



## CELEBRATING 150 YEARS OF THE LONDON MATHEMATICAL SOCIETY

The LMS, founded in 1865, is marking its 150th Anniversary in 2015. To commemorate this historic occasion, the Society is launching a year-long programme of events aimed at celebrating the contributions of UK mathematics, looking back over 150 years of achievements and looking forward to exciting opportunities in mathematics for future generations. The celebration events will come under the overarching theme of Mathematics Unlocking Worlds, with a particular focus on:

- 150 Years of the LMS and Mathematics
- Mathematics as Part of our Culture
- New Ways of Communicating Mathematics

The 150th celebrations will promote mathematics as widely as possible and the key messages which it is hoped will be taken from the many events and activities taking place throughout 2015 are:

- Mathematics transforms people's lives
- Mathematics is everywhere and for everyone
- Mathematics Research: Curiosity, Creativity, Discovery.

The Society has put in place a large programme of events to celebrate this momentous anniversary. More information can be found on the LMS website (<http://www.lms.ac.uk/2015-events-listing>) which is being updated weekly with events, dates and venues. The Anniversary celebrations will be launched exactly 150 years from the first ever meeting of the Society.

See page 25 for a full programme of events.

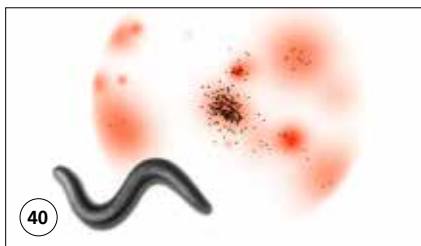


### SOCIETY MEETINGS AND EVENTS

- Friday 16 January: 150th Anniversary Launch, London
- Friday 27 February: Mary Cartwright Lecture, London *page 35*
- 16 - 20 March: LMS Invited Lectures, Professor Michael Shapiro (MSU), Durham *page 42*
- Wednesday 1 April: LMS 150th Anniversary Celebration Day at BMC-BAMC Joint Meeting, Cambridge *page 38*
- Tuesday 7 April: Northern Regional Meeting, Lancaster *page 53*
- 20 - 31 July: LMS Undergraduate Summer School, Loughborough

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## 150TH ANNIVERSARY ARTIST ASSOCIATES ANNOUNCED

The Society is pleased to announce the two selected artists for the 150th Anniversary Artist Associates Scheme. During 2015 the Society will be sponsoring George L-Legendre and Mark Francis to create projects based on mathematics. Each will work closely with the mathematics community for several months, designing works that reflect the beauty and complexity of mathematics. Following the completion of this project, their work will be displayed both in De Morgan House and at other venues and events across the UK, with the aim of engaging the widest possible audience to share in the Society's anniversary year.

Mark Francis is a Northern Irish painter living and working in London. He is an artist of international reputation whose work is represented in numerous international collections including Tate Gallery, Irish Museum of Modern Art and the Metropolitan Museum of Art, New York.



Mark Francis



George L-Legendre

George L-Legendre is an architect and a founding partner of IJP, a London-based practice exploring the intersection between space, mathematics and computation. He is currently Adjunct Associate Professor of Architecture at Harvard Graduate School of Design. A regularly published essayist, he guest edited a special issue of AD Magazine on the Mathematics of Space and 'Pasta by Design', published by Thames and Hudson.

The Scheme is being organised by Barry Phipps, Fellow of Churchill College, Cambridge. Barry was the first Interdisciplinary Fellow at Kettle's Yard, Cambridge, where he conceived and organised a number of multi-disciplinary exhibitions, including the highly acclaimed 'Beyond Measure: Conversations across Art and Science' exhibitions. Most recently, he curated 'Intersections: Henry Moore and Stringed Surfaces' at the Science Museum and Royal Society, London.

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<http://newsletter.lms.ac.uk>

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## LMS COUNCIL 2014–15



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Vice President  
University of Glasgow



**Professor John Greenlees**  
Vice President  
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Publications Secretary  
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University of Kent



**Professor Beatrice Pelloni**  
Member-at-Large  
University of Reading



**Professor Michael Singer**  
Member-at-Large  
University College, London



**Professor Gwyneth Stallard**  
Member-at-Large  
Open University



**Professor Iain Stewart**  
Member-at-Large  
University of Durham

## LMS COUNCIL 2014–15

As a result of the annual election at the AGM held on 14 November 2014, membership of the LMS Council is the following:

<b>President</b>	Professor T.J. Lyons, FRS (University of Oxford)
<b>Vice-Presidents</b>	Professor K.A. Brown, FRSE (University of Glasgow) Professor J.P.C. Greenlees (University of Sheffield) Professor R.T. Curtis (University of Birmingham) Professor S.A. Huggett (University of Plymouth)
<b>Treasurer</b>	Vacant**
<b>General Secretary</b>	Professor J.R. Hunton (University of Durham)
<b>Programme Secretary</b>	Professor F.A. Rogers (King's College London)
<b>Publications Secretary</b>	Dr J.E. Barrow-Green (Open University)
<b>Education Secretary</b>	Professor A.V. Borovik (University of Manchester)
<b>Member-at-Large (Librarian)</b>	Dr T. Brendle (University of Glasgow)
<b>Members-at-Large</b>	Dr F.W. Clarke (University of Swansea) *Professor D.M. Evans (University of East Anglia) Dr C.A. Hobbs (University of the West of England) Professor R. Hoyle (University of Surrey) *Professor E.L. Mansfield (University of Kent) Professor B. Pelloni (University of Reading) Professor M.A. Singer (University College, London) *Professor G.M. Stallard (Open University) *Professor I.A. Stewart (University of Durham)

\*Members continuing the second year of their two-year election in 2013.

\*\*The role of Programme Secretary is vacant. Council will appoint pro-tem until the next elections in 2015.

### LMS Nominating Committee

Also at the AGM, Stephen Donkin (University of York) and Alex Wilkie, FRS (University of Manchester) were elected to the Nominating Committee for three year terms of office.

Continuing members of the Nominating Committee are Penny Davies (Chair), Keith Ball, Martin Bridson, Paul Glendinning and David Tranah. Council will also appoint a representative.


www.demorganhouse.org.uk

## CONFERENCE FACILITIES




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

Call us now on 0207 927 0800 or email [roombookings@demorganhouse.co.uk](mailto:roombookings@demorganhouse.co.uk) to check availability, receive a quote or arrange a visit to our venue.

## RECORDS OF PROCEEDINGS AT MEETINGS

### ANNUAL GENERAL MEETING AND SOCIETY MEETING OF THE LONDON MATHEMATICAL SOCIETY

held on Friday 14 November 2014 at the Institute of Education, London. About 80 members and visitors were present for all or part of the meeting.

The meeting began at 3:00 pm, with the President, Professor Terry Lyons, FRS, in the Chair. Members who had not yet voted were invited to hand their ballot papers to the Scrutineers, Professors Chris Lance and Rodney Sharp.

The Vice-President, Professor Ken Brown, presented a report on the Society's activities and the President invited questions.

The General Secretary, Professor Stephen Huggett, presented a report on the preparations for the celebrations of the Society's 150th anniversary in 2015. The Society's logo was unveiled.

The Treasurer, Professor Robert Curtis, presented his report on the Society's finances during the 2013/14 financial year and the President invited questions.

Copies of the Trustees Report for 2013/14 were made available and the President invited members to adopt the Trustees for 2013/14 by a show of hands. The Trustees Report for 2013/14 was adopted.

The President proposed Messrs Kingston Smith be re-appointed as auditors for 2014/15 and invited members to approve the re-appointment by a show of hands. Messrs Kingston Smith were re-appointed as auditors for 2014/15.

The President, on Council's behalf, presented certificates to the 2014 Society Prize-winners:

Pólya Prize: Professor Miles Reid, FRS;

Fröhlich Prize: Professor Martin Hairer, FRS;

Senior Anne Bennett Prize: Professor Caroline Series;

Whitehead Prizes: Dr Clement Mouhot

The joint winners of the Senior Berwick Prize: Professor Daniel Freed, Professor Michael Hopkins and Professor Constantin Teleman and the winners of the other Whitehead Prizes, Dr Tom Coates, Professor Ruth Baker and winners of a joint Whitehead Prize; Professor Daniela Kühn and Professor Deryk Osthus, were unable to attend to collect their prizes.

Thirty people were elected to Ordinary Membership: Omar Al Hathaf, Hilal Ayvaci, Martina Balagovic, Roger Behrend, Jonathan Ben-Artzi, Timothy Bodisco, Martins Bruveris, Filippo Cagnetti, Eugenia Cheng, Dan Ciubotaru, David Conlon, Ammar Edress Mohamed, Mark Gross, Sk Sharif Hassan, Renee Hoekzema, Francis Hunt, Anne-Sophie Kaloghiros, Oded Lachish, Xin Li, Paul May, Vanessa Miemietz, Johannes Nordstrom, Olufemi Ogunsola, Luciano Rila, David Roberts, Muwafaq Salih, Jack Thorne, Timothy Walton, Ali Yusuf, Yi Zhang, Diwei Zhou.

Sixteen people were elected to Associate Membership: Alexander Best, Yumi Boote, Pierpaolo Calligaris, Alastair Darby, Simon Gritschacher, Chak Hei Lo, Wali Khan Mashwani, Robert McDermott, Olivia McLeod-Brown, Marco Montalto Monella, Steven Moon, Paul Otieno, Kamal Pal, Andrea Savoldi, Matthew Tranter, Christian Yates.

Eight people were elected to Reciprocity Membership: Shabnam Beheshti, Aleksander Chorny, Susil Kumar Jena, Mohammad Sohel Rahman, Sukhdev Singh, Vasudevan Srinivas, Milan Sturgis, Ashish Upadhyay.

One hundred and thirty three people were elected to Associate Membership for Teacher Training Scholars: Bushra Ajmal, Ayse Akel, Farhana Akther, Sarah All-Aali, Muhib Anis, Daniel Artman, Christian Atwell, Natalie Bain, James Baker, Gemma Ballard, Emily Barnett, Charlotte Barrow, Christopher Bell, Catherine Bell, Kulsuma Bibi, Pamela Bolla, Joel Branganza-Mendes, Tunde Braimah, Elizabeth Bromley, Iain Brooksbank, Nathan Brown,

Rowan Brunswick, Pieter Burger, Josephine Burn, Philippa Burrows, Nicholas Caldwell, Lisa Chalmers, Cucani Charvanathan, Rui Chen, Bethany Clapham, Robert Cleaver, Sophie Cocker, Amie Coley, Adam Cottingham, Sergio Coury, Chris Cuthbert, Bryony Denney, Stephanie Dickson, Fabienne Dischamps, Cesar Octavio Dominguez, Sean Donegan, Erin Dunn, Jamine Etheridge, James Etheridge, Emma Fairclough, Clare Fanthorpe, Rebecca Fellows, Jennifer Fidler, Joanna Fowles, Ashby Gibson, Jessica Goldberg, Cedric Gordon, Giancarlo Grasso, Oliver Gray, Joseph Harris, Thomas Harrison, Natasha Harwood, Carol Hayman, Junhui Huang, Andrew Hutchinson, Niall Hyland, Mark Ikin, Natasha Illingworth, Justine Jefferies, Lucy Jordan, Jeremy Judge, Zsafia Juhasz, Bryony King, Jennifer Kingham, Sarah Kirkpatrick, Sarah Lazzerini, Daniel Lewis, Michelle MacDonagh, Timothy MacFarlane, Jordan Macrow, Simon Main, Jennifer Manley, Jennifer Marshall, Fredrick Martin, Kim Mather, Allie Metcalfe, Thomas Millgate, Daniel Murphy, David Myers, Bushra Nisar, Laura Nolan, Rukaya Omope, Megan Orloff, Sonal Patel, Julia Payne, Rachel Pearson, Rosie Perry, David Phillips, Natalie Pickering, Andrew Price, Saima Rahman, Rafiur Rahman, Samuel Reese, John Ring, David Selwyn Roberts, William Robinson, Paul Rodrigo, Amber Ruxton, Abigail Salter, Alison Sarson, Alexandru Scarlat, Harry Seago, Bobby Seagull, Rebecca Smedley, Chris Snook-Lumb, Silvina Stoeva, Jack Styles, Kate Sullivan, Steven Sutcliffe, Alice Taherzadeh, Luke Tennant, Marcus Thomas, Chloe Thompson, Michael Turton, Ayaan Ulusow, Melissa Varney, Dominic Vipond, Elliot Welch, Helena Wells, George Welsman, Stephen Williams, Brooke Williams, James Williams, Lloyd Williams, Elizabeth Wood, Leo Wright, Susan Yates, KirstyYoxon.

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

The President announced that the next meeting of the Society would be in Plymouth on 17 December 2014 as part of the South West and South Wales Regional Meeting and Workshops on *Circular designs balanced for neighbours at distances one and two* and *Differential Galois theory*. The following Society Meeting would be in London on 27 February 2015 and would include the Mary Cartwright Lecture.

Professor E. Brian Davies, FRS gave a lecture on *Non-self-adjoint spectral problems*.

After tea, Professor Lance announced the results of the ballot. The following Officers and Members of the Council were elected:

President: Terry Lyons;

Vice-Presidents: Ken Brown, John Greenlees;

Treasurer: Robert Curtis;

General Secretary: Stephen Huggett;

Publications Secretary: John Hunton;

Programme Secretary: vacant;

Education Secretary: Alice Rogers;

Members-at-Large of Council (for 2 year terms): June Barrow-Green (Librarian Member-at-Large), Alexandre Borovik, Tara Brendle, Cathy Hobbs, Rebecca Hoyle, Beatrice Pelloni, Michael Singer.

Five Members-at-Large who were elected for two years in 2013 have a year left to serve: Francis W. Clarke, David M. Evans, Elizabeth L. Mansfield, Gwyneth Stallard and Iain A. Stewart.

The following were elected to the Nominating Committee: Stephen Donkin and Alex Wilkie. The continuing members of the Nominating Committee are: Penny Davies (Chair), Keith Ball, Martin Bridson, Paul Glendinning and David Tranah. Council will also appoint a representative.

Professor L. Nick Trefethen, FRS, winner of the 2013 Naylor Prize and Lectureship in Applied Mathematics gave the Naylor Lecture on *Mathematics of the Faraday Cage*.

After the meeting, a reception was held at De Morgan House, followed by the Annual Dinner, which was held at the Montague Hotel and attended by 60 people.

## TREASURER'S REPORT AT THE 2014 ANNUAL GENERAL MEETING

The Treasurer began by saying that, despite a slight decrease in the income from publishing which had been anticipated in the present climate, the Society had enjoyed a rather successful year financially.

In the first of a series of slides he highlighted the fact that in the year 2013-14 a total of almost £650k had been awarded in grants supporting research and other activities, an increase of 20% on last year. This was due in large part to the re-established and flourishing network of LMS representatives in universities throughout the country who had encouraged more people to apply for grants. He drew attention to the contribution made by the Clay Mathematical Institute and the Heilbronn Institute to our successful Research Schools. A further £100k had been spent in support of other mathematical events, including attendance at the Congress of the International Mathematical Union, and the International Congress of Mathematicians which both took place this year in South Korea.

The Treasurer then reported on progress made in the ongoing LMS Membership Drive, responsibility for the members being his other main duty. The Society now has Representatives in almost 60 universities and hopes to increase this number in the coming year. Over 200 new members were admitted to the Society during the last 12 months, many of whom are younger mathematicians and an increasing proportion of whom are women. The Treasurer had made membership presentations at each of the LMS/CMI/Heilbronn Research Schools during the year, in Bristol, Oxford, Glasgow and Imperial. It is now possible to apply for membership online and so the process has become much more straightforward.

It is the intention of the Society to make 2015 a seminal date in its history.

Accordingly, Council has set up a Development Committee which is establishing a community of influential friends who are enthusiastic supporters of mathematics and who are keen to help us realise our aims. It is recognised that some of the highly-valued schemes which have been introduced recently will have to terminate unless we are able to identify external funding. Beyond this it is intended to create such a splash in our Anniversary Year that the legacy will live on for many years thereafter.

Returning to investments the Treasurer explained that the bulk of the Society's financial assets are now part of a Schroders Charity Multi-Asset fund whose objective is to make a return of 4% above inflation without taking any undue risks. Whilst it had not quite managed this in the current year, once we had drawn down 3% to pay for our charitable activities, the fund was close to holding its own against the retail price index. Concern with the rather poor performance of the stock exchange for a number of years led Council to authorise a diversification of investments into residential property and the Society now owns three flats in the Kings Cross and Bloomsbury areas. These are all occupied and will generate a healthy rental income to the Society, in addition to any increase in property values which accrues.

