LONDON MATHEMATICAL SOCIETY
EST. 1865

NEWSLETTER

No. 468 April 2017

CMS AT THE HOUSE OF COMMONS

The Council for the Mathematical Sciences (CMS) (www.cms.ac.uk) held an event recently at the House of Commons on *Mathematics Education,* hosted by Stephen Metcalfe MP, Chair, Science and Technology Select Committee. Over 100 invited guests from parliament, including Sir Julian Brazier MP and Stephen Timms MP, government departments including the Department for Education, academia, education and a range of Science, Technology, Education and Mathematics (STEM) organisations. Guests had the chance to network with colleagues and also heard an address from Sir Adrian Smith, Chair, CMS, about his upcoming review of post-16 mathematics provision in England where he drew on general points from his yet to be published review. The invited guests also heard from the new chair of the Advisory Committee on Mathematics Education (ACME) (www.acme-uk.org) Professor Frank Kelly, about new developments within the Committee and the vision moving forward.

Sir Adrian Smith, Chair, CMS

Professor Frank Kelly, Chair, ACME

SOCIETY MEETINGS AND EVENTS 2017

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LMS COUNCIL STRATEGIC RETREAT

A Personal View

Council's 2017 Strategic Retreat was held on the 3rd and 4th of February at Chicheley Hall.

The 2014–2019 strategic plan arose from the Council's previous strategic retreat, in February 2013. The five strategic priorities of this plan are Communication, Review of grants, Early career researchers, Society meetings, and Data collection. A report had been provided to bring Council up to date with the work undertaken so far on each of these priorities.

Council was invited to consider current activities in relation to the strategic plan. The main points of the discussion included: improvement of communication between Council and Committees, development of communications policy with government, the membership and the public; improvement of the web site; schemes focusing on early career researchers; data collection.

One of the more important issues discussed at the retreat were the possible changes in the Charter, Statutes, and By-laws of the Society. A special working group of the Council, the Standing Orders Review Group has been working for several years on these documents. An annotated preliminary version was presented to Council. It was not a recommendation, but a way of getting early feedback from Council to the Review Group. Any proposed changes in the Charter and Statutes will require further approval.

The Review Group was requesting Council's feedback on two key proposed changes. One concerned the size and composition of Council (there was a proposal to cut it to eleven members) and the nominations procedure.

In addition, there was a suggestion, not previously discussed by the Standing Orders Review Group and not reflected in the draft Charter, to separate completely the roles of the Council and the Board of Trustees. The issue of the composition of Council triggered a lively and inconclusive discussion. Many Council members felt that such changes would be unhelpful for the governance of the Society. There were also suggestions that there was room for improvement in governance which could be achieved now without waiting for new governing documents: for example, draft minutes of Council produced more rapidly; clarification of the delegation to, and reporting from, Committees, and so on.

The General Secretary gave a presentation outlining the Society's current activities by committee with an indication of the budgetary allocation for these activities.

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http://newsletter.lms.ac.uk

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After presentations from Treasurer and Publications Secretary, there was a discussion of future financial security of the Society under various economic and political scenarios, and possible fundraising activities.

On the basis of these discussions, Council considered possible updates in the Society's Strategic Plan. Council members were invited to consider how the Society might develop a summary strategy document similar to that of the American Mathematical Society.

The retreat was a success: the atmosphere of all the discussions was relaxed and very amicable, and the range of complex issues covered in very limited time was quite impressive.

Council will consider the next steps at its meeting on 31 March 2017.

LMS Council Diary

The Council meeting was held on Saturday 4 February, after the Retreat, and was shorter than usual.

After agreeing on the minutes of the previous Council meeting and noting the unconfirmed minutes of the Finance and General Purposes Committee meeting and the Annual General Meeting, the Council received an update on the activities of the President undertaken since the last meeting of the Council.

The main activities included attendance at: the Parliamentary and Scientific Committee Annual Lunch, the Standing Orders Review Group. Alice Rogers, June Barrow-Green and Fiona Nixon attended the Science Museum reception at the opening of its new mathematics gallery. The Programme Secretary, Vice-President Greenlees and the Executive Secretary had attended the South West and South Wales Regional Meeting.

The most important topics discussed were financial matters and the consultation on the next Research Excellence Framework, as well as some governance matters.

Alina Vdovina

REVISED COMMITTEE STRUCTURE AT THE LONDON MATHEMATICAL SOCIETY

Over the last year Council set up a working group under the chairmanship of the General Secretary to reconsider the structure of its standing committees. In particular, Council had previously identified at a strategic retreat the need to have a standing committee dedicated to supporting young and early career research mathematicians and to bring together all of the supporting activities for this constituency under its own standing committee. Following recommendations from the working group, Council approved the disbanding of the current Programme Committee and Research Meetings Committee and in their place has formed three new committees, Early Career Research Committee, Research Grants Committee, and Society Lectures and Meetings Committee. Council is pleased to announce the three new Chairs, who will lead these committees from 1 August 2017:

- Chair of Early Career Research Committee: Chris Parker (Birmingham).
- Chair of Research Grants Committee: Francis Clarke (Swansea)
- Chair of Society, Lectures and Meetings Committee: Iain A. Stewart (Durham).

The primary remits of the three new Committees are broadly outlined below:

Early Career Research Committee

Postdoctoral Support:

- Travel Grants to the International Congress of Mathematicians (ICM) and European Congress of Mathematics (ECM) for Early Career Researchers.

- Grants to Celebrate New Lecturers' Appointments.
- Cecil King Scholarship.

Postgraduate Support:

- Research Schools.
- Graduate Student Meetings.
- Postgraduate Conference Grants.

Undergraduate Support:

- Undergraduate Research Bursaries.
- Undergraduate Summer Schools.
- LMS Prospects in Mathematics Meetings.
- UK Undergraduate Mathematical Societies grants.
- Travel Grants to Heidelberg Laureate Forum.

Research Grants Committee

These are primarily grants for established researchers.

- Research Grant Schemes (Conference, Visits to the UK, Joint Research Groups, Research in Pairs).
- International Grants (African Mathematics Millennium Science Initiative (AMMSI), Mentoring African Research Mathematics (MARM)).
- LMS Durham Symposia.
- Research Workshop Grants.
- Travel Grants to ICM and ECM for mid – late Career Researchers.

Society Lectures and Meetings Committee

- Society meetings.
- Spitalfields Days.
- Lectureships (Hardy, Invited Lecture Series, LMS-NZMS Forder/Aitken, Hirst).

Council wishes to thank the current members who have served on the Research Meetings Committee and Programme Committee and is grateful that they will continue to support the Society by serving on these new committees.

Stephen Huggett
LMS General Secretary

LMS ELECTION NEWS

Members are asked to note that two Officer roles on Council will be vacated by the incumbents at the 2017 AGM. After serving as a Vice-President for 8 years, Professor Ken Brown will not seek a further term of office in order to avoid the two Vice-Presidents, who were both appointed at the same time, having to step down at the same time due to having served full terms of office during the same period. After serving as Education Secretary for 5 years, Professor Alice Rogers will not seek re-election to the role of Education Secretary.

The Society wishes to place on record its thanks to both Professors Brown and Rogers for their services and wishes them well for the future.

Elections for a Vice-President and Education Secretary will take place as normal at the AGM. The Nominating Committee would be pleased to receive suggestions of names of those who might be considered for either of these vacancies. The deadline for receipt of suggestions is Friday 5 May 2017. Suggestions should be sent to the Chair of Nominating Committee, Professor John Toland, at nominations@lms.ac.uk. Of course members may make their own nominations as usual.

Future role of the Society's Programme Secretary

The revised committee structure put in place by Council will have an impact on the role of the Programme Secretary. At present the Programme Secretary chairs the Programme Committee, which will shortly cease to exist. One possibility is that in future the Programme Secretary chairs the new Research Grants Committee,

as this will become the standing committee which supports the major programme of grant-giving within the Society. Council will be considering this at its next meeting, and Nominating Committee will be invited to take this matter under consideration at its meeting in May to agree an election slate.

Fiona Nixon
Executive Secretary, LMS

LMS GRANT SCHEMES

Next Closing Date for Research Grant Applications: 15 May 2017

Applications are invited for the following grants:

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

Celebrating New Appointments (Scheme 1)
Grants of up to **£600** are available to provide partial support for meetings held in the United Kingdom to celebrate the new appointment of a lecturer at a UK university.

Postgraduate Research Conferences (Scheme 8)
Grants of up to **£4,000** are available to provide partial support for conferences held in the United Kingdom, which are organised by and are for postgraduate research students.

Visits to the UK (Scheme 2)
Grants of up to **£1,500** are available to provide partial support for a visitor to the UK, who will give lectures in at least three separate institutions. Awards are made to the host towards the travel, accommodation and subsistence costs of the visitor.

Research in Pairs (Scheme 4)
Grants of up to **£1,200** are available to support a visit for collaborative research either by the grant holder to another institution abroad, or by a named mathematician from abroad to the home base of the grant holder. Grants of **up to £600** are available to support a visit for collaborative research either by the grant holder to another institution within the UK, or by a named mathematician from within the UK to the home base of the grant holder.

International Short Visits (Scheme 5)
Grants of **up to £3,000** are available to support a visit for collaborative research, by a named mathematician from a country in which mathematics could be considered to be in a disadvantaged position, to the home base of the grant holder. Grants of **up to £2,000** are available to support a visit for collaborative research by the grant holder to a country in which mathematics could be considered to be in a disadvantaged position. Applicants will be expected to explain in their application why the proposed country fits the circumstances considered eligible for Scheme 5 funding. Applicants unsure if the proposed country is eligible under a Scheme 5 grant should contact the Grants team.

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

- Applications received by **15 May 2017** will be considered at a meeting in June 2017.

- Applications should be submitted well in advance of the date of the event for which funding is requested.
- Grants are not awarded for events which have already happened, and in cases where insufficient time has been allowed for processing of the application, the Programme Committee reserves the right to decline funding.

Queries regarding applications can be addressed to the Grants Administrator, Anthony Byrne (tel 0207 927 0807, email: grants@lms.ac.uk) who will be pleased to discuss proposals informally with potential applicants and give advice on the submission of an application.

LMS HOLGATE LECTURES AND WORKSHOPS

The Holgate Lectures and Workshops sessions scheme provides session leaders who are willing to give a talk on a mathematical subject to groups of students or teachers. The sessions are of mathematical content and are not, for example, careers talks. Rather they are intended to enrich and enhance mathematical education, looking both within and beyond the curriculum. Holgate session leaders do not charge a fee for giving talks, but local organisers are expected to pay travel expenses and subsistence costs, together with any local costs of organising the session. The LMS will pay an annual honorarium to the session leaders.

The scheme is named in memory of Philip Holgate, who helped ensure the success of the LMS Popular Lectures.

There will be three vacancies on the Holgate Lecture/Workshop sessions scheme from July 2017. The Society invites applications from people who would like to become Holgate Session Leaders.

It is anticipated that, primarily, each session leader should offer a range of sessions for those in education outside of higher education. This could be at primary, secondary or A-Level or equivalent (including STEP/AEA). It may also cover adult education. The leader would also be free to offer sessions to other relevant groups, for example teachers of mathematics, to enhance their professional mathematical development.

It is anticipated that the majority of the sessions would be held in schools and applicants with strong contacts in schools are particularly welcomed. The LMS will advertise the Holgate Scheme, however session leaders will be expected to promote themselves and the Holgate sessions they offer locally.

The local organiser of a session may be a school, or a group of schools, or a local branch of a mathematical organisation. Schools will be strongly encouraged to collaborate when hosting sessions. There is no required minimum or maximum attendance for the sessions, and appointees will be free to decide whether to accept or decline a request.

There will be no upper or lower bound on the session leader's workload. As an indicative number it is anticipated that they will give three or four sessions during each academic year with the possibility of doing more, although proposals for alternative models will be considered.

Appointees will be asked to provide material for the LMS website such as titles/abstracts/descriptions of talks. They will also be asked to provide an e-mail contact and a short profile, including areas of expertise, interests and experience. It is not intended that the sessions listed on the website would be comprehensive and session leaders would be encouraged to develop or adapt content in light of requests.

