



LONDON
MATHEMATICAL
SOCIETY
EST. 1865

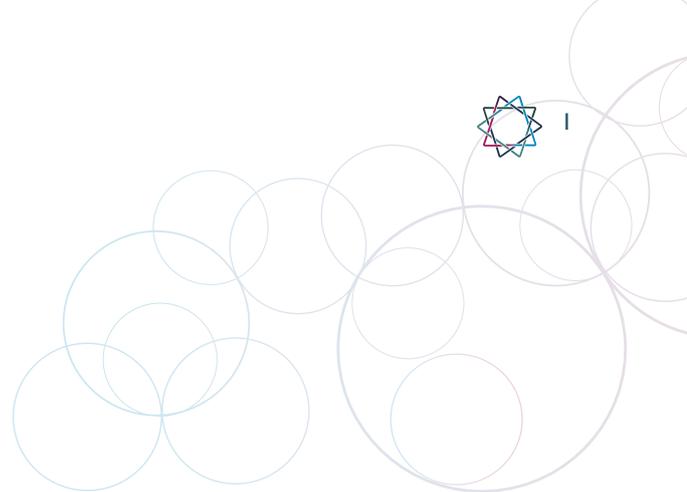
ANNUAL REVIEW

2017–2018





WELCOME FROM THE PRESIDENT



As President of the LMS, I am privileged to have a multifaceted view of the many activities undertaken by the Society. As well as those which we all know and love – small grants, prizes, regional meetings and so on – the Society has a vital role in influencing

and shaping the national agenda for mathematics and promoting our discipline to the wider public.

Located as it is in central London, the Society's headquarters, De Morgan House, is an enormous asset. On most days the basement area is a hive of activity. Besides all sorts of LMS related meetings and events, DMH also offers a convenient venue for many other mathematical groups. On the international level, this year we hosted meetings of both the Abel Prize Committee and the IMU Executive Committee. A recent innovation is the video conferencing equipment installed in both our newly refurbished Cartwright boardroom and in the Hardy lecture room. This has proved invaluable, allowing participation in meetings to a degree impossible before.

Through the Council for Mathematical Sciences (CMS), the LMS works closely with our sister societies to coordinate responses to items of common concern. In June Professor Sir Adrian Smith ended his term as CMS chair, and we are very pleased that Professor Sir Ian Diamond has taken up the role. The question of how to further the bold aspirations of the Bond Review will be a major topic during the coming year and I am working hard to ensure that the LMS's voice is an integral part of the process.

Another upcoming item of importance is the long awaited revision of our Charter and Statutes dating from 1965. A membership consultation will be launched shortly and, if all goes according to plan, the proposed new version will be ready to put to the 2019 AGM.

As LMS President I have travelled a lot, maintaining links with our fellow societies and the international mathematical community. A highlight of the year was the ICM in Rio at which I was delighted to be able to present the two LMS honorary members elected this year, Peter Scholze and Maria Esteban, with their certificates, as well as being able to congratulate Cambridge based Fields Medallist Caucher Birkar in person.

A rather special event was the De Morgan Exhibition, held in the magnificent setting of the Guildhall, London, at which the LMS was invited to stage an exhibition about our founder Augustus De Morgan alongside a display of superb ceramics created by his son William. The year also saw the launch of the *Success Stories* project now displayed on our website, celebrating the diversity of successful careers and mathematicians.

I cannot end without a special mention of the LMS staff. Led by Fiona Nixon, they do a most wonderful and professional job, ensuring the smooth functioning of everything from organising meetings and running the conference facilities at De Morgan House to alerting us to important external developments and policy issues. It has been a great pleasure to work with them and it would be impossible for LMS to function without them.

It is a great honour to be serving the LMS as its President. As announced in June, our next President Designate is Professor Jon Keating, Chair of the Heilbronn Institute for Mathematical Research in Bristol, and I am much looking forward to working with him over the coming year.

Professor Caroline Series, FRS
President, London Mathematical Society

ABOUT THE LMS

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.

www.lms.ac.uk

AN INFLUENTIAL VOICE FOR MATHEMATICS

During 2017-18 the Society has continued its work supporting its membership and the mathematical community more widely. Membership continues to increase and diversify, and the Society now has 3,135 members from 65 countries worldwide.

A major priority for the Society in 2017-18 was establishing a new Early Career Research Committee to provide a strategic overview of the schemes and activities offered by the Society for undergraduate students through to postdoctoral researchers, and to invest resources in this crucial stage of the people pipeline.

The Society continues to have a vital role in the UK mathematics funding landscape through its research grant schemes. In 2017-18 over £680,000 was awarded overall, with almost £400,000 via its core grant schemes alone. The grant schemes provide vital support for UK mathematicians to do research in pairs, organise conferences and workshops and to invite collaborators to the UK, making available opportunities for exchange of ideas as well supporting research and career progression.

Collaboration is a vital part of the Society's work and the Society continues to work with its sister societies (Institute of Mathematics and its Applications, Royal Statistical Society, Operational Research Society and the Edinburgh Mathematical Society) on policy matters through the Council for the Mathematical Sciences (CMS). The CMS is a collective voice in liaising with government, UK Research and Innovation (UKRI), and other decision-making bodies. A major milestone in 2017-18 was the publication of the Bond Review Report, *The Era of Mathematics: An Independent Review of Knowledge Exchange in the Mathematical Sciences*.