The Treasurer concluded his presentation by comparing income and expenditure with last year. In fact the Society had a slightly lower income, due to the aforementioned decrease in revenue from publications, and a slightly higher expenditure, but overall it remains in a very healthy position financially with total assets of more than £14m.

Robert Curtis  
LMS Treasurer





LONDON  
MATHEMATICAL  
SOCIETY  
150 YEARS

**LMS TRAVEL GRANTS FOR YOUNG RESEARCHERS**  
invited to  
**THE HEIDELBERG LAUREATE FORUM**  
**23-28 AUGUST 2015, HEIDELBERG**

The Heidelberg Laureate Forum is a unique opportunity for outstanding young researchers in mathematics & computer science to meet winners of the Abel Prize, Fields Medal, Turing Award and Nevanlinna Prize during a week of scientific talks. The LMS offers financial support for participants based in the UK.

To apply for a place at the forum go to [www.heidelberg-laureate-forum.org/forum\\_2015/](http://www.heidelberg-laureate-forum.org/forum_2015/)

The application deadline is 28 February 2015.

Once invited, for LMS travel support go to [www.lms.ac.uk/lms-travel-grants-hlf](http://www.lms.ac.uk/lms-travel-grants-hlf)

Successful candidates will be sent a letter of invitation from the Heidelberg Laureate Forum. For successful candidates based in the UK, the LMS offers travel grants of up to £200 (to be matched by travel funding from other sources e.g. candidates' departments).

To apply for an LMS Travel Grant to the Heidelberg Laureate Forum, download the application form ([www.lms.ac.uk/lms-travel-grants-hlf](http://www.lms.ac.uk/lms-travel-grants-hlf)) and send to [RMC.Chair@lms.ac.uk](mailto:RMC.Chair@lms.ac.uk) with a copy of the Heidelberg Laureate Forum invitation and a letter of support from the department.



## 3rd Heidelberg Laureate Forum

### August 23 – 28, 2015

Abel, Fields and Turing Laureates  
Meet the Next Generation

HEIDELBERG  
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## Apply Now !

Online application: **November 17, 2014 until February 28, 2015**

The Heidelberg Laureate Forum (HLF) annually connects promising young researchers in mathematics and computer science with the top scientists in their fields. For one week in late summer, the Heidelberg Laureate Forum Foundation (HLFF) invites the recipients of the **Abel Prize**, **Fields Medal**, **Nevanlinna Prize** and **ACM A.M. Turing Award** to join 200 carefully selected young researchers. The HLF's focus is to provide an informal atmosphere where the most accomplished minds of mathematics and computer science thoroughly interact with the brightest minds of the next generation.

Who can apply?	<ul style="list-style-type: none"> <li>• Undergraduates</li> <li>• PhD Candidates</li> <li>• Postdocs</li> </ul> } in mathematics and computer science
Where can I apply?	Applications for the HLF can only be submitted via the online application tool! <b><a href="http://www.application.heidelberg-laureate-forum.org">www.application.heidelberg-laureate-forum.org</a></b>
What do I need?	<ul style="list-style-type: none"> <li>• <b>Required Documentation in all Categories:</b> CV; statement of purpose; awards, other scientific achievements (if any); letters of recommendation (1-3).</li> <li>• <b>Additional Information from PhD Candidates:</b> Short summary of thesis topic; transcripts; publications (if any).</li> <li>• <b>Additional Information from Postdocs:</b> Short summary of thesis topic; publications; suggestion for a 60-minute workshop to be organized as part of the Forum (optional).</li> </ul>
Selection	<ul style="list-style-type: none"> <li>• International reviewers from mathematics and computer science.</li> <li>• Scientific Committee makes the final selection of 200 participants.</li> </ul>
E-Mail Notification	<p><b>Invitation:</b> Successful applicants will be invited to participate at the HLF. If they cannot obtain financial support from their home institutions or agencies, they may request travel funding from the HLFF.</p> <p><b>Rejection:</b> The number of places for the HLF is limited. Young researchers are welcome to apply again for the next HLF.</p>
Meeting Venue	Heidelberg has a long academic tradition as the oldest university town in Germany, and is the perfect place to host the HLF.
Costs	<ul style="list-style-type: none"> <li>• Board and lodging provided</li> <li>• Travel grants available</li> </ul>
Event Language	English

**[www.heidelberg-laureate-forum.org](http://www.heidelberg-laureate-forum.org)**

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Abel, Fields and Turing Laureates  
Meet the Next Generation

HEIDELBERG  
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**3rd Heidelberg Laureate Forum**  
August 23 – 28, 2015



# Apply now!

Submission Deadline: February 28, 2015

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- **Board and lodging provided.**
- **Travel grants available.**
- **Event language: English**

*“One of the most enriching experiences of my life.”*

Young researcher at HLF 2014

The Heidelberg Laureate Forum connects highly talented young researchers (undergraduates, PhD candidates, and postdocs) with the best scientists in their research fields: mathematics and computer science (Abel, Fields, Turing, and Nevanlinna Laureates).



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For more information and application, please visit:

[www.heidelberg-laureate-forum.org](http://www.heidelberg-laureate-forum.org)

## MATHEMATICS POLICY ROUND-UP

December 2014

### SCHOOLS AND COLLEGES

#### Ofqual Chief Executive talks about A-level reform

Glenys Stacey spoke to the Westminster Education Forum about A-level reform. A transcript of the presentation is available at <http://tinyurl.com/phj23em>.

#### Closing the skills gap and the government plan for education

In a recent speech The Secretary of State for Education, Nicky Morgan said that the government is putting the issue of addressing the skills gap at the heart of its plan for education. To do that its efforts are focused on 5 key areas:

- increasing the number of young people studying the key science, technology, engineering and maths (STEM), subjects;
- attracting and developing more STEM teachers;
- increasing the rigour and responsiveness of vocational qualifications;
- creating strong links between schools and employers to open young people's minds to the opportunities available and boost their employability skills; and
- improving the quality of apprenticeships as an alternative to university study.

More information is available at <http://tinyurl.com/pkxvtuv>.

### RESEARCH

#### EPSRC publishes 2015 Strategic Plan

To take account of the changing national and international research landscape in which the EPSRC operates its Strategic Plan has been updated, with input from partners and communities, recognising external influences including the international research landscape, global economic situation and government strategies.

The Strategic Plan also 'recognises the importance of working in partnership if the UK is to maintain its position as a

world-leading location for high quality research, and be equally renowned for its innovation'. More information is available at [www.epsrc.ac.uk/newsevents/news/2015strategicplan/](http://www.epsrc.ac.uk/newsevents/news/2015strategicplan/).

#### Headquarters for new Alan Turing Institute announced

Headquarters of the £42 million Alan Turing Institute for Data Science will be at London's new Knowledge Quarter – with 'spurs' around the country. The world-class research institute, dedicated to British computer pioneer and WW2 Enigma code-breaker Alan Turing, will work with universities across the country to focus on new ways of collecting, organising and analysing large sets of data.

The institute will be based at the British Library, a key part of the new Knowledge Quarter – a partnership of 35 academic, cultural, research, scientific and media organisations based in Kings Cross, Euston and Bloomsbury that will share ideas, research and innovation. Its members range from the British Museum and the University of London to the Wellcome Trust. More information is available at <http://tinyurl.com/m4xx75x>.

### OTHER

#### Transforming the higher education culture

The annual report of the Equality Change Unit (ECU), *Equality in HE: statistical report 2014*, says that 'focused support for staff and students is needed to transform higher education into a more inclusive culture'. Older students, disabled staff and students, women and people from black and minority ethnic backgrounds need more focused support from their universities, according to the latest staff and student equality statistics. The report aims to focus universities' attention on where action is needed. More information is available at [tinyurl.com/n9babtt](http://tinyurl.com/n9babtt).

### Your Life Campaign Launch

Your Life is a three-year campaign to ensure young adults in the UK have the maths and science skills needed to succeed in the current competitive global economy. It looks to inspire young people to study maths and physics as a gateway into wide-ranging careers while also triggering employers to recruit and retain this talent. More information about the campaign is available at <http://yourlife.org.uk/about/>. The Secretary of State for Education, Nicky Morgan spoke about science and mathematics at the launch. A transcript of her speech is available at <http://tinyurl.com/o3pk4ag>.



### Big data analytics report

A report on the future demand for specialists in big data reveals 'soaring' demand for big data skills in the UK. According to the report there will be approximately 56,000 job opportunities in 2020 for big data professionals. However, the research also shows that there are serious skills shortages in big data, with recruiters reporting that three quarters (77%) of big data positions were either 'very' or 'fairly' difficult to fill. The report emphasises the need for a multidisciplinary approach to data science, with businesses needing to develop data science teams comprising people with complementary skills. More information is available at <http://tinyurl.com/onz4khs>.

Dr John Johnston  
Joint Promotion of Mathematics



LONDON  
MATHEMATICAL  
SOCIETY  
150 YEARS

## DAVID CRIGHTON MEDAL 2015

### Call for Nominations

The David Crighton Medal was established by the Councils of the LMS and IMA in 2002 in order to pay tribute to the memory of Professor David George Crighton, FRS. The silver gilt medal will be awarded to an eminent mathematician for services **both** to mathematics and to the mathematical community, who is normally resident in the mathematical community represented by the two organisations on the 1st January of the year of the award.

The award is considered triennially by the Councils of the Institute and the Society. The medal-winner will normally be presented with the award at a joint meeting of the IMA and the LMS, and will be invited to give a lecture.

The David Crighton Medal was awarded in 2012 to Professor Arieh Iserles and Dr Peter Neumann, OBE. Previous winners of the Medal are Professor Keith Moffat, FRS (2009), Professor Sir Christopher Zeeman, FRS (2006) and Professor Sir John Ball, FRS (2003).

Nominations are now invited. These should be made on a nomination form available on both Societies' websites (<http://bit.ly/DavidCrightonMedal2015>) or from the Secretary to the David Crighton Committee ([prizes@ima.org.uk](mailto:prizes@ima.org.uk)).

Nominations must be received by **28 February 2015**.

## LONGSTANDING MEMBERS

The following is a list of the one hundred and forty four members who have completed fifty years or more of membership of the London Mathematical Society. The list also

includes members who will be celebrating their fiftieth year of membership during 2015, whilst the Society celebrates its 150th Anniversary.

Date of Election	Name
17 Mar 1943	Dyson, F.J.
15 Jun 1944	Williams, A.E.
23 May 1946	Huppert, E.L.
20 Mar 1947	Hayman, W.K.
19 Jun 1947	Cassels, J.W.S.
18 Mar 1948	Isaacs, G.L.
18 Mar 1948	Reade, M.O.
13 Dec 1948	Fishel, B.
19 Jan 1950	Shepherdson, J.C.
20 Jan 1949	Borwein, D.
16 Feb 1950	Lehner, J.
23 Mar 1950	Ponting, F.W.
17 May 1951	Roth, K.F.
20 Dec 1951	Dowker, Y.N.
17 Jan 1952	Wilson, D.H.
15 Feb 1952	Shephard, G.C.
20 Mar 1952	Swinerton-Dyer, H.P.F.
20 Nov 1952	Knight, A.J.
18 Dec 1952	Reeve, J.E.
18 Jun 1953	Marstrand, J.M.
18 Jun 1953	Rayner, M.E.
17 Dec 1953	Ringrose, J.R.
17 Dec 1953	Samet, P.A.
21 Jan 1954	Zeeman, E.C.
18 Feb 1954	Cohen, D.E.
18 Feb 1954	James, I.M.
17 Jun 1954	Taylor, S.J.
25 Nov 1954	Amson, J.C.
27 Jan 1955	Atiyah, M.F.
24 Feb 1955	Rayner, F.J.
24 Mar 1955	Farahat, H.K.
12 May 1955	Harrop, R.
12 May 1955	Murdoch, B.H.
12 May 1955	Wall, G.E.
15 Dec 1955	Armitage, J.V.
19 Jan 1956	Bowers, J.F.

15 Mar 1956	Edmunds, D.E.
19 Apr 1956	Penrose, R.
14 Jun 1956	Collins, W.D.
14 Jun 1956	Perry, R.L.
15 Nov 1956	Edwards, D.A.
14 Mar 1957	Brown, R.
13 Jun 1957	Brown, A.L.
18 Jun 1957	Russell, D.C.
21 Nov 1957	Wallington, J.E.
19 Dec 1957	Longdon, L.W.
19 Dec 1957	Mohamed, I.J.
19 Dec 1957	Monk, D.
19 Dec 1957	Newman, M.F.
19 Dec 1957	Schneider, H.
20 Mar 1958	Keedwell, A.D.
20 Mar 1958	Wallace, D.A.R.
17 Apr 1958	Macdonald, I.G.
15 May 1958	Foster, D.M.E.
20 Nov 1958	Rigby, J.F.
17 Dec 1958	De Barra, G.
18 Dec 1958	Birch, B.J.
18 Dec 1958	Higgins, P.J.
15 Jan 1959	Blackburn, N.
16 Apr 1959	Burgess, D.A.
16 Apr 1959	Manogue, J.F.
21 May 1959	Ingram, G.
18 Jun 1959	Carter, R.W.
17 Dec 1959	Eames, W.P.
17 Dec 1959	Hoskins, R.F.
17 Dec 1959	West, A.
17 Mar 1960	Guy, R.K.
17 Mar 1960	Harris, D.J.
18 Mar 1960	Scourfield, E.J.
18 Mar 1960	Strauss, D.
19 May 1960	Hoare, A.H.M.
17 Nov 1960	Morris, A.O.
15 Dec 1960	Turner-Smith, R.F.

16 Mar 1961	Rhodes, F.
18 May 1961	Sklar, A.
15 Jun 1961	Button, L.G.
15 Jun 1961	Dey, I.M.S.
15 Jun 1961	Dlab, V.
15 Jun 1961	Robertson, S.A.
16 Nov 1961	Croft, H.T.
21 Dec 1961	Barry, P.D.
21 Dec 1961	Davies, R.O.
21 Dec 1961	Rutter, J.W.
21 Dec 1961	Sands, A.D.
21 Dec 1961	Wall, C.T.C.
18 Jan 1962	Ezeilo, J.O.C.
18 Jan 1962	Kingman, J.F.C.
15 Mar 1962	Baumslag, B.
26 Apr 1962	Cohn, J.H.E.
26 Apr 1962	Williams, S.O.
17 May 1962	Lue, A.S.T.
17 May 1962	Mullin, A.A.
17 May 1962	Thompson, A.C.
21 Jun 1962	Peters, J.E.
15 Nov 1962	Gaffney, M.P.
15 Nov 1962	Riles, J.B.
20 Dec 1962	Douglas, A.J.
20 Dec 1962	Pears, A.R.
20 Dec 1962	Roberts, J.B.
20 Dec 1962	Wallace, E.W.
17 Jan 1963	Anderson, J.M.
17 Jan 1963	Beardon, A.F.
17 Jan 1963	Blyth, T.S.
17 Jan 1963	Dugdale, J.K.
17 Jan 1963	Epstein, D.B.A.
17 Jan 1963	Garling, D.J.H.
17 Jan 1963	Piper, F.C.
17 Jan 1963	Robinson, W.J.
17 Jan 1963	Whittington, J.E.
18 Apr 1963	Bernau, S.J.
18 Apr 1963	Mazhar, S.M.
18 Apr 1963	Sutherland, W.A.
15 May 1963	Ault, J.C.
16 May 1963	Harte, R.E.
16 May 1963	Lee, P.M.
16 May 1963	Sondheimer, E.H.

16 May 1963	Weinmann, A.
16 May 1963	White, D.J.
20 Jun 1963	Duren, P.L.
20 Jun 1963	Pym, J.S.
20 Jun 1963	Rogosinski, H.P.
21 Nov 1963	Bechtell, H.F.
21 Nov 1963	Curtis, C.W.
21 Nov 1963	Eggan, L.C.
21 Nov 1963	Lowe, P.G.
19 Dec 1963	Gani, J.M.
19 Dec 1963	Heywood, P.
19 Dec 1963	Knowles, J.D.
19 Dec 1963	Watters, J.F.
16 Jan 1964	Craven, B.D.
16 Jan 1964	Shawyer, B.L.R.
16 Jan 1964	Steer, B.F.
19 Mar 1964	Perfect, H.
21 May 1964	Brown, W.G.
25 Jun 1964	Erdos, J.A.
19 Nov 1964	Evans, E.A.
19 Nov 1964	Roseblade, J.E.
19 Nov 1964	Vincent-Smith, G.F.
16 Dec 1964	Larman, D.G.
16 Dec 1964	Nelson, R.
16 Dec 1964	Reid, G.A.
17 Dec 1964	Ledgard, R.C.
17 Dec 1964	Morton, H.R.
17 Dec 1964	Neumann, P.M.
21 Jan 1965	Kegel, O.H.
21 Jan 1965	Walker, G.
18 Mar 1965	DeWallens, J.H.
10 Apr 1965	Batty, J.C.R.
20 May 1965	Hirst, K.E.
17 Jun 1965	Dodson, M.M.
17 Jun 1965	McGregor, M.T.
18 Nov 1965	Gardiner, C.F.
18 Nov 1965	Giblin, P.J.
18 Nov 1965	Harvey, W.J.
18 Nov 1965	McCrudden, M.
18 Nov 1965	Reade, J.B.
18 Nov 1965	Robinson, D.J.S.
16 Dec 1965	Evans, W.D.



