



LONDON  
MATHEMATICAL  
SOCIETY  
EST. 1865

# London Mathematical Society Annual Review 2015–2016



# Welcome from the President



It is a great honour to have been elected President of the LMS, and I began my first year in office looking forward to continuing the efforts of the LMS to build a sustainable future for mathematics in the UK. The 150th Anniversary celebrations led the way in showcasing the importance of mathematics, and mathematicians, to society and the economy, and provided many opportunities to build on.

Of course, a lot can change in a year. We are all aware of the uncertainties following the Brexit vote in June, particularly how changes to freedom of movement may affect students and academics in UK HE institutions. Collaboration is an important aspect of research and innovation in science, and in mathematics in particular. I would only emphasize the commitment of the LMS to continued successful collaboration with our EU partners.

Other uncertainties have come with expected loss of access to EU research programmes (such as ERC grants), with new ways to allocate EPSRC funding for PhD students, and with potential reorganization of some mathematics departments, as well as the implementation and impact of the teaching excellence framework (TEF). The LMS has been actively involved in discussions on these themes.

I should say a few words about the workings of the DMH. Societies with a large and complex remit like ours rely on the work of their staff as well as the selfless contribution by their members. We are no exception. I have relied on Fiona Nixon and her team for help and advice on many aspects of the Society's business, as well as the Officers of Council. Much of the Society's business is led by committees, and I thank them all for their work on behalf of the Society.


The LMS has a long and honoured history, and boasts a distinguished and creative membership. It has been a pleasure to meet many of you at meetings at the DMH, and regional meetings around the country. Joint meetings with other societies have continued. I particularly enjoyed Rafa Coifman's big data seminar at the ICMS in Edinburgh, Kirsten Lauter's public lecture on homomorphic encryption at the Society Meeting at BMC 2016 in Bristol, and Terry Lyons' seminar on rough paths and data analysis at the Society Meeting at 7ECM in Berlin. A joint meeting with the Royal Statistical Society is planned for November.

I have noted that mathematics in the UK is indeed flourishing. International prizes are but one measure of this: Sir Andrew Wiles FRS won the Abel Prize this year for his proof of Fermat's Last Theorem, Nigel Hitchin FRS (former LMS President) won the Shaw Prize in Mathematical Sciences for his contributions to geometry, representation theory and theoretical physics, and Sir Timothy Gowers FRS was awarded the Royal

## About the LMS

Society's Sylvester Medal for his work on Banach spaces, combinatorics, and additive number theory. Suffrage Science introduced a new award for women in Maths and Computing. Professors Dame Frances Kirwan, Gwyneth Stallard OBE, Leslie Ann Goldberg and Shafi Goldwasser were among the 12 award winners.

I will end with a tribute to the Women in Mathematics Committee (WIM), founded by the LMS in 1999 in response to the fact that in 1998 only 3% of mathematics professors were women. In order to improve diversity, in 2009 WIM introduced a Good Practice Scheme that has helped 34 departments reach Athena SWAN bronze status, and four silver status. WIM has been instrumental in the LMS efforts to raise the profile of mathematics with policy makers; in 2013 the LMS launched the report 'Advancing Women in Mathematics' in the House of Commons. Women in Mathematics Days have been successful in raising the profile of female mathematicians. I am delighted to report that the success of WIM's work in increasing gender diversity in mathematics has just been recognized by the award of the first Royal Society Athena Prize. Congratulations to you all!



Professor Simon Tavaré FRS FMedSci  
President, London Mathematical Society

The London Mathematical Society (LMS) is the UK's learned society for mathematics. Its purpose is the advancement, dissemination and promotion of mathematical knowledge, both nationally and internationally. The Society receives its resources through publishing, investments, membership fees and endowments. Providing funding in support of mathematics is the primary mechanism through which the Society achieves its charitable aims. Such activities are vital for the continued health of mathematics as a discipline, which is critical to the UK economy and which impacts on a wide range of societal activities.

Following an extraordinary 12 months of anniversary celebrations, the Society's 150th year ended on 15 January 2016 with a closing reception at De Morgan House. A great deal of work was done to make the Anniversary celebrations such a success with contributions from LMS Officers, committees, members and staff. It was truly a team effort and the breadth and volume of events and activities was incredible.

The 150th Anniversary celebrations have raised the profile of not only the Society but also of mathematics more generally and it is important not to lose this momentum. The LMS needs to continue communicating the breadth of its activities and needs to reach young people as they are the future of the mathematics community. The Society now has to maximise the opportunity to further promote mathematics to the widest possible audience.

