



LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 442 December 2014

Society Meetings and Events

2014

**Wednesday
17 December**

SW & South Wales
Regional Meeting
Plymouth
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150th Anniversary
Launch, London
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Friday 27 February

Mary Cartwright
Lecture, London
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16 - 20 March 2015

LMS Invited Lectures
Durham
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150th Anniversary
Celebrations at the
BMC-BAMC 2015
Cambridge
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Tuesday 7 April

Northern Regional
Meeting, Lancaster

20-31 July

LMS Undergraduate
Summer School
Loughborough
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NEWSLETTER ONLINE:

newsletter.lms.ac.uk

 @LondonMathSoc

NEW MATHEMATICS DEPARTMENT AT LINCOLN



The City of Lincoln has historical connections with some of the most notable mathematical minds. It is the birth place of George Boole and Charlotte Scott. George Boole started his mathematical career in Lincoln as a school teacher and spent a large part of his short life there.

An important cathedral city, Lincoln, however, only recently became a university place, and did not previously have its own mathematical university provision.

That situation changed in September 2014 with the opening of the School of Mathematics and Physics at the University of Lincoln. It is the result of a close collaboration with industrial partners, and a £6.8 million grant from the HEFCE Catalyst

Fund. The school offers a range of mathematics programmes from BSc up to PhD including both pure and applied mathematics, with the first undergraduate intake beginning in September 2015.

The main research area of the school in pure mathematics is algebra (group theory and theory of Lie rings). Applied mathematics is represented by theoretical and computational modelling of soft matter.

The school has recently made its first staff appointments. The plan is to have at least six academics in post by next summer, with the long-term aim being to bring this number up to thirty. Pure mathematics development will be led by a well-known algebraist, Dr

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University of Lincoln
Main administration buildings

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Evgeny Khukhro, expert in group theory and theory of Lie rings, a member of the editorial boards of the *Journal of Algebra* and *Journal of Group Theory*.

In applied mathematics and physics we have also attracted top scientists: Dr Marco Pinna, the winner of the UK Institute of Physics 2009 PhD Prize in Computational Physics and Dr Manuela Mura, the winner of the 2010 Tadi-

on-Rideal Prize for Molecular Science from King's College London, and of the Springer Thesis Prize. Research in applied mathematics has possibilities of collaboration with Lincoln's existing strengths in materials science, molecular biology, nanotechnology and pharmacology.

Professor Andrei Zvelindovsky
Head of School of Mathematics and Physics

LMS GOOD PRACTICE SCHEME WORKSHOP

Report

The Good Practice Scheme has now run a number of workshops for departments to try and help them to implement good working practices. Most of these have focused on Athena SWAN awards with presentations being given by departments who have been successful in obtaining awards.

The latest workshop was held on 21 October 2014 at De Morgan House and had a rather different format. The workshop was led by Claire Herbert who is a Senior Policy Advisor for the Equality Challenge Unit (ECU) and was on the theme of Unconscious Bias. Participants at previous workshops had indicated that they would like a session on this topic and a recent Government Inquiry on women in scientific careers recommended that all universities should give training to their staff (and in

fact students!) in this area so it seemed timely to offer a workshop on this theme.

The ECU is the organisation that runs the Athena SWAN scheme but it also runs a number of other activities including training sessions on topics such as unconscious bias. For this particular topic, the ECU has developed a training pack www.ecu.ac.uk/publications/unconscious-bias-colleges-he-training-pack/ that is freely available for university staff to use at their own institutions. Claire used this pack to run the session at the LMS Workshop and also talked through ways in which participants could use and adapt the material to run sessions themselves.

The workshop was well attended with



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Updates and corrections to
calendar@lms.ac.uk

Articles

Send articles to
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around 30 participants from a range of universities. The feedback was very positive and several participants said that they were considering using the training material at their own universities. Claire illustrated the theory with a range of practical examples and case studies which were discussed in groups and these were especially helpful in getting a better understanding of the issues involved and ways in which they could be overcome.

It became clear that unconscious bias is an important issue and that the training material could be used as the basis for a

whole workshop or to provide material for part of a workshop on a topic such as recruitment. In fact the ECU is currently preparing a new training pack on recruitment which will include a section on unconscious bias.

Participants appreciated the experienced and friendly input from Claire and also the chance to chat and swap ideas about this and other issues with members of other departments over lunch.

Gwyneth Stallard
Chair, LMS Women in Mathematics
Committee

MATHEMATICS POLICY ROUND-UP

November 2014

RESEARCH

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EPSRC Strategic Advisory Teams (SATs)

EPSRC is asking for applications from industrialists, academics and individuals working in the third sector and government organisations to join Strategic Advisory Teams (SATs), across the range of EPSRC's Themes.

It is looking for suitable individuals to guide and advise as theme experts across a range of EPSRC's current key themes. Applicants can be full-time or part-time, on sabbatical or a career break, academic or researcher, based in academe, industry, the third sector or government organisation. Applicants are not required to act as representative of their own organisation but rather as someone with an expert command of a particular theme that is free of bias.

The closing date for applications is **Friday 5 December 2014**. More information is available at www.epsrc.ac.uk/newsevents/news/satmembership.

Feedback on EPSRC draft strategic plan

The EPSRC received comments from over 40 organisations and these covered aspects directly impacting on the draft Strategic Plan, as well as more operational issues.

These comments from the community

form an important part of the development process. Specific points have been taken on board and the text refined and sharpened in the Strategic Plan, which is expected to be published before the end of the year.

There were some consistent themes across the comments including:

- links and partnerships with universities, research users, particularly Innovate UK, and other Research Councils;
- the value of bottom-up funding opportunities and the need for balance with user-facing investment;
- the internationalisation of research;
- research infrastructure needs; and
- diversity.

The comments relating to operational issues will be more fully addressed as detailed ideas are developed for the next Delivery Plan, covering the period from 2016/17 onwards.

SCHOOLS AND COLLEGES

Schools plan to increase focus on mathematics

Recent surveys show that schools across the country are planning to boost the amount of time and staff devoted to teaching mathematics, giving more young people a greater knowledge and understanding of the subject.

The surveys revealed that ahead of the introduction of a new, more demanding mathematics GCSE to be taught from next September:

- more than a quarter of schools planned to increase the amount of mathematics taught per week;
- half of schools were introducing training programmes for mathematics teachers;
- more than one-third of schools said they had recruited additional staff to prepare for the new mathematics GCSE; and
- more than three-quarters of senior leaders said they were confident that their school's curriculum reflects the new National Curriculum for mathematics.

More information is available at <http://tinyurl.com/kmfppj2>.

Teaching bursaries to continue for top graduates

The Department for Business, Innovation and Skills (BIS) announced the continuation of a bursary scheme to encourage more top graduates to begin a teaching career in the further education sector.