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## LMS 150TH ANNIVERSARY UNDERGRADUATE RESEARCH BURSARIES IN MATHEMATICS 2015

### NATURE OF AWARDS

The purpose of the awards is to give experience of research to undergraduates with research potential and to encourage them to consider a career in scientific research. The awards provide support for the student at a rate of £180 per week (or £190 per week in London), for a period of between six and eight weeks.

**The closing date for receipt of applications is 5 pm Tuesday 10 February 2015.**

### ELIGIBILITY

- Open to Undergraduate Students in the **intermediate years** (i.e. 2/3, 2/4 or 3/4) of their undergraduate degree to undertake the project during the summer vacation between their intermediate years. Students in the final year of their degree intending to undertake a **taught Masters** degree immediately following their undergraduate degree may apply. (*Applications on behalf of first-year undergraduates will not be considered.*)
- **Mature students** are eligible to apply, but must not have a previous degree in any subject.
- Students must be registered at a **UK institution** for the majority of their undergraduate degree.
- Bursaries will **not** be awarded for projects that are a **part of degree work**, or that take place overseas for more than 50% of the project time.
- Researchers in Mathematics at universities and research institutions within the UK are eligible to apply. Interdisciplinary projects will be considered providing the project has significant mathematical content.
- **Postdoctoral researchers** and **new lecturers**, early in their careers are also encouraged to apply, and should note this on the application form.
- Only **one** application should be submitted by a supervisor.
- Normally no more than **four** awards will be made to an individual department or subject area within multidisciplinary departments or schools. Please bear in mind that this is a national scheme with a limited number of bursaries.
- Bursaries will only be granted for the student named on the application form; awards are not transferable between students.

### HOW TO APPLY

- Application forms can be downloaded from the Society's website: [www.lms.ac.uk/content/grants](http://www.lms.ac.uk/content/grants)
- Applications must be made by the project supervisor on behalf of the student, and not by the student.
- Applications should be discussed with the nominated student, who should also contribute to the project design.
- Applications should include the student's academic record and a supporting statement from his/her academic tutor.
- Applications must be signed by the Head of Department to confirm his/her approval for the award to be administered by the department. (*Awards are not offered directly to individual researchers but to the institutions to which they belong.*)

Further information including the *Guidelines on How to Apply* are available from the Society website: [www.lms.ac.uk/content/grants](http://www.lms.ac.uk/content/grants). Queries may also be addressed to Katy Henderson ([urb@lms.ac.uk](mailto:urb@lms.ac.uk)).





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## LMS INVITED LECTURE SERIES 2016

### Call for Proposals

Proposals for the Invited Lecture Series 2016 are now being sought. Proposers are invited to suggest a topic and Lecturer for the lecture series, which they should be prepared to organise at their own institution or a suitable conference centre within the UK.

The annual LMS Invited Lecturers scheme aims to bring a distinguished overseas mathematician to the United Kingdom to present a small course of about ten lectures held over five days (Monday-Friday). Each course of Invited Lectures is on a major field of current mathematical research, and is instructional in nature, being directed both at graduate students beginning research and at established mathematicians who wish to learn about a field outside their own research specialism.

The format of annual Invited Lectures series is:

- meetings at which a single speaker gives a course of about ten expository lectures, examining some subject in depth;
- held over a five day period (Monday to Friday) during a University vacation;
- the meetings are residential and open to all interested. It is intended that the texts of the lectures given in the series shall be published.
- In addition to full expenses, the lecturer is offered a fee for giving the course.
- A grant is given to the host department to support attendance at the lectures.

Enquiries about the Invited Lectures should be directed to the Programme Secretary at the Society (lmsmeetings@lms.ac.uk). The deadline for the submission of proposals is **6 February 2015**.

For more information about the scheme and how to submit a proposal, please visit: [www.lms.ac.uk/events/lectures/invited-lecturer-proposals](http://www.lms.ac.uk/events/lectures/invited-lecturer-proposals).

The Invited Lecturer for 2015 is **Professor Michael Shapiro** (Michigan State University), who will visit Durham from 16-20 March 2015 to give a series of lectures on Cluster algebras and integrable systems (see page 8 for further details).

Recent previous lecturers have been:

- 2014 J. Väänänen (University of Helsinki and University of Amsterdam) *Games, trees and models, Foundations of mathematics and second order logic and The mathematical theory of dependence and independence.*
- 2013 F. Bogomolov (NYU) *Birational geometry and Galois groups*
- 2012 A. Borodin (MIT) *Determinantal point processes and representation theory*
- 2011 E. Candes (Stanford) *Compressed sensing*
- 2010 M. Bramson (University of Minnesota) *Stability of queuing networks*
- 2009 A.D. Ionescu (University of Wisconsin-Madison) *Black holes in vacuum: examples & uniqueness properties*

## LMS GRANT SCHEMES

### Next Closing Date for Research Grant Applications: 31 January 2015

Applications are invited for the following grants:

#### Conferences (Scheme 1)

Grants of **up to £7,000** are available to provide partial support for conferences held in the United Kingdom. This includes a maximum of £4,000 for principal speakers, £2,000 to support the attendance of research students who are studying at universities in the UK, and £1,000 to support the attendance of participants from Scheme 5 or former Soviet Union countries.

#### Celebrating new appointments (Scheme 1)

Grants of **up to £600** are available to provide partial support for meetings held in the United Kingdom to celebrate the new appointment of a lecturer at a UK university.

#### Visits to the UK (Scheme 2)

Grants of **up to £1,500** are available to provide partial support for a visitor to the UK, who will give lectures in at least three separate institutions. Awards are made to the host towards the travel, accommodation and subsistence costs of the visitor.

#### Research in Pairs (Scheme 4)

Grants of **up to £1,200** are available to support a visit for collaborative research either by the grant holder to another institution abroad, or by a named mathematician from abroad to the home base of the grant holder. Grants of **up to £600** are available to support a visit for collaborative research either by the grant holder to another institution within the UK, or by a named mathematician from within the UK to the home base of the grant holder.

#### International Short Visits (Scheme 5)

Grants of **up to £3,000** are available to support a visit for collaborative research by a named mathematician from a country in Africa (or countries where mathematics is in a similar position) to the home base of the grant holder. Grants of **up to £2,000** are available to support

a visit for collaborative research by the grant holder to a country in Africa (or countries where mathematics is in a similar position).

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

- Applications received by **31 January 2015** will be considered at a meeting in March.
- Applications should be submitted well in advance of the date of the event for which funding is requested.
- Normally grants are not made for events which have already happened or where insufficient time has been allowed for processing of the application.

Queries regarding applications can be addressed to the Grants Administrators: Sylvia Daly and Elizabeth Fisher (tel: 020 7291 9971/3, email: [grants@lms.ac.uk](mailto:grants@lms.ac.uk)) who will be pleased to discuss proposals informally with potential applicants and give advice on the submission of an application.

#### Postgraduate Research Conferences (Scheme 8)

Grants of **up to £4,000** are available to provide partial support for conferences held in the United Kingdom, which are organised by and are for postgraduate research students.

### OTHER LMS GRANTS AND FUNDING

#### Research Workshop Grants

The Society offers grants to support Research Workshops held in the UK. Requests for support (for travel and subsistence of participants, and reasonable associated costs) in the range **£1,000-£10,000** will be considered. The maximum award is **£10,000**, but a typical award is in the range of **£3,000-£5,000**. Applications for partial support of workshops with other sources of support will be considered. Applications should normally be submitted 12 months in advance of the proposed workshop. For further information visit: [www.lms.ac.uk/content/research-workshops-grants](http://www.lms.ac.uk/content/research-workshops-grants).

### 150th Anniversary Postdoctoral Mobility Grants 2015-16

**Next deadline: 31 March 2015**

The Society will award grants up to **£9,200** to mathematicians of excellent promise. The purpose of the grants is to support a period of study and research in mathematics between three and six months in the academic year 2015-16 at one or more institutions other than the holder's home institution (the grant holder's home institution may be included for applicants with circumstances that make moving impractical, please see the website for the full guidelines). They are intended to support promising researchers during the transitional period between having submitted their thesis and the start of their first postdoctoral employment. The value of the grant will be calculated at £1,200 per month plus a travel allowance of up to £2,000. For more information and an application form, please visit: [www.lms.ac.uk/grants/postdoc-mobility-grants](http://www.lms.ac.uk/grants/postdoc-mobility-grants).

### Undergraduate Research Bursaries in Mathematics 2015

**Next deadline: 10 February 2015**

Open to Undergraduate Students in the intermediate years (i.e. 2/3, 2/4 or 3/4) of their undergraduate degree to undertake the project during the summer vacation. Students in the final year of their degree intending to undertake a taught Masters degree immediately following their undergraduate degree may apply. (First-year undergraduates are not eligible). The purpose of the awards is to give experience of research to undergraduates with research potential and to encourage them to consider a career in scientific research. The awards provide support for the student at a rate of £180 per week (or £190 per week in London), for a period of between six and eight weeks. For more information and an application form, please visit: [www.lms.ac.uk/grants/undergraduate-research-bursaries](http://www.lms.ac.uk/grants/undergraduate-research-bursaries).

### Young British and Russian Mathematicians Scheme

**Next deadline: 31 January 2015**

#### Visits to Russia

Applications are invited from young British postdoctoral mathematicians who wish to spend a few weeks in Russia giving a series of survey lectures on the work of their school. The LMS is offering grants of **up to £500** to meet the travel costs, while the host should apply to the Russian Academy of Sciences for funding towards local expenses for accommodation and subsistence. Please contact Sylvia Daly ([grants@lms.ac.uk](mailto:grants@lms.ac.uk)) for information before contacting the Russian Academy of Sciences for funding. Applications to the LMS should include the following:

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

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

#### Visits to Britain

Under this Scheme, applications may also be made by any mathematician in Britain wishing to host a visit by a young Russian postdoctoral mathematician who wishes to spend a few weeks in Britain giving a series of survey lectures on the work of their Russian seminar. The LMS is offering grants to the host institution to meet the visitor's actual travel and accommodation costs of **up to £1,500**. Applications should include the following:

1. Name and brief CV of the visitor.

2. A brief budget.
3. A brief description of the course of lectures.
4. A letter or email of agreement from the head of the host department, including the proposed dates of the visit.

Financial and academic reports will be required after the visit. Further details of the Scheme can be found on the LMS website: [www.lms.ac.uk/content/international-grants](http://www.lms.ac.uk/content/international-grants). Applications received by **31 January 2015** will be considered at a meeting in March. Enquiries should be made to the Grants Administrators: Sylvia Daly and Elizabeth Fisher (tel: 020 7291 9971/3, email: [grants@lms.ac.uk](mailto:grants@lms.ac.uk)).

### Spitalfields Days

**Next deadline: 31 January 2015**

Grants of **up to £1,000** are available to support an LMS Spitalfields Day, which have been run since 1987 and are in honour of the Society's predecessor, the Spitalfields Mathematical Society (1717-1845). A Spitalfields Day is a one-day meeting, which is usually associated with a long-term symposium on a specialist topic at a UK university. Selected participants, often distinguished experts from overseas, give survey lectures (or other types of lecture accessible to a general mathematical audience) on topics in the field of the symposium. Please see the website for further details: [www.lms.ac.uk/content/spitalfields-days](http://www.lms.ac.uk/content/spitalfields-days).

### Grace Chisholm Young Fellowship

**Next deadline: 30 June 2015**

The Society offers two fellowships of **£1,000** (consisting of £500 personal support and £500 contribution to a host institution) each year to mathematicians who need support when their mathematical career is interrupted by family responsibilities, relocation of partner, or other similar circumstance.

These fellowships, named after Grace Chisholm Young, aim to provide some support, making possible some continuous mathematical activity, so enabling the fellow to be in a position to apply for posts when circumstances allow. The Fellowship will give an endorsement

of the holder's status as a mathematician, so that the break in formal employment should not prevent them from resuming a career as a mathematician at a later stage. Please see the website for further details: [www.lms.ac.uk/grants/grace-chisholm-young-fellowships](http://www.lms.ac.uk/grants/grace-chisholm-young-fellowships).

### Small Grants for Education

**Next deadline: 31 January 2015**

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

### Teacher CPD Grants

**Next deadline: 31 January 2015**

Funding for grants **up to £400** is available to provide opportunities for mathematics teachers to attend training which is specifically mathematical. It is intended to facilitate mathematical professional development to allow teachers in UK schools/educational institutions to:

- develop their subject knowledge
- engage in a deeper understanding of how to develop mathematical thinking
- appreciate the interconnectivity of mathematical topics
- update themselves on mathematics curriculum reform
- use technology when and where appropriate

Visit the website for further details: <http://www.lms.ac.uk/grants/teacher-cpd-grants>.

### Computer Science Small Grants (Scheme 7)

**Next deadline: 15 April 2015**

Funding for grants **up to £500** is available to support a visit for collaborative research at the interface of Mathematics and Computer Science either by the grant holder to another institu-

tion within the UK or abroad, or by a named mathematician from within the UK or abroad to the home base of the grant holder. Please see the website for further details: [www.lms.ac.uk/content/computer-science-small-grants-scheme-7](http://www.lms.ac.uk/content/computer-science-small-grants-scheme-7).

### Childcare Supplementary Grants

**Next deadline: 31 January 2015**

Grants of **up to £200** are available to parents working in mathematics to help with the cost

of childcare when attending a conference or research meeting. The Society believes that all parents working in mathematics should be able to attend conferences and research meetings without being hindered by childcare costs. Institutions are expected to make provision for childcare costs and parents are encouraged to make enquiries. However, where this is not available, the Society administers a Childcare Supplementary Grants Scheme. Visit the website for further details: [www.lms.ac.uk/content/childcare-supplementary-grants](http://www.lms.ac.uk/content/childcare-supplementary-grants).

## LMS COUNCIL DIARY

**14 November 2014**

### A personal view

The meeting began on a sober note as we learnt from Past President Graeme Segal that Alexander Grothendieck (one of the greatest mathematicians of the 20th century) had died the day before.

Among the meetings recently attended by the President was a most constructive CMS Board meeting with the new Chief Executive of EPSRC. The issue of geographic diversity had been well received. There would however be no change to the current unacceptable gender balance of EPSRC's Mathematics Strategic Advisory Team until new recruitment was undertaken next April.

Education Secretary Alice Rogers reported that as the Higher Education Academy was pulling out of the training of new lecturers, HoDMS were taking over its role. Council member Cathy Hobbs, who is Chair of HoDMS at present, said that the new course would be essentially the same as the existing one, but it would be important to ensure that it was accredited.

In the context of the continuing search for a candidate for the vacancy of Programme Secretary, there was a discussion of how the work of the Programme Committee should be structured. The Programme Committee has responsibility for two main areas: approving research grants and arranging Society meetings. It was agreed, particularly in the light of a

recent increase in the number of grant applications, that there should be some separation of these tasks. A search was therefore being undertaken for a Programme Secretary, who would retain overall responsibility, and for a Deputy Secretary who would take charge of the assessment of grant applications.

The Treasurer announced that there had been as many as 148 new membership applications since the last meeting only a month ago. Though recruitment does continue to be buoyant, the bulk of this particular figure was made up of holders of Teacher Training Scholarships in Mathematics, who have the right to free associate membership. The hope is, of course, that they will retain their membership in future years.

At this time of year Council is provided with lists of members whose subscription is unpaid for either one or two years. Since the rules are rather strict, meaning that membership ceases when the subscription hasn't been paid for two years, Council members are asked to help in contacting those whose failure to pay may have been inadvertent.

The meeting ended with the President thanking Colva Roney-Dougal, Graeme Segal, Rob Wilson and Ulrike Tillmann and who were leaving Council, and wishing the best of luck for those standing for election.

Francis Clarke

## EUROPEAN NEWS

The following items are from the EMS webpage [www.euro-math-soc.eu/recent-news](http://www.euro-math-soc.eu/recent-news).