# Celebrating the LMS

## 150th Anniversary

### LMS Anniversary Departmental Celebrations

The Society was keen to involve as many of its members and the wider mathematics community as possible in celebrating its 150th Anniversary. Through the LMS Representatives network, mathematics departments in universities throughout the UK were invited to hold LMS 150th Anniversary receptions, either as a standalone activity or as part of another event. The only conditions were that a toast was made to the continued health of the Society and to mathematics, and that pictures of the toasts were sent for inclusion on the LMS website and in the LMS Newsletter. Over 50 UK Mathematical Sciences departments took part and pictures of each of the celebrations appeared in the *LMS Newsletter* throughout the Anniversary Year and can be found on the LMS website at [www.lms.ac.uk/2015-events-listing](http://www.lms.ac.uk/2015-events-listing)



The departments at the Universities of Chester, Queen's Belfast and Cambridge toast the LMS 150th Anniversary (clockwise from left to right)



### Annual Dinner

The 2015 Annual Dinner, held at the Montague Hotel in London, was attended by over 100 people and provided an opportunity for invited guests from government, academia, industry, other STEM organisations, and members of the Society to celebrate the Society's achievements over the past 150 years. Guests were addressed by the outgoing LMS President, Professor Terry Lyons, FLSW FRSE FRS and the new LMS President Professor Simon Tavaré, FMedSci, FRS.

## Maths Festival and Lates

At the end of November, the Society collaborated with the London Science Museum, the interactive theatre company *non zero one*, and a number of UK university research groups to create an immersive Mathematics Festival titled *What's Your Angle? Uncovering Maths*. The four-day event comprised a (Calcu) Lates event – featuring a talk by Sir Roger Penrose and the premier of the film *Thinking Space*, commissioned by the Society in its 150th Anniversary year, a schools day, and two public days. Over 2,000 people visited the Festival.

The Festival's principal aim was to demonstrate that mathematics is everywhere and for everyone. The Society and the Science Museum wanted each visitor to leave with the knowledge that mathematics is relevant, fun and capable of opening doors to a wide range of fulfilling careers. Postgraduate mathematicians from across the UK provided the content for the event in the form of nine research groups from the University of Brighton, the University of Cambridge, University College London, the University of Essex, the University of Kent, King's College London, the University of Liverpool, the Open University and the University of Surrey. The groups demonstrated the mathematics research behind different real-world scenarios to discover the many fascinating ways in which mathematics relates to everyday modern life. The scenarios were brought to life by mathematics researchers and actors dressed as track athletes, oceanographers, archaeologists, government intelligence officers and dairy farmers.



Visitors learn about the mathematics in real world applications (Top Image: Copyright London Science Museum)

## General Relativity Conference

To mark the 100th Anniversary of Einstein's Theory of General Relativity a conference was held at Queen Mary University of London (QMUL) in November 2015. Along with the hosts QMUL, the conference was supported by the LMS, the Institute of Physics (IOP), the Royal Astronomical Society (RAS), Cardiff University and the University of Nottingham. Over 300 participants attended the two day conference, which included keynote speakers Professor Sir Roger Penrose (University of Oxford) and Professor John Barrow (University of Cambridge).

## Joint LMS/EMS Anniversary Weekend

Over the weekend of 18 to 20 September 2015 mathematicians from around the world gathered at the University of Birmingham to celebrate two anniversaries: the 150th of the LMS, and the 25th of the European Mathematical Society (EMS). The participants were greeted with welcome speeches from Professors Terry Lyons and Pavel Exner, the two Societies' respective Presidents, and from Professor Andrew Schofield, Head of Birmingham University's College of Engineering and Physical Sciences. Distinguished mathematicians from the UK and abroad provided a range of talks across a number of subject areas and the event was a fitting way to celebrate these landmark occasions for both Societies.



Professor Pavel Exner (President, EMS) and Professor Terry Lyons (President, LMS) preside over the joint meeting in Birmingham.

## Joint Meeting with the Edinburgh Mathematical Society (EMS)

The LMS and the EMS held a joint meeting at the International Centre for Mathematical Sciences (ICMS) in Edinburgh in December 2015 to mark 150 years of London Mathematical Society. The meeting looked at the Mathematical Aspects of Big Data and included a broad range of international experts in mathematics, statistics, and computer science, whose research covers big data analysis. Around 100 delegates attended the event

After the meeting a reception was held at the ICMS where the EMS President, Professor Ian Strachan, presented a silver Quaich to the President of the London Mathematical Society, Professor Simon Tavaré, on the occasion of the 150th Anniversary of the London Mathematical Society.