The funding is specifically for teachers in mathematics, English and Special Educational Needs (SEN). This scheme was previously available for the 2013 to 2014 and 2014 to 2015 academic years and BIS has confirmed this will continue for teachers recruited to begin in September 2015 for the 2015 to 2016 academic year.

More information is available at <http://tinyurl.com/o22u56l>.

Dr John Johnston
Joint Promotion of Mathematics

COUNCIL DIARY

18 October 2014

A personal view

LMS Council on Friday 18 October 2014 was, as usual, a full meeting which considered a diverse range of issues affecting mathematics in universities today.

One of the main agenda items was the draft Report of the Trustees, an annual report which details the activities of the Society over the last year and how they were funded. The 2013/14 report is not only informative but also very well-presented, highlighting the many areas in which the LMS has fulfilled its aims as a charity this year. These include the work of the Society to sustain the mathematics community, to disseminate and promote mathematics and to engage with education and with the public. Figures such as the net increase in membership are highlighted, with 220 new members joining this year, of whom 24% are female. The staff at De Morgan House have worked hard on the content and presentation of the report and, as trustees, Council members were very pleased to sign this report off subject to minor factual corrections. It will be published on the LMS website in the next couple of months.

Plans for the 150th Anniversary Year are now well in hand. At Council we heard from a number of the Committees of the LMS who are organising commemorative events during the year, such as a special conference on Cryptography in September 2015 organised by the Computer Science Committee and a four day Women in Mathematics event to be held in Oxford in April 2015, which will include two days of events for school girls. Council is also aware of the importance of making the most of the legacy of the 150th Anniversary. We must use the year as a springboard to raise the profile of mathematics in the nation and take the opportunity to work with other bodies and industry to launch campaigns for longer term projects. These might include continued support of undergraduate and postgraduate students (through programmes such as the Undergraduate Research Bursaries and Postdoctoral Mobility Scholarships), the development of a national retreat centre for mathematics, the promotion of mathematics more generally and supporting mathematics overseas, such as through the MARM project.

The LMS Development Committee is working on these plans and developing relationships with potential champions for the various projects.

Programme Committee has been very active in receiving, reviewing and awarding grants, with the number of bids up on previous years. The President had chaired Programme Committee recently and noted how many really excellent proposals the Committee is receiving. This speaks well of the health of the community, although does present the Committee and the LMS with difficulties in deciding between very good applications. This is a further spur for considering how to increase the available funding for grants of the size the LMS has been able to award, which clearly fill an important gap. The President thanked the outgoing Programme Secretary, Professor Rob Wilson, for all his work for the Society over a number of years.

The update to Council from the Women in Mathematics Committee highlighted a successful year. Since the publication of the Benchmarking Survey and the launch of the LMS Good Practice Workshops, 12 Departments have now gained Athena SWAN awards (there were four previously). This year's Women in Mathematics Day had been oversubscribed and there has been a significant increase in demand for funding that the LMS Women in Maths Committee provides for

childcare and Grace Chisholm Young fellowships. The Committee is working on ensuring consideration of gender issues is embedded in all of the Society's activities and also focusing on how it might help improve the numbers of women moving from undergraduate to postgraduate study in mathematics. It was noted in the report of the Research Meetings Committee that the number of female applicants for Undergraduate Research Bursaries and Postdoctoral Mobility Scholarships was disappointingly low. The two Committees will look to work more closely together to address this issue.

A report to Council of the Q-STEP conference in Cardiff by Professor Simon Maskill highlighted the need for mathematicians to engage even more with colleagues in the social sciences, not just as solution providers but in order to bring new problems for mathematicians to engage with, just as has happened in engineering, physics and biology.

Council concluded with the receipt of a further 41 applications for membership, continuing the upward trend in membership reported above. Thanks are due to the Treasurer, the Education Secretary and Elizabeth Fisher who have been active in this recruitment drive, as well as the LMS Representatives within departments.

Cathy Hobbs

ISAAC NEWTON INSTITUTE

Call for Proposals

The Institute now invites proposals for 1-, 4- and 6-month research programmes in any branch of the mathematical sciences. A special case should be made for shorter proposals and there is no guarantee these will be held in the summer. The deadline for submission is **31 January 2015**, for consideration at the meeting of the Scientific Steering Committee in May. Details on submitting proposals are at www.newton.ac.uk/callprop.html.

Anyone interested in making a proposal is encouraged to contact the Director, John

Toland, by telephone (01223 335980) or email (director@newton.ac.uk) for advice and informal feedback.

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



LONDON
MATHEMATICAL
SOCIETY

150TH ANNIVERSARY

The London Mathematical Society is delighted to announce the Launch
of its 150th Anniversary Celebrations

MATHEMATICS: UNLOCKING WORLDS

With a programme of prestigious speakers including:

Professor Terry Lyons, President of the LMS
Steve Thompson, Playwright and Screenwriter
Professor Robert Calderbank, Duke University
Professor Nigel Hitchin, University of Oxford
James Reid, Head of Visual Effects at Milk Visual Effects
Robert Pické, Research Lead at Moving Picture Company
Professor Andrew Blake, Head of Microsoft Research, Cambridge
Professor Dame Frances Kirwan, University of Oxford

With link presenter **Maggie Philbin**, Television Presenter

Friday 16th January 2015
2.00pm to 6.30pm
Goldsmiths' Hall

This event will be live-streamed from www.lms.ac.uk/2015/launch

SPITALFIELDS DAY

Call for proposals

The London Mathematical Society is pleased to offer grants of up to **£500** towards the cost of a Spitalfields Day.

A Spitalfields Day is a one-day event at which selected participants, often eminent experts from overseas, give survey lectures or talks, which are accessible to a general mathematical audience. The Spitalfields Day is often associated with a long-term symposium and speakers will generally give lectures on topics of the symposium.

The name honours the Society's predecessor, the Spitalfields Mathematical Society, which flourished from 1717 to 1845, and Spitalfields Days have been held each year since 1987.

The grant of £500 is intended to cover

actual supplementary costs for the event, e.g. subsidising the cost for a lunch for participants, and for small travel grants of £50 to enable LMS members and research students to attend the event.

If you are interested in organising a Spitalfields Day, please write to the Society (grants@lms.ac.uk). The format need not be precisely as described, but should be in a similar spirit.

The next deadline for proposals is **31 January 2015**. Subsequent deadlines are 15 May 2015 and 15 September 2015. Please note the Society cannot fund events retrospectively so applicants are advised to apply well in advance of the event.



LMS 150TH ANNIVERSARY INVITED LECTURER 2015

Professor Michael Shapiro
(Michigan State University)

Cluster algebras and integrable systems

16-20 March 2015
Durham University

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

There will also be supplementary lectures by:

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

University accommodation will be available.