CELEBRATING SUCCESS

The winners of the 2018 LMS Prizes were announced at the Society meeting on Friday 29 June 2018. 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. www.lms.ac.uk/prizes

Pólya Prize



Professor Karen Vogtmann
(University of Warwick)

Fröhlich Prize



Professor Francesco Mezzadri
(University of Bristol)

Senior Berwick Prize



Professor Dr Marc Levine
(University of Duisburg-Essen)

Whitehead Prize



Professor Caucher Birkar
(University of Cambridge)

Whitehead Prize



Dr Ana Caraiani
(Imperial College London)

Whitehead Prize



Dr Heather Harrington
(University of Oxford)

Whitehead Prize



Professor Valerio Lucarini
(University of Reading)

Whitehead Prize



Dr Filip Rindler
(University of Warwick)

Whitehead Prize



Dr Péter Varjú
(University of Cambridge)

Hirst Prize and Lectureship



Professor Jeremy Gray
(Open University)

Anne Bennett Prize



Dr Lotte Hollands
(Heriot-Watt University)

JOINT LMS/IMA AWARDS

Zeeman Medal



Dr Hannah Fry
(University College London)

LMS

PUBLICATIONS



In January 2017 the LMS held a two day Publications Retreat, to stimulate discussions on all aspects of LMS publishing operations and to identify priorities for the work of the LMS Publications Committee. Following discussions at this Retreat and during 2017-18 the Society agreed new Aims and Objectives for its publications, which together form a three-year Publications Strategic Plan. The new Aims focus on the provision of services for authors and readers, leadership and representation within UK mathematics publishing, and sustainability of the Society's income from publishing.

The Society aims to ensure that its publishing activities continue on a sustainable basis, embrace the use of new technology to improve author and reader services, and uphold the Society's principles of diversity. The Society takes care to maintain reasonable and ethical pricing, including free availability to members and developing countries.

LMS PUBLICATIONS AIMS

As the Society's overarching mission is the advancement of mathematics, its publishing activities aim to contribute to this goal by providing:

- services to authors, through a broad and developing portfolio of high quality international titles, which are peer reviewed, managed and produced in a transparent, timely and professional manner;
- services to readers through publishing content of wide interest and high quality, circulated globally and accessible through a comprehensive range of reader platforms;
- a reliable source of funding to give ongoing support for mathematics, delivered through the Society's national and international grants schemes, research schools and workshops, international research networks, support for early career researchers, the development of the mathematics people pipeline, shaping of mathematics education, and representation at national policy discussions on mathematics; and
- leadership and representation of UK mathematics publishing through advocacy, communication and education.

LMS PUBLICATIONS OBJECTIVES

The objectives against which LMS publishing will be reviewed and monitored are listed below.

- Maintain a competitive position within mathematics publishing
- Ensure that the LMS reputation for publishing high-quality research and exposition is maintained
- Develop a portfolio which covers a broad range of mathematics
- Increase international penetration
- Improve processes, workflows and editorial board engagement
- Improve author, reader and member engagement
- Maintain a sustainable income and financially balanced portfolio
- Uphold the Society's principles of diversity within the context of the Society's Publishing aims

As a result of these new objectives, plans are being put in place with regards to developing individual publications. This includes speeding up editorial processes, clearer identities for the Society's journals, and the extension of subject coverage, for example by including aspects of computational mathematics. Further strategic developments are being considered by a smaller working group reporting to the Publications Committee.

A new model of governance and reporting on the Society's publications was also put in place, securing the accountability of the Publications Committee to Council in areas relating to the Society's reputation and its legal and financial arrangements, and devolving responsibility for developing the Society's publications to the Publications Committee.

In other publication activities, new contracts were signed with Cambridge University Press for five years from January 2018 to continue the publication of the LMS Lecture Notes and Student Texts book series and for hosting the 1998-2017 content of the (discontinued) *LMS Journal of Computation and Mathematics*.

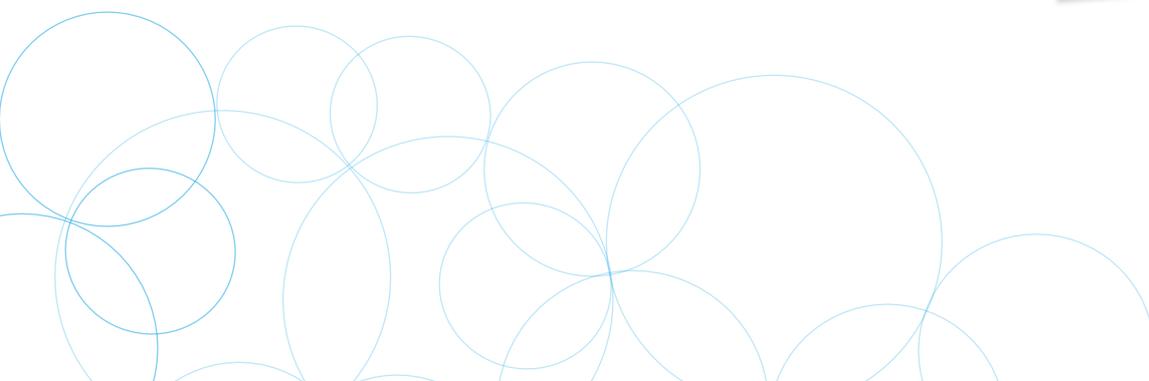
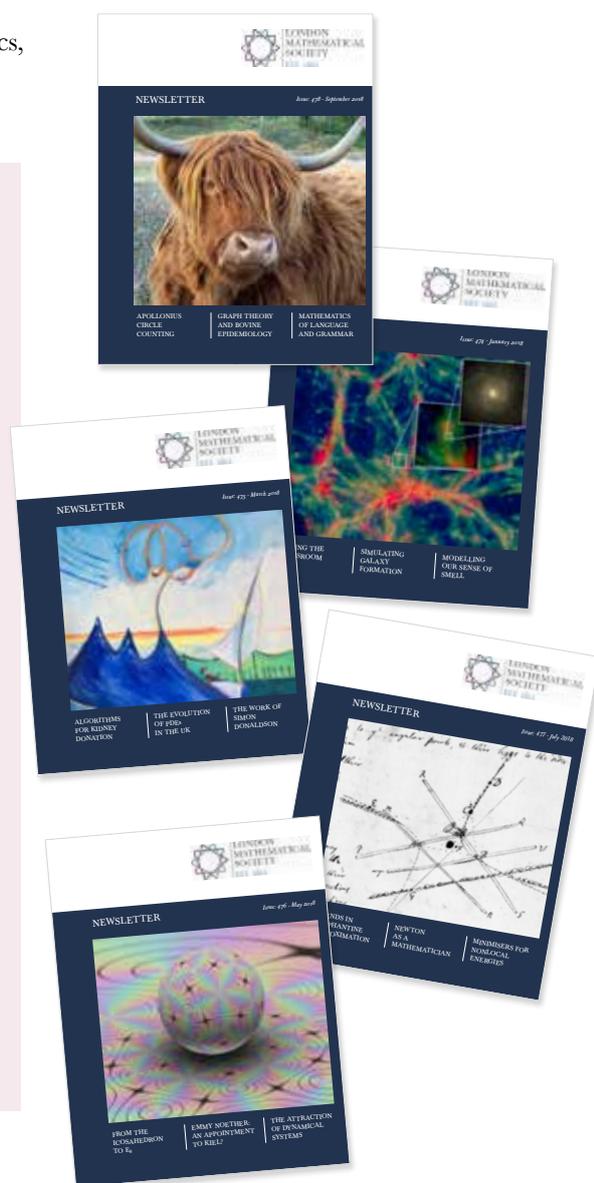
2018 saw the publication of the fiftieth issue of the *Bulletin of the London Mathematical Society*. Since 1969 the *Bulletin of the London Mathematical Society* has been publishing significant research across the whole range of pure mathematics, together with some more applied areas of analysis, theoretical computing, and mathematical physics. www.lms.ac.uk/publications