Applicants are asked to send a short (2-page)

CV and a letter detailing what it is they think they could offer as a Holgate Session Leader, and what they believe that the Holgate sessions could offer as an educational experience. The Society is open to a wide range of proposals and applicants are encouraged to set out ideas. Applicants are asked to set out what contacts they have that will help them to reach those learning and/or teaching mathematics and those who would benefit from the Holgate Lectures and Workshops. Applications should be received by 30th April 2017, sent to education@lms.ac.uk.

While there is no particular person specification, applicants should have a track-record in mathematics education, communicating with people learning and/or teaching mathematics outside of HE. They may be research-active mathematicians in a university department or be someone mathematically or statistically qualified based outside of academia. There is no requirement that applicants be members of the LMS.

Session leaders and local organisers will be asked to provide a short report on each session and will be paid £450 per year as an honorarium. Appointment will be for a three year term (August 2015 – August 2018) renewable by agreement.

LMS PUBLICATIONS STRATEGIC RETREAT

Publishing mathematics is one of the essential roles of the London Mathematical Society, and is extremely important to our purpose as a learned society and our charitable aims. We have been doing this since the first volume of the *Proceedings* in 1865, and have seen the landscape change several times and adapted with it. With open access, online publishing and recent growth in output by high-quality publishers, it seems we are at another turning point.

Through our Publications Committee, the Society regularly reviews the health of its publications, and discusses new opportunities that may work for us. In that spirit, the Publications Secretary organised a Strategic Retreat in January this year to gather a range of people — around 30 mathematicians, including early career and established, publishers, editors, authors, independent publishing consultants, and our President Designate — to discuss the position of our journals and book series, and other forms of disseminating mathematics.

I certainly have my own axe to grind, being a now-grumpy associate editor of the LMS *Journal of Computation and Mathematics*, which Council recently chose to

terminate, so I was very happy to be invited and to stick my oar in. And so we all met in a hotel outside Leamington Spa for two days in January. The itinerary was packed, with large group discussions broken up by small break-out groups focusing on particular questions, and presentations from the Society's publisher, Wiley, and editors and other consultants.

As you probably know, the Society is involved in publishing 12 journals (one fewer than last year...) and two book series — which over the years have included pre-eminent texts that are still in demand, vital translations from our Russian friends and colleagues, and ranging from student texts to cutting-edge research conferences.

Why does the LMS play the publishing game at all? After all, anyone can write a professional-looking paper and put it online for the world to see. One part of the answer is that publishing addresses our principal missions directly by disseminating mathematical knowledge worldwide. Another is that the rigorous (and costly) processes of refereeing and editing are a service to both authors and readers, giving research and scholarship the imprimatur that the model of science we know depends upon. And another is that publishing supports our promotion of mathematics to other audiences, such as policy makers and science funding bodies, and the high-quality mathematics we publish represents UK science (even though most authors are not from the UK) and tells a story about the science we undertake.

You will have noticed the absent elephant: publishing is also a commercial venture that earns the Society most of its annual income, without which it could not function as we know it and could not support and influence mathematics in the UK as it does through its grants and events and policy committees and prizes and so on. From this point of view, the work we contribute towards Society publications is a direct and essential contribution to enabling its function as a charity and learned society. Not surprisingly, there was a lot of discussion during the retreat of the balance between our ethical obligations as a charity and scientific publisher, the value the Society makes of the income, and the costs and risks we are

exposed to by being in the business.

Granted that publishing is a key part of the Society's mission, however, there are many questions to be asked. Are our current publication aims right for modern publication of contemporary (largely pure) mathematics? Are we adept at responding to new mathematical streams as they arise? Should we be considering additional open access initiatives? How might we improve the reputation of our books and journals, and do we even want to? Is the quantity of work we publish too high, too low or about right? How should quality, financial returns and level of dissemination be balanced against each other? Should we aim to increase international input into the editorial processes? Could we use special events or social media to promote our publications (which is something publishers themselves are good at and could help us with)? Is the experience of authors good enough? How should the work of Council, the Publications Committee and the individual Editorial Boards fit together? And so on. These are some of the questions that we addressed at the retreat, in the light of professional reviews of the Society's publishing activities that we commissioned in 2012 and 2016.

The meeting seemed, to me at least, to be extremely successful. In a short space of time, armed with an inch-thick analysis of our performance and that of similar publishers, we debated dozens of such questions, and identified themes and ideas that resonated with the different perspectives of the group. Our overall aim at the retreat was to come away with a broad list of priorities for consideration by the Publications Committee. Some points came up again and again. We asked the Committee to consider ways to improve the experience of authors — perhaps especially in cases where papers are not accepted. We thought it should consider the quantity of mathematics we publish, in a growing market of high-quality papers. We asked how it might raise the visibility of our publishing. And we asked the Committee to keep the ethics of publishing as a charitable society at the heart of any development.

Over the coming months the Publications Committee will form a smaller discussion group to meet regularly in De Morgan House to prepare an analysis of the outcomes that the Committee can consider later this year. I will be there too, and look forward to tying the different ideas together into a single story, even if we don't have quite as much fun on day release in Russell Square as we did at the retreat in Leamington Spa.

Gavin Brown
Mathematics Institute
University of Warwick

LONDON MATHEMATICAL SOCIETY
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LMS INVITED LECTURER 2017

Professor Jim Agler (UCSD)

Function Theory by Hilbert Space Methods

18-22 April 2017, Herschel Building, Newcastle University

Our topic will be a powerful machinery that has been developed in the last 60 years both to discover and to prove theorems about analytic functions in one and several complex variables through the construction of operators on Hilbert space.

The lectures will begin with expositions of the elementary operator theory that is required to achieve interesting results in function theory.

Next we will show how a number of classical results in the theory of analytic functions in one variable, when cast in a Hilbert space setting, can be proved by operator-theoretic methods which are largely algebraic in nature. These results will include the Herglotz Representation Theorem, the Carathéodory and Pick Interpolation Theorems, Nevanlinna's Representation Theorems, the Carathéodory-Julia Theorems, and Loewner's Theorem.

The remainder of the talks will focus on how the operator-theoretic proofs of these one- variable theorems can be generalized to yield a variety of new results in several complex variables.

Guest Lectures

There will also be supplementary lectures by:

Professor John McCarthy (Washington University in St. Louis, USA)
Research interests: Analysis, especially Operator Theory and one/several Complex Variables

Associate Professor Greg Knese (Washington University in St. Louis, USA)
Research interests: Complex Function Theory, Operators, Harmonic Analysis

Assistant Professor Kelly Bickel (Bucknell University, Lewisburg, PA, USA)
Research interests: Multivariate Operator Theory, Several Complex Variables, Harmonic Analysis

Accommodation, Travel Funding and Registration

Accommodation will be provided at the Osborne Hotel.

Limited financial support is available with preference given to UK research students. Please contact the organiser for further details: Zinaida Lykova zinaida.lykova@newcastle.ac.uk.

For further details and how to register for the 2017 Invited Lectures please visit:
http://www.mas.ncl.ac.uk/~nek29/lmslectures2017/function_theory.html

Institute of mathematics & its applications

LONDON MATHEMATICAL SOCIETY EST. 1865

LMS–IMA Joint Meeting
Symmetry and Computation

12 October 2017, 11am – 5pm
De Morgan House, Russell Square, London

Speakers (l to r): Evelyne Hubert (INRIA Méditerranée), Kurusch Ebrahimi-Fard (Trondheim), Peter Neumann (Oxford), Gloria Mari Beffa (U Wisconsin-Madison), Darryl Holm (Imperial)

The first joint meeting of the **Institute of Mathematics and its Applications** and the **London Mathematical Society** will take place on October 12, 2017, at De Morgan House, Russell Square, London.

Organisers: Elizabeth Mansfield, Arieh Iserles, Evelyne Hubert and Peter Hydon.

The meeting will be followed by a reception. Keep the date!

Express your interest by emailing lmsmeetings@lms.ac.uk by 30 April 2017. You will still need to register for the meeting but your expression of interest means we can contact you when registration opens.

Background image: Objects by Matilda Leake

LONDON MATHEMATICAL SOCIETY
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LMS Mary Cartwright Lecture
Friday 5 May 2017

De Morgan House, 57-58 Russell Square, London, WC1B 4HS

3.30 **Opening Lecture**

Sinead English (University of Cambridge)

Information use within and across generations: implications for understanding animal development and non-genetic inheritance

4.30 **Tea**

5.00 **Mary Cartwright Lecture**

Rebecca Hoyle (University of Southampton)

Transgenerational plasticity and environmental change

6.00 **Wine reception**

Rebecca Hoyle

To register please contact Katy Henderson on womeninmaths@lms.ac.uk by Friday 28 April
The reception will be followed by dinner at the Montague Hotel, at a cost of £35 per person

LMS LIBRARY AT UCL

Registering and Renewing

Members of the Society are reminded that they may register as users of the University College London Library, where the London Mathematical Society Library is held and which contains a collection of:

- periodicals published by other mathematical societies which are received in exchange for the Society's publications
- copies of books and journals published by the Society
- items acquired by the Society as review copies or gifts.

The Society's Library is housed in the UCL Science Library. Members may also use all the material available in the reading rooms and stores of the UCL family of libraries. These privileges include:

- Borrowing up to ten items at any one time.
- Placing up to three concurrent reservations on material already on loan.
- Borrowing books by post without service charge (costs for returning the books must be covered by the user).
- Access to MathSciNet and specific electronic journals from designated terminals in the Science Library.
- Use of the *Explore* access points to search for and view electronic publications and save single copies of articles (no more than one article per journal issue) for your own personal use. You can save articles to standard USB sticks, note that USB sticks containing encrypted software do not work on the Explore access points.
- Use of photocopying facilities at UCL libraries (charged at the same rate as UCL staff).
- Rapid photocopying service by post - *Photocopy Request and Copyright Declaration Form.*

Please note that, for licensing reasons, use of the Library at UCL does not include remote electronic access to journals and articles. To check the listings of electronic journals available to visitors, before your visit to the Library, use *Explore* (http://sfx.ucl.ac.uk/sfx_local/az/walkin).

To Register/Renew (in person)

Please complete the application form (which can be downloaded from http://www.ucl.ac.uk/library/docs/borrowerform) and bring the following items with you:

- passport-size photograph
- proof of Identity e.g. passport, photocard driving licence.
- proof of address e.g. utility bill, recent bank statement, valid photocard driving licence
- proof of membership – a letter of confirmation can be obtained from the Society, please email membership@lms.ac.uk

To Register/Renew (by post)

To register by post, please complete the application form (which can be downloaded from http://www.ucl.ac.uk/library/docs/borrowerform) and return it with:

- a passport-size photograph
- proof of membership – a letter of confirmation can be obtained from the Society, please email membership@lms.ac.uk.

To:
Head of Membership, UCL Library Services
University College London
Gower Street
London WC1E 6BT
Telephone: 020 7679 7953
Fax: 020 7679 7373
Email: lib-membership@ucl.ac.uk

When registering by post, library cards will be posted back to the address given on the application form.

Please note that library cards are valid for 12 months from date of issue and will need to be renewed each year.

No charge is made is made for the initial registration or for renewing expired library cards or cards which are within one calendar month of expiring.

Reminders to Renew - To receive reminders to renew by email from the Library at UCL, please remember to include an email address on the form when registering and renewing. The UCL Library will send out reminders two weeks before your library card is due to expire.

Forgotten Cards – Please note that if you forget your library card, you will not be admitted to any UCL Library. This rule is strictly applied.

Visiting the library

24 Hour Opening

The Science Library is open 24 hours for UCL Library card holders and has extended the opening hours of the assistance desk.

Opening Hours

	Help Point and Collection Point	Self Service	Reading Rooms
Monday	09:30 – 21:00	Open from 08:45	Open from 08:45
Tuesday	09:30 – 21:00	24 hour opening	24 hour opening
Wednesday	09:30 – 21:00	24 hour opening	24 hour opening
Thursday	09:30 – 21:00	24 hour opening	24 hour opening
Friday	10:00 – 21:00	24 hour opening	24 hour opening
Saturday	11:00 – 18:00	Close at 20.45	Close at 21:00
Sunday	Closed	11:00 – 20:45	11:00 - 21:00 (holders of UCL Library Cards only)

Please note:

- During the weekends and evenings, the Library is open principally to offer book loans and to handle related queries. For all other queries, please contact a member of staff during office hours (http://www.ucl.ac.uk/library/help).
- During the year, the opening hours may change. Please check the Science Library website before travelling (http://www.ucl.ac.uk/library/sites/science#open).