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

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

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



LMS 150TH ANNIVERSARY UNDERGRADUATE RESEARCH BURSARIES IN MATHEMATICS 2015

NATURE OF AWARDS

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

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

ELIGIBILITY

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

HOW TO APPLY

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

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



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DAVID CRIGHTON MEDAL 2015

Call for Nominations

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

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

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

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

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



www.demorganhouse.org.uk

CONFERENCE FACILITIES

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



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



LMS Advancing
Mathematics
London Mathematical Society



**Institute of
mathematics**
& its applications

Christopher Zeeman Lecture and Medal Presentation



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

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

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

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

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

LMS Undergraduate Summer School 2015

**Loughborough University,
July 20-31, 2015**

The aim of the School is to introduce modern mathematics to the best UK undergraduates who are not currently in their final year of study

The School will be a combination of short lecture courses with problem solving sessions and colloquium style talks from leading mathematicians

The lecture courses will be given by

Gwyn Bellamy (Glasgow)
Ton Coolen (King's College)
Darren Crowdy (Imperial)
Giovanni Felder (ETH Zurich)
Mark Gross (Cambridge)
Caroline Series (Warwick)
Sergei Tabachnikov (Penn State)
Reidun Twarock (York)

Scientific Committee:

Andrew Hone, Frances Kirwan,
Sergei Tabachnikov and Alexander Veselov.

Local Organising Committee: Gavin Brown,
Claudia Garetto, Alexander Veselov and
Brian Winn.

<http://www.lms.ac.uk/events/lms-summer-schools>

This Summer School is part of the LMS 150th Anniversary celebrations.
<http://www.lms.ac.uk/2015>



LMS 150TH ANNIVERSARY POSTDOCTORAL MOBILITY GRANTS

2015-16 Awards

The London Mathematical Society will award grants of up to £9,200 to mathematicians of excellent promise. The purpose of the grants is to support a period of study and research in mathematics between three and six months in the academic year 2015-16 at one or more institutions other than the holder's home institution (the holder's home institution may be included for applicants with circumstances that make moving impractical, please visit the website for the full guidelines). They are intended to support promising researchers during the transitional period between having submitted their thesis and the start of their first post-doctoral employment.

The value of the grant will be calculated at £1,200 per month plus a travel allowance of up to £2,000.

At the time of the closing date applicants have to be UK residents. Successful candidates must have submitted their thesis within twelve months before the start of their grant period. Grant holders are allowed to teach up to three hours a week. Otherwise they are expected to spend their working time on study and research.

Candidates are asked to provide with their application:

- a **completed application form**
- a **cover letter**;
- a **CV** including a list of publications (maximal two A4 pages);
- a **research proposal** including a rationale for the choice of institution(s) to be visited (maximal three A4 pages);
- at least **two letters of reference**, which applicants should request that referees email directly to the LMS (to the email address below) by the closing date;
- and **letter(s) of support** from the host(s) at the institution(s) where the proposed visit will take place; it is expected that host institutions provide the grant holder with office space and access to computing and library facilities.

These grants have been established by the LMS to mark its 150th anniversary.

Applications should be sent by **Tuesday 31 March 2015** by email to: pmg@lms.ac.uk.

Queries should be referred to Katy Henderson: pmg@lms.ac.uk, tel.: +44 (0)20 7927 0809.

Applicants will be notified of the outcome of their application in late May 2015.



LMS 150TH ANNIVERSARY MARY CARTWRIGHT LECTURE & SOCIETY MEETING

Friday 27 February 2015

De Morgan House, 57-58 Russell Square, London, WC1B
(Nearest tube: Russell Square)

3.30 Opening of the Meeting

Mathieu Lewin

(Université Paris-Dauphine)

*Bose-Einstein condensation: history,
model and recent mathematical results*

4.30 Tea

5.00 Mary Cartwright Lecture

Maria Esteban

(Université Paris-Dauphine)

*Eigenvalue problems in relativistic
Quantum Mechanics, theory and
applications*

6.00 Wine reception



Maria Esteban

To register, please contact Katy Henderson (womeninmaths@lms.ac.uk) by **Friday 20 February**. Late registrations for places may still be accepted, subject to availability.

The reception will be followed by a dinner at a restaurant tbc, at a cost of £35 per person, inclusive of wine. If you would like to attend the dinner, please contact Katy Henderson (womeninmaths@lms.ac.uk) by **Friday 20 February**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Please contact Katy Henderson (womeninmaths@lms.ac.uk) for further information.

BRIAN HARTLEY MEMORIAL DAY AT MANCHESTER

Report

A one day meeting on algebra to commemorate the 20th anniversary of the day Brian Hartley died while walking in the Lake District was held at the University of Manchester on 8 October 2014. The meeting was attended by about 30 people, among them Catherine Barber-Brown, née Hartley, Brian Hartley's daughter, as a guest of honour.

In his opening address the organizer of the event reflected on Brian Hartley's life and work. Hartley was a Professor at the University of Manchester from 1977 till his untimely death in 1994. He was the undisputed leader of the Manchester algebraists who were at that time located at the Victoria University and at UMIST. As an eminent researcher and skilful organizer of seemingly unlimited energy, he shaped the development of the Manchester algebra community, and made Manchester an internationally recognized centre of algebraic research. Hartley pioneered active collaboration with colleagues from Eastern

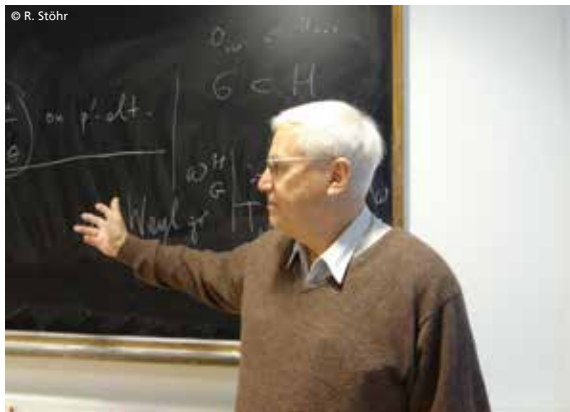


Ralph Stöhr and Catherine Barber-Brown

Europe across the Iron Curtain. He is remembered by many as a wonderful colleague and friend.

Catherine Barber-Brown addressed the audience with memories about her father, his legacy and how he is remembered in the family today.

There is no better way of celebrating the memory of a great mathematician than by doing mathematics. The centrepiece of the event were three mathematical talks. All three speakers were closely connected to Brian Hartley. Alex Zaleski (now retired and based in Minsk) was a major collaborator of Hartley's. His talk was on the Steinberg representation of the orthogonal group. Mahmut Kuzucuoğlu (Ankara) was Hartley's PhD student. He received his PhD from the Victoria University of Manchester in 1987, and is now one of the leading algebraists in Turkey. His talk was on automorphisms of finitary symmetric groups. The final speaker was Dan Segal (Oxford)



Alex Zaleski

Restriction of the Steinberg representation of orthogonal groups to the orthogonal subgroup of one less dimension

who had also been a speaker at the first Brian Hartley Memorial meeting at Manchester back in 1995. His talk, *'Subgroups of finite index in profinite groups' 35 years on*, was on developments originating from Hartley's 1979 paper.