### **EuroScience: Petition against budget cuts in Research and Development**

Scientists from different European countries describe in a petition that, despite marked heterogeneity in the situation of scientific research in their respective countries, there are strong similarities in the destructive policies being followed. Their critical analysis, highlighted in *Nature* and simultaneously published in a number of newspapers across Europe, is a wake-up call to policy makers to correct their course imposing drastic budget cuts in Research and Development (R&D) that make European countries more vulnerable in the mid- and long-term to future economic crises. The petition, endorsed by *EuroScience* and several other organisations, has already received almost 15,000 signatures. For further information visit [tinyurl.com/m98bze8](http://tinyurl.com/m98bze8).

### **New journal Analysis, Geometry and Number Theory**

*Analysis, Geometry and Number Theory* is an international, blind peer-reviewed, semi-annual journal published in several issues by Fabrizio Serra editore (Pisa-Roma) devoted to selected publications in analysis, geometry, number theory and their connections. Submissions are solicited for the first issue of 2015; both original papers and review papers are welcome. For further information visit the website at <http://tinyurl.com/plsrhc4>.

### **EMS Monograph Award**

The EMS Monograph Award is assigned every two years to the author(s) of a monograph in any area of mathematics that is judged by the selection committee to be an outstanding contribution to its field. The prize is endowed with €10,000, and the winning monograph is published by the EMS Publishing House in the series *EMS Tracts in Mathematics*. The monograph must be original and

unpublished, written in English, and should not be submitted elsewhere until an editorial decision is rendered on the submission. The second award will be announced in 2016, the deadline for submissions is **30 June 2015**.

### **Calderon Prize**

The Inverse Problems International Association (IPIA) will award the fifth Calderon Prize to a researcher under the age of 40 who has made distinguished contributions to the field of inverse problems broadly defined. The deadline for nominations is **31 January 2015**. Nominations should be sent to Professor Otmar Scherzer ([otmar.scherzer@univie.ac.at](mailto:otmar.scherzer@univie.ac.at)).

### **2015 ICIAM prizes announced**

The *Collatz Prize* is awarded to Annalisa Buffa (IMATI CNR) in recognition of her spectacular use of deep and sophisticated mathematical concepts to obtain outstanding contributions to the development of computer simulations in science and industry.

The *Lagrange Prize* is awarded to Andrew J. Majda of the Courant Institute at New York University in recognition of his groundbreaking, original, fundamental and pioneering contributions to applied mathematics and, in particular, to wave front propagation and combustion, scattering theory, fluid dynamics and atmosphere climate science.

The *Maxwell Prize* is awarded to Jean-Michel Coron of the Université Pierre et Marie Curie for his fundamental and original contributions to the study of variational methods for partial differential equations and the nonlinear control of nonlinear partial differential equations.

The *Pioneer Prize* is awarded to Björn Engquist of the University of Texas at Austin, USA for fundamental contributions in the field of applied mathematics, numerical analysis and scientific computing which have had long-lasting impact in the field as well as successful applications in science, engineering and industry.

The *Su Buchin Prize* is awarded to Li Tatsien of the Fudan University, Shanghai in recognition of his outstanding contributions to applied mathematics and to the dissemination of mathematical sciences in developing countries.

For further information visit [www.iciam.org/Prizes/ICIAM-PrizeWinners-2015.pdf](http://www.iciam.org/Prizes/ICIAM-PrizeWinners-2015.pdf).

#### Balzan Prize 2014

The Balzan Prize in mathematics (pure or applied) of the International Balzan Prize Foundation was in 2014 awarded to Dennis Sullivan (CUNY, USA) for 'his major contributions to topology and the theory of dynamical systems, opening new perspectives for generations to come. For his exceptional results in many fields of mathematics, such as geometry, the theory of Kleinian groups, analysis and number theory'.

For further information visit the website at <http://tinyurl.com/p5ows7d>.

#### Edinburgh and Barcelona

The Edinburgh Mathematical Society and the Societat Catalana de Matematiques invite participants to the first joint meeting from 28 to 30 May 2015 at the Institut d'Estudis Catalans, Barcelona. The programme will focus on research areas of current interest for the two scientific communities. Plenary speakers and thematic sessions have been selected by the Scientific Committee of the meeting. More information at <http://tinyurl.com/pufzwfv>.

#### Société Mathématique de France (SMF)

The Centre International de Rencontres Mathématiques (CIRM) located in Marseille (with CNRS and SMF as governing bodies) is launching its *Audiovisual Mathematics Library*, a sophisticated platform built on a corpus of talks given by worldwide mathematicians during their stay at CIRM. This new tool provides the functionalities of a high level search applied to indexed and enriched videos. Presentation and Access to the *Audiovisual Mathematics Library* can be found on the site <http://library.cirm-math.fr>.

#### Ostrowski Prize 2015

The jury of the Ostrowski Prize invites nominations for candidates. Nominations should include a CV of the candidate, a letter of nomination and two to three letters of reference. The Chair of the jury for 2015 is Christian Berg of the University of Copenhagen, Denmark. Nominations should be sent to [berg@math.ku.dk](mailto:berg@math.ku.dk) by **15 April 2015**. More information is available at <http://tinyurl.com/kc8v7g8>.

#### EMS Newsletter

The December 2014 issue of the *EMS Newsletter* is online at [tinyurl.com/jw5gyc5](http://tinyurl.com/jw5gyc5). This issue includes the first part of a series of articles on Seoul ICM, as well as an overview of the EMS by the retiring President Marta Sanz-Solé, and an article by D.H.J. Polymath on *Bounded Gaps between Primes*.



David Chillingworth  
LMS/EMS Correspondent

## DNA OF MATHEMATICS

by Dr. Mehran Basti

Friesenpress.com

and

major online bookstores



LONDON  
MATHEMATICAL  
SOCIETY  
150 YEARS

## 150TH ANNIVERSARY

### LMS PRIZES 2015

#### Call for Nominations

The London Mathematical Society welcomes nominations for the 2015 prizes, to recognise and celebrate achievements in and contributions to mathematics.

In 2015, the LMS Council expects to award:

- **The Polya Prize** - in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom.
- **The Shephard Prize** – *awarded for the first time in 2015*. For making a 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 Senior Whitehead Prize** - for work in, influence on or service to mathematics, or recognition of lecturing gifts in the field of mathematics.
- **The Naylor Prize and Lectureship** - for work in, and influence on, and contributions to applied mathematics and/or the applications of mathematics, and lecturing gifts.
- **The Berwick Prize** - in recognition of an outstanding piece of mathematical research actually published by the Society during the eight years ending on 31 December 2014.
- **The Whitehead Prizes** - for work in and influence on mathematics.
- **The Anne Bennett Prize** – *awarded for the first time in 2015*. For work in and influence on mathematics, particularly acting as an inspiration for women mathematicians.
- **The Hirst Prize for the History of Mathematics** – *awarded to mark the LMS 150th Anniversary* – for contributions to the study of the history of mathematics. The prize will be awarded in recognition of original and innovative work in the history of mathematics, which may be in any medium.
- **The Prize for Communication of Mathematics** - *awarded to mark the LMS 150th Anniversary* - for the award of the prize are communication of mathematics and excellence in communication. The communication of ideas may be in any medium and the audiences involved may be of any age-group.

For further information and nomination forms, please visit the LMS website ([www.lms.ac.uk/content/nominations-lms-prizes](http://www.lms.ac.uk/content/nominations-lms-prizes)) or contact Duncan Turton, Secretary to the Prizes Committee at the Society (tel: 020 7927 0801, email: [prizes@lms.ac.uk](mailto:prizes@lms.ac.uk)).

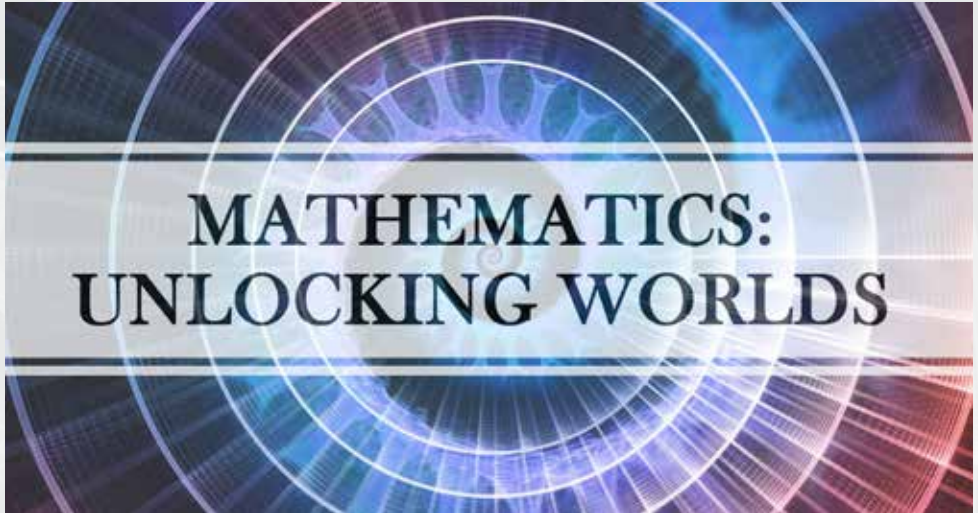
The Prizes Committee is keen to increase the number of nominations it receives and, in particular, the number of nominations for women, which are disproportionately low each year. The prize regulations refer to the concept of 'academic age' — rather than date of birth — in order to take account more fully of broken career patterns.

Closing date for nominations  
**Monday 20 January 2015**





## Join us in the Launch of the 150th Anniversary Celebrations



The 150th Anniversary Launch on 16 January 2015 will be held at The Goldsmiths' Hall, London, which has an appropriate historical link as it is the venue in which the Society held its Centenary Dinner in 1965. The aim of this exciting event is to introduce the year of celebrations, to recognise and promote 150 years of the Society, and to highlight the historical and continuing value and prevalence of mathematics to society and in day-to-day life - from entertainment to everyday objects, linking this to the actual underlying mathematics. The event will illustrate that mathematics is for everyone and that everybody uses it, whether consciously or not.

The talks will showcase the exciting ways in which mathematics touches so many parts of our daily lives and will be given by mathematicians at the cutting-edge of mathematics research, whose successes have contributed to, amongst other things, the invention of the Xbox KINECT motion sensor, linking signals to

masts which enables the use of mobile phones, and the mathematics in the making of TV classics such as Dr Who and Sherlock and blockbuster films including Harry Potter and the Life of Pi.

The event will aim to reach the widest possible audience. Three hundred people including many mathematicians, distinguished guests and schools will attend at The Goldsmiths' Hall. Invitations to join in via the live-streamed link have also been issued to over 5,000 secondary schools and sixth form colleges around the UK. Those not able to join in on the day will be able to view the recorded talks online after the event. There will also be competitions and a live Q&A session with some of the speakers a few days after the event.

For those members not attending it is hoped that as many as possible will be able to participate via the live-streamed link and be part of the introductory event in 2015 celebrating 150 years of the London Mathematical Society.

## Jim Simons to speak at the Anniversary Dinner



Dr Jim Simons

On 18 June 2015 the Society will hold an invitation-only Anniversary Dinner at The Goldsmiths' Hall, London. We are delighted to announce that the after-dinner speaker will be Dr Jim Simons, who with his wife, Marilyn Hawrys Simons, co-founded the Simons Foundation, a charitable organization that supports projects related to education, health, and scientific research. Dr Simons donated generously to Math for America, a foundation aimed at improving basic science and math education in cities. He also donates to research in the field of autism.

The extensive and varied 150th Anniversary Programme covers Scientific Meetings, Publications, Mathematics and Culture, Promoting Mathematics, and Special 150th Grants and Prizes. A flavour of these events and activities follows.

## MATHEMATICS AND CULTURE

People in science, technology and finance are more and more aware of the crucial importance of mathematics, but this awareness is not so evident outside these communities. The value of mathematics is not only to be measured in terms of its critical relevance to these areas, though. It has very great intrinsic beauty, which is what has inspired people to study it for millennia. Is this why mathematics, and mathematicians, are more often appearing in literature, films, and even in the fine arts? We hope so. In any case, old stereotypes are being challenged, and the subject is increasingly recognised as a part of our culture. A number of exciting events and activities are being organised to celebrate and promote mathematics and culture to the widest possible audiences.

### Mathematics Festival @ the London Science Museum



The Society is collaborating with the London Science Museum in the creation of an exciting, interactive Mathematics Festival to be held at the Museum from Wednesday 25

to Sunday 29 November 2015. Nine mathematics research groups from a range of both individual and collaborating UK universities will be involved in the event. Science Museum audiences will have the opportunity to meet mathematicians whose research

relates to everyday life and to discuss mathematics and its importance. Participating mathematicians will be provided with training and practical experience of public engagement activities, allowing them to share their knowledge and experience, and to support them in developing creative activities and events that communicate their work in new ways to new audiences.

The Mathematics Festival will launch with a Late Night event aimed at an older audience with an interest in mathematics and will run for four days, including a day for schools followed by an open exhibition at the weekend for the general public. The programme will include live demonstrations, interactive exhibits, displays and activities centred on mathematics.

### 150th Anniversary Local Heroes Museum Exhibitions

Through this project, the Society aims to bring mathematics and mathematicians into the local community, celebrating the origins of famous mathematical researchers. Museum staff will be put in contact with departments of mathematics in local universities.



Robert Adrian

Discussions are currently taking place to hold exhibitions in Carrickfergus as part of the Irish National Mathematics Week, Dundee and other areas of Scotland, and also in Wales. Museums and mathematics departments looking to take part in this Scheme are asked to visit the Local Heroes Grant

page ([www.lms.ac.uk/grants/localheroes](http://www.lms.ac.uk/grants/localheroes)).

### 150th Anniversary Exhibition of LMS Members' Correspondence at the Royal Society

From 1 May to 31 July 2015, the LMS, in collaboration with The Royal Society, will be exhibiting historic correspondences relating to LMS Presidents and Members. These will be available for viewing in the display cases of The Royal Society and are designed to highlight the fascinating history and achievements of eminent LMS Members over the past 150 years.

### 150th Anniversary Artist Associates Scheme

During 2015 the LMS is funding an Artist Associates Scheme to create a project based on mathematics. An announcement regarding the successful artists with more information of the project has been reported on page 3.

## SCIENTIFIC MEETINGS AND LECTURES

An exciting programme of scientific meetings is being offered as part of the 150th celebrations. These include enhanced activities for LMS sponsored events as well as activities organised specifically to recognise the Anniversary year. Some examples are:

### 150th Anniversary Joint Meetings



EDINBURGH  
MATHEMATICAL  
SOCIETY

IOP Institute of Physics



The Society is pleased to announce a number of joint meetings taking place during the celebratory year including:

- jointly with the **European Mathematical Society**, which celebrates its 25th Anniversary in 2015, to be held at Birmingham University from 18 – 20 September 2015;
- jointly with the **Edinburgh Mathematical Society** at the International Centre for Mathematical Sciences (ICMS) in Edinburgh from 10 - 11 December 2015; and
- jointly with the **Royal Astronomical Society** and the **Institute of Physics** in celebration of the centenary of General Relativity in November 2015 (date and venue to be confirmed).

### 150th Anniversary Celebratory Day at the Joint B(A)MC

The organisers of the joint BMC/BAMC 4-day Colloquium to be held at the University of Cambridge in April have kindly allocated a day of the event to celebrating the LMS 150th Anniversary. Two distinguished mathematicians

have agreed to speak as part of the day of celebrations, Professors Robert Calderbank and Andrew Wiles. In addition a number of LMS sponsored Scheme 3 Research Groups will be holding workshops. There will also be a Society meeting followed by a 150th Anniversary reception.

## Scientific Lectures

As part of the celebrations a number of distinguished mathematicians will give lectures at venues throughout the country:

- the 150th Anniversary **Mary Cartwright Lecture** will be given by Professor Maria Esteban, Université Paris-Dauphine, who will speak at a Society meeting in London on 27 February 2015;
- the 150th Anniversary **Hardy Lecturer** will be Professor Nalini Joshi, University of Sydney who will speak at various venues across the country as well as at the Society's General Meeting in London on 3 July 2015;
- the 150th Anniversary **Invited Lecturer** will be Professor Michael Shapiro, Michigan State University, who will give a course of ten lectures at Durham University from 16 to 20 March 2015;
- jointly with the New Zealand Mathematical Society as part of the Forder/Aitken Scheme, the 150th Anniversary **Aitken Lecturer** will be Professor Steven Galbraith, University of Auckland, who will undertake a lecture tour of institutions throughout the UK. During 2015 Professor Endre Suli, University of Oxford, will similarly visit New Zealand as the Forder Lecturer.