Checking seat availability

You can also check online for the availability of seats in the reading rooms and computer cluster at the Science Library: http://www.ucl.ac.uk/library/sites/science/#current.

For further information about the Society's Library visit www.lms.ac.uk/library/lms-library.

Inside UCL Science Library

LONDON MATHEMATICAL SOCIETY
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Introduction to Geometry, Dynamics, and Moduli in Low Dimensions

LMS-CMI Research School

Warwick
11 – 15 September 2017

Organisers: J. Aramayona (Madrid), S. Schleimer (Warwick), J. Smillie (Warwick)

Course outline

The Research School will offer a broad introduction to low-dimensional geometry, topology, and dynamics. Experts in the field will each deliver a mini-course devoted to a particular sub-area. The mini-courses will be accompanied by problem sessions, supervised by tutors. The School is the opening event of the EPSRC-Warwick Symposium "Geometry, dynamics, and moduli in low dimensions" to be held at Warwick during the academic year 2017-18. Participants of the School are also invited to apply to the other workshops of the symposium.

Lecture Courses

Yael Algom-Kfir (Haifa) *Free groups as fundamental groups of graphs*

Tara Brendle (Glasgow) *Description of Teichmüller space in terms of hyperbolic geometry*

Nathan Dunfield (UIUC) *Methods for computation of geometric structures and invariants*

Erwann Lanneau (Grenoble) *Teichmüller dynamics*

Julien Marché (Paris VI) *Geometric structures viewed in terms of representations*

These lecture courses will be supplemented by tutorial sessions.

For further information, please visit: www2.warwick.ac.uk/fac/sci/maths/research/events/2017-18/symposium/igdm/

Apply online (https://tinyurl.com/gwgv8lr) by **16 June 2017.** Research students, post-docs and those working in industry are invited to apply. A reference is also required: https://tinyurl.com/jcmgffk

All applicants will be contacted within three weeks after the deadline; information about individual applications will not be available before then.

Fees

Research students: **£150**. There will be no charge for accommodation and subsistence costs.

Early career researchers: **£250**. There will be no charge for accommodation and subsistence costs.

Other participants (e.g. those working in industry): **£250**

Research students who have not completed their PhDs by the start of the Research School and who would otherwise be unable to attend can apply for financial aid.

Fees are not payable until a place at the Research School is offered but will be due by 11 August 2017.

LONDON MATHEMATICAL SOCIETY
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Algebraic Topology of Manifolds

LMS-CMI Research School

Oxford
11 – 15 September 2017

Organiser: Ulrike Tillmann (Oxford)

Manifolds are at the centre of much of geometry and topology, and through the influence of axiomatic topological quantum field theory they have become an important organising force in category and representation theory.

Classically, in the 1960s, algebraic topology was at the heart of their classification theory in form of characteristic classes and numbers, cobordism theory, surgery theory, and later Waldhausen's K-theory of manifolds. We are now experiencing a renaissance of the field as well as a paradigm shift where manifolds not only are the objects of study but become the tools.

The school aims at inspiring the next generation with this exciting success story of interwoven ideas bouncing between different fields, and giving the participants the tools to contribute to this lively research area.

Lecture Courses

Dan Freed (Austin, USA)
Topological Quantum Field Theory
Oscar Randall-Williams (Cambridge, UK)
Characteristic classes & moduli spaces of manifolds
Greg Arone (Virginia, USA)
The Goodwillie–Weiss embedding calculus
Nathalie Wahl (Copenhagen, Denmark)
Homological stability

These lecture courses will be supplemented by tutorial sessions. In addition there will be guest lectures.

For further information, please visit: https://people.maths.ox.ac.uk/tillmann/ATM-SCHOOL.html

Apply online (www.surveymonkey.co.uk/r/RS33-ATManifoldsApplicationForm) by **16 June 2017.** Research students, post-docs and those working in industry are invited to apply. *All applicants will be contacted within three weeks after the deadline; information about individual applications will not be available before then*

Fees

Research students: **£150**. There will be no charge for subsistence costs.
Early career researchers: **£250**. There will be no charge for subsistence costs.
Other participants: **£250** plus subsistence costs.
Research students who will not have completed their PhDs by the start of the Research School and who would otherwise be unable to attend can apply for financial aid to cover their travel costs.
Fees are not payable until a place at the Research School is offered but will be due by 21 July 2017.

NEWS FOR EARLY CAREER RESEARCHERS AND STUDENTS

UNDERGRADUATES

Funding for Undergraduate Society Meetings

Funds of up to £500 are available to support meetings of Undergraduate Mathematical Societies to cover the travel and accommodation costs for an invited speaker (from academia or industry) and to cover catering costs e.g. a wine reception after the meeting. Further information and an application form is available online: www.lms.ac.uk/grants/LMS-Funding-Undergrad-Soc-Meetings.

MASTERS STUDENTS

Date for your diary

30 June 2017: Graduate Student Meeting in London. Look out for further details next month.

PhD STUDENTS

Dates for your diary:

15 May 2017: Deadline for Postgraduate Conference (Scheme 8) Grant Applications. Planning to organise a conference for you and your fellow research students? The LMS offers grants of up to £4,000 to support costs for speakers and participants. Find out more here: https://www.lms.ac.uk/grants/postgraduate-research-conference-grants-scheme-8

POST-DOCS AND EARLY CAREER RESEARCHERS

Dates for your diary:

15 May 2017: Deadline for Celebrating New Appointments (Scheme 1) Grant Applications. If you are new lecturer who has been appointed within the last two years, why not celebrate your appointment with a research meeting? The LMS offers grants of up to £600 to support costs for speakers and participants. Find out more here: https://www.lms.ac.uk/grants/celebrating-new-appointments-scheme-1

Jinan Raheem al-Asady (Leicester) gives a talk at the Young Researchers in Mathematics Conference, August 2016, St Andrews

LMS Graduate Student Meeting

LMS-CMI RESEARCH SCHOOL APPLICATION DEADLINES

16 June 2017: Deadline for applications to the LMS-CMI Research School *Algebraic Topology of Manifolds,* Oxford; 11-15 September 2017.

Further details here: https://people.maths.ox.ac.uk/tillmann/ATM-SCHOOL.html Apply here: https://www.surveymonkey.co.uk/r/RS33-ATManifoldsApplicationForm.

A reference will also be required so ask your referee to complete the form here: https://www.surveymonkey.co.uk/r/RS33-ATManifoldsRefereeForm

16 June 2017: Deadline for applications to the LMS-CMI Research School *Introduction to Geometry, Dynamics, and Moduli in Low Dimensions,* Warwick; 11-15 September 2017.

Further details here: http://www2.warwick.ac.uk/fac/sci/maths/research/events/2017-18/symposium/igdm/ Apply here: http://www.surveymonkey.co.uk/r/RS30IntroToGeometryDynamicsAndModuliInLowDimensionsApplnForm

A reference will also be required so ask your referee to complete the form here: https://www.surveymonkey.co.uk/r/RS-30IntroductiontogeometrydynamicsandmoduliinlowdimensionsrefereeForm.

MATHEMATICS POLICY ROUND-UP

April 2017

RESEARCH

Government responds to Select Committee reports

The government has responded to the recent House of Commons Science and Technology Committee report: *Leaving the EU: implications and opportunities for science and research.* The response is available at http://tinyurl.com/h39xlr2.

The government has also responded to the House of Lords Science and Technology Committee reports: *A time for boldness: EU membership and UK science after the referendum* and *EU membership and UK science.* The responses are available at http://tinyurl.com/ho3y3bk.

EPSRC publishes the results of its Balancing Capability exercise

The Engineering and Physical Sciences Research Council (EPSRC), after 'extensive engagement and dialogue with the research community', has published refreshed research area rationales as part of its Balancing Capability strategy. The results for the Mathematical Sciences theme are available at http://tinyurl.com/hkeb98w.

OTHER

Algorithms in decision-making inquiry launched

The House of Commons Science and Technology Select Committee has launched a new inquiry into the use of algorithms in public and business decision making.

The Committee would welcome written submissions on the following points.

- The extent of current and future use of algorithms in decision-making in government and public bodies, businesses and others, and the corresponding risks and opportunities.
- Whether 'good practice' in algorithmic decision-making can be identified and spread, including in terms of: the scope for algorithmic decision-making to eliminate, introduce or amplify biases or discrimination, and how any such bias can be detected and overcome; whether and how algorithmic decision-making can be conducted in a 'transparent' or 'accountable' way, and the scope for decisions made by an algorithm to be fully understood and challenged; the implications of increased transparency in terms of copyright and commercial sensitivity, and protection of an individual's data.
- Methods for providing regulatory oversight of algorithmic decision-making, such as the rights described in the EU General Data Protection Regulation 2016 http://tinyurl.com/zjtouov.

The closing date for submissions is **Friday 21 April 2017.** More information is available at http://tinyurl.com/hcgvvmm.

High level stakeholder working group on EU exit

The government has convened a stakeholder working group to provide a forum for the Department for Business, Energy and Industrial Strategy (BEIS), the Department for Education (DfE), the Department for Exiting the European Union (DExEU) and a broad range of UK representatives of the universities, science, research and innovation communities to discuss issues of common interest in approaching the UK's exit from the EU. The emphasis will be on considering all factors related to research and innovation that need to be taken into account as government policy develops. Professor Sir John Holman, President, Royal Society of Chemistry, is representing the Council for the Mathematical Sciences, Institute of Physics, Royal Society of Biology and Royal Society of Chemistry as a member of the group.

More information is available at http://tinyurl.com/hcl8nwu.

Dr John Johnston
Joint Promotion of Mathematics

OXFORD MATHEMATICS

UK-Networking Scheme

The Mathematical Institute invites applications from UK-based mathematicians under its UK-networking scheme. Applications are invited for funds up to £500 from individuals who have no other support

- to participate in events at the Oxford Mathematical Institute;
- to invite members (including visitors) of the Oxford Mathematical Institute to visit their own institutions.

Applications outside the remit but in the spirit of the above are welcome. For more details see http://tinyurl.com/j62fbyy.

EUROPEAN NEWS

European Science

The EMS is one of the European societies which signed an open letter with the title *European science organisations: maintain transparency, open communication and mobility of scholars and scientists* motivated by the recent events in the United States. The letter text is available at www.euroscience.org/news/press-release-open-letter and will be sent, in particular, to the EU authorities.

Researchers stranded abroad

Initiative for Science in Europe, a lobbying organization of which the EMS is a member, has come up with an initiative to coordinate offers of help to researchers stranded abroad after the US immigration ban. Those who want to offer a temporary harbour to such people are invited to visit www.embo.org/science-solidarity and present their proposals there.

EMS President on Trump's EO

Professor Pavel Exner, President of the European Mathematical Society, has issued the following statement:

The European Mathematical Society is closely following the activities of our American colleagues in response to the Executive Order signed by US President Donald Trump, temporarily suspending travel to the US from seven countries. I support the statement signed by the AMS Board and the online academic petition opposing the ban. I share their worries about the consequences of this measure.

Europe in the last century amassed too much experience of bans based on group identity and we know the devastating consequences they have. I am afraid that such policies will harm scientific work everywhere, including the United States.

German Mathematical Society

Gerd Faltings will be awarded the **Cantor Medal** of the German Mathematical Society (DMV) in September this year. Jean-Pierre Bourguignon (who was the second President of the EMS) has been named honorary member of the DMV.

CNRS Medals in Mathematics

Christophe Breuil (CNRS and Université Paris-Sud Orsay) is the winner of the *Médaille d'Argent 2017,* and Béatrice de Tilière (CNRS, Université Paris-Est Créteil, Université Paris-Est Marne-la-Vallée) is the winner of the *Médaille de Bronze 2017*. For more details see www.cnrs.fr/insmi/spip.php?article2049

David Chillingworth
LMS/EMS Correspondent

LMS DURHAM SYMPOSIA 2018
CALL FOR PROPOSALS

The London Mathematical Society and Durham University invite proposals for LMS Durham Symposia in 2018 and intend to support two Symposia to take place in August 2018.