The meeting concluded with a wine reception, followed by dinner at a nearby Chinese restaurant.

The participants felt that this Brian Hartley Day was a full success. The talks made it a

highlight in the Manchester mathematical calendar. Equally important, it was a moving and heart-warming experience, particularly for those who knew and admired the late Brian Hartley.

The meeting was supported by an LMS Conference grant and funds from the Manchester Institute of Mathematical Sciences MAPLE grant.

Ralph Stöhr
University of Manchester

THE MAXWELL INSTITUTE GRADUATE SCHOOL ON EVOLUTION EQUATIONS

Report

The Maxwell Institute Graduate School on Evolution Equations, which took place from 8 to 10 October 2014 at the International Centre for Mathematical Sciences, Edinburgh attracted over 30 postgraduate students and young researchers to discuss topics around time-dependent differential equations, deterministic and stochastic.

The programme centred around two short courses by Christian Lubich (Tübingen) and Erwan Faou (INRIA and ENS Paris). Lubich explained aspects of the long-time behaviour of the energy in oscillatory Hamiltonian ODEs and PDEs or their discretisations, and he emphasized the role of modulated Fourier expansions as a tool for the analysis. His wide range of applications ranged from energy near-conservation in symmetric multistep methods via celestial mechanics to a stability analysis of plane wave solutions for nonlinear Schrödinger equations. Faou's lectures gave an introduction to stochastic differential equations and their numerical approximation. Starting from virtually zero (Ito's formula), he eventually discussed the numerical approximation of invariant measures, a weak error



Claudia Wulff (Surrey), Jonathan Sherratt (Heriot-Watt),
Erwan Faou (INRIA and ENS Paris), Christian Lubich (Tübingen)

analysis and provided a glimpse towards molecular dynamics. Both lecturers emphasized the common ground between the two topics, in an interplay of pure and numerical analysis.

On the first day, seven short talks by postgraduate students and young postdocs turned into one of the most popular parts of the programme. The talks introduced participants to each other's research interests, from the analysis of stochastic PDE and fluid dynamics to the mathematical modelling of crime, and provided a source for personal discussions over



Some of the participants

the following days. In addition, three senior participants (Jonathan Sherratt, Heriot-Watt; David Siska, Edinburgh; Claudia Wulff, Surrey) connected the content of the main lectures to their research. Their one-hour presentations included topics from numerical time discretisations for nonlinear PDE and SPDE to oscillatory reaction-diffusion equations arising in theoretical ecology.

the home page www.macs.hw.ac.uk/~hg94/evo14.

We thank the London Mathematical Society, the Edinburgh Mathematical Society and the Glasgow Mathematical Journal Trust Fund for support.

Heiko Gimperlein, Lehel Banjai,
Heriot-Watt University
Ben Leimkuhler, Edinburgh University

17

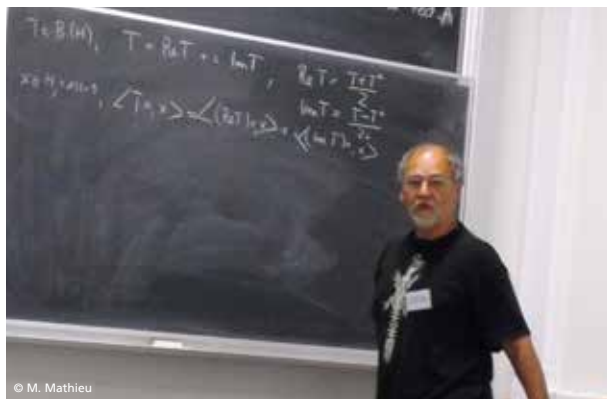
OPERATOR THEORY 2014

Report

The International Workshop on Operator Theory 2014 (iWOP 2014) was held in the Pure Mathematics Research Centre of Queen's Uni-

versity Belfast from 3 to 5 September 2014. Organised by Dr Martin Mathieu, MRIA, it brought together experts in various branches of operator theory on Banach and on Hilbert space. The six plenary speakers were: Professor Jesús Araújo (Universidad de Cantabria); Professor Isabelle Chalendar (Université de Lyon I); Professor Raúl Curto (University of Iowa); Professor Jörg Eschmeier (Universität des Saarlandes); Professor Vladimir Müller (Akademie v d České republiky); and Professor Jan Stochel (Uniwersytet Jagielloński).

Among the almost 40 participants from altogether



© M. Mathieu

Vladimir Müller presenting the lecture



All six plenary speakers with organiser Martin Mathieu in the middle

17 countries there were 17 PhD students, a very positive sign for the future of this branch of Pure Mathematics. Topics of talks ranged from connections with the Invariant Subspace Problem; properties of isometries on various types of Banach spaces; Toeplitz operators; subnormal operators; dissipative and accretive operators and semigroups of operators; to generalised inverses and multi-

own compositions (song and piano) to the delight of the participants.

The generous funding by the LMS was complemented by funds from Queen's University to support students from outside the UK and Ireland, in particular those from the US, Turkey, Spain, Germany and Hungary.

Martin Mathieu
Queen's University Belfast

WORD PERIODICITY AND CONJUGATE WORDS

Report

In September 2014 I visited Professor Bruce Watson at the Department of Information Science at the Stellenbosch University in South Africa. During my visit we had the opportunity to work on applications of combinatorics on words in the field of computational molecular biology, in particular on problems related to *word periodicity* and *conjugate words*; the two respective articles are currently in preparation.

Word periodicity is important in the context of tandem duplication in molecular sequences, for instance, words over the DNA alphabet. The appearance of specific kinds of tandem repeats has been linked to a number of different genetic diseases, such as the *Huntington's disease*.

The concept of conjugate words naturally

arises in many biological contexts as this type of circular structure occurs in the DNA of viruses, bacteria, eukaryotic cells, and archaea. Hence, combinatorial properties of conjugate words are important in the analysis of organisms with such structure.

While I was in Stellenbosch, I gave a lecture entitled *Fast Algorithms for Approximate Circular String Matching*. I also attended a lecture by Professor Watson entitled *Using Correctness-by-Construction to Derive Dead-zone Algorithms*.

The visit was supported by an LMS International Short Visits Scheme 5 grant.