LMS NEWSLETTER

The Society's Newsletter is a central resource for mathematical and Society news, and events. It is published six times a year with copies posted to Society members. Each issue offers Society and member news, forthcoming events, reports, letters, and obituaries. Each issue also includes a range of feature items, such as mathematical articles aimed at general mathematical readers, reviews of books and events, and career development articles for early career researchers. Furthermore, through its 'microtheses' section, the Newsletter provides space for current and recent research students to present their research findings to the wider mathematical community.

A new initiative this year was to distribute, free of charge, paper copies of the Newsletter to all departments of mathematics in the UK, which has increased the Society's visibility in the sector.

The Society welcomes ideas for Newsletter contributions from members and non-members, and benefits from a high level of member engagement. The six issues of the Newsletter produced over the previous year have benefited from thirty-four authors collectively contributing twenty-two items for the features section, sixteen people contributing to eighteen reviews, fifteen people have contributed to career-development articles, and five PhD students have contributed 'microtheses'. Many more members and non-members have contributed to other parts of the Newsletter in addition to this. The Newsletter's Editorial Board warmly welcomes suggestions and content from the mathematical community. www.lms.ac.uk/publications/lms-newsletter



LMS

MEMBERSHIP

The membership is the core of the London Mathematical Society. Mathematicians drive the Society, and volunteers' contributions are vital to the Society in defining its priorities, running its activities and achieving its objectives. The Society now has a global membership of 3,135 across 65 countries. 401 new members joined the Society in 2017-18, including 157 female members. A large cross-section of the mathematical community is directly involved in the work of the Society, engaging widely with other organisations across the UK and beyond. The Society's global reach is reflected in its membership, with over 20% of LMS members based outside the UK.

The Society acknowledges achievements in mathematics through its prize-giving and in those it invites to become Honorary Members and the Society was delighted to elect Professor Maria J. Esteban (CNRS and University Paris-Dauphine) and Professor Peter Scholze (University of Bonn) as Honorary Members in 2018.

As of 2017-18 the Society has 58 LMS Representatives at higher education institutions around the UK with whom it communicates via monthly emails and an annual LMS Reps Day in London.

The 2018 Reps Day took place at De Morgan House in May with 40 Representatives attending the event.

After a welcome and introduction by LMS President Professor Caroline Series and LMS Treasurer Professor Rob Curtis the Representatives heard presentations on a range of the Society's committee activities including the International Affairs Committee and the Prizes Committee.

Other activities during the event included hearing from a group of Representatives about their successes in recruiting LMS members at their respective institutions and exchanging ideas with their fellow Representatives on approaches to recruitment. The Reps also received information about the LMS engagement package to help recruit members.

The Society is in the process of revising its Charter and Statutes dating from 1965 and after a presentation by the LMS General Secretary, Professor Stephen Huggett the Representatives had a chance to discuss specific areas of the proposed changes.

The feedback from the event was very positive with the Representatives welcoming the opportunity not only to hear more about the Society's work but also the chance to network with colleagues from other institutions at the post event reception. www.lms.ac.uk/membership



Delegates discussing issues raised at the LMS Reps Day

LMS GRANTS

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

£684,444 was awarded in grants in 2017-18 to support mathematical activities in the UK and abroad. This represents 184 grants awards of which:

- **79** grants were awarded to support mathematical conferences and meetings in the UK;
- **24** grants were awarded to support institutional visits between mathematicians based in the UK and research partners abroad;
- **81** grants were awarded to support UK-wide joint research groups, and collaborative research visits within the UK and abroad.

In addition, three international grants were awarded in conjunction with the African Mathematics Millennium Science Initiative (AMMSI) to support attendance at African mathematical conferences for postgraduate students in Africa www.lms.ac.uk/grants

BUILDING THE FUTURE OF MATHEMATICS

The 2013 Deloitte Report: *Measuring the Economic Benefits of Mathematical Science Research in the UK* stated that the Mathematical Sciences contribute 16% of UK GVA (£208bn) and 10% of all UK jobs. They are the foundation of all the science and data disciplines, and the key to many of the UK's economic growth sectors including the low carbon economy, life sciences, pharmaceuticals and medicine, engineering, finance and data science.

The 2015 *Mathematical Sciences People Pipeline* report showed that there are widespread gaps in mathematical knowledge across many sectors and in different levels of industry and employment. The UK needs a healthy pipeline of mathematically skilled individuals trained at every level



Delegates in Africa benefit from international grants

to feed its industry and economy and to guarantee the UK's place as a leader in a number of areas of industry.

Over a number of years the LMS has developed a range of initiatives to support healthy growth and development of the Mathematical Sciences people pipeline, with a particular emphasis on those at an early stage in their career.