## LMS Officers Reception

The Society's 150th Anniversary year officially ended on 15 January 2016 with a closing reception at De Morgan House for past and current Officers. The Officers Reception opened with a welcome from the LMS President Professor Simon Tavaré FRS, who thanked all the guests for the contributions they had made to the LMS over the years. The guests ranged from Past Presidents, General Secretaries, Treasurers, Secretaries and other Members of Council, whose dedication and hard work was recognised in helping to steer the Society to its 150th year and ensure its continued success into the future. The President's welcome was followed by talks from the Society's 2015 Artist Associates, Mark Francis and George Legendre. Following the artists' talks, Heidi Morstang, an artist and film director, then introduced a screening of her documentary *Thinking Space*, which was commissioned by the Society as part of its 150th Anniversary. The documentary comprises a number of insightful interviews with prominent mathematicians: Professors Kevin Buzzard, Peter Donnelly, Tim Gowers, Martin Hairer, Roger Penrose, Caroline Series, Richard Thomas, Reidun Twarock and Karen Vogtmann. Over 60 guests attended the event, which was a fitting end to what was a hugely successful and memorable year. Short clips of *Thinking Space*, titled Frames of Mind are available to view on the LMS website at [www.lms.ac.uk/library/frames-of-mind](http://www.lms.ac.uk/library/frames-of-mind)



Past and current LMS Officers of the Society enjoy the closing event for the 150th Anniversary celebrations



## Other Activities

### European Congress of Mathematics (ECM)

The 7th ECM was held in Berlin in July 2016 and attracted over 1,000 delegates from around the world. The Society was represented by the President, Professor Simon Tavaré, and other LMS Council members (Professors Stephen Huggett, John Hunton, Iain Stewart and Beatrice Pelloni, Drs Alina Vdovina and Tony Gardiner) at the European Mathematical Society (EMS) Council meeting immediately prior to the ECM and afterwards at the ECM itself. The LMS organised several programme items including a Publishing Panel session titled *Meet the Editors: How to get your paper published*, a Society Meeting and lecture by Immediate Past President Professor Terry Lyons (University of Oxford), which was followed by a reception.. The ECM also provides a major opportunity to promote Society membership, events, activities and publications, and to network with mathematics publishers, other learned societies and the wider mathematical community.

### Research Schools

The Society works in partnership with the Clay Mathematics Institute (CMI), and with support from the Heilbronn Institute of Mathematics Research (HIMR), to run a series of Research Schools to provide a five-day residential lecture programme for graduate students and early career researchers. These Schools provide training for young researchers in core areas of mathematics. Each course aims to attract at least 40 participants.

From August 2015 to July 2016, LMS ran three Research Schools in partnership with the Clay Mathematics Institute (CMI) and with support from the Heilbronn Institute of Mathematical Research (HIMR) on *Diophantine Equations* (Baskerville Hall, Hay-on-Wye), *Developments in Contact and Symplectic Topology* (Glasgow) and *Modern topics in Nonlinear PDE and Geometric Analysis* (Reading). The Society also supported a further Research School on *Computational Algebraic Topology* (Oxford). Over 150 graduate students and early career researchers benefitted from lecture courses from the leading mathematicians in their fields.

### British Mathematical Colloquium 2016

This year's British Mathematical Colloquium (BMC) was held in Bristol from 21 to 24 March. The event was organised by Tim Dokchitser and Lynne Walling (University of Bristol) and supported by the LMS, as well as the Clay Mathematics Institute, and the Heilbronn Institute. Around 250 participants from the UK and the rest of the world attended the event. This year's BMC gave a wide view of mathematics in the UK engaging with the public while deepening connections within mathematics, including two public lectures by Professors Kristin Lauter of Washington/Microsoft Research and Hendrik Lenstra of Leiden. The Society also held a Society meeting where members were able to sign the 150 year old Members' Book.

## LMS Women in Mathematics Days 2016

The Women in Mathematics Day is an annual event organised by the London Mathematical Society for women in mathematics to meet together for a day of talks and discussion groups. This year the Women in Mathematics Committee arranged two LMS Women in Mathematics Days – at Microsoft Research in Cambridge on 15 April and at the International Centre for Mathematical Sciences in Edinburgh on 22 April. The events were intended to demonstrate to early career women mathematicians the different possibilities for mathematical careers in academia and industry. The Society was very grateful to receive sponsorship for the events from the International Centre for Mathematical Sciences, Microsoft Research and Wiley Publishing. [www.lms.ac.uk/women/events](http://www.lms.ac.uk/women/events)



Delegates enjoyed stimulating discussions at the 2016 Women in Mathematics Days

## The Inaugural LMS Hirst Lecture

As part of the Society's 150th birthday celebrations in 2015, the LMS Council created a new prize, the *Hirst Prize and Lectureship for the History of Mathematics*. It is awarded in recognition of original and innovative work in the history of mathematics. The name commemorates Thomas Archer Hirst, FRS (1830–1892). One of the founding fathers of the LMS, Hirst served as its first Vice-President, worked on its Council for 20 years, as Honorary Treasurer for much of that time, and served as President 1872–74. The first award was made to Dr John O'Connor and Professor Edmund Robertson for their creation, development and maintenance of the MacTutor History of Mathematics website, hosted at the University of St Andrews. The first Hirst lecture was chaired by Professor Ken Brown, LMS Vice-President, on Wednesday 20 April 2016 at the University of St Andrews. Sixty members and guests heard two lectures on topics in the history of mathematics. First was a talk by Dr Mark McCartney (University of Ulster) titled *Sir Edmund Taylor Whittaker (1873–1956): Laplace's Equation, Silver Forks and Vogue*. This was followed by the inaugural Hirst Lecture, *History of Mathematics: Some Personal Thoughts*, presented on behalf of both prize-winners by Professor Robertson.