Solon P. Pissis
Department of Informatics
King's College London



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150TH ANNIVERSARY LMS PRIZES 2015 Call for Nominations

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

In 2015, the LMS Council expects to award:

- **The Polya Prize** - in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom.
- **The Shephard Prize** – *awarded for the first time in 2015*. For making a contribution to mathematics with a strong intuitive component which can be explained to those with little or no knowledge of university mathematics, though the work itself may involve more advanced ideas.
- **The Senior Whitehead Prize** - for work in, influence on or service to mathematics, or recognition of lecturing gifts in the field of mathematics.
- **The Naylor Prize and Lectureship** - for work in, and influence on, and contributions to applied mathematics and/or the applications of mathematics, and lecturing gifts.
- **The Berwick Prize** - in recognition of an outstanding piece of mathematical research actually published by the Society during the eight years ending on 31 December 2014.
- **The Whitehead Prizes** - for work in and influence on mathematics.
- **The Anne Bennett Prize** – *awarded for the first time in 2015*. For work in and influence on mathematics, particularly acting as an inspiration for women mathematicians.
- **The Hirst Prize** for the History of Mathematics – *awarded to mark the LMS 150th Anniversary* – for contributions to the study of the history of mathematics. The prize will be awarded in recognition of original and innovative work in the history of mathematics, which may be in any medium.
- **The Prize for Communication of Mathematics** - *awarded to mark the LMS 150th Anniversary* - for the award of the prize are communication of mathematics and excellence in communication. The communication of ideas may be in any medium and the audiences involved may be of any age-group.

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

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

Closing date for nominations
Monday 20 January 2015



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LMS INVITED LECTURE SERIES 2016

Call for Proposals

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

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

The format of annual Invited Lectures series is:

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

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

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

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

Recent previous lecturers have been:

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



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LMS HARDY FELLOWSHIP LECTURE TOUR 2016

Nominations Sought

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

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

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

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

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

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

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

The London Mathematical Society will fund:

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

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

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

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

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LMS SOUTH WEST & SOUTH WALES REGIONAL MEETING

17 December 2014

Centre of Mathematical Sciences, Plymouth University

- | | |
|---------|---|
| 2:45 pm | Opening of the meeting |
| 3:00 pm | Rosemary Bailey
(Queen Mary and St Andrews)
<i>Circular designs balanced for neighbours at distances one and two</i> |
| 4:00 pm | Tea/Coffee |
| 4:30 pm | Marius van der Put
(Groningen)
<i>Differential Galois theory</i> |
| 7:00 pm | Dinner at venue TBC |

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 two workshops on **Combinatorics** and on **Differential Algebra** on 18 and 19 December 2014. For further details on the meeting and workshops please visit tinyurl.com/o88aou2 or contact the organisers thomas.mccourt@plymouth.ac.uk and daniel.robertz@plymouth.ac.uk.

To register for the meeting or the dinner please contact the organisers. The cost of the dinner will be approximately £30, including drinks.

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.



In association with the Newton Institute programme

Periodic and Ergodic Spectral Problems

(5 January - 26 June 2015)

PERIODIC AND OTHER ERGODIC PROBLEMS

23 – 27 March 2015

Organisers: Leonid Parnovski (UCL) and Alexander Sobolev (UCL).

Workshop Theme In the last two decades spectral theory of periodic operators witnessed a number of new exciting developments in several directions. New sophisticated techniques have been put forward for the study of spectral structure of periodic operators (e.g. absolute continuity, finiteness of the number of gaps, inverse spectral problems), and in the theory of homogenisation. The main aim of the workshop is to review these and other achievements. At the same time it is expected that the other two themes of the programme (almost periodic and random) will be prominently represented as well, and that the workshop will stimulate discussions between experts in different field.

Closing date for applications is **30 January 2015**.

Further information is available from the website
www.newton.ac.uk/programmes/PEP/pepw02

ALMOST-PERIODIC AND OTHER ERGODIC PROBLEMS

7 – 10 April 2015

Organisers: Svetlana Jitomirskaya (University of California, Irvine) and Frédéric Klopp (Université Pierre et Marie Curie).

Workshop Theme This workshop will bring together scientists working at the front edges of the area of almost periodic operators, with a goal of providing the audience with overview of the state of the art, as well as fostering the exchange of ideas. The field has seen remarkable breakthroughs in the last two decades, some of which were recognized by Avila's 2014 Fields medal. Being in between random and periodic in various ways, the area strongly benefits from the ideas coming from researchers working in two other themes of the program, and this will be reflected at the meeting. The workshop will also feature shorter talks by talented young researchers.

Closing date for applications is **8 February 2015**.

Further information is available from the website
www.newton.ac.uk/event/pepw03

AMS-EMS-SPM INTERNATIONAL MEETING

Each year the American Mathematical Society liaises with a host society from another country to organize a meeting, linking together members of the mathematical community from the US and abroad. The 2015 meeting will bring together the American Mathematical Society (AMS), the European Mathematical Society (EMS) and the hosting Portuguese Mathematical Society (SPM) in the UNESCO world heritage city of Porto, from which Portugal derives its name. The meeting will take place from 10 to 13 June 2015.

Perched high above the Douro River, the venue is close at hand to local cultural sites and a variety of accommodations. The scientific scope of this meeting ranges from plenary talks of general interest to special sessions focusing on current research in specific areas.

There will be an evening Public Lecture given by Marcus du Sautoy (University of Oxford), distinguished Invited Addresses and a variety of Special Sessions. The Invited Addresses will be given by:

- Rui Loja Fernandes (University of Illinois)
- Irene Fonseca (Carnegie Mellon University)
- Annette Huber (Albert-Ludwigs-Universität)
- Mikhail Khovanov (Columbia University)
- André Neves (Imperial College London)
- Sylvia Serfaty (Université Pierre et Marie Curie Paris 6)
- Gigliola Staffilani (MIT)
- Marcelo Viana (Instituto de Matemática Pura e Aplicada)

The social program will include a reception and a banquet, and the organizers plan on having special social activities for the persons accompanying the participants. For further information visit the website <http://aep-math2015.spm.pt/>.

COMBINING PROBABILITY AND LOGIC

The seventh workshop on *Combining Probability and Logic* (Prolog 2015) will take place at the University of Kent from 22 to 24 April 2015. Invited speakers include:

- Richard Bradley (LSE)
- Dorothy Edgington (Birkbeck)
- John Norton (Pittsburgh)
- Jeanne Peijnenburg (Groningen)

The workshop will be preceded by a two-day Summer School on *Inductive Logic* from 20 to 21 April 2015.

This instalment of Prolog will also be interested in connections between formal epistemology and inductive logic. Can inductive logic shed light on epistemological questions to do with belief, judgement etc? Can epistemological considerations lead to a viable notion of inductive logic?

The workshop is supported by an LMS Conference grant. This will provide financial support to fund student bursaries. These bursaries cover travel expenses (up to £100) and accommodation for the entire week. UK-based mathematics students are invited to apply for these bursaries. To apply send an email to the organiser j.landes@kent.ac.uk and explain your interest in these events.