The Symposia began in 1974, and have now become an established and recognised series of international research meetings. They provide an excellent opportunity to explore an area of research in depth, to learn of new developments, and to instigate links between different branches. The format is expected to allow substantial time for interaction and research. The meetings are by invitation only and held in August, lasting 5 days, with up to 50 participants, roughly half of whom will come from the UK. They are held at the University of Durham.

Prospective organisers should send a formal proposal to the Durham Representative, Dirk Schuetz (dirk.schuetz@durham.ac.uk) by **Monday 10 April 2017**.

Proposals should include:

- A full list of proposed participants, divided into specific categories (please see the guidance on submission of proposals at www.lms.ac.uk/events/durham-symposia for more details). Proposers are encouraged to actively seek to include women speakers and speakers from ethnic minorities, or explain why this is not possible or appropriate.
- A detailed scientific case for the symposium, which shows the topic is active and gives reasons why UK mathematics would benefit from a symposium on the proposed dates.
- Details of additional support from other funding bodies, which will be sought if the application is successful, with the view to increase the number of participants and/or the number of days.

The Durham Representative will provide an estimated cost for accommodation for the symposium and estimated travel costs for participants.

For further details about the Durham Symposia, please visit the Society's website: www.lms.ac.uk/events/durham-symposia.

Before submitting: Organisers are welcome to discuss informally their ideas with the Durham Representative (dirk.schuetz@durham.ac.uk) and/or the Chair of the Research Meetings Committee, Professor Chris Parker (RMC.Chair@lms.ac.uk).

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

ALAN TURING'S LOST NOTEBOOK

The Leibniz notation $\frac{dy}{dx}$ *I find extremely difficult to understand in spite of it having been the one I understood best once!*

— Turing in *Notes on Notations*

Turing's mathematical notebook went on display recently at Bletchley Park. Until then, the notebook had been seen by few — not even scholars specializing in Turing's work. It is on loan from its current owner, who acquired it in 2015 at a New York auction for over one million dollars.[1]

The yellowing notebook — from Metcalfe and Son, just along the street from Turing's rooms at King's College in Cambridge — contains 39 pages in his handwriting. The auction catalogue (which inconsequentially inflated the page count) gave this description:

> "Hitherto unknown wartime manuscript of the utmost rarity, consisting of 56 pages of mathematical notes by Alan Turing, likely the only extensive holograph manuscript by him in existence."

A question uppermost in the minds of Turing fans will be whether the notebook gives new information about his code-cracking breakthroughs at Bletchley Park, or about the speech-enciphering device named "Delilah" that he invented later in the war at nearby Hanslope Park. The answer may disappoint. Although most probably written during the war, the notebook has no significant connection with Turing's work for military intelligence. Nevertheless it makes fascinating reading: Turing titled it *Notes on Notations* and it consists of his commentaries on the symbolisms advocated by leading mathematicians.

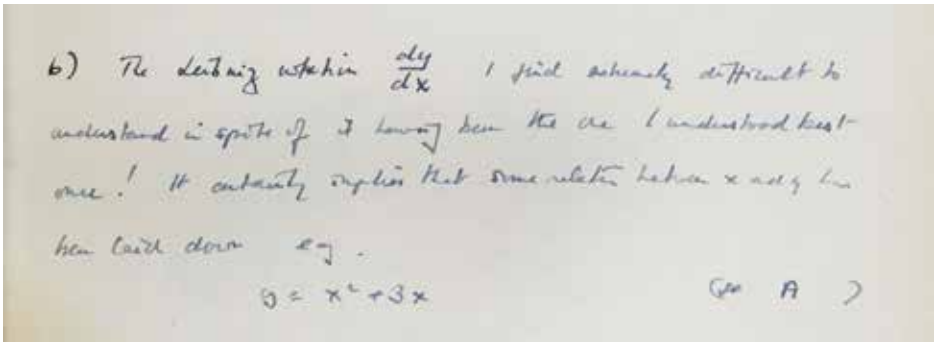
My interest in the notebook was first piqued more than 20 years ago. This was during a visit to Turing's friend Robin Gandy, an amiable and irreverent mathematical logician. In 1944-5 Gandy and Turing had worked in the same Nissen hut at Hanslope Park. Gandy remembered thinking Turing austere at first, but soon found him enchanting — he discovered that Turing liked parties and was a little vain about his clothes and appearance. As we sat chatting in his house in Oxford, Gandy mentioned that upstairs he had one of Turing's notebooks. For a moment I thought he was going to show it to me, but he added mysteriously that it contained some private notes of his own.

In his will Turing left all his mathematical papers to Gandy, who eventually passed them on to King's College library — but not the notebook, which he kept with him up till his death in 1995. Subsequently the notebook passed into unknown hands, until its reappearance in 2015. Gandy's private notes turned out to be a dream diary. During the summer and autumn of 1956, two years after Turing's death, he had filled 33 blank pages in the centre of the notebook with his own handwriting. What he said there was indeed personal.

Only a few years before Gandy wrote down these dreams and his autobiographical notes relating to them, Turing had been put on trial for being gay. Gandy began his concealed dream diary: "It seems a suitable disguise to write in between these notes of Alan's on notation; but possibly a little sinister; a dead father figure and some of his thoughts which I most completely inherited."

Mathematical Reformer

Turing's own writings in the notebook are entirely mathematical, forming a critical commentary on the notational practices of a number of mathematicians, including



Extract from the notebook

Courant, Eisenhart, Hilbert, Peano, Titchmarsh, Weyl, and others. In his wartime typescript titled *The Reform of Mathematical Notation and Phraseology,* Turing said that an ill-considered notation was a "handicap" that could create "trouble"; it could even lead to "a most unfortunate psychological effect", namely a tendency "to suspect the soundness of our [mathematical] arguments all the time".[2]

This typescript, which according to Gandy was written at Hanslope Park in 1944 or 1945, provides a context for Turing's notebook. In the typescript Turing proposed what he called a "programme" for "the reform of mathematical notation". His programme would, he said, "help the mathematicians to improve their notations and phraseology, which are at present exceedingly unsystematic". The programme called for "An extensive examination of current mathematical ... books and papers with a view to listing all commonly used forms of notation", together with an "[e]xamination of these notations to discover what they really mean". His *Notes on Notations* formed part of this extensive investigation.

Key to Turing's proposed reforms were applications of the theory of types. Turing favoured the version due to his mentor, Church, and said that Wittgenstein also influenced his thinking about types.[2] Today, of course, virtually every programming language incorporates type-based distinctions: in emphasizing the importance of type theory for day-to-day mathematics Turing was as usual ahead of his time.

Link to the Real Turing

Turing never displayed much respect for status and — despite the eminence of those whose notations he was discussing — his tone in *Notes on Notations* is far from deferential. "I don't like this" he wrote at one point, and at another "this is too subtle and makes an inconvenient definition". His criticisms bristle with phrases like "there is obscurity", "rather abortive", "ugly", "confusing", and "somewhat to be deplored". There is nothing quite like this blunt candour to be found elsewhere in Turing's writings; and with these phrases we perhaps get a sense of what it would have been like to sit in his Cambridge study listening to him. This scruffy notebook gives us the plain unvarnished Turing.

Jack Copeland
University of Canterbury
New Zealand

[1]www.bonhams.com/auctions/22795/lot/1/
[2]http://www.turingarchive.org/browse.php/C/12
Editor's note: The full version of this article was an OUPBlog.

LONDON MATHEMATICAL SOCIETY
EST. 1865

BMC 2017: 3–7 April 2017

including

LMS Society Meeting

Monday 3 April

Durham

3:45 pm LMS Society Meeting
Plenary Lecture: Isabelle Gallagher (Université Paris-Diderot, IMJ-PRG)

This Society Meeting is part of the British Mathematical Colloquium 2017. The full conference will also include a public lecture by ***Noam Elkes*** *(Harvard),* and plenaries given by ***Eva Bayer-Fluckiger*** *(ÉPFL),* ***Kenji Fukaya*** *(Kyoto University/Simons Center),* ***Laurent Lafforgue*** *(IHÉS),* ***Jacob Lurie*** *(Harvard University)* and ***George Lusztig*** *(MIT).*

MORNING SPEAKERS

Alessandra Bernardi, Gérard Besson, Tara Brendle, Jan Bruinier, Olivia Caramello, Alexander Grigor'yan, Fanny Kassel, Ari Laptev, Diane Maclagan, Oscar Randal-Williams, James Robinson.

Workshops (Tuesday & Wednesday afternoon)

Algebra, *organiser: Emilie Dufresne*
Analysis, *organisers: Norbert Peyerimhoff, Ari Laptev*
Geometry, *organiser: John Parker*
Number Theory, *organiser: Jens Funke*
Topology, *organiser: Dirk Schuetz*

The plenary and morning talks will take place in the Calman Learning Centre (CLC) on the Science Site. The tea/coffee and lunches will be served in the Earth Sciences (ES) building, adjacent to the CLC. Rooms E101 and E102 are in the Engineering building and CM101 is in the Maths building.

The **cost of registration** is £50 (early bird until 28 February 2017; £80 thereafter). The registration fee for postgraduate students is £50. The conference dinner is £50.

The accommodation is in Collingwood College, which is a 10 minute walk from the Science Site, where the conference will take place.

For further information and to register: http://www.maths.dur.ac.uk/bmc2017/index.xhtml

CHALKDUST ISSUE 05: MATHEMATICS IN POLITICS

I would, I suppose, be preaching to the converted if I wrote that maths was useful (which, in fact, I have just done). If I went out into the street and said it to the first person who passed, however, the reaction might be somewhat different—even setting aside the terrified look that inevitably follows an approach to a stranger. So-called 'applied mathematics', maybe, is more generally accepted as being useful, provided the listener knows what it refers to. Maths can—and is—used to explain the social structures and behaviours of many animals, such as stags and bees; and, despite the recent rapid advancement of experimental and computational technology that has seen us go from slide rules to high performance computing in little over a century, our subject should remain of great importance in not only validating results obtained from numerical models, but also providing an insight into physical phenomena observed.

What is traditionally considered more 'pure' mathematics, however, has also proved itself (excuse the pun) to be extremely useful. The example most often given is that of factorising large primes and its application to RSA cryptography, although finding square roots in modular arithmetic is just as challenging a problem. However, the applications of pure mathematics go much further and include, for example, the link between quantum computing or system theory and the representation of linear algebra as circuit diagrams. It is linear algebra, of course, that has contributed so much to our ability to solve (approximately) the difficult partial differential equations that govern much of nature.

Many of us, though, do maths for the fun of it, for the journey, for the thrill. As an outlet for our curiosity, for the ability to ask imaginative questions about what is possible and what is not. For the moments when we spot links between different fields (folding paper to produce dragon curves and the complex plane, for example) or gain an insight into the behaviour of shapes in higher dimensions by constructing origami.

Bernard Silverman

We remain, however, embedded in the real world. Mathematics has a vital role to play in shedding light on the pressing issues of our time and influencing decision making at the highest level. Many government departments have teams of scientists and mathematicians conducting and collating research to inform policy. In the Home Office, researchers led by Bernard Silverman look at important national concerns: crime prevention, community safety, security and identity assurance, among many others. Silverman made his name in data analysis, and the engagement of statistics with governance dates back, not famously enough, to Florence Nightingale's use of it to reform healthcare: better treatment for soldiers, better nursing in hospitals, better sanitary conditions for the army and the local population in India. Perhaps most importantly, she championed the use of diagrams to present findings to the public in a format they could understand. In her work, maybe, there are lessons for us today as we strive to look past stereotypes, question our assumptions and acknowledge our ignorance.

At the same time, one should remember that humans are not rational decision makers faced with a payoff matrix, aiming to employ an optimum strategy; nor are we isolated individuals. We never have been, and we never will be. In fact, it is our diversity, our irrationality, our imagination, our desire to challenge ourselves and take the hard road, along with our willingness to collaborate with one another, that has driven the development of mathematics and led to the explosion of such a rich and fascinating range of fields and applications.