Professor Edmund Robertson presents the inaugural Hirst Lecture



## LMS Holgate Lectures and Workshops

The Holgate Lectures and Workshops Sessions Scheme provides session leaders who are willing to give a talk or run a workshop on a mathematical subject to groups of school and college students or teachers. The sessions are of mathematical content and are intended to enrich and enhance mathematical education, looking both within and beyond the curriculum.

The LMS Education Committee has chosen eight individuals from a wide range of backgrounds and mathematical interests to act as session leaders (Dr Katie Chicot, Open University; Dr Alan Davies, University of Hertfordshire; Dr Tony Gardiner (formerly University of Birmingham); Professor Peter Giblin, University of Liverpool; Dr Simon Goodwin, University of Birmingham; Dr Vicky Neale, University of Oxford; Dr Joe Watkins, University of Kent and Dr Jane White, University of Bath). Session Leaders work with local hosts to develop and adapt sessions to the needs of the audience. The Society strongly encourages schools hosting a Holgate session to consider collaborating with other local schools. Local hosts of a Holgate Session are asked by the Society to complete a brief questionnaire about the session, which gives valuable information to the Society in helping to further develop the scheme. More information is available on the LMS website at [www.lms.ac.uk/events/lectures/holgate-lectures-and-workshops](http://www.lms.ac.uk/events/lectures/holgate-lectures-and-workshops)

## LMS Undergraduate Summer School

The second LMS Undergraduate Summer School took place at the University of Kent in July 2016. The aim of the school was to present topics in modern mathematics to the UK's best and keenest students before their final year of undergraduate studies and to encourage them to consider a further career in mathematics. Institutions throughout the UK were invited to nominate potential candidates. Following selection 50 participants from 36 different universities, went to Canterbury for a fortnight of lectures and colloquia introducing them to a variety of topics outside the usual undergraduate curriculum. The School was a combination of short lecture courses with problem solving sessions and colloquium style talks from leading mathematicians. The Schools have proved a great success for the Society and are attracting the top undergraduate mathematics students from across the UK. Students have commented that it was great privilege to hear all the talks and absorb the wonderful atmosphere at the summer school. Apart from the academic benefits, the students said they really enjoyed being in a group of like-minded people, and they learned a lot about the collaborative nature of modern mathematics. The 2017 Summer School will be held at the University of Manchester. More information is available at [www.lms.ac.uk/content/lms-summer-schools](http://www.lms.ac.uk/content/lms-summer-schools)

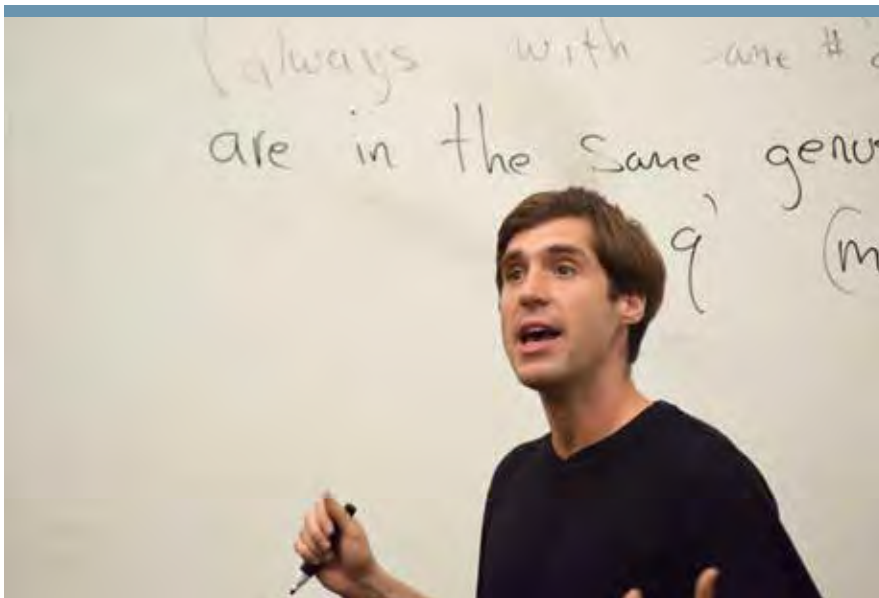


Delegates at the 2016 Summer School for Undergraduates at the University of Kent

## LMS Lectureships

### Hardy Lectureship

The LMS Hardy Fellow 2016 was Professor Jacob Lurie (Harvard University). The Hardy Lectureship was founded in 1967 in memory of G.H. Hardy in recognition of outstanding contributions to both mathematics and the Society. The Hardy Fellow is always a leading mathematician and undertakes a lecture tour within the UK. In 2016 Professor Lurie visited the universities of Oxford, Southampton, Glasgow, Aberdeen, Leicester, Sheffield and Cambridge. The lecture tour ended with the Hardy Lecture at the Society Meeting on Friday 8 July in London. Professor Lurie has had a major impact on modern day pure mathematics, in particular through his seminal work on derived algebraic geometry, higher category theory, stable homotopy theory and topological field theory. His earliest published work on surreal numbers was carried out while still at school, and since his PhD in 2004 he has held professorships at MIT and Harvard University.