Professors Maria Esteban, Nalini Joshi and Steven Galbraith

## It All Adds Up: celebrating 150 years of women across the mathematical sciences



An exciting 4-day event will be co-sponsored by and held at Oxford University from 14 to 17 April 2015, when the Society's annual Women in Math-

ematics Day will be expanded with two days for school students and two days for university mathematicians and mathematical scientists.

For the school students each day will feature inspiring talks by female mathematicians and workshops in which the students will tackle stimulating mathematics themselves, and have opportunities to chat to undergraduates and others about mathematical possibilities beyond school

level.

For university mathematicians and mathematical scientists the event will comprise a mix of lectures by invited speakers, panel discussions on a range of topics, contributed talks by early career researchers, and posters. Participants will have plenty of opportunities to meet other mathematicians, including at a conference dinner on the evening of Thursday 16 April.

## 150th Anniversary Computer Science Colloquium at the Royal Society

The LMS Computer Science Committee has organised a major Colloquium on Algorithms and Cryptography to be held at the Royal Society in London on 17 September 2015. Distinguished speakers have been invited from the UK and overseas. Two hundred people will attend the event which will be followed by an Anniversary reception. Registration will open nearer the time.

### 150th Anniversary Regional Meetings

The LMS Regional Organisers are providing enhanced annual regional meetings for 2015. The Northern Regional Meeting will be held at Lancaster University on 7 April where the meeting will incorporate a Wikipedia Editathon. The workshop will be on Homotopical Algebra and Geometry.

The Midlands Regional Meeting at the University of Warwick on 8th July will be celebrating the 150th Anniversary through the involvement of international speakers. The topic of the conference is Finite Simple Groups.

The South West & South Wales Regional Meeting at Southampton University on 14th December will include two high profile speakers from the USA. The topic for the workshop is Aspects of Homotopy Theory.

### LMS-CMI Research Schools during the Anniversary Year

Five Research Schools will be held in 2015. The first School will be held at Loughborough from 13 to 17 April with the second at Sussex in June. Following that Schools will be held

in Warwick from 1 to 5 July, Oxford from 5 to 10 July, Oxford and Hay-on-Wye from 14 to 20 September. The Research Schools will celebrate the 150th Anniversary.

### Young Researchers in Mathematics Conference

As part of this successful annual conference, organised entirely by postgraduate students and held at a different university each year, the LMS is sponsoring a 150th Anniversary Public Lecture and Reception. The 2015 conference will be held from 17 to 20 August and the speaker giving the Public Lecture will be LMS Past President, Professor Dame Frances Kirwan.

### 150th Anniversary LMS Prospects in Mathematics

This annual event for undergraduate students interested in continuing in research following graduation will be held at Loughborough from 15 to 16 December. The Society is working with the organisers to incorporate a celebratory aspect as part of the event.

## PROMOTING MATHEMATICS

A large part of celebrating the 150th anniversary will be the opportunity to become even more effective advocates for our subject and to respond creatively to changes in communications technology. One of the Anniversary themes is to explore and exploit new ways of communicating mathematics. The Anniversary Launch on 16 January 2015 will begin a year-long programme of events which aims to effectively engage and inform the general public about mathematics and will use live-streaming to reach the widest possible audiences. The LMS YouTube and Twitter accounts will also be used to good effect. You are encouraged to forward any information you might receive via these platforms to your network of contacts, to spread the word about the Anniversary and about mathematics. Examples of other planned events and activities are given below.

### Filmed Interviews of Mathematicians

The Society will be producing a series of short filmed interviews with prominent UK-based mathematicians. These interviews will aim to showcase the extensive history and scope of mathematics in the UK, emphasising its contributions to modern culture and technology. Up to nine interviews covering a variety of disciplines will be created, each one focusing on a specific aspect of the academic's work, looking

at the historic context, underlying principles, and modern impact of their research. These films will be aimed at a wide audience ranging from those intimately familiar with the LMS and mathematics, through to members of the general public with a passing curiosity in the subject. The videos will be available online through the LMS website and social media, with a view to promoting mathematics as widely as possible as both accessible and exciting.

## Queen of the Sciences

The Society held its inaugural meeting at University College London on Monday, 16 January 1865, with Augustus De Morgan as its first President giving the opening address. The Society is therefore delighted that throughout 2015 there will be an exhibition at University College London Library entitled *Queen of the Sciences: A Celebration of Numbers and the London Mathematical Society*.

## 150th Anniversary Maths Puzzles in Newspapers

The Society is in conversation with a national newspaper and UKMT regarding mathematics puzzles to be published during 2015. More information will be released as it becomes available.

## Mathematics Departments join in the 150th Anniversary Celebrations

The Society is keen to involve as many of its members and the wider mathematics community as possible in celebrating such a momentous occasion. Through the LMS Representatives network it is asking mathemat-



University College London

ics departments throughout the UK to hold LMS 150th Anniversary receptions, either as a standalone activity or as part of another event already being organised. The only conditions are that a toast is made to the continued health of the Society and mathematics and that pictures of the toasts are sent for inclusion on the website and in the *Newsletter*.

## 150th LMS Popular Lectures

For the 150th Anniversary the annual Popular Lecture series will be expanded from the usual two speakers, to four speakers. These talks aim to bring mathematics to the general public, encouraging interest and excitement in the field. More information on these events will be released shortly. Speakers include Professor Martin Hairer and Professor Ben Green. The locations and venues have still to be confirmed but are likely to be in London, Birmingham, Scotland and the North of England.



Professors Martin Hairer and Ben Green

## Open House in 2015

For the last three years De Morgan House has featured as part of Open House London. Over 1,500 people have visited and heard about the Society and about mathematics.

On 20 September 2015 the Society will once again open its doors to the public with special displays and exhibitions celebrating the 150th Anniversary.

## SPECIAL GRANTS AND PRIZES

### 150th Anniversary Prizes



Thomas Archer Hirst

To mark the 150th Anniversary the Society will award two additional prizes in 2015 and members are encouraged to make nominations. Firstly, the Society will award a Hirst Prize and Lectureship for the History of Mathematics. This will be for contribu-

tions to the study of the history of mathematics. The prize will be awarded in recognition of original and innovative work in the history of mathematics. Secondly, the Society will award a Prize for the Communication of Mathematics for excellence in communication of mathematical ideas. The communication of ideas may be in any medium and

the audiences involved may be of any age-group.

In addition it is expected that Council will recommend the election of a larger than normal number of Honorary Members in 2015 – members are encouraged to suggest eminent mathematicians, based overseas, who may be candidates for honorary membership.

### 150th Anniversary Grants

The Society has put in place a number of special grants in recognition of the 150th Anniversary including £200,000 for Postdoctoral Mobility Grants (see the October 2014 *Newsletter*, pp 4 – 5, for the successful 2014 grantholders), the introduction of Undergraduate Summer Schools - the first of which will be held from 20 to 31 July 2015 at Loughborough University, and the introduction of Continuing Professional Development Grants for Mathematics Teachers.

## PUBLICATIONS

### Sir Christopher Zeeman Archive celebrates two landmark birthdays



To mark the occasion of his 90th birthday in the year of the Society's 150th Anniversary, the Zeeman family are producing an online archive of Sir Christopher's lifetime work. The Society is delighted to

host an archive on one of its Past Presidents. The archive will be launched on Thursday 19 March 2015 at the University of Oxford.

The family invites you to send in your birthday greetings and well wishes, plus any personal stories and photos from time you spent with Sir Christopher. These will be collated into a special one-off celebratory book for his birthday. It will be presented as a surprise to Sir Christopher and Lady Rosemary at the launch of the London

Mathematical Society online archive of his work. You can leave your message at: <https://zeeman90.typeform.com/to/J2IO5b>.

### 150th Anniversary Historical Book

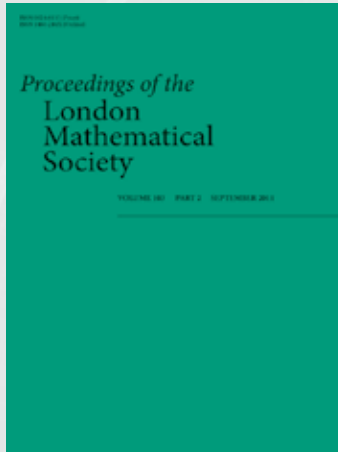
The LMS is working with author John Heard in the publication of a book that examines the history and role of the LMS from its foundation up until just after the First World War. This publication, which will highlight the role of the LMS in the formation of pure mathematics as a new discipline in Britain, is scheduled for publication towards the end of 2015.

### 150th Anniversary Impact Case Studies

To highlight the ongoing impact of mathematics to UK technology and culture, the Society will be releasing a series of case studies written by prominent academics. These case studies will examine how a specific field or aspect of mathematics has changed the UK, often over decades or even centuries of use. These case studies will be released online via the LMS website and will vary in length from short, 1,500 word essays, to longer, more in-depth examinations of mathematical fields and their widespread effects.

## Happy birthday to the *Proceedings of the London Mathematical Society*

As well as being the 150th Anniversary of the London Mathematical Society 2015 also sees the 150th Anniversary of the *Proceedings of the London Mathematical Society* including the first paper published, which is the speech given by Augustus de Morgan at the first Society meeting. The *Proceedings* has published many famous papers in its 150 years including particular papers by Hardy and Ramanujan, Turing, Marstrand, Atiyah, and Donaldson, to name but a very few, but each of them a landmark in their field. During 2015 Oxford University Press has kindly agreed to make several famous papers published by the Society freely available. These will be publicised via Twitter and also the LMS website.



## Who's Where in UK Mathematics

Since 1865 the LMS has existed to serve the UK mathematics community. With the intention of furthering this goal, we have recently begun work on a database of UK mathematicians aimed at facilitating com-

munication and collaboration. This database will be launched during the 150th Anniversary year and is intended to be of use to those seeking experts in the field, whether for research, degree supervision, paper refereeing, lecturing, or other purposes. It is hoped that, if appropriately recognised, owned and maintained by the wider mathematics community the database could eventually provide evidence-based information for use in the representation of mathematics to national funders and policymakers, including those less obvious industries and sectors which provide employment to mathematicians who move away from academia on graduation.

## 150th Anniversary Edition of the Members' Handbook

The membership is at the heart of the Society and to celebrate we will be releasing a special edition of the Members' Handbook, recording the membership as at 2015. This commemorative Handbook will contain the names of all Society members, along with details of the Society during its sesquicentennial year.

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Full details of the 150th Anniversary programme of activities are available on the LMS website at

[www.lms.ac.uk/2015](http://www.lms.ac.uk/2015) where a calendar of all events can be found.

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## With thanks

The Society would like to thank all those who are organising and taking part in the 150th celebratory events. This major Programme of events and activities could not happen without the enthusiasm and dedication of the Officers and Members of Council and all Society Committees, the membership of the Society, the wider mathematical community and the Society staff.

Particular thanks go to the LMS 2015 Committee: Members: June Barrow-Green (Member-at-Large, Librarian), Robert Curtis (Treasurer), Peter Goddard (Past President), John Greenlees (Vice President), Stephen Huggett (General Secretary), Terry Lyons (President and Chair of Committee), and (formerly) Programme Secretary Robert Wilson. Staff: Elizabeth Fisher, John Johnston, Fiona Nixon, Susan Oakes, Ann Thresher, Lindsay Walsh.





It all adds up:  
Celebrating 150 years  
of women across the  
mathematical sciences

14th-17th April 2015

Mathematical Institute, University of Oxford

## The LMS 150th Anniversary Women in Maths event

Tuesday 14th April and Wednesday 15th April: talks and workshops for school students.

**Thursday 16th April and Friday 17th April:** for mathematicians and mathematical scientists from **undergraduates to professors**, and including lectures, panel discussions, talks, posters, and time to meet others.



Registration: free for students, £5 for others.

Limited funds available for travel costs.

Limited free accommodation and limited free places at the conference dinner on

Thursday 16th April (first come, first served).



Prizes for the best posters by students and postdocs.

*(Left: Loyal Hakim, winner of the best poster competition in 2014.)*



For the programme, for registration, to offer a talk or to express interest in submitting a poster, see

[www.maths.ox.ac.uk/events/conferences/women-maths](http://www.maths.ox.ac.uk/events/conferences/women-maths)

#italladdsup2015



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Institute of  
**mathematics**  
& its applications

## Christopher Zeeman Lecture and Medal Presentation



### Professor Marcus du Sautoy OBE (University of Oxford) *Maths for the masses*

Tuesday 3rd March 2015  
The Royal Society, Carlton House Terrace,  
London, SW1Y 5AG

*The lecture will start at 6.30 pm, with Registration from 6.00pm.  
A reception will be held after the lectures*

To register contact Duncan Turton at the LMS  
(email [duncan.turton@lms.ac.uk](mailto:duncan.turton@lms.ac.uk)) or De Morgan House, 57-58 Russell Square  
London WC1B 4HS by 1 March 2015

Attendance is free of charge and is on a first come, first served basis.



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## 150th ANNIVERSARY MARY CARTWRIGHT LECTURE AND SOCIETY MEETING

Friday 27 February 2015

### 3.30 Opening Lecture

Mathieu Lewin (Université Paris-Dauphine)  
*Bose-Einstein condensation: history, model  
and recent mathematical results*

### 4.30 Tea

### 5.00 Mary Cartwright Lecture

Maria Esteban (Université Paris-Dauphine)  
*Eigenvalue problems in relativistic quantum  
mechanics, theory and applications*

### 6.00 Wine reception



### To register

For all event enquiries please contact Katy Henderson ([womeninmaths@lms.ac.uk](mailto:womeninmaths@lms.ac.uk)) by Friday 20 February. Late registrations for places may still be accepted, subject to availability.

The reception will be followed by a dinner at the Ambassadors Bloomsbury Hotel, at a cost of £35 per person, inclusive of wine.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting.

## LMS 150TH ANNIVERSARY: HARDY FELLOWSHIP 2015

Professor Nalini Joshi



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© Ted Healy 2014



Professor Nalini Joshi  
University of Sydney

The London Mathematical Society is pleased to announce the LMS Hardy Fellow 2015 is **Professor Nalini Joshi** (University of Sydney)

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.

In 2015, the Society will be hosting a special Hardy Lecture as part of its 150th Anniversary celebrations. Professor Joshi will undertake a lecture tour of the UK in the summer which will end with the Hardy Lecture at the Society Meeting on Friday 3 July in London.

Professor Nalini Joshi's research focuses on discovering new properties of solutions of integrable and near-integrable systems by bringing together geometry and asymptotic analysis, a unification of fields of mathematics that remain separate in the UK. Joshi is one of the leaders of the most exciting recent developments in nonlinear systems theory: the study of discrete versions of partial and ordinary differential equations that arise widely as prototypical, integrable models in applications. Her results on the geometric analysis of discrete nonlinear equations form a major breakthrough and will constitute the main theme of her Hardy lectures.

## ALL SHAPES AND SIZES EXHIBITION

The Quilt Museum and Gallery is celebrating the design and draughtsmanship skills of quilters through the ages as its first main exhibition for 2015 (24 January to 9 May). All Shapes and Sizes is a stunning collection of quilts that reveal complex, geometric designs that are pieced to perfection.

The exhibition showcases a fascinating and varied selection of items from The Quilters' Guild Collection. Generally made by women, many uneducated, complex mathematical patterns emerge in the work using shapes difficult to construct without compasses and protractors. William Singleton's table cover has circular and polygonal overlapping shapes. You only have to look at The Billings' Coverlet to see the amount

of work that has gone into keeping each of shapes (mainly diamonds) in the border equidistant.

The mathematics involved in quilting can be simple tessellating squares, forming a symmetrical pattern when repeated. By using triangles, the patterns become more complex. Using 16 squares (a block) each made from two contrasting triangles joined on the hypotenuse, 322,560 pairs of patterns can be made. Rhombus, circle, ellipse, parallelogram and trapezium also feature in quilt patterns, as does the common hexagon. Quilt block names reveal mathematical connections – Circle within Circle, 8-pointed Star, Diamond Cube to name a few. Double Wedding Ring blocks



The Billings' Coverlet

use interwoven concentric circles, divided into wedges. More recently, fractal quilts have become popular with the ability to generate complex designs using computer programs. The Fibonacci sequence is found in the size and shape of borders in many quilts.



William Singleton's table cover

An accompanying workshop (20 and 21 March) led by quilt historian and teacher Celia Eddy, looks at geometric patterns used in decorative ways with an explanation on the construction for the non-mathematician. Participants will make small quilted items using the knowledge they have gained.