Chalkdust, a magazine for the mathematically curious founded at University College London two years ago, aims to communicate this beauty to as wide an audience as possible through weekly articles and a magazine published twice a year. The examples included above, as well as an interview with Bernard Silverman, can all be found in Issue 5, which came out on 7 March. Thanks to the generous support of our sponsors, including the London Mathematical Society, we distribute it for free to numerous universities but you can also find it on our website www.chalkdustmagazine.com; and you can stay in touch with us via Twitter (@chalkdustmag), Facebook (/chalkdustmag), or our newsletter, which you can sign up to on our website. We always welcome articles: send them through to contact@chalkdustmagazine.com.

Pietro Servini
Chalkdust Academic Coordinator

CLAY RESEARCH FELLOWS 2017

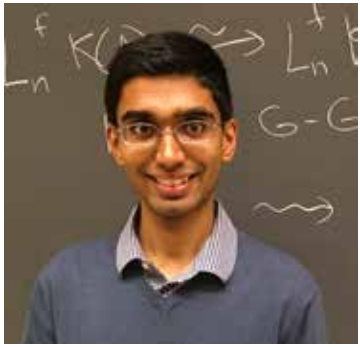
The Clay Mathematics Institute is pleased to announce that Peter Hintz and Akhil Mathew have been awarded Clay Research Fellowships.

Peter Hintz studies hyperbolic partial differential equations arising in general relativity using methods from microlocal analysis, spectral and scattering theory, and dynamical systems. His recent work concerns the stability of black holes in expanding spacetimes. Peter received a PhD in 2015 from Stanford University under the supervision of András Vasy. He is a Miller Research Fellow (2015-17) at the University of California at Berkeley, mentored by Maciej Zworski. Peter has been appointed as a Clay Research Fellow for a term of three years beginning 1 July 2017.

Akhil Mathew will receive his PhD in 2017 from Harvard University under the supervision of Jacob Lurie. Akhil's research focuses on homotopy theory, higher categories, and their applications, especially to derived algebraic geometry and algebraic K-theory. Some of his past work studied various generalizations of faithfully flat descent in stable homotopy theory and their role in describing certain invariants of structured ring spectra. Akhil has been appointed as a Clay Research Fellow for a term of five years beginning 1 July 2017.

Clay Research Fellowships are awarded on the basis of the exceptional quality of candidates' research and their promise to become mathematical leaders. For more information visit www.claymath.org.

Peter Hintz



Akhil Mathew

SWISS MATHEMATICAL SOCIETY

Euler's desk

In 1883, on the centenary of Euler's death, Ferdinand Rudio suggested to publish all books, papers and the correspondence of Leonhard Euler in a scientific edition. Rudio was one of the organizers of the first International Congress of Mathematicians in 1897 in Zürich and advanced his plan on that occasion further. Finally, in 1907, the bicentennial of Euler's birth, the Swiss Academy of Natural Sciences agreed to pursue this project and an Euler Committee was installed. The resulting activities made it desirable to have a national mathematical society which was then founded on 4 September 1910 by Marcel Grossmann, Rudolf Fueter and Henri Fehr. A few years later, the need for a mathematical journal was felt. Since Switzerland has four official languages, a Latin title for the journal was chosen in a meeting of the Swiss Mathematical Society (SMS) on 20 May 1928: *Commentarii Mathematici Helvetici.* In the sequel, in 1929, Michel Plancherel, Andreas Speiser, Émile Marchand and Rudolf Fueter established the Foundation for the Promotion of the Mathematical Sciences with the aim to provide, together with the SMS, a solid financial basis for the new journal.

Zürich is the only city which hosted the ICM three times: After the first ICM in 1897, the international mathematical community met again in Zürich in 1932 and in 1994. Each time, the SMS played a major role in organizing the Congress. Moreover, in 2007, the SMS was the hosting organization of the ICIAM in Zürich.

In 1930, a Committee was set up by the SMS to take care of the legacy of Jakob Steiner, and in 1937 the same committee was given the responsibility for the archive left by Ludwig Schläfli. The journal *Elemente der Mathematik* was founded in 1946 by Louis Locher-Ernst. In order to guarantee the continuance of the journal, the SMS took over the responsibility for its publication in 1975.

The SMS played a leading role in the creation of the European Mathematical Society Publishing House in 2002 whose permanent office resides at ETH Zürich. In particular, the SMS decided to have their journals published by the new publishing house. In order to join the efforts of the mathematical community to make the global mathematical corpus digitally available, the SMS founded in 2005 the Swiss Digital Mathematical Library which archives the Commentarii, Elemente and L'Enseignement Mathématique, the official organ of the International Commission on Mathematical Instruction. This journal was founded in 1899 by Henri Fehr and Charles-Ange Laisant.

Today, the SMS organizes an Annual Meeting in spring with a public lecture. The meeting also includes the General Assembly of the Society. Moreover, the SMS hosts a Fall Conference which is dedicated to a scientific topic. It also supports national and international mathematical conferences in Switzerland.

The century-long task of publishing Euler's Opera Omnia is shortly before its completion with 74 volumes in the Series I-III, and 9 volumes in the Series IVA with Euler's scientific correspondence. The Bernoulli-Euler Center, founded in 2010 and the Bernoulli-Euler Society, founded in 2014, aims to promote research about the life and work of the Basel scholars who are counted among the most important scientists of the 18th century, and the conversion of the classic editorial activities into the digital age for the benefits of the research and the future generations. The SMS, the Foundation for the Promotion of the Mathematical Sciences, the Swiss National Science Foundation and the Swiss Academy of Sciences support this new venture.

Today, an important concern of the SMS is the promotion of mathematical instruction and of young mathematicians. In even years, the SMS awards a Prize for young talents, namely for the best maturity works in mathematics at the school leaving examination. The SMS publishes a weekly Bulletin, has reciprocity and double member agreements with many sister societies, among them the LMS, and supports mathematics in developing countries. In its history, the SMS has appointed over 30 eminent mathematicians as honorary members.

Further information about the SMS can be found on the website http://math.ch.

Norbert Hungerbühler
Past President
Swiss Mathematical Society

MATHEMATICAL STAMPS WEBSITE

The Sociedade Portuguesa de Matemática and the British Society for the History of Mathematics have produced a Mathematical Stamps website, www.mathematicalstamps.eu, for use by teachers and others. Featuring over 450 postage stamps depicting mathematics and mathematicians from around the world, it also includes an extensive historical commentary written by Robin Wilson. These are currently in English and Portuguese, and it is hoped that other languages will be added in due course.

A one-hour public lecture given by Robin Wilson on *The History of Mathematics in 300 Stamps* is available for watching on the Oxford Mathematical Institute website at www.maths.ox.ac.uk/node/13353.

See a selection of the stamps on the back page of this *Newsletter*.

VISIT OF MANFRED MADRITSCH

Dr Manfred Madritsch (Institute Elie Cartan Nancy, Universite de Lorraine, Nancy, France) will be visiting the UK between 24 May and 2 June 2017. His research interests are in exponential sums. Dr Madritsch will be visiting the following institutions where he will give talks:

- 24 -28 May, Royal Holloway, University of London (contact Martin Widmer: Martin.Widmer@rhul.ac.uk)
- 29 - 31 May, University of Reading (contact Titus Hilberdink: t.w.hilberdink@reading.ac.uk)
- 31 May - 2 June, University of Bristol (contact Tim Browning: t.d.browning@bristol.ac.uk)

Precise dates and times as well as titles will be available closer to the time. Further details of these arrangements may be obtained from Titus Hilberdink (t.w.hilberdink@reading.ac.uk). The visit is supported by an LMS Scheme 2 grant.

LONDON MATHEMATICAL SOCIETY
EST. 1865

LMS NORTHERN REGIONAL MEETING

University of York
1 June 2017

2.00 pm	Opening of the meeting Fran Burstall (University of Bath) *Conformal submanifold theory for beginners*
3.20 pm	Marta Mazzocco (University of Loughborough) *Colliding holes in Riemann surfaces*
4.20 pm	Tea/Coffee
5.00 pm	Dominic Joyce (University of Oxford) *What is a derived manifold?*

The meeting will be followed by a wine reception in the Mathematics Department and dinner at a venue to be confirmed.

These lectures are aimed at a general mathematical audience.

All interested, whether LMS members or not, are most welcome to attend this event.

The meeting forms part of a workshop on *Variational Methods in Submanifold Theory*, 30 May – 2 June 2017. For further details, visit: https://www.york.ac.uk/maths/events/2017/lms-workshop-on-vartational-methods-in-submanifold/ or contact the organisers, Ian McIntosh (York): ian.mcintosh@york.ac.uk and Katrin Leschke (Leicester): k.leschke@leicester.ac.uk

The deadline for registration for both the meeting and the workshop is 12 noon on Thursday 18 May.

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

For further details and to register and to reserve a place at the dinner, please visit: https://www.york.ac.uk/maths/events/2017/lms-northern-regional-society-meeting-2017/. The cost of the dinner will be approximately £20, including drinks.

LONDON MATHEMATICAL SOCIETY
EST. 1865

LMS Midlands Regional Meeting and Workshop

Modern Geometry and Physics

18 September 2017
Loughborough University

The LMS Midlands Regional Meeting will take place at Loughborough University on Monday, September 18th, 2017.

The speakers are:

- Giovanni Felder (ETH, Zurich)
- Nigel Hitchin (Oxford)
- Nikita Nekrasov (Simons Center, Stony Brook).

The meeting will be followed by a three-day workshop on *Modern Geometry and Physics,* September 19-21. The speakers include Barbara Bolognese (Sheffield), Andrea Brini (Imperial), Leonid Chekhov (Moscow), Fiorenza Domenico (Rome), Boris Dubrovin (Trieste), Vladimir Fock (Strasbourg), Lotte Hollands (Heriot-Watt), Marina Logares (Plymouth) and Elisa Postinghel (Loughborough).

Funds may be available to support the attendance of the UK research students.

Enquiries should be addressed to the organisers: H. Ahmadinezhad (H.Ahmadinezhad@lboro.ac.uk) and A.P. Veselov (A.P.Veselov@lboro.ac.uk)

COW & CALF

Report

The COW algebraic geometry seminar is one of the longest-running nationwide seminars in that subject. It originated in early 1990s as a joint seminar ran by the groups in Cambridge, Oxford, and Warwick, and eventually expanded. Its meetings are now held in many other locations, such as London, Bath, Cardiff, and there are occasional ventures abroad. The Calf is the junior offspring of COW, it is organised by graduate students for graduate students and has been active since 1997. For over two decades now, the COW and the Calf together helped to raise several generations of UK algebraic geometers.

There was a joint two-day meeting of the COW and the Calf in Cardiff from 23 to 24 February 2017. It was attended by approximately 50 participants, over 20 of whom were graduate students. Several speakers travelled from Europe, including Rome and Hannover. There was a mixture of talks by junior and senior speakers, running the full range from PhD students presenting their first independent work, to well-established algebraic geometers giving a broad overview of their research field. Indeed, the main aim of the meeting was to encourage interaction and collaboration across the herd. To expose junior participants to a cross-section of current research interests in UK and European algebro-geometrical community, while giving them an opportunity to present their own results and receive potentially useful feedback. Judging by the busy discussions which took place during the breaks between the talks and during the social dinner in Mowgli's Indian Restaurant that aim was at least partially achieved.

The invited speakers were:

- Hamid Ahmadinezhad (Loughborough)
- Elana Kalashnikov (Imperial College)
- Anna Barbieri (Sheffield)
- Roberto Laface (Hannover)
- Sjoerd Beentjes (Edinburgh)
- Sara Muhvić (Warwick)
- Alastair Craw (Bath)
- Elisa Postinghel (Loughborough)
- Domenico Fiorenza (Rome Sapienza)
- Rory Potter (Sheffield)
- Roberto Fringuelli (Edinburgh)
- Jason Van Zelm (Liverpool)

More details on the meeting, as well as links to the COW and the Calf seminar webpages, are at: http://www.cantab.net/users/t.logvinenko/2017-2CinC/ index.html.