Professor Jacob Lurie (Harvard University) 2016 Hardy Lecturer



### Invited Lecturer

The 2016 Invited Lecture series was presented by Professor Edgar Knobloch (UC Berkeley) at Loughborough University on Dynamics, Patterns and Spatially Localised Structures. In a series of 10 lectures Professor Knobloch described and illustrated recent progress in understanding the origin and properties of spatially localised structures formed in dissipative, pattern-forming systems such as the Swift-Hohenberg equation. He provided a mathematical and a physical explanation of homoclinic snaking of stationary states and related results for spatially localised temporal oscillations. He used the theory to develop an understanding of similar phenomena observed in fluid dynamics, reaction-diffusion systems and nonlinear optics.



Professor Edgar Knobloch (UC Berkeley) 2016 Invited Lecturer

## Forder- Aitken Lecturers

The Forder-Aitken Lectureship is a collaboration between the LMS and the New Zealand Mathematical Society in which each Society invites an eminent mathematician from the other country to give lectures at different universities around their country. The 2015 LMS Aitken Lecturer was Professor Steven Galbraith (University of Auckland). Steven Galbraith is the third Aitken Lecturer to visit the UK and he gave talks on Linear Algebra with Errors, Coding Theory, Cryptography and Fourier Analysis on Finite Groups and Kangaroos, Card Tricks and Discrete Logarithms at: Royal Holloway, University of London, Open University, University of Oxford, University of Bristol, University of Sheffield, and Loughborough University.

The 2016 Forder Lecturer was Dr Julia Gog, (University of Cambridge). She visited New Zealand to give at a number of talks on *Epidemics and viruses: the mathematics of disease* at Canterbury University, Christchurch; Otago University, Dunedin; Victoria University, Wellington; Massey University, Palmerston North; Waikato University, Hamilton; Auckland University, Auckland and Massey University, Albany



Dr Julia Gog (University of Cambridge) 2016 Forder Lecturer



Professor Stephen Galbraith (University of Auckland) 2015 Aitken Lecturer

## Development and 150th Anniversary Legacy

The Society will be prioritising its Development activities from 2016-17, to help ensure that the financial foundation of the organisation is as secure as possible for future generations.

The 'De Morgan Dinners', held in 2013 and 2014 and the Anniversary Dinner held in 2015 have helped develop a group of influential external supporters from a wide range of backgrounds, sympathetic to the Society's mission. The Society aims to work further with this group to help develop strategies and support for the healthy future development of the Mathematical Sciences.



## LMS Publications

A new contract was signed between the Society and John Wiley & Sons Ltd to publish the *Bulletin*, *Journal*, *Proceedings*, *Transactions of the London Mathematical Society* and the *Journal of Topology* for five years from January 2017. Contracts were also signed with Cambridge University Press and the Foundation Compositio Mathematica for the continued publication of *Compositio Mathematica* during the same time period.

The Society's publishing operations were reviewed this year, and as a result the publications department has been restructured leading to a stronger future focus on strategy and development.

*The LMS Journal of Computation and Mathematics (JCM)* was closed to new submissions and will continue to be published only as long as there remain papers under review. Consideration is currently being given to how the Society will continue to support the area of mathematics and computation.

The number of printed pages in the *Proceedings* will decrease by 34% in 2016 as it reverts to normal size after its backlog was eliminated in the preceding year. The *Journal*, the *Journal of Topology* and *Mathematika* will increase their page extent by 18%, 5% and 15%, respectively, while the *Bulletin* and *Compositio Mathematica* will not change in size.

## LMS Grants

The LMS continues to offer a wide range of established grant schemes to support mathematical activities, including conferences, joint research activities, collaborative meetings and visits. The Society is particularly concerned with providing help for mathematicians (including research students) at an early stage in their careers.

In 2015-16 a total of **£679,457** was awarded in grants to support mathematical activities.

A total of 194 grants were awarded during the year.

- 70 were used to support mathematical conferences and meetings (Scheme 1: Conference Grants and Celebrating New Appointments and Scheme 8: Postgraduate Conference Grants).
- 86 were used to support collaborative visits between mathematicians (Scheme 2: Visits to the UK; Scheme 4: Research in Pairs and Scheme 5: International Short Visits) and
- 38 were used to support joint research groups (Scheme 3).