For further information contact The Quilt Museum and Gallery, York, St Anthony's Hall, Peasholme Green, York YO1 7PW, tel: 01904 613 242, email: [admin@quiltersguild.org.uk](mailto:admin@quiltersguild.org.uk) or visit [www.quiltmuseum.org.uk](http://www.quiltmuseum.org.uk).





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UNIVERSITY OF  
CAMBRIDGE

## BMC-BAMC 2015: 30 March – 2 April 2015

including

### 150TH LMS Anniversary Celebration

#### Wednesday 1 April 2015

- 9.00 am Morning Speakers: **Ulrike Tillmann** (Oxford),  
**Ye Tian** (CAS Beijing)
- 10.00 am Morning Speakers: **Arend Bayer** (Edinburgh),  
**Adrian Constantin** (KCL)
- 11.30 am Plenary: **Robert Calderbank** (Duke)
- 12.30 pm Lunch
- 2.00 pm Afternoon Workshops (including LMS Scheme 3 meetings)
- 4.40 pm LMS Society Meeting
- 5.00 pm Plenary: **Sir Andrew Wiles** (Oxford)
- 7.00 pm Drinks Reception at Churchill College
- 8.00 pm Conference Dinner at Churchill College (separate ticket  
required)  
The after dinner speaker will be **Philip Nelson** (Head of  
EPSRC)

This 150th celebration day is part of the BMC-BAMC 2015 conference. The full conference will also include plenaries given by Ingrid Daubechies (Duke), Jacques Dumais (UAI, Chile), Phil Hall (Imperial), Peter Kronheimer (Harvard), Sylvia Serfaty (Paris 6 & Courant), and Wendelin Werner (Paris-Sud & ENS), as well as 8 further morning speakers and a public lecture given jointly by Stephen Hawking (Cambridge) and Michael Green (Cambridge).

For further details and to register, please visit [www.bmc-bamc.org.uk](http://www.bmc-bamc.org.uk). Early bird registration opens on 1 December 2014 and closes on 7 February 2015. The cost of registration will be approximately £115, with the dinner approximately an additional £50 including drinks. Accommodation in Cambridge Colleges is also available, but the number of rooms is limited and expected to sell out quickly.





LONDON  
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150 YEARS

## LMS HARDY FELLOWSHIP LECTURE TOUR 2016

### Nominations Sought

The Society is seeking nominations for a Hardy Lecture Tour in 2016.

The Hardy Fellow visits the UK for a period of about two weeks, and gives the Hardy Lecture at a Society meeting, normally held in London in early July. The Hardy Fellow will also give at least six other lectures, on different topics, at other venues in the UK.

The schedule is decided by the Programme Secretary in consultation with the Hardy Fellow, and will be designed to allow as many UK mathematicians as possible to benefit from the Hardy Fellow's presence in the UK.

The holder of the Hardy Fellowship shall be a mathematician who has not been normally resident in the United Kingdom of Great Britain and Northern Ireland for a period of at least five years, at the time of the award. Grounds for the award of the Fellowship include:

- the achievements of the Hardy Fellow, including work in, influence on, and general service to mathematics; lecturing gifts; and breadth of mathematical interests;
- the overall benefit the UK mathematical community might derive from the visit;
- the possibility of bringing to the UK a mathematician who might otherwise visit rarely or never.

The Hardy Fellowship is not restricted to mathematicians working in any specific area of mathematics. Previous lecturers include: 2014 **Percy Deift** (NYU), 2012 **Etienne Ghys** (Lyon), 2010 **Hiraku Nakajima** (Kyoto), 2008 **Shmuel Weinberger** (Chicago and Hebrew University).

In 2015, the Society will host **Nalini Joshi** (University of Sydney) as the Special Hardy Lecturer and she will visit the UK (and Scotland) during the Society's 150th Anniversary year.

The London Mathematical Society will fund:

- the honorarium - £2,000 paid directly to the Hardy Fellow/Hardy Lecturer
- travel expenses (including travel to/from the UK and within the UK) up to £2,500
- accommodation expenses up to £1,500
- a contribution to the host department to hold a dinner for the Hardy Fellow/Hardy Lecturer up to £100 per institution

The host department(s) will be expected to provide office accommodation and the academic support normally offered to a distinguished visitor.

Nominations must have the support of the host department(s), and should be sent by the Head of Department to the Programme Secretary (lmsmeetings@lms.ac.uk). The closing date for proposals is **31 January 2015**.

For further details and guidance on how to submit a nomination, please visit the Society's website: [www.lms.ac.uk/events/lectures/hardy-lectureship](http://www.lms.ac.uk/events/lectures/hardy-lectureship).

## COMPUTATIONAL AND MATHEMATICAL MODELLING FOR IMPROVED UNDERSTANDING OF BIOLOGICAL SYSTEMS

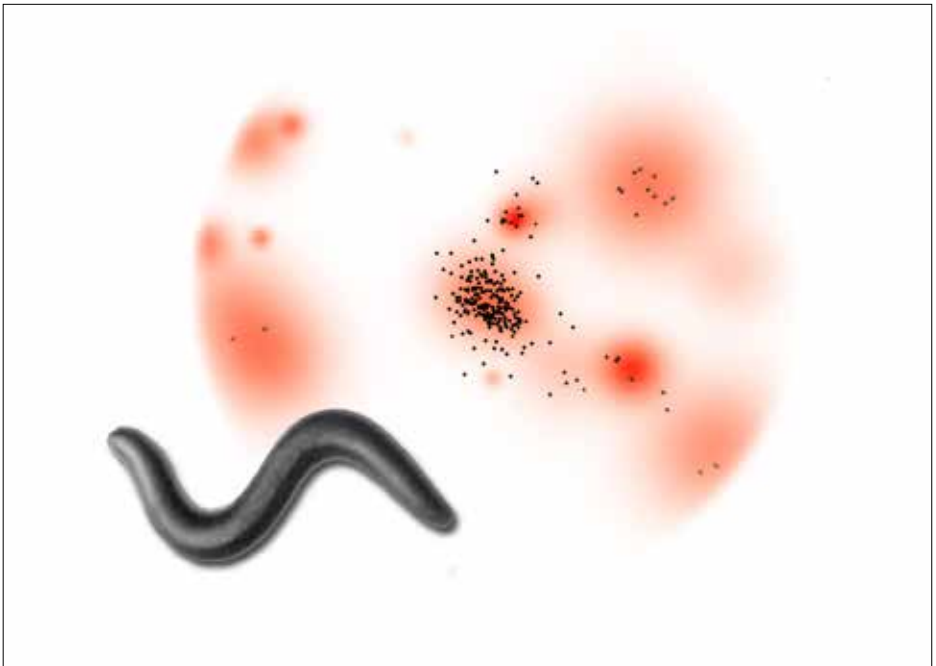
### Report

An invitation from Professor Peter Jimack of the University of Leeds to attend the LMS Computer Science Colloquium: *Computational and Mathematical Modelling for Improved Understanding of Biological Systems* on 29 October 2014, somehow found its way into my Inbox, and caught my attention. The teaching of artificial intelligence in my school of computing includes the familiar topics of artificial neural networks, machine learning, genetic algorithms, uncertain reasoning and emergent behaviour, computational techniques of which several have been inspired by biological systems. In turn, as suggested by the title of the colloquium, understanding of biological processes has been greatly advanced

by the use of advanced computational and mathematical models drawn from computer science. It seems that both computer science and the study of biological modelling profit from this mutual interest and exchange.

Four distinguished speakers, all experts in their field, presented diverse examples of the application of computational modelling to understanding biological systems. Netta Cohen discussed adaptive search behaviours in the nematode worm *C. elegans*. This simple creature has a basic nervous system of only 302 neurons, but nevertheless exhibits a wide range of behaviour, all of which (as far as I understood) has been modelled by Professor Cohen and her team.

Jane Hillston of the University of



Netta Cohen's talk described models of the nervous system of a type of worm



Edinburgh described the use of a process algebra for biological modelling known as ProPPA (developed by Professor Hillston and her group) which can incorporate uncertainty and machine learning. Aldo Faisal of Imperial College London discussed noise in biological systems and the consequent variability in behaviour. His team have applied statistical machine learning techniques to quantify these phenomena. Finally Luca Cardelli of Oxford University

discussed “morphisms” of chemical reaction networks.

Whilst not pretending that I understood all of the content of these talks (such was the high technical level) I found the colloquium very worthwhile and inspiring. Many thanks to Peter Jimack and the London Mathematical Society for hosting this event, which was well organised and attended.

Michael Boyd  
Birmingham City University

## HUXLEY MEETING ON ANALYTIC NUMBER THEORY

### Report

From 17 to 19 September 2014, Cardiff University School of Mathematics was proud to host The Huxley Meeting on *Analytic Number Theory*. The conference featured talks by many eminent number theorists, with recent breakthroughs on the gaps between prime numbers playing a prominent role.

Speakers at the conference included Jose A. Adell (Zaragoza), Antal Balog (Renyi), Mark Coffey (Colorado), Ben Green (Oxford), Roger Heath-Brown (Oxford), Christopher Hooley (Bristol), Jens Marklof (Bristol), James Maynard (Montreal and Oxford), Nina Snaith (Bristol), Efthymios Sofos (Bristol), Igor Wigman (Kings College London), Trevor Wooley (Bristol), Nigel Watt, and of course

Martin Huxley himself.

The talk opened with a rousing speech by former Head of School, Professor Russell Davies. At the Conference Dinner another former Head of School, Professor Christopher Hooley, paid tribute to Professor Martin Huxley’s many achievements during the course of his academic career as a leading number theorist.

The three day conference was generously supported by an LMS Conference grant, WIMCS and Cardiff School of Mathematics.

The opening session is pictured below with Professors Martin Huxley and Russell Davies sitting in the centre of the second row.

Matthew Lettington  
Cardiff



© Gerald Harris

Conference attendees

## VISIT OF PANAGIOTIS CHATZIPANTELEDIS

Professor Panagiotis Chatzipantelidis (University of Crete) will be visiting the UK in February and March 2015. He is an expert in the Numerical Analysis of PDEs, focusing on Finite Volume and Finite Element discretisations of nonlinear evolutionary problems. He is best known for his important contribution to the analysis of Finite Volume Element method and for his work on numerical stochastic PDEs. During his visit Professor Chatzipantelidis will lecture at:

- University of Reading, Department of Mathematics, Maths & Stats Departmental Seminar, Tuesday 10 February 2015 at noon, Room 113, Department of Mathematics

(contact Dr Alexey Chernov: [a.chernov@reading.ac.uk](mailto:a.chernov@reading.ac.uk))

- University of Leicester, Department of Mathematics, Applied Mathematics Analysis Seminar, Thursday 12 February 2015 at 2 pm, Room 119, Michael Atiyah Building (contact Dr Bogdan Grechuk: [bg83@le.ac.uk](mailto:bg83@le.ac.uk))
- University of Sussex, Department of Mathematics, Maths and Applications Sussex Seminar, Thursday 19 February 2015 at 3 pm, Room 5C11, Pevensey III, Department of Mathematics (contact Dr Omar Lakkis: [O.Lakkis@sussex.ac.uk](mailto:O.Lakkis@sussex.ac.uk))

For further details contact Dr Andrea Cangiani ([andrea.cangiani@le.ac.uk](mailto:andrea.cangiani@le.ac.uk)). The visit is supported by the LMS Scheme 2 grant.



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## LMS 150TH ANNIVERSARY INVITED LECTURER 2015

**Professor Michael Shapiro**  
(Michigan State University)

*Cluster algebras and integrable systems*

16-20 March 2015  
Durham University

The minicourse consisting of ten lectures will be devoted to the fast growing area on the intersection of cluster algebras theory and integrable systems, and interactions of these with other areas of mathematics and theoretical physics. The course will be fully accessible to postgraduate students and non-specialists interested in the topic.

There will also be supplementary lectures by:

- **Robert Marsh** (Leeds)
- **Andrew Hone** (Kent)
- **Sebastian Franco** (CCNY, New York)

University accommodation will be available.

Limited financial support is available with preference given to UK research students. Contact the organiser Pavel Tumarkin ([pavel.tumarkin@durham.ac.uk](mailto:pavel.tumarkin@durham.ac.uk)) for further details.

Deadline for funding: **8 February 2015**.

For further details on the 2015 Invited Lectures please visit: [www.maths.dur.ac.uk/users/pavel.tumarkin/LMS2015/](http://www.maths.dur.ac.uk/users/pavel.tumarkin/LMS2015/).

## VISIT OF NINA GANTERT

Professor Nina Gantert (Technische Universität München) will visit the UK from 2 to 18 February 2014. Her interests lie in Probability and Stochastic Processes. In particular, her area of expertise includes random media, large deviations, stochastic analysis, random networks and algorithms, percolation, and probabilistic models in biology. During her visit Professor Gantert will give lectures as follows:

- Monday 2 February 12:15, Probability Laboratory Seminar, University of Bath (contact Alexandre Stauffer: a.stauffer@bath.ac.uk)
- Friday 6 February 15:40, Probability and Statistics Seminar, University of Bristol (contact Marton Balazs: m.balazs@bristol.ac.uk)
- Thursday 12 February 15:00, London Analysis and Probability Seminar, Imperial College (contact Nadia Sidorova: n.sidorova@ucl.ac.uk)

For further details please contact Nadia Sidorova (n.sidorova@ucl.ac.uk). The visit is supported by an LMS Scheme 2 grant.

## VISIT OF DR KARMA DAJANI

Dr Karma Dajani (Utrecht University) will be visiting the UK from 2 to 16 May 2015. Her expertise lie in the fields of Ergodic theory, number theory and probability theory. Dr Dajani will visit:

- University of Warwick from 4 to 6 May (contact Zemer Kosloff: Z.Kosloff@warwick.ac.uk)
- University of York from 7 to 8 May (contact Sara Munday: sara.munday@york.ac.uk)
- University of Manchester from 11 to 15 May (contact Simon Baker: simon.baker@manchester.ac.uk)

For further details contact Simon Baker (simon.baker@manchester.ac.uk). The visit is supported by an LMS Scheme 2 grant.

## VISIT OF RICHARD MILES

Dr Richard Miles from Uppsala University will be visiting Durham University from 5 to 19 January 2015. He works on algebraic dynamical systems, using tools from algebra and number theory to understand dynamical properties of systems generated by automorphisms of compact groups. During his visit he will continue research with Tom Ward on the prevalence of natural boundary phenomena for zeta functions of group automorphisms. During his visit Dr Miles will be giving the following presentations:

- Algebra-Geometry Seminar, 6 January, 15.05-16.00, Newcastle University
- School of Education Seminar, 7 January, 13.00-14.00, Durham University

For further details please contact Tom Ward (t.b.ward@durham.ac.uk). The visit of Dr Miles is supported by the LMS through the Scheme 4 Research in Pairs scheme.

## VISIT OF BEN GOLDYS

Professor Benjamin Goldys (University of Sydney) will be visiting the UK from 26 January to 7 February 2015. He works on stochastic partial differential equations and analysis on infinite-dimensional spaces. During his visit Professor Goldys will lecture at:

- University of York, Mathematical Finance and Stochastic Analysis seminar. Monday 26 January at 4 pm (contact Zdzislaw Brzezniak: zdzislaw.brzezniak@york.ac.uk)
- University of Sheffield, Probability and Statistics seminar, Thursday 29 January at 2 pm (contact David Applebaum: d.applebaum@sheffield.ac.uk)
- University of Warwick, Probability seminar, Wednesday 4 February at 4.00 pm (contact Martin Hairer: M.Hairer@warwick.ac.uk)

For further details contact David Applebaum (d.applebaum@sheffield.ac.uk). The visit is supported by an LMS Scheme 2 grant.

## LIMIT THEOREMS IN PROBABILITY

A conference on *Limit Theorems in Probability* will be held at Imperial College, London from 23 to 26 March 2015 in honour of N.H. Bingham's 70th birthday. The conference will seize the opportunity afforded by the 70th birthday (on 19 March) of N.H. Bingham to enlist the participation of probabilists in a meeting on a broad topic of central importance in the subject. Associated with the workshop a Festschrift is planned, to be published as a special volume of *Advances in Applied Probability*.