LMS UNDERGRADUATE RESEARCH BURSARIES

The Undergraduate Research Bursaries Scheme (URB) is a very popular programme, which provides bursaries for undergraduates in their intermediate years to get a taste of working as a research mathematician. The undergraduates are partnered with a research supervisor and over a 6-8 week project they explore how mathematical research works – from the initial proposal stage to learning research and analytical methods, and working within a research group. The programme is aimed at helping undergraduates to gain research skills and further mathematical knowledge.

119 applications were received in 2018, from 35 institutions, an increase on the 105 applications received in the previous round. The majority of applications were again supported by match-funding, with 30 out of 35 institutions offering to provide 50% of funding for successful applications, allowing the Society to nearly double the number of awards made under the scheme than in previous years. 43 awards were made in 2018, of which 40 were match-funded. The scheme has now provided support to almost 200 students over six years, and feedback from grant holders has indicated how

valuable this scheme has been in providing students with some experience of what a research career might entail. www.lms.ac.uk/grants/undergraduate-research-bursaries

'It was a crucial experience for me and my decisions about my future'.

URB student

'This is an excellent scheme. In our case it works beautifully as a way to try to recruit seriously interested PhD students'.

URB supervisor

LMS UNDERGRADUATE SUMMER SCHOOLS

The Undergraduate Summer Schools scheme provides an annual two-week residential summer school that aims to introduce undergraduates to modern mathematical research. The schools are designed to bring together undergraduates from a wide range of UK universities, particularly those that do not have a strong tradition of undergraduates continuing to PhD study.

The Schools provide networking opportunities both with their peers and with senior mathematicians, with social events held alongside an academic programme featuring a variety of lectures, colloquia and practical seminars.

The 2018 Summer School was held at the University of Glasgow and attracted applications from 31 universities across the UK. 54 students attended the School which included a combination of short lecture courses given by mathematical experts alongside problem solving sessions and colloquium style talks. A number of prizes, including four one-year LMS memberships for students, were also awarded during the School. www.lms.ac.uk/events/lms-summer-schools

'I left with much more knowledge and inspiration than I ever had'.

Summer School Participant

'Just being in such a wonderful environment has made me feel better in that area. There isn't one specific moment, it was the whole two weeks of being with so many committed people'.

Summer School Participant



Delegates attend the Young Researchers in Mathematics meeting (University of Southampton)

LMS POSTGRADUATE RESEARCH SCHOOLS

The aim of the Postgraduate Research Schools is to provide training for young researchers in core areas of mathematics. These schools are currently run in partnership with the Clay Mathematics Institute (CMI), with additional support from the Heilbronn Institute for Mathematical Research. The Schools have a high international standing and include both international lecturers and participants so that postgraduate students and postdocs can meet leading experts in particular topics as well as other young researchers working in related areas from around the world. www.lms.ac.uk/events/lms-cmi-research-schools

Four LMS/CMI/Heilbronn Research Schools took place in 2017-18, attracting over 135 participants.

- *Homotopy Theory and Arithmetic Geometry: Motivic and Diophantine Equations*, Imperial College London
- *Algebraic Topology of Manifolds*, University of Oxford
- *The Mathematics of Multiscale Biology*, University of Nottingham
- *Introduction to geometry, dynamics, and moduli in low dimensions*, University of Warwick

'For me personally I think it was the best research school I have ever visited'.

Research School Participant

'This was a great opportunity to discover 'what's going on' in applied topology today. The experience was eye-opening, and the exposure to new people and papers was useful'.

Research School Participant

LMS TEACHER CONTINUING PROFESSIONAL DEVELOPMENT GRANTS

The Teacher Continuing Professional Development (CPD) scheme aims to provide opportunities for mathematics teachers to attend training that is specifically mathematical. The scheme provides grants to support the costs of teachers attending conferences or events organised by professional institutions, providing high quality mathematical training and resources for the benefit of the individual, their department, school or college and very importantly their students. The scheme focuses particularly on supporting early career stage teachers (up to three years after achieving Newly Qualified Teacher (NQT) status). 25 grants of up to a maximum of £400 were awarded in 2017-18. www.lms.ac.uk/grants/teacher-cpd-grants

'Being a newly qualified teacher I have found this conference very exciting and useful. It has set me on the right path for my future teaching career.'

Teacher CPD grant holder

'It has given me the confidence to try out new strategies and also revisit those that may not have been so successful in the past to see if I can make them work.'

Teacher CPD grant holder

150TH ANNIVERSARY POSTDOCTORAL MOBILITY GRANTS MOVING FORWARD

The Postdoctoral Mobility Grants scheme was set up as part of the Society's 150th Anniversary celebrations. Its aim was to help early career researchers transition the difficult stage from submitting their PhD theses to gaining their first postdoctoral position. The grants were designed to support a period of study and research in a new institution and afford the grant holders the opportunity to make new academic connections, further their research and enhance their CVs. A total of 38 grants were awarded over the three years of the lifetime of the scheme. After a review of the scheme in 2017-18 the Society has decided to build on its successes by introducing the *Early Career Fellowship scheme*, to be launched in 2019.

'Obtaining this grant has furthered my career and been an amazing experience for me personally. Having the opportunity to visit another country and live there for six months, while working with one of the leading experts in my field was an invaluable experience.'

PMG grant holder

'This grant provides both the knowledge of some security after a PhD allowing a student to focus on the writing up and viva, but also a chance to choose where they go next.'