For further information visit the website at: www.kent.ac.uk/secl/philosophy/jw/2015/prolog/.

VISIT OF Wafa BATAT

Dr Wafa Batat from the École Normale Supérieure de L'Enseignement Technologique d'Oran (Algeria) is based at the University of Buckingham until 19 December 2014. Dr Batat works on pseudo-Riemannian Ricci solitons. In particular, she works on the clas-

sification of Lorentzian solitons on Lie groups and homogeneous manifolds. She is also interested in the role that these geometries play in theoretical physics. Dr Batat is hosted by Stuart Hall (stuart.hall@buckingham.ac.uk) who should be contacted for further details. This visit is supported by an LMS Scheme 5 grant.



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UNIVERSITY OF
CAMBRIDGE

BMC-BAMC 2015: 30 March – 2 April 2015

including

150th LMS Anniversary Celebration

Wednesday 1 April 2015

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

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

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





Statistical Properties of Dynamical Systems

LMS-CMI Research School

Loughborough

13-17 April 2015

Organiser: Wael Bahsoun

Course outline

The aim of the school is to provide PhD students with knowledge and training on basic tools needed to study statistical properties of dynamical systems. Students are not assumed to have any knowledge in the subject. In the first two days the lectures will aim at general background and tools needed in the area. More advanced topics which are related to current advances in the area will start to appear on the 3rd day of the school.

The three main lecture course topics are:

- *Strong statistical properties of hyperbolic and partially hyperbolic dynamical systems* (Carlangelo Liverani, Università di Roma)
- *Fast-slow skew product systems and convergence to stochastic differential equations* (Ian Melbourne, Warwick)
- *Open Systems: Fundamental Questions and Emerging Perspectives* (Mark Demers, Fairfield University)

These lecture courses will be supplemented by tutorial sessions.

For further information please visit: <http://homepages.lboro.ac.uk/~mawb/LMS-CMI.html>

Applications: Applications should be made using the registration form available via the website at: <http://homepages.lboro.ac.uk/~mawb/LMS-CMI.html>. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **30 January 2015**. Numbers will be limited and those interested are advised to make an early application.

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

Fees

All research students will be charged a registration fee of **£150**. **There will be no charge for subsistence costs.**

All early career researchers will be charged a registration fee of **£250**. **There will be no charge for subsistence costs.**

All other participants (e.g. those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£150) **£400** in total.

All UK-based participants must pay their own travel costs. For overseas-based participants, support will be available to contribute towards travel costs.

Fees are not payable until a place on the course is offered but will be due by 20 February 2015.

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

The LMS is the UK's learned society for mathematics. Registered charity no. 252660 (www.lms.ac.uk)

The CMI is charitable private operating foundation, incorporated in the USA.

150TH ANNIVERSARY CECIL KING TRAVEL SCHOLARSHIP



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The London Mathematical Society annually awards a £5,000 Cecil King Travel Scholarship in Mathematics, to a young mathematician of outstanding promise. The Scholarship is awarded to support a period of study or research abroad, typically for a period of three months. Study or research in all areas of mathematics is eligible for the award.

The award is competitive and based on a written proposal describing the intended programme of study or research abroad, and the benefits to be gained from such a visit. A shortlist of applicants will be selected for an interview during which they will be expected to make a short presentation on their proposal.

Applicants must be nationals of the UK or the Republic of Ireland, either registered for or having completed a doctoral degree within 12 months of the closing date.

Applications should be made using the form available on the Society's website (www.lms.ac.uk/content/cecil-king-travel-scholarship) or by contacting education@lms.ac.uk. The closing date for applications is **Friday 6 March 2015**. It is expected that interviews will take place in London in late April or early May.

The Cecil King Travel Scholarship was established in 2001 by the Cecil King Memorial Fund. The award is made by the Council of the London Mathematical Society on the recommendation of the Cecil King Prize Committee, nominated by the Society's Education Committee.

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- Articles have an expository flavour suitable for graduate students
- The flourishing modern topics of birational geometry and positivity feature prominently



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VISIT OF ALEJANDRA MAESTRIPIERI

Professor Alejandra Maestriperi (Instituto Argentino de Matemática "Alberto Calderón" and Universidad de Buenos Aires) will be visiting the UK between 28 December 2014 and 2 February 2015. Her expertise is in operator theory and its application to approximation problems. During her visit Professor Maestriperi will lecture at:

- Newcastle University, Analysis Seminar, Tuesday 6 January at 4.30 pm (contact Aleksey Popov: Aleksey.Popov@

newcastle.ac.uk)

- Leeds University, Yorkshire Functional Analysis Group Seminar, Friday 23 January at 3.30 pm (contact Charles Read: c.j.read@leeds.ac.uk)
- Lancaster University, Pure Mathematics Seminar, Wednesday 28 January at 3 pm (contact Derek Kitson: d.kitson@lancaster.ac.uk)

For further details contact Michael Dritschel (michael.dritschel@newcastle.ac.uk). The visit is supported by the LMS Scheme 2 grant.

OBITUARY

JOHN GAVIN BASTERFIELD



Dr John Gavin Basterfield, who was elected a member of the London Mathematical Society on 15 June 1979, died on 17 September 2014, aged 72.

Colin Fletcher writes: John became an undergraduate student

at Emmanuel College, Cambridge in 1960 with a Major Scholarship. His undergraduate career passed off with a succession of firsts, and in 1964 he started his research in the Statistical Laboratory at Cambridge under the supervision of David G. Kendall and subsequently David Williams. The title of his thesis was *Some problems in probability* but this was not submitted until 1971 and it was the following year when he was awarded the PhD degree. He left Cambridge in 1967 when he was appointed Assistant Lecturer in the Department of Statistics at the University College of Wales, Aberystwyth. The Department was noteworthy because, incredibly, Aberystwyth's Chair of Statistics was one of the first to be established in the UK. John's most enduring mathematical legacy is a paper he wrote with L.M. Kelly in 1965 (published in 1968) *A characterization of sets of n points*

which determine n hyperplanes. Kelly was a visiting mathematician from Michigan when the two met in Cambridge. The problem they solved was a generalisation of a problem posed by Sylvester in 1893. Given a finite number of points in the Euclidean plane either all the points are collinear or there is a line which contains exactly two of the points.

John was born on 15 December 1941 in Barrow-in-Furness. At that time this event made him a Lancastrian although it would not do so today. This combination of birth and time manifested itself primarily in his love of cricket and his support for the Lancashire team. Aberystwyth is hardly near to any major cricket ground but he found time to visit venues such as Old Trafford, Edgbaston and Worcester to support the Red Rose.

