Stable Homotopy Theory Conference, Manchester (437)
3–5 Jordan Geometric Analysis and Applications, Queen Mary, University of London (432)
3–5 Operator Theory Workshop, Queen's University, Belfast (435)
5–6 Caucasian Mathematical Conference Tbilisi, Georgia
6 Mathematics and the First World War, LMS Meeting, London (435)
10–12 Interdisciplinary Approaches to Understanding Microbial Communities INI Workshop, Cambridge (437)
18 Additive Combinatorics Meeting, Bristol (437)
18 Recent Advances in Orthogonal Polynomials and its Interactions with Integrable Systems Meeting, University of Kent (437)
22–26 Bounded Gaps Between Primes, LMS–CMI Research School, Oxford (437)
24 LMS Popular Lectures, Birmingham (437)
28–2 Oct Advances in Probability Clay Research Workshop, Oxford (436)
29–3 Oct Analytic Number Theory Clay Research Workshop, Oxford (436)
29–3 Oct Functional Transcendence around Ax–Schanuel Clay Research Workshop, Oxford (436)
29–3 Oct Symplectic Topology Clay Research Workshop, Oxford (436)

OCTOBER 2014

1 Clay Research Conference, Oxford (436)
20 History of Statistics, BSHM–Gresham College Joint Meeting, London

NOVEMBER 2014

14 LMS AGM, London

MARCH 2015

30–2 Apr Joint Meeting of the BMC and BAMC, Cambridge (436)

JULY 2015

13–17 Conference on Stochastic Processes and their Applications, Oxford

LMS-FUNDED MEETINGS

Integrable Models, Conformal Field Theory and Related Topics
held at the University of Glasgow from 11 to 12 April 2014
(report on page 18)

Poster session

Invited speakers: Vincent Pasquier (CEA Saclay) and Olaf Lechtenfeld (Leibniz)

Niall MacKay (York), Charles Young (Hertfordshire) and Vidas Regelskis (Surrey)

Kent Spectral Theory Meeting
held at the University of Kent from 14 to 17 April 2014
(report on page 15)