The meeting will include the following confirmed speakers:

- David J. Aldous (Berkeley)
- David Applebaum (Sheffield)
- Søren Asmussen (Aarhus)
- Nick Bingham (Imperial)
- Dan Crisan (Imperial)
- Ron Doney (Manchester)
- Paul Embrechts (ETH Zurich)
- Jean-François Le Gall (Paris-Sud Orsay)
- Priscilla E. Greenwood (British Columbia)
- Geoffrey R. Grimmett (Cambridge)
- Wilfrid S. Kendall (Warwick)
- Rüdiger Kiesel (Duisburg-Essen)
- Claudia Klüppelberg (TU Munich)
- Andreas Kyprianou (Bath)
- Terry Lyons (Oxford)
- Aleksandar Mijatovic (Imperial)
- Thomas V. Mikosch (Copenhagen)
- Adam Ostaszewski (LSE)
- Gareth O. Roberts (Warwick)
- Ulrich Stadtmüller (Ulm)
- Bálint Tóth (Bristol and Budapest)

PhD students are strongly encouraged to attend; some support is available, and details on how to apply will be displayed on the conference website shortly. The conference is open to all, and registration is via the website <http://wwwf.imperial.ac.uk/~amijatov/IP/LimitTheorems/LTP.html>. For further information consult the website above or contact C.M.Goldie@sussex.ac.uk.

The conference is organised by Charles

Goldie, Alex Mijatovic and Rüdiger Kiesel under the auspices of the Imperial Probability Centre, with support from an LMS Conference grant and from the Department of Mathematics at Imperial College, London.

## GRAPH THEORY IN DESIGN AND EVALUATION OF ALGORITHMS

A meeting on *Graph Theory in Design and Evaluation of Algorithms* will be held at King's College London on Friday 6 February 2015, as a satellite event of the annual *LSD & LAW 2015 (London Stringology Day & London Algorithms Workshop)* taking place at King's on Thursday 5 to Friday 6 February 2015. This meeting will explore graph theoretic aspects of modelling discrete computational problems, designing efficient algorithms and evaluating their performance. The programme will include two invited talks by international experts in algorithmic graph theory:

- Thomas Erlebach (Leicester)
  - Paul Spirakis (Liverpool)
- and four to six shorter contributing talks. The participants will also have access to all invited and contributing talks included in LSD & LAW 2015 (expected 20 talks in total).

The meeting welcomes researchers at all levels with interests in any theoretical or applied aspect of algorithms and graph theory, including Graph and Tree Algorithms, Computational Complexity, Automata Theory, Bioinformatics, String Algorithms, Combinatorics on Words, and Bioinformatics. Research students are especially welcome. There is no registration fee, but please contact the organiser (Tomasz. Radzik@kcl.ac.uk) in advance, if you plan to attend.

For further information visit the website at [www.inf.kcl.ac.uk/events/LSD&LAW15](http://www.inf.kcl.ac.uk/events/LSD&LAW15). The meeting is supported by an LMS Conference grant and by King's College London.

## NEW PERSPECTIVES IN ANALYSIS AND PROBABILITY

A workshop (intensive research week) on *New Perspectives in Analysis and Probability* will take place at the Department of Mathematics, University of Sussex from Monday 2 to Friday 6 March 2015. The purpose of this workshop is to discuss recent developments in these areas, and to explore future directions for common interaction. This is also the occasion to celebrate the new appointments of several lecturers and professors at Sussex. The workshop consists of five one-day mini-conferences, each devoted to a special topic:

- Monday 2 March: *Probability and Non-local Operators*
- Tuesday 3 March: *Phase Transitions*
- Wednesday 4 March: *Geometric Structures in Materials*

- Thursday 5 March: *Calculus of Variations and Geometric Measure Theory*
  - Friday 6 March: *Random Media*
- Further information is available at the website [www.sussex.ac.uk/maths/research/intensive2015](http://www.sussex.ac.uk/maths/research/intensive2015).

Invited Speakers include:

- Márton Balázs (Bristol)
- David Bourne (Durham)
- Nicolas Dirr (Cardiff)
- Francesco Ghiraldin (Zurich)
- Eva-Maria Graefe (London)
- Stefan Grosskinsky (Warwick)
- Vassili Kolokoltsov (Warwick)
- József Lőrinczi (Loughborough)
- Apala Majumdar (Bath)
- Lucia Scardia (Bath)
- Daniel Ueltschi (Warwick)
- Nikolaos Zygouras (Warwick)

The meeting is supported by an LMS Conference grant, by the School of Mathematics and Physical Sciences, and by the Department of Mathematics at the University of Sussex.

CAMBRIDGE

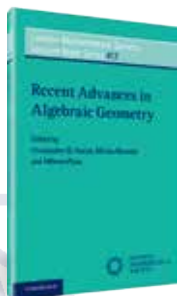
### Recent Advances in Algebraic Geometry

Christopher D. Hacon,  
*University of Utah*

Mircea Mustață,  
*University of Michigan, Ann Arbor*

Mihnea Popa,  
*University of Illinois, Chicago*

- Features contributions on modern topics from leading experts in algebraic geometry and related areas
- Articles have an expository flavour suitable for graduate students
- The flourishing modern topics of birational geometry and positivity feature prominently



London Mathematical Society Lecture Note Series, No. 417  
Paperback | 9781107647558 | December 2014 | £65.00

[www.cambridge.org/lms417](http://www.cambridge.org/lms417)

### Optimal Transport

Theory and Applications

Yann Ollivier,  
*Université de Paris XI*

Hervé Pajot,  
*Université de Grenoble*

Cedric Villani,  
*Université de Paris VI (Pierre et Marie Curie)*

- Contains short courses which give an accessible introduction to problems of current interest, and research papers which present modern developments
- The book presents both the theory of optimal transport and some of its many applications
- Of interest to researchers in pure and applied mathematics, physics, computer science and economics



London Mathematical Society Lecture Note Series, No. 413  
Paperback | 9781107689497 | August 2014 | £40.00

[www.cambridge.org/lms413](http://www.cambridge.org/lms413)

## OBITUARIES

### ALEXANDER GROTHENDIECK

*Graeme Segal writes:* Alexander Grothendieck, who died on 13 November 2014, was a towering figure in 20th century mathematics. He completely transformed algebraic geometry, and in a much wider area he changed the way mathematicians think about their subject and attack mathematical problems.

He was born in 1928 to parents who were fully-committed left-anarchist political activists, his father Russian of Jewish descent and his mother German. His childhood was very unsettled and increasingly insecure, in the care of foster parents from 1934 till almost the outbreak of war in 1939, when he rejoined his parents in France, just before his father was arrested and deported to die in Auschwitz. Grothendieck spent the first years of the war with his mother in internment camps in France, but from 1942 had the good fortune to be taken in by the extraordinary Collège de Cévenol in Le-Chambon-sur-Lignon, where very many mainly Jewish refugee children found shelter.

At the end of the war, penniless and stateless, he enrolled at the university in Montpel-

lier, and devoted himself single-mindedly to mathematics. He worked without direction or advice until in 1949 he succeeded in bringing himself to the attention of Dieudonné and Schwartz, who launched him on a meteoric mathematical career, beginning in functional analysis, where he developed the theory of tensor products of topological vector spaces and invented the idea of a nuclear space.

In about 1954 he began an intensive mathematical correspondence with Serre which continued for fifteen years. Serre — two years older, and already a Fields medallist — was at first a mentor to Grothendieck, but soon the relationship became more one of sparring-partners, and enormously fruitful for both of them, with their very different mathematical styles. Under Serre's influence Grothendieck turned to algebraic geometry. He had already fixed on his own very individual way of approaching problems: from the first he had a mystical conviction that if one thinks long and attentively enough about the fundamental nature of a problem, and patiently identifies its true context, then understanding will inevi-



Alexander Grothendieck and Michael Atiyah

tably emerge, and the problem will solve itself. Algebraic geometry provided the ideal testing-ground for this approach in Weil's conjectures about the magic way the numbers of solutions of algebraic equations over finite fields — problems of diophantine number theory — are controlled by the topology of the corresponding complex algebraic varieties. Grothendieck's first achievement in the field was a far-reaching generalization and completely new proof of the Hirzebruch-Riemann-Roch theorem, which as by-products gave the world  $K$ -theory and also — one of Grothendieck's most characteristic legacies — the idea that with an object one must always study all its possible deformations, all the 'families' it belongs to.

He went on to rebuild algebraic geometry from the bottom, and also to prove a great part of the Weil conjectures by inventing a purely algebraic cohomology theory which captured the topology of a variety over the complex numbers. More mystically, he conceived a theory of 'motives', at first mainly conjectural, which would account for many of the most mysterious phenomena of algebraic geometry; this theory still guides much of the research in the field.

A few years after winning a Fields Medal in 1966 Grothendieck broke with the mathematical world and withdrew into a life of seclusion, from which in the 1980s at least two striking contributions to mathematics emerged: first a project of studying the Galois group of the rational numbers by what he called 'children's drawings', and then an enormous work which began the burgeoning field now called 'higher category theory'.

On the AMS website there is a sympathetic and insightful account of the complicated circumstances of Grothendieck's change of life around 1970 by his dedicated biographer Winfried Scharlau, and also a fuller account of his life and mathematical contributions in a two-part article by Allyn Jackson. The Grothendieck-Serre correspondence has been published, and there is an excellent overview of it by Leila Schneps at [webusers.imj-prg.fr/~leila.schneps/corr.pdf](http://webusers.imj-prg.fr/~leila.schneps/corr.pdf).

## ALBERT BAERNSTEIN



Professor Albert Baernstein, who was elected a member of the London Mathematical Society on 13 October 1978, died on 10 June 2014, aged 73.

*John McCarthy writes:* Professor

Albert Baernstein was a highly respected mathematician, with an international reputation in the fields of complex analysis and potential theory. He had a special affinity for symmetrization problems – roughly speaking, showing that the most symmetric arrangement corresponds to the lowest energy. In 1972, he invented something now called the Baernstein Star Function and used this to solve several open problems in mathematics, including the difficult Edrei spread conjecture.

Al went to graduate school in mathematics at the University of Wisconsin-Madison, receiving his MA in 1964 and PhD in 1968. He taught at Syracuse University from 1968 to 1972, then moved to Washington University and spent the rest of his career there, retiring from teaching in 2011.

Al could be seen daily, year round, striding from his home in University Heights to his office at the university sometimes accompanied by his beloved dog Porterhouse and later by another big mutt, Sadie.

Al and his wife, Judy, were very warm and generous people. There was a constant stream of mathematical visitors to the university and Al and Judy would invite the entire department over to their house for a party; this set the tone that made the Washington University Mathematics Department one of the friendliest in the world.

He enjoyed bad puns and limericks, dark ale, hot curry, and Wagner. Finding that Thai restaurants didn't take his requests seriously, he learned how to ask for "very hot" in Thai.

In addition to his own research, he supervised 15 PhD students, and was a fertile and generous source of ideas and knowledge for the many mathematicians with whom he interacted.

## REVIEWS

### THE IMITATION GAME

The breaking of the Enigma code may have shortened the Second War by as much as two years. But because the work was kept secret not just during the war but for twenty-five years afterwards, many people still do not appreciate how much is owed to a relatively small group of very clever people, many of them mathematicians, working in the huts at Bletchley Park. The *Imitation Game*, a recently released film starring Benedict Cumberbatch as Alan Turing, will help put that right.

Those who already know the history will be aware that it didn't all happen exactly as in the film. The titles at the start describe it as *based on a true story*, and so it is. Mostly that doesn't matter; we all know that a film script has to compress reality, simplify characters, and turn something that was actually a long hard slog into a single Eureka moment. But there are a few scenes that are added for no obvious reason, such as those involving espionage or the suspicion of it. And Turing gets even more credit than he deserves, which has already provoked a number of letters to the editor to remind us of the important contributions that others made.

If you already know about how the code was



Benedict Cumberbatch as Alan Turing

broken, I advise you to put that out of your mind for a couple of hours and enjoy the film. It brings the story to life remarkably well, and you mustn't let the details get in the way.

Having said that, I was still disappointed by one omission. Turing and the other mathematicians are portrayed as very clever, which of course they were. But the code breaking also required their mathematical knowledge and skills, and this is never mentioned. It would have helped link Turing with his other work, which the film occasionally tries to do, and it would have been a long overdue plug for our subject.

Peter Saunders  
King's College London

**ALEX THROUGH THE LOOKING-GLASS** by Alex Bellos, Bloomsbury Publishing, 2014, pp 352, 18.99, ISBN: 978-1-4088-1777-3.

This is a popular book about mathematics, and it is a very good one. I'm not sure who it is aimed at, but that doesn't matter: it could work well for a reader who has curiosity but no mathematical training, and equally for a student of mathematics who would like to relax with some fun stories about familiar friends and topics. I knew most of the characters in the book, and still I had a lot of fun reading it.

The author, Alex Bellos, may already be well known to you from his work as a journalist or his previous popular book on mathematics,

*Alex's Adventures in Numberland*. He is not a mathematician, although having studied mathematics at degree level he knows the difference between an example and a theorem, he knows what a limit is and why it matters, and he does not pretend that mathematics can be understood without the technicalities and is not afraid to begin to explain them.

The range of topics is wide, and each chapter has its own personality, so I can only give a flavour of the book. The chapter on triangles, for example, quickly and convincingly explains



how Eratosthenes calculated the circumference of the Earth using reasoning based on shadows and angles, and then uses broad-brush history of the ancients to get us to trigonometry. This is then applied to surveying and map-making and finally GPS - all in the context of people today who would rather go out to visit triangulation points than collect stamps at home. By describing more subtle calculations of the geometry of the Earth, Bellos even gives some idea of how a basic tool may be powerful enough to be deployed with increasing skill far beyond what was already incredible, and how even the questions you ask are inextricably tied to the mathematics you use to answer them.

It is nice, also, that there a chapter on proof for its own sake. It even talks slowly through several proofs, showing where the main points are and why they work: infinity of primes, 2-colouring of the complements of planar line configurations, 2-dimensional ham sandwich results, and even a discussion of the evolving role of computers. The value of rigour is illustrated with some tempting falsehoods. Into that mix, we are led through Russell's paradox and the Banach-Tarski paradox, before, for me the most enjoyable part, an interview with an anonymous Bourbakiste.

Having said that, this book will not teach a reader any mathematics, in the sense of being able to develop a calculation or solve a problem. It has ten chapters, each of which runs with a general theme (things like numbers, conic sections, exponentials, automata) and interweaves stories, foundations, historical development and modern ideas around it. A few short appendices expand on technical points for those with the stamina, or at least a little trig.

As a popular book, of course the main body of text is extremely careful to avoid technical brick walls. It has an engaging narrative, regularly regrouping with a new strand of a story, and

each chapter goes somewhere. The chapters are not quite independent, but with sympathy one could more or less dip in at any point - the author encourages you to start the next chapter if you get bogged down in the later stages of one.

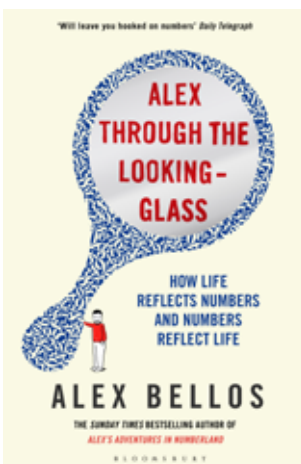
Bellos has patience with his reader, and gives the sense in most paragraphs that the thing you're reading about now is the thing that is interesting, and not just a tiny step to what he really wants to tell you about.

It's not right to review this only as a popular book. Mathematics does appear in popular culture, and we all know a dozen or so mathematicians who go out of their way, often brilliantly, to promote it in various media (quite apart from the hundreds of us who conduct school master classes or give popular talks), but does it really connect regularly with the public imagination in the way physics or history or engineering do? (Or, for that matter, as music and art do even when treated from an academic point of view.) If you think, as I do, that it would be great if mathematics and its central role were

more widely appreciated and even understood, then Bellos is a key ally. If rather than "I had a terrible maths teacher" you got "I nearly understood how you can calculate the circumference of the earth by measuring shadows", your trips to the pub would be more fun. It is super that there are research mathematicians we all know who write popular books, but there is plenty of room for authors whose first job is to engage with a wide audience by the million to join our side. I want Bellos on my team.

If you, as a mathematician, read this book, you will doubtless find small points where you would like a bit more detail or clarity. That is your burden. If you could do better, please do - but I doubt that you can.

The only thing I didn't like was the title. It's a shame the publishers couldn't find a better

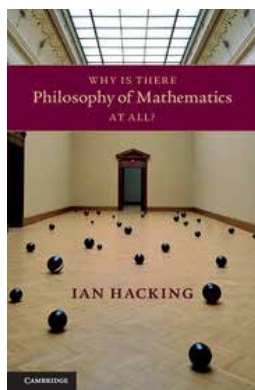


way to inform the readership that this was the same author who wrote a successful popular book a few years ago. The title of the US edition, *The Grapes of Math*, isn't great, but at least it is funnier and tells you something about the content, with a picture that is a maths pun related to the content.