The meeting was supported by an LMS Conference grant and the School of Mathematics, Cardiff University. We are grateful to both bodies for making the meeting possible.

Timothy Logvinenko
Cardiff University

New Zealand Mathematical Society

LONDON MATHEMATICAL SOCIETY EST. 1865

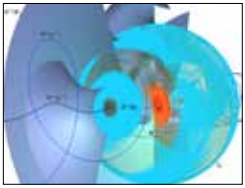
LMS – NZMS AITKEN UK LECTURE TOUR 2017

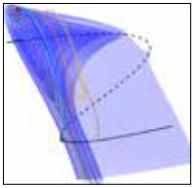
The Society is delighted to announce that the 2017 LMS-NZMS Aitken Lecturer is Professor Hinke Osinga FRSNZ (University of Auckland).

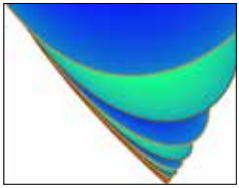
Hinke Osinga, Professor of Applied Mathematics at the University of Auckland in New Zealand, is the fourth Aitken Lecturer to visit the UK. She is an expert in dynamical systems and its applications. Her publications, illustrations, animations and outreach activities have made her famous worldwide in the mathematics and arts communities.

In 2017, there will be two Aitken Lecture Tours taking place. In May 2017, Professor Osinga will visit Bath, Cambridge, Exeter and Oxford. She will then return to in October 2017 to visit Bristol, Kent, Newcastle and Warwick.

She will give lectures on "Chaos and wild chaos in Lorenz-type systems," "The art of computing global manifolds," and "Shaken but not stirred: Using mathematics in earthquakes."







The Aitken Lectureship scheme is part of Forder-Aitken Lectureship exchange, which is a collaboration between the London Mathematical Society and the New Zealand Mathematical Society. Each Society invites an eminent mathematician from the other country to give lectures at different universities around the country.

The Aitken Lectureship, named after Professor A. Aitken - one of New Zealand's great mathematicians, is a Lecture Tour around the UK undertaken by a mathematician from New Zealand. The Forder Lectureship, named after Professor H. G. Forder (formerly of the University of Auckland and a benefactor of the London Mathematical Society) is a Lecture Tour around New Zealand undertaken by a mathematician from the UK. For further details about the Aitken Lectureship, please visit https://www.lms.ac.uk/events/lectures/forder-and-aitken-lectureship#Aitken

MATHEMATICAL LOGIC

Each year since 2015 the British Society for the History of Mathematics (BSHM) have run a one-day conference on mathematics and its history at Birkbeck (University of London) supported by the Department of Economics, Mathematics and Statistics at Birkbeck.

This year's event will take place on Saturday 27 May 2017 on the history of mathematical logic. The theme is to honour the eminent mathematical historian Ivor Grattan-Guinness, former President of the BSHM, who died at the end of 2014. This will be a particularly special conference. The speakers are:

- Apostolos Doxiadis *First there is no proof, then there is.*
- Susanne Prediger *Learning the logical structures of deductive reasoning – insights into mathematics education research.*
- John Dawson *How relevant has logic been to mathematical practice?*
- Volker Peckhaus *Convolutions of 19th Century Logic.*
- Adrian Rice *"Everybody makes errors": The intersection of De Morgan's logic and probability, 1837-1847.*
- Michel Serfati *The search for Laws of Thought. Some mathematical and psychological aspects in the work of Boole.*
- Amirouche Moktefi *Why make things simple when you can make them complicated? An appreciation of Lewis Carroll's symbolic logic.*

Registration will be £5 for students, £10 for BSHM members and Birkbeck staff, and £20 for non-members. For further information visit http://tinyurl.com/jqg5mhe.

GRAVITY AND BLACK HOLES

This three day conference at Cambridge University is being organized to mark the 75th birthday of Stephen Hawking. The conference will run from Monday 3 to Wednesday 5 July 2017.

The conference speakers are: Bruce Allen, Raphael Bousso, Mihalis Dafermos, Gary Gibbons, Gabriela Gonzalez, James Hartle, Thomas Hertog, Gary Horowitz, Ted Jacobson, Renata Kallosh, Eiichiro Komatsu, Pablo Laguna, Andrei Linde, Viatcheslav Mukhanov, Hiranya Peiris, Harald Pfeiffer, Frans Pretorius, Douglas Stanford Jeff Steinhauer and Andrew Strominger.

On Sunday 2 July the conference will be preceded by an afternoon of public lectures from Brian Cox, Gabriela Gonzalez and Stephen Hawking. For more information see http://www.ctc.cam.ac.uk/activities/stephen75/.

The conference is supported by an LMS Conference grant and also by Intel, STFC and the Institute of Physics.

PROFINITE GROUPS

A one-day meeting on *Maximal Conditions and Embeddings of Profinite Groups* will take place at the University of Lincoln on Friday 2 June 2017. The speakers are:

- John Wilson (Oxford)
- Simon Smith (Lincoln)
- Alejandra Garrido (Düsseldorf)
- Anitha Thillaisundaram (Lincoln)

Anyone interested is welcome to attend. Further information may be found at https://profinitelincoln2017.wordpress.com. Queries may be directed to Anitha Thillaisundaram (athillaisundaram@lincoln.ac.uk). This meeting is supported by the LMS Celebrating New Appointments grant.

BOUNDARY INTEGRAL METHODS

The Eleventh UK Conference on *Boundary Integral Methods* (UKBIM11) will take place at the Nottingham Conference Centre at Nottingham Trent University from 10 to 11 July 2017. Mathematicians, scientists and engineers who are interested in the theory and application of boundary integral methods are encouraged to participate. The Plenary Speaker is Professor Thanasis Fokas (University of Cambridge).

Funding is available to cover travel and accommodation expenses for a limited number of UK based PhD students in the Mathemati-

cal Sciences. Send expressions of interest to bimowave@ntu.ac.uk, giving a short description of your research area. For further information visit: http://nottinghamconferences.net/ukbim/. The conference is supported by an LMS Conference grant.

RANDOM GRAPHS AND RANDOM PROCESSES

King's College London will be hosting a joint one-day workshop on *Random Graphs and Random Processes* on 25 April 2017. The workshop looks at recent work in the area of random structures and algorithms and random processes on networks. Of particular interest are threshold behaviours, the short term dynamics of processes during approach to equilibrium, the time taken to reach equilibrium and algorithmic efficiency. The workshop will include talks by the following speakers:

- Fabio Caccioli (UCL)
- Alan Frieze (CMU)
- Leslie Ann Goldberg (Oxford)
- Reimer Kuehn (KCL)
- Riccardo Margiotta (KCL)
- Nicolas Rivera (KCL)
- Thomas Sauerwald (Cambridge)
- Fiona Skerman (Bristol)
- Gregory Sorkin (LSE)
- Andrew Wade (Durham)

Attendance is free, but if you plan to attend, register on the website at https://workshoponrandomgraphs.eventbrite.co.uk/ where further details are available.

The workshop has been organised jointly between the Department of Informatics and Department of Mathematics at King's College, and the School of Computing, University of Leeds. The organisers are Colin Cooper, Martin Dyer, Reimer Kuehn, Andrew McDowell, Tomasz Radzik and Peter Sollich.

Due the support of an LMS Conference grant, the organisers will be able to provide some support towards travel costs for UK-based research students. For enquiries contact Andrew McDowell (andrew.mcdowell@kcl.ac.uk).

OPEN QUANTUM SYSTEMS

A one-day workshop on *New Mathematical Methods for Open Quantum Systems* will be held at the University of Bristol on 12 May 2017, from approximately 10:30 until 18:00. Speakers will include:

- Joseph Viola (Nantes)
- Euan Spence (Bath)
- Suresh Eswarathan (Cardiff)

The meeting is one in a series of collaborative workshops between Universities of Bristol and Nottingham, and Imperial College, supported by an LMS Scheme 3 grant. Funds may be available to support the attendance of research students. Enquiries should be addressed to the organiser Roman Schubert (roman.schubert@bristol.ac.uk). Further information about the workshop is available on the website at http://wwwf.imperial.ac.uk/~egraefe/lms-meetings.html.

EUROPEAN STUDY GROUPS WITH INDUSTRY

The 130th *European Study Groups with Industry* (ESGI130) will be held from 4 to 8 September 2017 at the University of Warwick (http://warwick.ac.uk/esgi130).

The aim of the week is for companies and other bodies to present mathematical problems to mathematical scientists and for the mathematical scientists to team up in groups to make progress towards solutions of the problems.

Companies or other bodies interested in posing a problem are invited to contact esgi130@warwick.ac.uk. There will be a fee for accepted problems, which contributes to the running costs of the event. Accepted problems receive an oral report on the last day of the workshop and a written report shortly afterwards.

Mathematical scientists, including postgraduate students, interested in attending to help solve some of the problems are invited to express interest via the form on http://warwick.ac.uk/esgi130.

MATHEMATICAL PHYSICS DAY

The 50th *North British Mathematical Physics Seminar* (NBMPS) one-day meeting will take place at King's Manor, York on Friday 12 May 2017. The meeting is open to all. There will be a dinner arranged as part of our celebration of 50 NBMPS meetings. All are welcome. Full details of the programme and dinner arrangements are available at http://www-users.york.ac.uk/~eh555/NBMPS50.html.

Currently three NBMPS meetings are held each year, supported by an LMS Scheme 3 grant, bringing together Mathematical Physics groups from Durham, Edinburgh, Glasgow, Heriot-Watt, Newcastle, Nottingham and York. The LMS have supported theses regular meetings since the Inaugural Meeting in Edinburgh in 2002. Further details about the NBMPS meetings are available at https://empg.maths.ed.ac.uk/NBMPS.

GENDER DIVERSITY IN MATHEMATICS

The St Andrews Mathematics Department Undergraduate Mathematical Society will be hosting a *Gender Diversity in Mathematics* event on the afternoon of Wednesday 19 April 2017. The goal of the event is to start a discussion on what we as a larger community can do to support women and gender minorities in maths.

The event will be split into two parts. There will be talks from a female and a nonbinary mathematician before a small refreshments break with coffee and tea provided. This will be followed by a panel discussion giving attendees a chance to voice their own opinions as well as hear from many established academics. The speakers are:

- J. MacKenzie (they/them) (University of Glasgow)
- Eugenie Hunsicker (she/her) (University of Loughborough)

The event is open to the general public and is free to attend. For more information email Isabella Scott (is48@st-andrews.ac.uk). The conference is supported by an LMS Funding for Undergraduate Mathematical Society Meetings.

ESCHER AND COXETER: A MATHEMATICAL CONVERSATION

The Gresham College Lecture *Escher and Coxeter: A Mathematical Conversation* will be given by Professor Sarah Hart on Monday 5 June from 1 pm - 2 pm at the Museum of London.

In 1954 the Dutch artist M.C. Escher met the Canadian mathematician and geometer Donald Coxeter at the International Congress of Mathematicians in Amsterdam. This meeting sparked a lifelong correspondence which would influence the work of both men. Coxeter was preparing an article about symmetry, and asked Escher's permission to use some of his pictures to illustrate the ideas. Escher agreed, and Coxeter in due course sent him a copy of the finished paper. When Escher looked at the paper, he was fascinated by one of the other diagrams it included – it was an illustration of a tessellation in hyperbolic geometry. Escher realised that this opened up an entirely new possibility for his designs.

This mathematical conversation continued for many years. Coxeter wrote mathematical papers about Escher's work, and said that it had led him to a new understanding of the hyperbolic disc. Meanwhile Coxeter described to Escher how one could produce many more hyperbolic tilings.

In the talk, we will see examples of Escher's work in the plane and on the sphere and discuss why the possibilities in these geometries are finite. We'll look at what the diagram in Coxeter's paper was about, and how it helped Escher to produce new work. Finally, we'll give an indication about what it was in Escher's work that Coxeter found mathematically fascinating.

Admission is free entry, first-come first-served. For further information visit the website at https://www.gresham.ac.uk/lectures-and-events/escher-and-coxeter-a-mathematical-conversation.