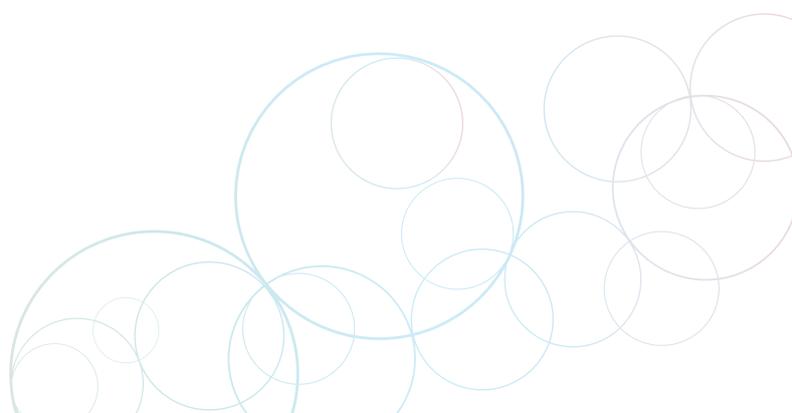
PMG grant holder



Supporting future mathematicians

LMS TRAVEL GRANTS FOR EARLY CAREER RESEARCHERS

In 2017-18 the Society launched a new grant scheme to support Early Career Researchers (research students or those having completed their PhD within the past five years, excluding career breaks) to attend conferences or undertake research visits both within the UK and elsewhere. The grant scheme was very successful in its first year with over 80 applications received and around £10,000 awarded to 21 early career researchers. www.lms.ac.uk/grants/lms-travel-grants-early-career-researchers



IMPACT AND INFLUENCING

The Mathematical Sciences are a crucial part of the infrastructure of a successful country: their importance to industry and the economy is vast and demonstrable, and they are essential to economic growth across the UK.

The Society continues to work with its sister societies as part of the Council for the Mathematical Sciences (CMS), facilitating communication between the Mathematical Sciences community and other stakeholders in government, research, funding agencies and other science, technology, engineering and mathematics (STEM) organisations. This collective work is aimed at maintaining and improving a strong Mathematical Sciences base and exploring common issues and potential solutions.

A key publication in 2017-18 was the Bond Review Report, *The Era of Mathematics: An Independent Review of Knowledge Exchange in the Mathematical Sciences* (tinyurl.com/y943xe6n).

The report makes a number of extremely ambitious and far-reaching proposals to improve communication between mathematics and policy makers and the training and support of mathematicians, especially those engaging with potential (mathematical) applications. Recommendations in the report include:

- establishing an Academy for the Mathematical Sciences to facilitate links between academia, government and industry;
- creating a minimum of 100 additional PhD places per year dedicated to training mathematical scientists; and
- tripling funding for the Mathematical Sciences

The Society has been actively involved in discussions regarding the recommendations from the report and the exciting possibilities that these could bring for UK mathematics. The Society is interested to know what members think and comments can be posted on the blog at bond.lms.ac.uk. The CMS has also issued a statement of support which is available at tinyurl.com/y9oqvply

During 2017-18 the LMS Education Committee responded to several major inquiries and consultations from government departments and other organisations mainly on issues concerning school and college education, and higher education.

2018	
DFE	Teaching Excellence and Student Outcomes Framework: Subject-level
DFE	Strengthening Qualified Teacher Status (QTS) and Improving Career Progression for Teachers
DFE	Accelerated Degrees: Widening Student Choice in Higher Education
2017	
OFQUAL	Reformed Functional Skills Mathematics and English Subject Content
GENERAL	Statement on the teaching and assessment of mathematics degrees (updated)

ENGAGING WITH PARLIAMENT



Dr Celine Maistret with her Gold Award

STEM for BRITAIN 2018

Early career mathematicians took part in the annual STEM for BRITAIN competition for the fifth time on Monday 13 March. 30 posters featuring research in the Mathematical Sciences were presented at Parliament to politicians and a panel of expert judges, who awarded Gold, Silver and Bronze prizes to the top three exhibitors.

Dr Celine Maistret (University of Bristol) was awarded Gold for her research into the Birch and Swinnerton-Dyer conjecture, one of the Clay Mathematics Institute (CMI) Millennium problems.

Silver was awarded to Linda Irons (University of Nottingham), for her poster presenting the mathematical modelling of cell adhesion in asthma. The recipient of the Bronze award was Dr Yoann Altmann (Herriot-Watt University), for his research into new computational methods for low illumination imaging and sensing.

The Gold and Silver prizes (including £2,000 and £1,250 respectively) were sponsored by the Clay Mathematics Institute, and the Bronze prize (£750) was sponsored by the Heilbronn Institute of Mathematical Research.



The CMS continues to support the event in choosing the early career researchers who present their research in Parliament. It is important to encourage early-career research scientists, engineers, technologists and mathematicians and the STEM for BRITAIN event is a very effective way of doing this. www.setforbritain.org.uk/2018event.asp

Voice of the Future

The CMS was once again asked to nominate early career mathematical scientists to take part in the event, which gives students and early career researchers the chance to scrutinize politicians and their advisors.

Those representing the Mathematical Sciences were Lucy Barnes (University of Kent), Stephen Blaxland (Nationwide), Dr Maurice Chiodo (University of Cambridge) and Emily Maw (University College London).

A range of politicians, including Sam Gyimah MP, Minister for Universities, Science, Research and Innovation, were quizzed on topics such as fake news, artificial intelligence (AI), plastic waste, gene-editing, self-driving cars, mental health in academia, the underrepresentation of women in science and how the government would ensure that Brexit would not have a negative effect on UK science.

Others facing scrutiny included Chi Onwurah MP, Shadow Minister for Industrial Strategy, Science and Innovation, members of the Science and Technology Select Committee and Dr Rupert Lewis, Director of the Government Office for Science. Video of the event is available at tinyurl.com/ydf1gmlf

Parliamentary Links Day

Parliamentary Links Day 2018 took place at Portcullis House on 26 June. Organised by the Royal Society of Biology on behalf of the STEM community, the event brought together scientists, learned societies and MPs to discuss scientific issues of national and international significance. This year's attendance was one of the largest ever for the event.