This is a very good and very readable book, and it is about mathematics. You could buy it for a family member for their birthday - they might just read it, and if they do I think they'll be amazed by what you do for a living.

Gavin Brown  
Loughborough

**WHY IS THERE PHILOSOPHY OF MATHEMATICS AT ALL?** by Ian Hacking, Cambridge University Press, 2014, pp 290, £50.00, US\$80.00 (hardcover), ISBN 978-1-107-05017-4, £17.99, US\$27.99 (paperback) 978-1-107-65815-8.



According to its foreword, the book under review is a collection of "philosophical thoughts about proofs, applications, and other mathematical activities". It is not a conventional work of philosophy in which an author stakes out and defends philo-

sophical claims, but rather, a journey through a landscape of ideas related to the practice of mathematics. Among the supports for this are the fact that the Greek ideal of proof did not figure as centrally into early Chinese, Persian, and Arab traditions. Historical counterfactuals are curious beasts, however, and while Hacking challenges us to imagine that the role of proof in mathematics could have been different today, he leaves us wondering whether or not that would be a good thing.

In a similar way, a chapter on the applicability of mathematics argues that the contemporary distinction between pure and applied mathematics is also a historical accident. Canvassing historical views as to the role of mathematics *vis-à-vis* practical pursuits shows a more nuanced relationship, and by exploring a number of senses in which a piece of mathematics can be said to be "applied," Hacking argues, convincingly, that overly naïve models of how that works – we abstract a model, reason about it, and then read off empirical predictions – is too simplistic.

sophical claims, but rather, a journey through a landscape of ideas related to the practice of mathematics.

The initial answer to the question posed by the title is twofold: there is philosophy of mathematics, first, "because of the *experience* of some demonstrative proofs" and the powerful hold this experience exerts on us; and, second, "because of the richness of applications of mathematics, often derived by thinking at a desk and toying with a pencil", a phenomenon which calls for explanation. The book aims to challenge and deflate many of our intuitions on these matters. For example, after drawing a distinction between a "leibnizian" view of proof, on which a proof is a mechanically-checkable artifact, and a "cartesian" view, on which a proof is something that delivers a certain experience of understanding, Hacking argues, surprisingly, that neither notion of demonstrative proof is essential: "deep mathematics could have developed without what we call proofs at

The bulk of the text is devoted to presenting the views of others, including a battery of Fields medalists (such as Michael Atiyah, Alain Connes, Tim Gowers, Alexander Grothendieck, Atle Selberg, William Thurston, Vladimir Voevodsky) and great mathematicians and philosophers of the past (including Bacon, Berkeley, Bernays, Cantor, Dedekind, Descartes, Frege, Gödel, Hamilton, Hardy, Hilbert, Kant, Kronecker, Kuhn, Lakatos, Leibniz, Littlewood, Maxwell, Newton, Pascal, Peirce, Pólya, Poncelet, Pythagoras, Quine, Russell, Weil, Weyl, Wigner, and Wittgenstein). These are supplemented by the views of a host of contemporary mathematicians and philosophers, as well as anecdotal factoids, such

as the location of the largest tensegrity structure in the world and the contents of a telephone company error message in Cape Town (“the number that you have called does not exist”).

Most of the transplanted views are not discussed in any depth, however, reducing the exploration to a hodge-podge of slogans, catchphrases, and taglines. The lack of detailed analysis makes the work feel ungrounded and impressionistic. Hacking’s own views are notably absent, and when they do intrude, it is with the disclaimer that his “personal opinion is as worthless as almost everyone else’s.” The strategy seems to be to throw everything against the wall and see what sticks, leaving the reader wondering what it all amounts to.

The final pages, though, bring a number of discursive threads together with startling conclusion: it really *doesn’t* amount to much. After professing a “lack of interest in a contemporary philosophical problematic,” Hacking answers the book’s central question by endorsing a quotation from Thurston: “mathematics, and not only its basic contents, exists independently of us. This is a notion that is hard to credit, but hard for a professional mathematician to do

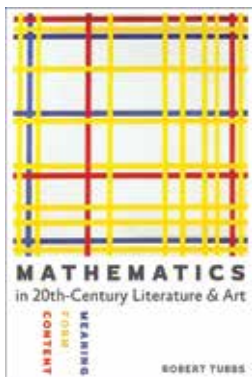
without.” When push comes to shove, core philosophical questions are largely irrelevant; but it is important to the practice that we think that they matter, and that we experience mathematics as more than a “barren formalism.”

This conclusion, if warranted, is depressing. Some of our greatest minds devote their lives to the study of mathematics; we subject our offspring to countless hours of mathematical instruction from kindergarten to graduate school; and we let mathematical results guide our decisions in practical endeavors of all sorts, from industrial engineering to medicine to public and fiscal policy. Surely, one would think, sustained thought as to what it means to do mathematics should provide an understanding that can help us do it better, not just make us feel better about doing it. In that respect, Hacking has done us a service: by presenting us with an extensive catalog of philosophical ideas that do not seem to matter much, the book challenges us to do a better job of finding the ones that do.

Jeremy Avigad  
Department of Philosophy  
Carnegie Mellon University

## MATHEMATICS IN 20TH CENTURY LITERATURE AND ART: CONTENT, FORM AND

**MEANING** by Robert Tubbs, Johns Hopkins University Press, 2014, pp 184, paperback, US\$29.95, £19.50, ISBN 978-1-4214-13808.



The book *Mathematics in 20th Century Literature and Art* by Robert Tubbs takes us on a fascinating journey through the works of modern art and literature. It is eye opening how mathematics of the 19th and 20th centuries is intimately connected with the work that

was brought forth by artists such as Salvador Dali, Alain Breton, Marcel Duchamp and others, and the poetry of Paul Braffort, Elizabeth

Bishop, and Robert Desnos, and literature of Raymond Queneau, John Barth, Albert Wachtel, and others. This book can be seen as a guide to understanding the various movements that emerged within artistic circles in the 20th century. Tubbs does an excellent job of leading the reader through this world of ideas, gently guiding the non-mathematicians through the panorama of advanced mathematics, and mathematicians and those who are artistically naive to an appreciation of the world of modern art and literature. The book is only able to give small samples of the poetry, novels, and art that it refers to. However the book serves as a compass to guide the reader to a better understanding of modern art. There is an extensive bibliography and numerous museums of modern art to further the education of the reader.

Tubbs has entered into the long tradition of mathematics influencing art. It is well known that for some artists and writers mathematics has been a stimulant to their art. The use of the golden section has been documented in the art of Mondrian, Seurat, and Leonardo da Vinci. Of course, it is well known that M.C. Escher incorporated Non-Euclidean geometries and the elements of symmetry groups into his work as evidenced by his fascinating wallpaper patterns, Limit Circle etchings and his phantasmagoric use of Riemannian geometry to trick the eye while carrying on a lengthy correspondence with the great 20th century geometer H.S.M. Coxeter. On the other hand, Jorge Luis Borges' stories drew upon the unimaginable mathematics for much of its stark imagery concerning the Library of Babel. Going back to the Renaissance, architect Filippo Brunelleschi was most responsible for codifying the laws of perspective. He and his fellow architects were the real mathematicians of the day as they spawned the mathematical study of projective geometry. However, Tubbs stakes out the terrain in which, on the one hand, mathematicians were struggling to understand the foundations of their own subject while artists and writers were exploring new ways of depicting the nature of reality in art and life. Some artists and writers discovered mathematics to be a metaphor for what they wished to convey. Today there is the stirrings of a reverse momentum of mathematicians seeking to connect with art and literature to bring forth new ideas in their fields.

Throughout the book Tubbs juxtaposes mathematics with applications of how these notions are translated to the language and interests of artists and writers. For example Kazimir Malevich in attempting to free himself from the ballast of objectivity created a painting of a large black square on a rectangular canvas with some cryptic remarks to the effect: The square = feeling, the white field = the void beyond this feeling. He then produced another painting with a large black square and a smaller red square slightly tilted beneath it. This invited others to add their own interpretations which underscored that the square was a primitive notion that transcended its

explanations. Such notions were influenced by the reformulation of Euclidean geometry by Hilbert that purged it of real objects such as points, lines and planes. Instead these objects were left undefined or primitive with their action governed by a set of axioms just as Malevich's black square was a primitive transcending its interpretations. This was followed by other writers such as Raymond Queneau who attempted to apply Hilbert's axioms to literature through his book *Foundations of Literature* playing on the title of Hilbert's book *Foundations of Geometry*. Another point that was made by Queneau was that as in geometry, a literary work can be viewed as a collection of words subject to certain constraints. This led to a style of writing known as a lipogram which is a text written without the use of one or more of the ordinarily available letters of the alphabet. And so Ernest Vincent Wright went on to publish a 50,000 word novel that avoided the letter e.

The book continues with discussion of randomness and dada poetry, the use of graphs to create literary works in which a single text can have numerous possible pathways through it to create the possibility of a single novel to be read as a multitude of novels. At the end of the book Tubbs enters into a philosophical discussion about modern art taking off from the statement by Arthur Danto in his essay *The Artworld*:

"To mistake an artwork for a real object is no great feat when an artwork is the real object one mistakes it for."

After study of the work of Breton and Duchamp and such artists as Andy Warhol, Robert Rauschenberg, and Allen Kaprow, the originator of the "happening," Richard Hertz in his paper "Philosophical Foundations of Modern Art" proposes two axioms that lead to the conclusion that whether a work is art or non-art is undecidable. From these axioms Hertz deduces the Theorem that Ideas are as important as or more important than the fulfillment of those ideas in practice. In conclusion Tubbs makes the observation that "throughout the twentieth-century mathematics and mathematical ideas became relevant to creating and

understanding artistic and literary work pieces – mathematical ideas have always informed our attempts to make sense of both the material and spiritual worlds – but in the 20th century something less obvious happened. Artists, writers, and theoreticians appealed directly to these mathematical ideas to create and explain

both pieces and theories. Tubbs has done a real service by showing that mathematics can have a life beyond its austere walls and provide metaphors that can further human understanding through art and literature.

Jay Kapraff  
New Jersey Institute of Technology



LONDON  
MATHEMATICAL  
SOCIETY  
150 YEARS

## 150TH ANNIVERSARY LMS NORTHERN REGIONAL MEETING

Department of Mathematics and Statistics, Lancaster University

7 April 2015

2.00 pm	Opening of the meeting <b>Peter Neumann</b> (Oxford)
3.00 pm	<b>Dennis Sullivan</b> (SUNY, Stony Brook)
4.00 pm	Tea/Coffee
4.30 pm	<b>Ieke Moerdijk</b> (Radboud University Nijmegen/ Sheffield)
6.00 pm	Reception and 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, visit the website at [www.lancaster.ac.uk/math/research/homotopical/](http://www.lancaster.ac.uk/math/research/homotopical/).

The cost of the dinner will be approximately £30, including drinks.

The meeting forms part of a workshop on *Homotopical Algebra and Geometry* from 7 - 11 April 2015. The speakers at the workshop include: D.-C. Cisinski, V. Ginzburg, M. Gross, I. Grojnowski, V. Hinich, D. Joyce, A. King and M. Livernet. For further details visit the website above or contact the organiser ([j.grabowski@lancaster.ac.uk](mailto:j.grabowski@lancaster.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.

## Assistant Professor of Mathematics (Mathematical Physics)

→ The Department of Mathematics ([www.math.ethz.ch](http://www.math.ethz.ch)) at ETH Zurich invites applications for an assistant professor position (non-tenure track) in mathematical physics. Candidates should hold a PhD or equivalent in mathematics or physics, and should have demonstrated the ability to carry out independent research work. Willingness to teach at all university levels and to participate in collaborative work within mathematics and physics is expected. The new professor will be expected to teach undergraduate (German or English) and graduate courses (English) for students of mathematics, physics, and other natural sciences and engineering. He or she will be part of the National Competence Center in Research “SwissMAP” ([www.NCCR-SwissMAP.ch](http://www.NCCR-SwissMAP.ch)).

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

→ Please apply online at [www.facultyaffairs.ethz.ch](http://www.facultyaffairs.ethz.ch)

→ Applications should include a curriculum vitae, a list of publications, and a statement of your future research and teaching interests. The letter of application should be addressed to the **President of ETH Zurich**. The **closing date for applications is 28 February 2015**. ETH Zurich is an equal opportunity and family friendly employer and is further responsive to the needs of dual career couples. We specifically encourage women to apply.

## 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](http://www.lms.ac.uk/content/calendar)). Please send updates and corrections to [calendar@lms.ac.uk](mailto:calendar@lms.ac.uk).

### JANUARY 2015

**5-8** Topology and Integrability, UK-Japan Winter School, Loughborough (440)

**5-16** Periodic, Almost-Periodic, and Random Operators Introductory School, INI, Cambridge (439)

**6-9** Bruhat-Tits Buildings Winter Meeting, Imperial College London (439)

**9** Research in Mathematics and its Applications IMA Conference, Bath (438)

**12-23** Random Geometry Instructional Workshop for Younger Researchers, INI, Cambridge (439)

**16** LMS 150th Anniversary Launch, London (443)

**26-30** Conformally Invariant Scaling Limits, INI Workshop, Cambridge (439)

### FEBRUARY 2015

**4-8** CERME 9, Prague (439)

**5-6** London Stringology Day & London Algorithms, King's College London (443)

**6** Graph Theory in Design and Evaluation of Algorithms, King's College London (443)

**27** Mary Cartwright Lecture, London (443)

### MARCH 2015

**2-6** New Perspectives in Analysis and Probability, Sussex (443)

**3** Christopher Zeeman Lecture, London (443)

**9-13** Stochastic Systems Simulation and Control ICMS Workshop, Edinburgh (440)

**16-20** LMS Invited Lectures, Professor Michael Shapiro (MSU), Durham (443)

**19** Mathematics 2015 IMA Conference, Mary Ward House, London (438)

**23-26** Limit Theorems in Probability, Imperial College, London (443)

**23-27** Galerkin Methods with Applications in Weather and Climate Forecasting ICMS Workshop, Edinburgh (440)

**23-27** Periodic and other Ergodic Problems INI Workshop, Cambridge (442)

**30-31** Flood Risk Assessment IMA Conference, Swansea (438)

**30-2 Apr** BMC and BAMC Joint Meeting, Cambridge (438)

### APRIL 2015

**1** LMS 150th Anniversary Celebration Day at BMC-BAMC Joint Meeting, Cambridge (443)

**7** LMS Northern Regional Meeting, Lancaster (443)

**7-10** Almost-Periodic and other Ergodic Problems INI Workshop, Cambridge (442)

**7-11** Homotopical Algebra and Geometry Workshop, Lancaster (441)

**13-17** Mathematics for Health and Disease ICMS Workshop, Edinburgh (440)

**13-17** Statistical Properties of Dynamical Systems LMS-CMI Research School, Loughborough (442)

**14-17** LMS Women in Maths Event, Oxford (443)

**20** Mathematical Education of Engineers IMA Conference, Loughborough (438)

**20-21** Inductive Logic Summer School, Kent (442)

**20-24** Gradient Flows: From Theory to Application ICMS Workshop, Edinburgh (440)

**20-24** Random Planar Structures INI Workshop, Cambridge (441)

**22-24** Combining Probability and Logic, University of Kent (442)

### MAY 2015

**10-13** AMS-EMS-SPM International Meeting, Porto, Portugal (442)

**28-30** Edinburgh Mathematical Society & Societat Catalana de Matematiques Joint Meeting, Barcelona (443)

### JUNE 2015

**10-13** AMS-EMS-SPM International Meeting, Porto, Portugal (442)

### JULY 2015

**20-31** LMS Undergraduate Summer School, Loughborough (442)

### AUGUST 2015

**23-28** Heidelberg Laureate Forum, Heidelberg (443)

### SEPTEMBER 2015

**18-20** LMS/EMS Joint Anniversary Mathematical Meeting, Birmingham (443)

### DECEMBER 2015

**10-11** LMS Joint Meeting with the Edinburgh Mathematical Society, Edinburgh (443)

# LMS ANNUAL GENERAL MEETING

held at the Institute of Education on Friday 14 November 2014



Pólya Prize certificate presented to  
Professor Miles Reid, FRS



Fröhlich Prize certificate presented to  
Professor Martin Hairer, FRS



Whitehead Prize certificate presented to  
Dr Clement Mouhot



Senior Anne Bennett Prize certificate presented to  
Professor Caroline Series



Professor Nick Trefethen, FRS,  
gave the Naylor Lecture on  
*Mathematics of the Faraday Cage*



Professor Brian Davies, FRS gave a lecture  
on *Non-self-adjoint spectral problems*