LONDON MATHEMATICAL SOCIETY
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GRESHAM COLLEGE

THE LONDON MATHEMATICAL SOCIETY
JOINTLY WITH GRESHAM COLLEGE

Tuesday, 23 May 2017

6:00pm at The Museum of London

Mathematics Can Make You Fly?

Dr Carola-Bibiane Schönlieb

University of Cambridge

Well, not quite. But it can make you seem to be flying, virtually. Some of the mathematical principles that can be used for creating such an effect will be discussed, with a focus on partial differential equations used for such a virtual image manipulation or restoration task. After lifting the mystery on the flying mathematician, we will see that such principles can be used beyond special effects, in the reconstruction of crucial information in satellite images of our earth, restoration of MR images in molecular imaging to the renovation of digital photographs and medieval artwork.

ADMISSION FREE

NO RESERVATIONS REQUIRED – FIRST COME, FIRST SERVED

Museum of London, London Wall, London EC2Y 5HN
Nearest underground stations: Barbican, St Paul's, and Moorgate

020 7831 0575 enquiries@gresham.ac.uk www.gresham.ac.uk

THE MATHEMATICAL ASSOCIATION

The Mathematical Association Annual Conference, *Common Denominators: Connections with and beyond Mathematics,* will take place at Royal Holloway, University of London, Egham from 7 to 9 April 2017.

Hear from top speakers. Take part in inspiring workshops. There's a programme full of exciting hands-on and interactive sessions. Have you ever wondered about the mathematics of bell ringing? Or would you like to investigate the new 2017 Mathematics A-Level? Perhaps you will allow Ems Lord to *Welcome you to the Wild Side!*

Encounter like-minded people in sessions you attend, and benefit from informal discussion during coffee breaks and evening gatherings.

Discounts and bursaries available. For further information visit the website at http://www.m-a.org.uk/annual-conference, email: conference@m-a.org.uk, telephone 0116 2210016.

EXTREMAL COMBINATORICS

The conference *Extremal Combinatorics* will take place at the University of Warwick from 18 to 22 September 2017. It will explore recent breakthroughs in the exciting area of Extremal Combinatorics, a subfield of Discrete Mathematics. The aim is to bring together researchers in this area and related fields to hear about recent important developments and powerful new tools and methods, in particular those that were pioneered by the speakers. The plenary speakers are:

- Zoltán Füredi (Urbana-Champaign and Rényi)
- Penny Haxell (Waterloo)
- Peter Keevash (Oxford)
- Dan Král' (Warwick)
- Daniela Kühn (Birmingham)
- Imre Leader (Cambridge)
- Deryk Osthus (Birmingham)
- Tibor Szabó (FU Berlin)

The invited speakers (former group members) are:

- Endre Csóka (Rényi)
- Łukasz Grabowski (Lancaster)
- Hong Liu (Warwick)
- Konstantinos Tyros (Koç)

The conference will also include contributed talks. To propose a talk, email your title and abstract to excomb2017@warwick.ac.uk before **1 August 2017**.

An LMS Conference grant allows the organisers to offer some financial support to UK-based research students and researchers from the former USSR countries. If you belong to one of these two categories and would like to apply for financial support, email your CV and at most three of your recent papers/preprints related to Extremal Combinatorics to excomb2017@warwick.ac.uk before **1 August 2017** (UK-based students) or **20 June 2017** (researchers from the former USSR countries).

Due to the sponsorship from the European Research Council, the LMS Conference grant and support from Warwick's Mathematics Institute, there is no registration fee. All participants are required to register online by **17 August 2017**. For more information, visit the conference's website (http://go.warwick.ac.uk/excomb2017) or contact the organisers, Oleg Pikhurko and Katherine Staden (excomb2017@warwick.ac.uk).

INTERACTING SYSTEMS AND STOCHASTIC PDES

A mini conference on *Interacting Systems and Stochastic PDEs* will be held at the University of Sheffield from 13 to 15 June 2017. The speakers include Siva Athreya, Marton Balazs, Nicolas Dirr, Benjamin Gess, Elena Issoglio, Davar Khoshnevisan (tbc), Cyril Labbe, Carl Mueller, Marcel Ortgiese, Nicolas Perkowski, Nadia Sidorova, Jon Warren, Hendrik Weber and Nikos Zygouras.

Additionally there will be two to three short talks by UK based PhD students. Partial funding is available for 10 UK based PhD students to attend the conference.

Further details on the conference can be found at http://nicfreeman.staff.shef.ac.uk/spde/index.html. The conference is supported by an LMS Conference grant, EPSRC and a grant from the School of Mathematics and Statistics in Sheffield.

Isaac Newton Institute for Mathematical Sciences

VARIATIONAL METHODS, NEW OPTIMISATION TECHNIQUES AND NEW FAST NUMERICAL ALGORITHM

4 – 8 September 2017

in association with the Isaac Newton Institute programme
Variational methods and effective algorithms for imaging and vision
(29 August - 20 December 2017)

Variational image processing typically leads to minimization problems which can be characterized by one or several of the following features: (extremely) large-scale, non-convex, non-smooth, or combinatorial. Each if these remarkable properties may be substantiated as follows:

(i) The increase in the size of problem instances can be attributed to the ever increasing number of data collected by modern devices, the need to merge data from various sources (multi-modality) or the type of application (such as, e.g., video surveillance) generating vast data.

(ii) Non-smoothness has been of interest to the imaging community with the inception of total variation regularization by Rudin, Osher and Fatemi in their seminal work in Physica D, 1992. Besides non-smooth regularization, non-smooth data fidelity terms have become important in order to cope, e.g., with impulse noise. But non-smoothness is also an issue in optimal parameter learning, which naturally leads to bilevel optimization problems. In cases (such as in case of total variation regularization) when the optimal solution of the lower level problem (i.e., the variational model with fixed regularization parameter) is characterized by a variational inequality, which contains the regularization parameter(s) as parameters in its own right, the overall problem falls into the realm of mathematical programs with equilibrium constraints. Such problems are non-smooth, non-convex, and they notoriously lack constraint qualification, all of which challenge stationarity principles and in particular numerical solution schemes.

(iii) Non-convexity, on the other hand, is of independent interest, e.g., in image inpainting, segmentation, clustering and as a filter. An example for the latter is the l^p-quasi-norm regularization (0<p<1, instead of convex l^1-norms) in compressive sensing.

(iv) Issues with combinatorial complexity when finding solutions arise in (global) minimizations in clustering, the parameter learning described above, or inpainting, to name only a few. Whenever the variational principle is originally posed in function space, then all of the aforementioned applications typically lead to highly non-linear and possibly non-smooth (systems of) partial differential equations (PDEs). On the other hand, methods based on graphs have become popular recently in image processing as they aim to guarantee (global) rather than approximate (local) solutions, possibly at the cost of non-polynomial complexity. Therefore, the aims of this workshop are to discuss recent advances in (ideally mesh independent) solvers for the associated PDE or variational inequalities, their implementation on modern computer architectures (GPU, Clusters), and the connection of these methods to solvers based on combinatorial or graph-based techniques. In particular, also the issues with fixed-point-type, first-order (gradient-based) and high-order (e.g., Newton-type) solvers and associated future directions for the community will be addressed.

Further information available from the website
www.newton.ac.uk/event/vmvw01

Closing date for receipt of applications: 1 June 2017

BRIAN WILSON

Brian Wilson, who was elected a member of the London Mathematical Society on 20 June 1986, died on 4 February 2017, aged 82.

Norman Biggs and Christine Farmer write: Brian James Wilson was born in Gillingham, Kent on 10 June, 1934. He attended Harrow County Grammar School, where there was a fine team of teachers of mathematics, and throughout his life he remained active in the old boys' association, particularly in the rugby club.

After National Service, Brian graduated from Chelsea Polytechnic (as it then was) with a First Class University of London degree in 1958. He took an MSc there in 1960, and taught for two years at Ealing Technical College and School of Art. In 1962 he returned to Chelsea as an Assistant Lecturer, and studied with Lisa Stein for a PhD in Finite Geometry, which was awarded in 1970. Chelsea became a College of the University of London in 1966 and he remained there until the Colleges were reorganised in the 1980s. Because he had been an active member of the Combinatorics Seminar run jointly by Reading University and Royal Holloway College, it was natural for him to move to Royal Holloway, which he did in 1985.

His work in finite geometry continued, and he published several papers on this topic in the 70s and 80s. Latterly, his detailed knowledge of geometric configurations enabled him to obtain some interesting results on harmonious colourings of graphs. He remained an active member of the Combinatorics group at Royal Holloway until his retirement in 1999.

Brian's love of mathematics and his willingness to work for the good of young people were combined in his contribution to the UK Mathematics Trust. He was a founder member of the British Mathematical Olympiad Subtrust, and spent many happy hours marking the 'Kangaroos'. This work continued throughout his retirement. Sadly, at the end of 2016 he suffered from a bout of food poisoning, rare complications from which led to his untimely death. His boyish enthusiasm for his interests was infectious, as was his smile. He will be remembered by many as a compassionate and valued colleague.

University of BRISTOL

School of Mathematics

Christopher Hooley and the Artin Conjecture: 50 years on

A celebration of the 50th anniversary of
Christopher Hooley's research on the Artin Conjecture

1 September 2017
University of Bristol

Confirmed Speakers
Alina Cojocaru, University of Illinois at Chicago
Roger Heath-Brown, University of Oxford
Christopher Hooley, Bristol University
Pieter Moree, Max-Planck Institute
Ram Murty, Queen's University

Support for travel for UK based PhD. students may be available. Please contact **heilbronn-coordinator@bristol.ac.uk** with any requests by **Fri 18th Aug 2017**.

We welcome applications for caring costs.*

Further details TBA.

Heilbronn Institute for Mathematical Research

Please contact heilbronn-coordinator@bristol.ac.uk for further information or visit heilbronn.ac.uk/events

*Applies to expenses incurred exceptionally as a result of attending the lecture series.

HIDDEN FIGURES

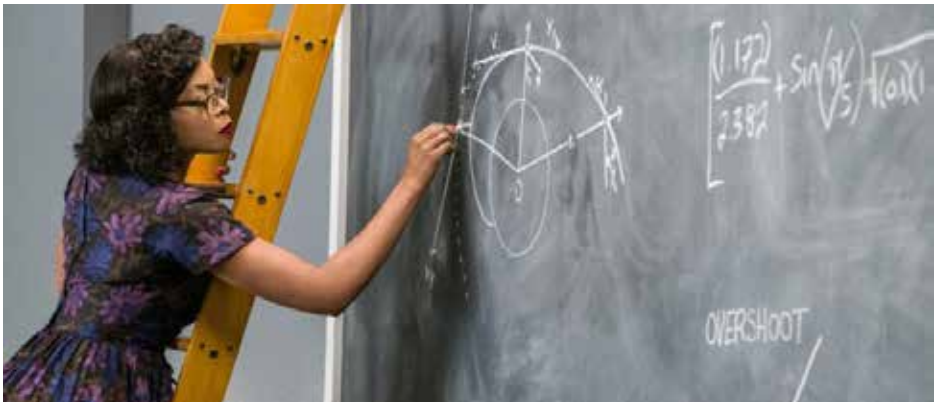
Hidden Figures is an inspirational film telling the true story of three African-American women who worked for NASA in the early 60s, about the time that the Americans started to build rockets to explore space. The three women had all studied mathematics at college and later became maths teachers before going on to NACA (National Advisory Committee for Aeronautics), which went on to become NASA.

These women were called 'computers', the name given to those who performed the calculations. It is worth pointing out that at the time, computers, like secretaries, were mainly women. In fact, women were considered superior to men at this job, as men were thought of as being too easily distracted. This film is fascinating on several levels. The film is about prejudice against black people and women, but tells its story with a lightness of touch and some humour. It is also about the beginnings of the space race. America was shocked when the Russians, through Yuri Gagarin, made the first earth orbit in 1961, and this led to NASA redoubling its efforts to launch manned rocket flights.

One of Katherine Johnson's main tasks is to compute the launch windows for the astronauts so that they can determine where they would land. She did this for Alan Shepard, the first American to take a space flight, and for John Glenn's orbit of the earth in 1962. At the time, electronic computers were in their infancy, and Glenn did not trust their calculations. He was satisfied only when Katherine checked them by hand: "Get the girl to check the numbers; if she says the numbers are good, I'm ready to go".