John was a giant of a man, but a gentle giant. He was a jovial character with a sharp intellect. Physical games were not his *forte* although he did turn out for the Statistics cricket eleven on numerous occasions. His game of choice was chess. He was a member of the Aberystwyth Chess Club for many years and he took part in Welsh tournaments. As befitted his nature he relished the opportunity to pit his wits against his opponents but in a non-competitive way. He played for the love of the game and for the friends it brought him, but he worked hard to increase his grading.

On the political front he was a founder

John died at home after a long illness. He is survived by his second wife Cheryl, and three children by his first wife Jane, six grandchildren and a sister.

The book gets better with every reading. It has a wonderful design, it is well produced and nice to look at and hold. Even though it is intended for the young readers, first-ever AMS book for children, we believe that it is best enjoyed if read together: a child and a patient and mathematically inclined adult. It is great for sharing, and for explain-



ing why we like mathematics so much. Get it with someone small you love, and start a journey. Have fun along the way and do not be afraid of taking those big leaps, because as you will learn in this book "Infinity is farther away than you thought".

Robert Jajcay and Tatiana Jajcayova, both mathematicians at Comenius University, in Bratislava, Slovakia, had fun reading and

re-reading this book with their daughter Greta, and are looking forward to yet more re-readings and more curious questions about really big numbers from her.

Robert Jajcay and Tatiana Jajcayova
Comenius University

A note from the Book Reviews Editor: this book would clearly make a great Christmas present for mathematicians to give to their children!

COFFEE, LOVE AND MATRIX ALGEBRA by Gary E. Davis, 2014, Republic of Mathematics, 396 pp, £9.93, ISBN 978-0-6922-6230-6.



At the end of the last millennium Timothy Gowers wrote an essay 'Rough Structure and Classification' (accessible, in postscript format, on his webpage) the first part being a contemplation of how computers might impact on mathematical

research over the next century. In his forecast, human mathematicians follow their chess grandmaster counterparts into also-ran status, with perhaps a twilight phase "where only a few very outstanding mathematicians could discover proofs that were inaccessible to computers. Perhaps the others," Gowers continues, "would concentrate on teaching, but computers would probably become better than us at this as well." His vision has more than a whiff of John Haugeland's Good-Old-Fashioned-AI about it but there is no doubt that some very deep results have acquired automated proofs since the year 2000, notably the Jordan curve theorem (2005), Feit-Thomson (2012) and Kepler's Conjecture (2014). And significant progress has been made towards a fleeting 'golden age' imagined by Gowers "when computers were good at exercises but not yet good at having deep insights". Maple has advanced,

since the millennium, through twelve version numbers; Wolfram Alpha (2009) has recently been followed by Mathematica Online; and there are high quality open-source competitors such as Sage and SymPy. Subject specific software such as Magma and Gap are completely entrenched as computer-aided research tools.

The reason I remind you of all this is because Gary Davis' novel is largely about how the clever, friendly, motivated staff of a mathematics department on the US East Coast become even more clever, friendly and motivated thanks to computer-aided teaching. Well, not to be coy, thanks to Wolfram Research's 'Computational Document Format' (CDF). Competitors, especially MatLab, are derided almost, I would have thought, to the point of being actionable: "MATLAB was now looking distinctly like last century software", "if MathWorks didn't do something about MATLAB it would probably be dead in ten years". Actually, product placement is rife throughout the book: a jewellery company, a legal company, an educational consultant, a barbecue consultant, a brand of coffee, all prove to be actual commercial entities and all get generous press.

In fact there is a general lack of editorial control and polish. Never mind, because Davis has the skill of a good story-teller in making you turn his pages. And his style is engaging, genial and unaffected: I was initially reminded of Alexander McCall Smith and there is some similarity between Davis' anti-hero Professor Albacete and McCall Smith's Professor Dr

von Igelfeld and between their respective tomes *Matrix Algebra* and *Portuguese Irregular Verbs*. But whereas von Igelfeld and his book are perpetual fall guys for McCall Smith's gentle mickey-taking, Albacete and his become symbols of the healing power of academic camaraderie, good (trade-marked) coffee, and the CDF. Love, of various types, came to predominate and I ended the book in the company of an adolescent *Pollyanna*.

Nevertheless, as well as being very readable I imagine Davis' book is well-informed. He has a background in mathematics education, maintains a very widely-read mathemat-

ics blog and has earned himself over thirty thousand Twitter followers. If he says that a successful small US mathematics department is or will soon be one that is exclusively devoted to multidisciplinary research into how to use computers to better educate its students then I, not having visited such a department since before Gowers wrote his essay, am inclined to believe him. So, at least to those who subscribe to Gowers' 'Golden Age' vision, I recommend this book as a pleasant and thought-provoking read.

Robin Whitty
Queen Mary, University of London

CHAOTIC FISHPONDS AND MIRROR UNIVERSES: THE MATHS THAT GOVERNS OUR WORLD

by Richard Elwes, Quercus, 2013, 368 pp, £8.99 pb, ISBN 978-1-78087-160-8.

Richard Elwes is becoming increasingly well-known as a writer of popular books on mathematics. This book, his fourth, explores mathematics through 35 diverse applications, each of which is explored in its own chapter. The chapters are designed to be self-contained so the book can be read in any order. At the same time, references are often made to other chapters to emphasize the many inter-connections between different branches of mathematics.

Chaotic Fishponds and Mirror Universes covers a wide range of applications of mathematics, including physics, computer science, finance, population biology, social science and even social media (Facebook). The title is taken from two of the chapters, one on the relation of population dynamics to chaos theory and the other on the importance of symmetry in particle physics. The book is well researched and includes cutting edge science, for example, constraints on the topology of the universe from recent analysis of the cosmic microwave background.

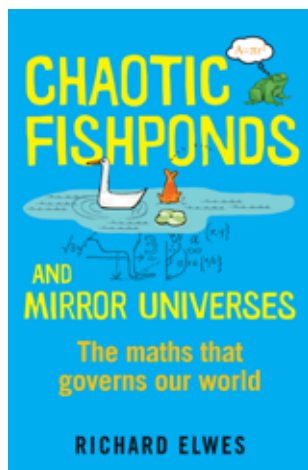
Elwes avoids jargon and equations but includes a surprisingly large amount of science: in each chapter he begins with familiar ideas and builds up to deep concepts within a few pages. A reader needs to stay focused to take everything in, but the book

is written in an informal and engaging style, which helps retain the reader's attention. One minor criticism is that the author did not include a bibliography or suggestions for further reading for those who wish to delve deeper.

Overall, *Chaotic Fishponds and Mirror Universes* is a book with a wide appeal. Most adults with an interest in engineering, science and mathematics would enjoy it. I would certainly recommend it to those considering studying mathematics: it emphasizes the

wide range of applications of mathematics to the modern world and gives a sense of the diversity of research in university mathematics departments.