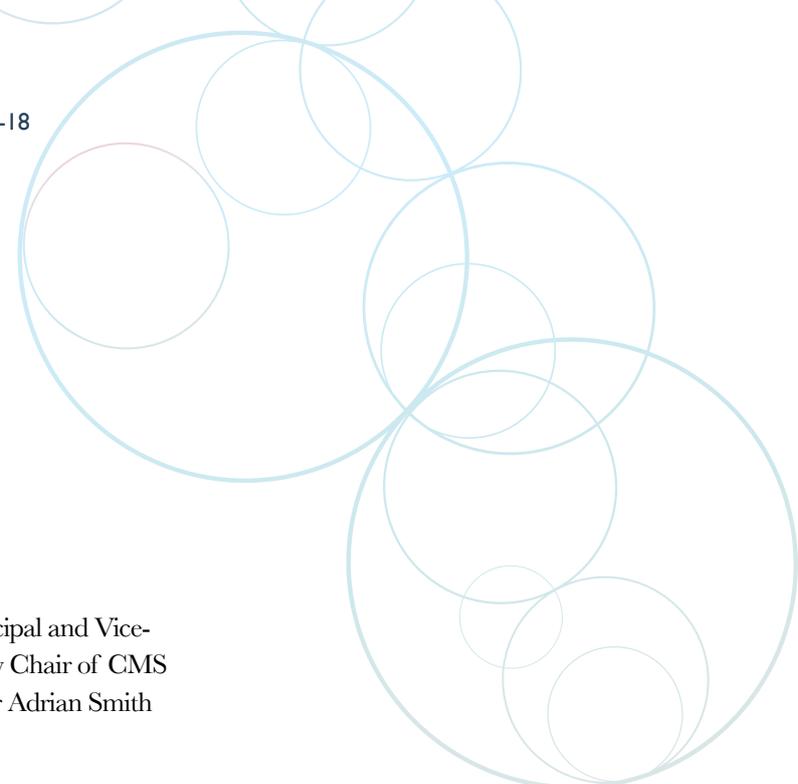
The Speaker of the House of Commons, John Bercow MP, opened the event followed by keynote speeches from Chi Onwurah MP, Shadow Minister for Industrial Strategy and Dr Patrick Vallance, recently appointed Government Chief Scientific Adviser.



Two panel discussions followed, chaired by BBC Science Correspondent Pallab Ghosh. The first panel considered the *Mission of the Industrial Strategy* with representatives from the Institute of Physics, the Institution of Chemical Engineers, the Royal Society of Chemistry, and the Royal Statistical Society.

Following the first panel session the Rt Hon Norman Lamb MP, Chair, House of Commons Science and Technology Committee and Rebecca Endean, Director of Strategy, UK Research and Innovation gave keynote addresses.

The second panel session included representatives from the Royal Society, the Royal Society of Edinburgh, the Royal Society of Biology, the Campaign for Science and Engineering and the Royal Academy of Engineering, which focussed on the *Target of the Industrial Strategy* and in particular the future of STEM-based industries in the UK and increased R&D funding. The final keynote speaker was the Rt Hon Claire Perry MP, Minister of State for Business, Energy and Industrial Strategy. tinyurl.com/yadd7qsq



CMS APPOINTS NEW CHAIR

Professor Sir Ian Diamond DL, FBA, FRSE, FacSS, former Principal and Vice-Chancellor of the University of Aberdeen was appointed the new Chair of CMS and took up the post in September 2018, succeeding Professor Sir Adrian Smith FRS, Director, The Alan Turing Institute.

Over the past five years, under the leadership of Sir Adrian, the CMS has grown its reputation as the authoritative body recognised by government as representing the Mathematical Sciences and with which national policymakers now regularly engage. Sir Ian will build on Sir Adrian's legacy as the sector enters a significant new phase with the many challenges to the Mathematical Sciences from Brexit and the reshaping of the science and innovation research landscape as a whole.

Sir Ian brings considerable experience both in higher education, and government. He has been Chief Executive Officer at the Economic and Social Research Council (ESRC), as well as Chair of the Research Council UK (RCUK) Executive Group, and he is a member of the board of UK Research and Innovation (UKRI). Sir Ian also has experience of working with government in his review of university finance in Wales, commissioned by the Welsh Assembly, and previously with his 2011 review of efficiency and effectiveness in higher education on behalf of Universities UK. Sir Ian also worked on the 2015 British Academy report *Count us in: Quantitative skills for a new generation*.

ROYAL SOCIETY ADVISORY COMMITTEE ON MATHEMATICS EDUCATION (ACME)

The CMS, in collaboration with the LMS Education Committee and those from sister societies, has been working with the Royal Society on the next steps for establishing various curriculum groups for the new Royal Society Advisory Committee on Mathematics Education (ACME) through its Chair, Professor Frank Kelly. The four partner organisations in this initiative, being the Royal Society (RS), the Institute of Mathematics and its Applications (IMA), the London Mathematical Society and the Royal Statistical Society (RSS), with wider support from the mathematics teacher community, are working together to create four 'Contact Groups', based within the Royal Society governance structure.

The purpose of these Contact Groups is to review the current implementation of the mathematics curriculum up to the age of 18 and, in time, prepare for the next round of curriculum reform, providing a unified voice for the mathematics education community.

WOMEN IN MATHEMATICS

The Society continues its commitment to improving the proportion of women in mathematics and to helping ensure that equal opportunities are embedded within working practices for the benefit of everyone working and studying within UK university departments through the work of its Women in Mathematics Committee

In 2018 the Committee launched an online resource for young people, *Success Stories in Mathematics*, to provide examples of how mathematics is used in a wide range of careers and to demonstrate the variety of career options available to anyone who has a mathematics degree. The website currently features nearly 60 profiles of mathematicians from all walks of life with diverse and interesting stories.

The project was launched at an event at the British Library in May 2018. It is intended that new profiles will be added on a regular basis to the website and that poster versions of the stories will be made available to download so that they can be used as educational resources. www.lms.ac.uk/success-stories

Success Stories in Mathematics

Krisztina Zaborszky
Job: Teacher in a grammar school

I had an amazing time doing mathematics at the University of Bath. We were allocated professional tutor groups and I was very lucky because I had a group of people there, who I still almost 10 years on, I still consider secondary close friends. There were several us 'maths girls' who were all studying for maths degrees and we decided to line up together once we moved out of halls of residences quite I remember working quite hard during my degree, but also having a lot of fun. We were a studying powerhouse in the end, as each of us managed to get a first. Our degrees have led on to careers in education, in academia, statistical research and consultancy.