The other two women are Dorothy Vaughan and Mary Jackson. Dorothy was the supervisor but later worked with the IBM computers that NASA was to use. We see her taking a book out of the 'white' section of the library on FORTRAN. She told the women who were working for her that they would have to learn FORTRAN or be out of a job. Mary is an engineer; in fact, the first African-American woman engineer in NASA. To become an engineer she needed to go to college to get more qualifications, and for this she had to go to court in order to bypass segregation laws. Segregation is one of the themes of the film: Virginia was one of the states with the strictest segregation laws. The black women had to work in a special laboratory, called 'coloured computers'. They also had to use 'coloured' bathrooms which were half a mile from where they worked.

The period that occurred just before the



Taraji P. Henson as the Langley Research Center's space program mathematician Katherine Johnson

one in which this film is set was momentous for the United States. In 1957, two events occurred almost simultaneously. The federal government was trying to outlaw discrimination and this was being resisted in Little Rock, Arkansas. The Governor of the state used the National Guard to prevent students attending school, and photographs of this went around the world. At the same time, the Russians put up Sputnik. So, at the same time that America was being portrayed as a backward country, Russia was seen to be advanced. The federal government realised the importance of space exploration and in September 1958, NASA was born.

What about the maths? At one point, the team are stuck. Katherine suggests Euler's method. One of the engineers says that this is "old maths", to which Katherine replies, "but it works". As in all popular films involving maths, there are a few squirmy moments (for experts), but on the whole it is fairly convincing and it does show that mathematics is important for human progress.

An epilogue reveals that Katherine calculated the trajectories for the Apollo 11 moon landing and the Apollo 13 flight. On 24 November 2015, Katherine Johnson was awarded the presidential Medal of Freedom by Barack Obama. At NASA, there is now a Katherine G. Johnson computational laboratory.

It is amazing that this story has been hidden for too long (hence the title of the film).

The film is based on the book of the same title by Margot Lee Shetterley, which offers more details about this fascinating history. From the epilogue to this book: "It's the question that most often comes up when I tell people about the black women who worked at NASA: Why haven't I heard this story before? […] It's a story of hope that even among some of the country's harshest realities — legalised segregation, racial discrimination — there is evidence of the triumph of meritocracy, that each of us should be allowed to rise as far as our talent and hard work can take us".

David Singerman
University of Southampton

MATHEMATICS EXHIBITION AT THE WINTON GALLERY, SCIENCE MUSEUM, LONDON

The London Science Museum's recent overhaul of their mathematics section has been much-hyped: this reviewer has seen coverage of it in The Times, The Economist, The BBC and several blogs before paying a visit. Consequently, my hopes and expectations before I arrived at the recently opened Winton Gallery were quite high.

Such a revamp is long overdue — this reviewer remembers visiting the old gallery as a child and revisiting as an adult some twenty years later only to find that nothing had changed!

The book associated with the exhibition (*Mathematics: How it Shaped Our World* by David Rooney) consists of six sections ('Trade and Travel'; 'War and Peace'; 'Money'; 'Life and Death'; 'Form and Beauty' and 'Maps and Models') one for each area of the gallery, followed by four essays on topics such as the role of women in mathematics. It helps to put much of the gallery in context – the intention is not to present what mathematics is but rather the role it plays in wider society and how ordinary people unwittingly use it in their everyday lives.

The centre-piece of the exhibition itself is a Handley Page *Gugnunc* aeroplane surrounded by curves to illustrate the modelling of the air-flow around its wings.

Moreover, all the cabinets containing the exhibits are laid out in a way that extends these curves to the rest of the room indeed even the T-shirts available in the gift-shop carry a design reminiscent of it. This produces a design in which several spaces in the exhibition are left empty to accommodate this awkward curvature (they are only displaying around a quarter of the objects its predecessor did). This also makes for a rather confusing lay-out: it is easy to find yourself walking along the displays only to find you've accidentally wondered into one of the other sections by mistake and very-likely over-looking some of the displays in the process. Combined with the gallery being accessible from two different ends and the gallery over-all can be rather difficult to follow. The display around the plane itself is somewhat over-bearing with several of the curved pieces around it so low that several visitors feel the need to duck under them just to navigate the display.

As a consequence of the galleries emphasis on mathematics' role in society there is not a single equation in sight and even many of the more esoteric features of the old display – the brightly coloured polyhedra, the elaborate glass Klein bottles and the vast number of slide rules – are essentially all gone making for a much-more surface-scratching display. (One is tempted to make comparisons with the National Museum of Mathematics in New York that this reviewer visited a couple of years ago with hands-on machines for demonstrating how basic probability works, devices showing how equations can be translated into beautiful curves and logic-problems galore – a much more hands-on experience!) Given that elsewhere in the museum the opening pages of both Shannon's *A Mathematical Theory of Communication* and Turing's *On Computable Numbers* are proudly exhibited, this lack of substance is a little frustrating to the expert. Items that are on display include 'Guinevere', one of the National Lottery's original random-number generators; The LSE's famous 'Moniac' economic model; an impressive cabinet of early 19th century weights and measures for keeping track of trading standards and an elaborate 1920s calculating device designed for performing computations as specialised as working with reinforced concrete.

This exhibition was a lost opportunity. The exhibitors avoided any real maths because of the widespread view that mathematics is off-putting to most people. It is bit like having an art gallery without modern art as this is not always understood. It would have been nice to have topics such as fractals and tessellations or four dimensions. Even bring back the Platonic solids and the Klein bottle! The audience could have been challenged.

Ben Fairbairn,
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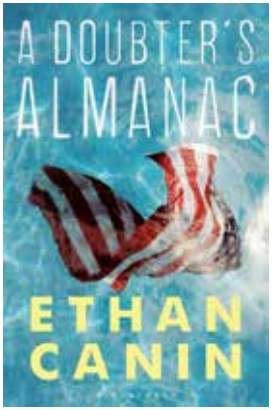
A DOUBTER'S ALMANAC

by Ethan Canin, Bloomsbury Publishing,
hb 2016, £18.99, ISBN 978-1408879641, pb 2017, £9.99, ISBN 978-1408879566.

This is a novel about Milo Andret, an imaginary pure mathematician who in the story wins a Fields Medal. The first part is from Milo's point of view; the second is from his son's.

The first part of the story contains some pacey and interesting sections, which can be absolutely gripping. I particularly liked the sections where Milo is a PhD student. The author does well to give a feel of the life of a researcher, explaining how Milo finds a problem, understands its current state, and forms his plans of attack. We care for Milo as these attacks fail. The mathematics plays a pivotal role in this first part and is mostly well researched.

After this, however, the mathematics appears to be filler rather than integral to the story. Much of the book then dwells on the characters wallowing in self-pity, mostly through internal monologues. These sections felt particularly slow due to my lack of empathy for the characters, and they are made more frustrating by the issues not being discussed, let alone resolved.



The author has made Milo cold and uncaring, and therefore awkward and unlikable. Although initially offset by his genius, it eventually feels tedious and unnecessary. This is a shame, and need not have been the case: at times Milo is a witty character. When put in the same department as physicists, he commented that "the two fields [pure mathematics and physics] were like cricket and baseball: alike only to those who knew the rules of neither".

On the whole the novel is difficult to read: the characters are strange and self-obsessed, making them hard to relate to, and the plot is slow and meandering. In the second part, I had the impression that the author had come to regret using a mathematician and wanted to write about something else. I felt I was reading a different book, and one that had departed from the promising themes and direction the author had started with.

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CALENDAR OF EVENTS

This calendar lists Society meetings and other mathematical events. Further information may be obtained from the appropriate LMS Newsletter whose number is given in brackets. A fuller list is given on the Society's website (www.lms.ac.uk/content/calendar). Please send updates and corrections to calendar@lms.ac.uk.

APRIL 2017

3 Society Meeting at BMC, Durham (468)
3–6 BMC, Durham (463)
4–7 Novel Mathematical Approaches for Modelling Evolution in Complex Living Systems, Leicester (467)
7–9 Mathematical Association Annual Conference, Royal Holloway, University of London (468)
10 Developing Efficient Methodologies for Modelling Stochastic Dynamical Systems in Biology, Bath (465)
10–12 BAMC, Surrey (463)
18–21 Research Students Conference, Durham (465)
18–22 Function Theory by Hilbert Space Methods, LMS Invited Lecturer Jim Agler, Newcastle (468)
19 Gender Diversity in Mathematics, St Andrews (468)

25 Reforms to Mathematics Qualifications Westminster Education Forum Seminar, London
25 Random Graphs and Random Processes, King's College London (468)
27–28 Mathematical Ecology Workshop, Swansea (464)

MAY 2017

2 Rough Paths in Probability and Statistics, Reading (466)
5 Mary Cartwright Lecture, London (468)
8–12 Approximation, Deformation, Quasification INI Workshop, Cambridge (464)
12 New Mathematical Methods for Open Quantum Systems, Bristol (468)
12 North British Mathematical Physics Seminar, York (468)
18 Index Theorems in Analysis, Geometry and Mathematical Physics, University of Kent (466)
22–24 Gregynog Welsh Mathematics Colloquium, Gregynog Hall, Newtown, Powys (466)
23 Mathematics Can Make You Fly? Museum of London (468)
27 History of Mathematical Logic, Birkbeck (468)

JUNE 2017

1 LMS Northern Regional Meeting, York (468)
2 Profinite Groups, Lincoln
5 Escher and Coxeter: A Mathematical Conversation, Gresham College London (468)
13–15 Interacting Systems and Stochastic PDEs, Sheffield (468)
19–23 Group Actions and Cohomology In Non-Positive Curvature, INI Cambridge (465)
19–23 New Trends in Representation Theory LMS–CMI Research School, Leicester (468)
19–23 Summer School and Workshop: The Sen Conjecture and Beyond, University College London
26–30 Quantum Topology and Categorified Representation Theory, INI Cambridge (465)
26–30 Orthogonal Polynomials and Special Functions LMS-CMI Research School, Kent (467)
26–30 Microlocal Analysis and Applications LMS–CMI Research School, Cardiff (468)
30 LMS Graduate Student Meeting, London
30 LMS Society Meeting, London

JULY 2017

3–5 Gravity and Black Holes, Cambridge (468)
3–7 Scalable Statistical Inference, INI Cambridge (466)
3–7 BSDEs, SPDEs and their Applications Workshop, Edinburgh
3–7 British Combinatorial Conference, Strathclyde (464)
10–11 Boundary Integral Methods, Nottingham Trent University (468)
10–12 Mathematical Models in Ecology and Evolution Conference, City, University of London (466)
10–14 Computer-aided Mathematical Proof, INI Cambridge (466)
10–19 Foundations of Computational Mathematics Conference, Barcelona (461)
31–5 Aug International Mathematics Competition, Blagoevgrad, Bulgaria (466)

AUGUST 2017

7–10 Nonlinear Water Waves, INI Cambridge (468)

SEPTEMBER 2017

1 Christopher Hooley and the Artin Conjecture: 50 Years On, Bristol (468)
4–8 September European Study Groups with Industry, Warwick (468)
4–8 Variational Methods, New Optimisation Techniques and New Fast Numerical Algorithm, INI Cambridge (468)
10–15 Mathematics Education for the Future Decade, Balatonfüred, Hungary (460)
11–15 Algebraic Topology of Manifolds LMS-CMI Research School, Oxford (468)
11–15 Introduction to Geometry, Dynamics, and Moduli in Low Dimensions LMS-CMI Research School, Warwick (468)
11–15 Scientific Computation and Differential Equations, Bath (466)
14–15 Heilbronn Annual Conference, Bristol
18 LMS Midlands Regional Meeting, Loughborough (468)
18–22 Extremal Combinatorics, Warwick (468)
24–29 Heidelberg Laureate Forum (465)

MATHEMATICAL STAMPS

(article on page 29)

Sophie Germain

Pedro Nunes

Niels Abel

Leonhard Euler

Sofia Kovalevskaya

Archimedes

Isaac Newton