As well as supporting UK-based mathematics, in 2015-16, the following grants were awarded for mathematics in Africa. £10,800 was awarded in grants to support mathematics across Africa under the Society's Scheme supporting conferences in Africa organised by the African Mathematics Millennium Science Initiative (AMMSI). 10 grants were awarded to organisers of conferences across Africa.

Supporting Mathematics in Africa

- 4 awards were made under the Mentoring African Research in Mathematics (MARM) programme, to support mentoring partnerships between UK and European mathematicians and mathematical sciences departments in African institutions. The MARM programme is jointly funded by the LMS and the International Mathematical Union (IMU) Commission for Developing Countries and is run in association with the African Mathematics Millennium Science Initiative (AMMSI); and
- An International Grant was awarded to support the Mathematics in Africa: Book Donation Scheme.

A significant change in 2015-16 was implemented by the LMS Women in Mathematics Committee to amend the guidelines of the Society's Childcare Supplementary Grants Scheme to allow applications to support 'caring' costs more widely. The new Caring Supplementary Grants Scheme allows mathematicians to apply for financial support for the costs of, for example, childcare or caring for elderly or disabled relatives when attending conferences, research schools, meetings or visits.

More information on the Society's grants is available at [www.lms.ac.uk/grants](http://www.lms.ac.uk/grants)

# LMS Prizes

The winners of the 2016 LMS Prizes were announced at the Society meeting on Friday 8 July 2016. The Society extends its congratulations to these winners, and its thanks to all the nominators, referees and members of the Prizes Committee for their contributions to the Committee's work this year.

The 2016 Louis Bachelier Prize was awarded to Professor Damir Filipović (École Polytechnique Fédérale de Lausanne and Swiss Finance Institute). The Louis Bachelier Prize is awarded jointly with the Société de Mathématiques Appliquées et Industrielles (SMAI) and in association with the Natixis Foundation for Quantitative Research.

[www.lms.ac.uk/prizes](http://www.lms.ac.uk/prizes)



**De Morgan Medal**  
Professor  
Sir Timothy  
Gowers, FRS,  
University of  
Cambridge



**Fröhlich Prize**  
Professor  
Dominic Joyce,  
FRS, University  
of Oxford



**Senior Berwick Prize (jointly)**  
Dr Keisuke  
Hara, Mynd Inc



Professor  
Masanori Hino,  
Kyoto University



**Louis Bachelier Prize**  
Professor Damir  
Filipović, École  
Polytechnique  
Fédérale de  
Lausanne and  
Swiss Finance  
Institute)

## Whitehead Prize



Dr Arend Bayer,  
University of  
Edinburgh



Dr Carola-Bibiane  
Schönlieb,  
University of  
Cambridge



Dr Jason Miller,  
University of  
Cambridge



Dr Gustav  
Holzegel,  
Imperial College  
London



**Anne Bennet Prize**  
Dr Julia Wolf,  
University of  
Bristol



# Representing and Influencing

The LMS continues to seek opportunities for bringing mathematics, and the role and importance of mathematics, to the attention of decision makers, policy advisers and funders. The LMS individually and as part of the Council for the Mathematical Sciences (CMS) contributes to public debate on mathematics research and education through responses to high level government consultations and direct liaison with organisations such as Hefce and EPSRC. The Society also has links to other bodies involved in policy issues and continues to actively represent the views of Society members and the mathematical community. Details of all the submissions by the Society can be found at [www.lms.ac.uk/policy/policy-consultations](http://www.lms.ac.uk/policy/policy-consultations)

## Mathematical Sciences: Driving the UK Economy

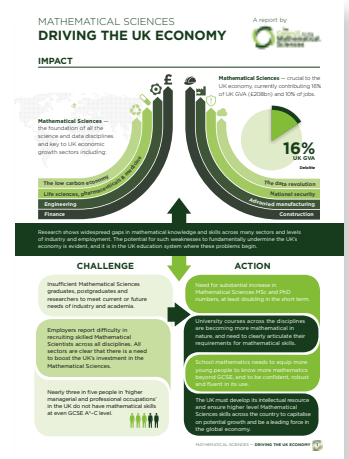
The Council for the Mathematical Sciences (CMS) launched a new report at an event in the House of Commons on 26 January 2016 in the presence of a distinguished audience of MPs, mathematicians and representatives of other STEM organisations. *Mathematical Sciences: Driving the UK Economy* provides evidence from 30 reports published over the past five years from leading organisations across many other disciplines such as the British Academy, the Royal Society, the Council for the Mathematical Sciences, the Science Council, Department for Business Innovation and Skills, the Institute of Physics, Engineering and Physical Sciences Research Council, Medical Research Council and National Endowment for Science, Technology and the Arts (Nesta).

The report highlights the overriding message of the imperative for increased investment in the Mathematical Sciences people pipeline to enable the UK to capitalise on potential growth and be a leading force in the global economy.