When I started doing my own, I don't really realise quite how varied different university courses could be for maths. The University of Bath offered courses that were mainly directed at analysis,

operation research and different equations. There were various, but most students had degrees containing elements of these. While doing an Erasmus course in Hamburg during my third year, I was also introduced to Number Theory, the History of Mathematics and facilities (seminars, all courses which I particularly enjoyed even if the lectures were in German!) I am happy to say I have done the modules I would encourage both, but I would encourage anyone who is thinking of doing a PGCE course at the University of Bath, it's a wonderful course and it brought between teaching mathematics and

Even though I'd been in education all my life, until then I had seen it from the students' perspective. Teaching something is very different from learning something - although through my own mathematical understanding has become far stronger.

This is now my fourth year of teaching. I've been very lucky to find a career that I enjoy and that I have done well in. It may not be my career for forever, but for now it suits me very well. I have found it important to be able doing a job that gives financial security but also gives a chance to work with other people. A Europa moment from a student can be a special thing and makes the job feel incredibly worthwhile and rewarding.

It is important to make sure that whatever career someone wants to be in, there is a recreational or pursuing hobby. It can be a recreational thing or also a competitive thing. I am a very keen Ballroom and Latin dancer and I have competed during my university years, and have also been a member of a formation team. I also really enjoy walking in the countryside and enjoy reading a good book whenever time permits.

I sometimes think that it would be wonderful if maths teachers did more recreational mathematics. Sadly, I don't do too much problem solving in my free time, but I would highly recommend doing a good Sudoku every now and then.

Success Stories in Mathematics

Sandrine Foldvari
Job: Portfolio Manager and Managing Partner at Taranis Partners LLP

Since I was 11, I remember having been interested in puzzles. My math teacher at that time started to give us some fun things (like the three prisoners puzzle). If we got it right we could get some more. I actually found mathematics really fun in my studies. Then as I progressed when we learnt it in high school and I had great amazing female math teachers that made me like it even more and made me feel comfortable and confident in learning.

When I started my undergraduate studies I had a primary focus in mathematics. I graduated from the Business School (where I majored in the finance exam thanks to a full time math also followed to parallel.

However, mathematics and in particular financial mathematics is a very interesting area. If the ratio male/female was 1:1, I think I would be a student. And again, at the time, the male/female ratio was pretty high. I was one of the few women majoring in finance. It was quite challenging to be a woman in finance, but it was also an opportunity to be a woman in finance and then when you prove you often conquer (explicitly or implicitly) that when you speak up you are being aggressive or pushy or bossy, which is more rarely seen as a weakness than a strength when men are themselves concerned.

I had the great chance to meet with a fantastic mentor early in my career who gave me the opportunity to become a partner in a start-up hedge fund almost 4 years ago. I would not qualify my career path as exceptional or even particularly successful. I am grateful to many great mentors (especially my family, close friends, teachers, professors or professional mentors). However that is probably what differentiates most men and women in my area: men tend to acknowledge more openly the help and support they receive from others. And to me that is the case for all success story: hard work is compulsory but not sufficient; we all need mentoring and directions from others.

mathematics at the London School of Economics. The reason why I actually pursued a PhD was because I met with an inspiring professor that supported me all the way (a part time PhD while working full time was not always easy...). At that time I simply found mathematics beautiful. For instance, I found that the way mathematics can transport problems into other spaces to solve them made to solve was just almost magical! The versatile aspects of mathematics, the fact it can be applied to so many areas of our day to day life make it really appealing to me.

Success Stories in Mathematics

Timothy Revell
Job: Science Journalist at New Scientist

I am an award-winning science journalist at New Scientist. I am a regular presenter and host of the BBC radio show The Naked Scientists, and author of the popular maths book *Black & White*.

After studying for a Master of Mathematics (MMaths) at the University of Bath, I moved to Glasgow to study for a PhD in computer science at the University of Strathclyde. It was there that I fostered a love of science journalism by joining and then running a student science publication called theIST.

Throughout my tenure as editor-in-chief we grew from fewer than 20 contributors to well over 100, we picked up awards from the Association of British Science Writers and The Guardian, amongst others, and became one of the best student publications in the country.

During a chaotic 6 months starting at the end of 2015, I wrote and defended my PhD thesis, wrote my first book, and decided that I wanted to become a full-time science journalist.

Shortly after that I got the job of technology reporter (although I cover maths as well) at New Scientist, and have been enjoying it ever since.

You can find all of my work on my website and my daily ramblings on twitter at [@timothyrevell](https://twitter.com/timothyrevell).

INTERNATIONAL COLLABORATION

The Society has a number of links with mathematical societies and organisations overseas, including the International Mathematical Union (IMU), the International Conference on Multimodal Interaction (ICMI) the International Council for Industrial and Applied Mathematics (ICIAM), and the European Mathematical Society (EMS).

In 2018 the Society hosted both the Abel Prize Committee and the IMU Executive Committee. The Abel Prize Committee meeting was held in De Morgan House in January 2018 and it was at this meeting that the 2018 Abel Prize winner was chosen. In addition to the meeting of the Committee the 2018 Abel Prize Committee reception was held at the Norwegian Ambassador's Residence in Kensington and hosted by Ragnhild Imerslund, Minister, Deputy Head of Mission and Head of the Political and Economic Section, in the absence of the Ambassador Monica Juul. The reception was an opportunity for members of the STEM community to meet with the Abel Prize Committee and the Norwegian Ambassador's staff. Professor Marie-France Vignéras, Institut de Mathématiques de Jussieu, Paris and a member of the Abel Prize Committee also welcomed guests on behalf of the Committee and presented LMS President, Professor Caroline Series FRS, with a copy of a publication containing three Niels Henrik Abel manuscripts. This is available to view in the De Morgan House library in the Members Room.



The Abel Prize Committee reception at the Norwegian Ambassador's Residence in Kensington



OTHER ACTIVITIES

MATHEMATICAL SCIENCES DIRECTORY UK

Launched in 2017 the MSDirectory is a comprehensive database about Mathematical Scientists in the UK and was set up to act as a free, central resource to facilitate research networking and collaboration. The Directory currently contains the details of over 6,000 UK-based Mathematical Scientists, primarily working in higher education institutions. The intention is that eventually all UK Mathematical Sciences undergraduates would register on the Directory as an undergraduate and remain a member of the Directory for the entirety of their career, regardless of their career path.