The event was hosted by Stephen Metcalfe MP and included a line-up of notable speakers introduced by Professor Sir Adrian Smith, Chair of the CMS. The speakers were Sir Andrew Dilnot, UK Statistics Authority; Dr Michael Lynch, Council for Science and Technology; Professor Dame Celia Hoyles, UCL Institute of Education; Sir Howard Covington, Chair of the Alan Turing Institute; and Professor Simon Tavaré, Director, Cancer Research UK Cambridge Institute and President, London Mathematical Society.

Each presentation provided an eloquent description of the vital part the Mathematical Sciences play across a wide range of areas including the broader sciences, social sciences to arts and education.

The report is available on the CMS website at <http://tinyurl.com/hfj2pep>



## SET for Britain

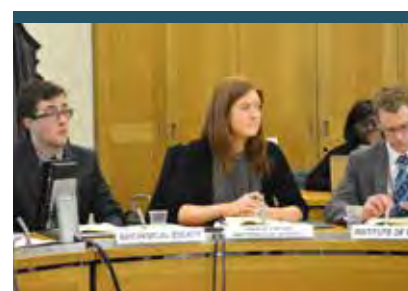
Three mathematicians won medals and awards at a competition in the House of Commons on Monday 7 March 2016 for the excellence of their Mathematical Science research, walking away with a £3,000, £2,000 and £1,000 prize for Gold (sponsored by the Clay Mathematics Institute), Silver and Bronze (sponsored by the Bank of England) respectively. Dr Philip Pearce (University of Manchester), Dr Tom Montenegro-Johnson (University of Cambridge) and Weijian Zhang (University of Manchester) each presented research to dozens of politicians and a panel of expert judges as part of the poster competition SET for Britain. Dr Philip Pearce was awarded Gold for his research on building a virtual placenta, Dr Tom Montenegro-Johnson won Silver for his research on microrobotic swimming and Weijian Zhang won Bronze for his research on time-dependent network modelling for mining scientific literature. The three winners were judged against 29 other shortlisted mathematicians and came out on top. From 2017 the event will be renamed STEM (Science, Technology, Engineering and Mathematics) for Britain in recognition of the major contribution made by the mathematical sciences. [www.setforbritain.org.uk](http://www.setforbritain.org.uk)



The Mathematical Sciences Prize winners receive their awards (left to right) Dr Stephen Benn (Royal Society of Biology), Sylaja Srinivasan (Bank of England), Professor Nick Woodhouse (Clay Mathematics Institute), Weijian Zhang (Bronze Award Winner), Dr Philip Pearce (Gold Award Winner), Dr Tom Montenegro-Johnson (Silver Award Winner), Professor Sir Adrian Smith (CMS), Stephen Metcalfe MP

## Voice of the Future

The Council for Mathematical Sciences (CMS) once again sent young Mathematical Scientists to this year's Voice of the Future event. The event is an opportunity for scientists aged 16-35 to put their questions to an assembled panel of MPs (based on the format of a Select Committee hearing) at the House of Commons. The event, organised by the Society of Biology, took place at Portcullis House on Tuesday 1 March 2016. This year's CMS nominated participants were Rosanna Cretney (Open University), Ellen Dowie (University of Kent), Hannah Mui (Ernst & Young) and Maria Sudell (University of Liverpool). MPs attending the event included the Minister for Universities and Science, Jo Johnson MP; then Shadow Minister for Science, Yvonne Fovargue MP; Nicola Blackwood MP and members of the House of Commons Select Committee for Science & Technology; and Sir Mark Walport the Government Chief Scientific Adviser. A video message was also received from Tim Peake aboard the International Space Station. More information about the event is available at [www.rsb.org.uk/policy/policy-events/voice-of-the-future](http://www.rsb.org.uk/policy/policy-events/voice-of-the-future). The event was also broadcast on Parliament TV.



The CMS is represented on the Voice of the Future panel

## Parliamentary Links Day

With the result of the EU referendum and its potential impact on higher education, science and research it was very timely that the topic for discussion at this year's Parliamentary Links Day on Tuesday 28 June 2016 at the House of Commons, was *Science after the Referendum: What Next?* Once again the Council for the Mathematical Sciences (CMS) was represented at the event and at the following House of Lords luncheon, which was attended by European Mathematical Society (EMS) President, Professor Pavel Exner, at the invitation of the LMS.

Many in the science, engineering, technology and mathematics (STEM) community had supported a 'Remain' vote as the benefits to science, research and innovation, for example through EU grants and the free movement of students and researchers, are vital to the continued position of the UK as a 'science superpower'.

The event was opened by the Rt Hon John Bercow MP, Speaker of the House of Commons, who welcomed the participants and went on to outline how STEM is 'fundamental to the country's present and future'.

The Minister of State for Universities and Sciences, Jo Johnson MP and the then Chair of the Science and Technology Select Committee, Nicola Blackwood MP addressed the delegates and highlighted the importance of the continued growth and sustainability of the sector through support from the government to meet the challenges that will inevitably arise in the coming months

Representatives from the STEM community and MPs continued the discussion in two panel sessions that covered *Science and Europe* and *Science and the World*.