The Society is preparing to undertake a major promotional campaign to encourage Mathematical Scientists working outside of academia – for example in industry – to become members of the MSDirectory, and to ask them, in turn, to inform their own personal contacts and colleagues about this freely available resource. The campaign will also be extended to target undergraduates and those in other STEM organisations and many other research disciplines who may find the Directory useful in their areas of work. Details on how to join the Directory are available at www.lms.ac.uk/msdirectory

LMS EDUCATION DAY 2018

This year's LMS Education Day was held at De Morgan House in May and attracted over 50 delegates from across the mathematics education sector. The theme of the event was the potential disruption of mathematics curricula in higher education (HE) by the introduction of measures such as the Teaching Excellence Framework (TEF). Mathematics departments across the UK are considering ways to scrutinise and improve how courses are structured and delivered. The LMS Education Day provided a forum to discuss the opportunities and challenges of any such changes.

The morning session featured talks from experts with experience working on curriculum transformation and innovation. Representatives from across the sector gave presentations focusing on measures aimed at reforming and improving curricula and on the recent consultation for subject-level TEF ratings.

For the afternoon session delegates broke into groups to discuss four questions central to the day's theme:

- What a new mathematics curriculum should look like
- How should a new curriculum be delivered?
- Assessment
- A strategy for effectively transforming the curriculum

The event concluded with an open discussion on whether mathematics degrees are already fit for purpose in the 21st century. Discussions focused on the importance of a coherent curriculum and the contribution to students' personal development, provided by general purpose mathematics education, versus the need to prepare for modern technologies and industries such as programming and artificial intelligence.

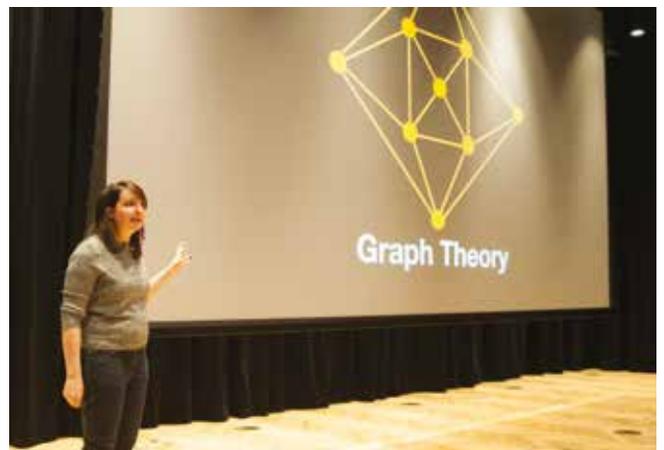
HAVING OUR VOICE HEARD: PROMOTING MATHEMATICS

During 2017-18 the Society continued to promote its events and activities to the wider mathematical community. The Society has built a successful social media presence since 2015. The number of followers on our two Twitter accounts @LondMathSoc and @WomeninMaths has risen to over 18,000. With the Society now targeting young mathematicians and early career researchers it is important to build and maintain a solid digital presence to provide timely up to date information about the wide range of activities and benefits the Society provides and also to network with the wider Mathematical Sciences community.

The growth of the Society's digital footprint along with regular e-updates to members and LMS Representatives are helping to extend the Society's reach in promoting Mathematical Sciences. The Society also continued to build video material from selected meetings and its Popular Lectures, which are broadcast on the LMS You Tube channel ([tinyurl.com/n849jv4](https://www.youtube.com/channel/UCn849jv4)). Last year's Popular Lectures have over 8,000 views combined and the Channel now has over 4,500 subscribers.

POPULAR LECTURES

This year's Popular Lectures in London and Birmingham featured Dr Katie Steckles and Dr Jennifer Rogers (University of Oxford) once again attracting large audiences with over 350 attending the London event at King's College London. Dr Steckles' presentation was titled *Maths's Greatest Unsolved Puzzles* – which looked at a range of mathematical puzzles and Dr Rogers' presentation was titled *Risky Business* - a journey through the correct and incorrect use of statistics to assess risk. How statistically significant are the risks that we see? And what do the numbers mean? If you would like to receive information about future Popular Lectures please email popular.lectures@lms.ac.uk



Dr Katie Steckles (top) and Dr Jennifer Rogers (bottom) present their Popular Lectures

COLLABORATING WITH OTHER ORGANISATIONS

The Society continues to collaborate on a range of activities including the *Maths Inside* project, in collaboration with the Royal Society Summer Science exhibition, which this year produced three leaflets: *Gaia Satellite: One billion stars in 3D with the help of mathematics*; *Malaria Vaccines: Saving lives with the help of mathematics*; *Random Revolution: From cybercrime to gaming with the help of mathematics*.

The Society is also represented on the British Science Association Mathematical Sciences Section, which is responsible for compiling the programme of Mathematical Sciences events at the British Science Festival and will continue to work on promoting the Society and the Mathematical Sciences through events such as the Bloomsbury Festival. This year's Festival included a panel session about diversity in mathematics and the film *Faces of Women in Mathematics* was also shown.

The LMS Education Committee also liaised with Gresham College to organise the joint London Mathematical Society/Gresham College Annual Lecture, which was held at the Museum of London. This year's lecture was entitled *Mathematical Research from Toy Models* and was presented by Professor Tadashi Tokieda (Stanford University).



Maths Inside 2018



SUBLIME SYMMETRY EXHIBITION

In 2018 the Society worked with the Guildhall Art Gallery, London as part of an exhibition entitled *Sublime Symmetry: The Mathematics behind William De Morgan's Ceramic Designs*, which examined the mathematical devices used in his designs. The pieces in the exhibition were chosen to demonstrate the mathematical concepts which are the basis for De Morgan's beautiful and colourful ceramic designs.

William De Morgan was the eldest son of the Society's first President, Augustus De Morgan and in this context the Society was asked to provide exhibition material about Augustus De Morgan and about the Society from its foundation in 1865 to the present day, to augment the ceramic displays. The exhibition ran at the Guildhall Art Gallery in London from May to October 2018.



LONDON
MATHEMATICAL
SOCIETY
EST. 1865

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