The closing address was given by Professor Sir Venki Ramakrishnan FRS, President of the Royal Society.

More information about the event is available at [www.rsb.org.uk/news/14-news/1530-jo-johnson-science-and-innovation-will-endure-in-uk](http://www.rsb.org.uk/news/14-news/1530-jo-johnson-science-and-innovation-will-endure-in-uk)



Professor Pavel Exner (President, EMS), left and Professor John Greenlees (Vice-President, LMS) attend the Lords luncheon



Nicola Blackwood MP addresses the audience at Parliamentary Links Day



## Consultations

Over the past year the Society has responded to a wide range of national consultations both individually and as part of CMS.

- *Teaching Excellence Framework: year 2 - technical consultation* (BIS)  
<http://tinyurl.com/jahpxnd>
- *Response to Lord Stern's Review of the Research Excellence Framework* (Stern Review)  
<http://tinyurl.com/z5dzft9>
- *Marking reviews, appeals, grade boundaries and Code of Practice* (OFQUAL)  
<http://tinyurl.com/gwqtam4>
- *AS and A Level Mathematics and Further Mathematics Consultation on Conditions and Guidance* (OFQUAL)  
<http://tinyurl.com/oj4rg3o>
- *Fulfilling our Potential: Teaching Excellence, Social mobility and Student Choice* (BIS)  
<http://tinyurl.com/grglwcp>
- *Developing new GCSEs, AS and A Levels for First Teaching in 2017 – response made regarding Statistics content* (OFQUAL)  
<http://tinyurl.com/oh6g6wx>
- *Further GCSE and A-Level Content for Teaching from September 2017 – response made regarding Statistics content* (DfE)  
<http://tinyurl.com/jqfjyha>
- *Assessing Quality in Higher Education* (House of Commons Select Committee - Business Innovation and Skills)  
<http://tinyurl.com/hdjt7z4>
- *Future Approaches to Quality Assessment in England, Wales and Northern Ireland* (HEFCE)  
<http://tinyurl.com/hcrxpag>
- *Brexit Consultation* (House of Commons Science and Technology Select Committee)  
<http://tinyurl.com/z9jvc2x>



## Promoting Mathematics

### Social Media

The Society continues to build its social and other digital media presence during the year, with the Society Twitter account (@Londmathsoc) now having over 4,000 followers. The Society also continues to build a repository of video material from selected scientific meetings and its Popular Lectures, which are broadcast on the LMS You Tube channel (<http://tinyurl.com/n849jv4>).

You Tube



### Popular Lectures

The LMS Popular Lectures continue to attract large audiences. After the special 150th Anniversary Lectures, which took place in four venues across the UK, the Lectures returned to London and Birmingham for this year and were presented by Drs Heather Harrington (University of Oxford) and Julia Wolf (University of Bristol). Dr Harrington's talk titled *The shape of data in biology*, describes how to understand

living systems using cutting-edge mathematics and Dr Wolf's presentation, *One, Two, Red, Blue – Ever wondered why noughts and crosses always results in a draw?*, explored the surprisingly deep mathematics behind this popular game and its variants. The London Lectures in June attracted over 400 attendees.

[www.lms.ac.uk/events/popular-lectures](http://www.lms.ac.uk/events/popular-lectures)



Dr Julia Wolf



Dr Heather Harrington

## Open House

On 20 September 2015 the Society, for the fifth successive year, took part in Open House London. The event provides an excellent channel for public engagement and in 2015 it allowed the Society to celebrate its 150th Anniversary year, promoting its work to an audience outside of the mathematical community but with an interest in the history of mathematics. LMS staff and volunteers from Open House welcomed around 300 visitors and were on hand to offer tours of De Morgan House. The tours focussed on the building's history and also on its many impressive architectural features. The tour also drew attention to the Anniversary year and to the work the Society does in promoting mathematics around the UK. The Society received widespread praise and thanks from visitors for the quality of the information given during the tours and there was significant interest in the De Morgan Exhibition that was initially created for De Morgan Day 2015.

For more information on Open House London please visit

[www.openhouselondon.org.uk/about](http://www.openhouselondon.org.uk/about)



## Collaborating with other organisations

The Society continues to work in collaboration with the IMA as the Joint Promotion of Mathematics (JPM), and also with the British Science Association Mathematical Sciences Section in developing Mathematical Science content for the annual British Science Festival.

As part of JPM the Society takes part in events such as the Bloomsbury Festival and continues to produce Maths Inside leaflets in association with exhibitors at the Royal Society Summer Science Exhibition. This year's leaflets were titled, *3D Imaging: Advancing surgical*



*procedures with the help of mathematics; Plant Growth: Understanding plant shapes with the help of mathematics and Measuring the Weather: Getting the input for weather forecasts with the help of mathematics.* The leaflets continue to be very popular with participants at the Summer Science Exhibition.





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