Marika Taylor
University of Southampton



AMERICAN MATHEMATICAL SOCIETY



A FIRST COURSE IN THE CALCULUS OF VARIATIONS

Mark Kot, University of Washington

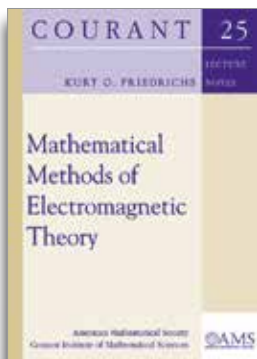
Intended for a first course in the calculus of variations, at the senior or beginning graduate level. The reader will learn methods for finding functions that maximize or minimize integrals. The text lays out important necessary and sufficient conditions for extrema in historical order, and it illustrates these conditions with numerous worked-out examples from mechanics, optics, geometry, and other fields.

The exposition starts with simple integrals containing a single independent variable, a single dependent variable, and a single derivative, subject to weak variations, but steadily moves on to more advanced topics, including multivariate problems, constrained extrema, homogeneous problems, problems with variable endpoints, broken extremals, strong variations, and sufficiency conditions.

Student Mathematical Library, Vol.72

Nov 2014 298pp 9781470414955 Paperback £38.50

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MATHEMATICAL METHODS OF ELECTROMAGNETIC THEORY

Kurt O. Friedrichs

Provides a mathematically precise but intuitive introduction to classical electromagnetic theory and wave propagation, with a brief introduction to special relativity. While written in a distinctive, modern style, Friedrichs manages to convey the physical intuition and 19th century basis of the equations, with an emphasis on conservation laws. Particularly striking features of the book include: (a) a mathematically rigorous derivation of the interaction of electromagnetic waves with matter, (b) a straightforward explanation of how to use variational principles to solve problems in electro- and magnetostatics, and (c) a thorough discussion of the central importance of the conservation of charge.

A co-publication of the AMS and Courant Institute of Mathematical Sciences at New York University

Courant Lecture Notes, Vol. 25

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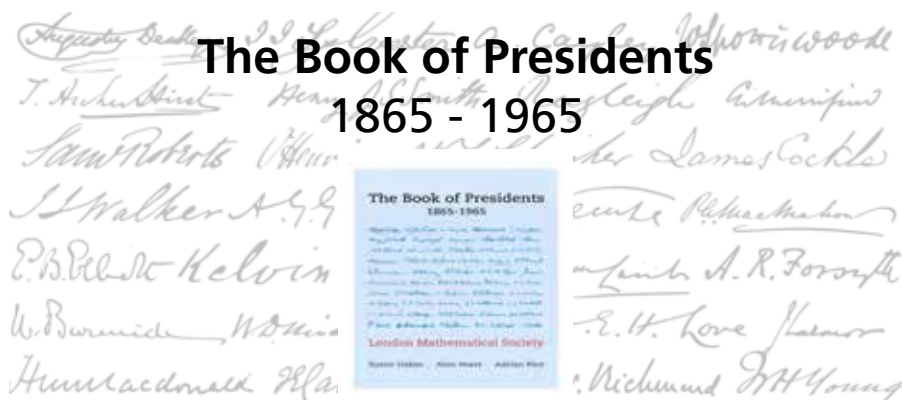
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The Book of Presidents 1865-1965 is available from the London Mathematical Society. LMS Members' price is £15; full price is £19.

To order a copy, please download an order form from the LMS website:

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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 *News/letter* 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.

DECEMBER 2014

8–10 Applications of Game Theory IMA Conference, Oxford (438)
12–13 Random Matrix Theory Workshop, Brunel University (440)
15–17 Maths in Signal Processing IMA Conference, Birmingham (438)
15–19 Regulating Systemic Risk: Insights from Mathematical Modelling, INI Workshop, Cambridge (440)
16–17 Mathematical Challenges of Big Data IMA, Woburn House, London (438)
17 LMS SW & South Wales Regional Meeting, Plymouth (442)
18 Combinatorics Workshop, Plymouth (442)
19 Differential Algebra Workshop, Plymouth (442)

JANUARY 2015

5–8 Topology and Integrability, UK-Japan Winter School, Loughborough (440)
5–16 Periodic, Almost-Periodic, and Random Operators Introductory School, INI, Cambridge (439)
6–9 Bruhat-Tits Buildings Winter Meeting, Imperial College London (439)
9 Research in Mathematics and its Applications IMA Conference, Bath (438)
12–23 Random Geometry Instructional Workshop for Younger Researchers, INI, Cambridge (439)
16 LMS 150th Anniversary Launch, London (442)
26–30 Conformally Invariant Scaling Limits, INI Workshop, Cambridge (439)

FEBRUARY 2015

4–8 CERME 9, Prague (439)
27 Mary Cartwright Lecture, London (442)

MARCH 2015

3 Christopher Zeeman Lecture, London (442)
9–13 Stochastic Systems Simulation and Control ICMS Workshop, Edinburgh (440)
16–20 LMS Invited Lectures, Professor Michael Shapiro (MSU), Durham (442)
19 Mathematics 2015 IMA Conference, Mary Ward House, London (438)
23–27 Galerkin Methods with Applications in Weather and Climate Forecasting ICMS Workshop, Edinburgh (440)
23–27 Periodic and other Ergodic Problems INI Workshop, Cambridge (442)
30–31 Flood Risk Assessment IMA Conference, Swansea (438)
30–2 Apr BMC and BAMC Joint Meeting, Cambridge (438)

APRIL 2015

1 LMS 150th Anniversary Celebration Day at BMC-BAMC Joint Meeting, Cambridge (442)
7 LMS Northern Regional Meeting, Lancaster (441)
7–10 Almost-Periodic and other Ergodic Problems INI Workshop, Cambridge (442)
7–11 Homotopical Algebra and Geometry Workshop, Lancaster (441)
13–17 Mathematics for Health and Disease ICMS Workshop, Edinburgh (440)
13–17 Statistical Properties of Dynamical Systems LMS-CMI Research School, Loughborough (442)
20 Mathematical Education of Engineers IMA Conference, Loughborough (438)
20–21 Inductive Logic Summer School, Kent (442)
20–24 Gradient Flows: From Theory to Application ICMS Workshop, Edinburgh (440)
20–24 Random Planar Structures INI Workshop, Cambridge (441)
22–24 Combining Probability and Logic, University of Kent (442)

JUNE 2015

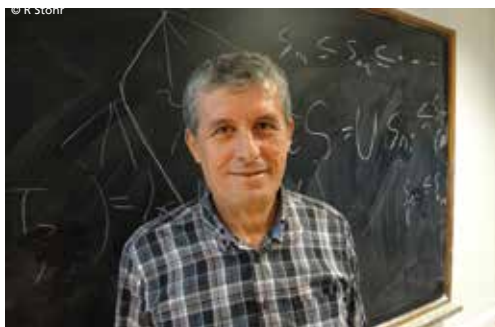
10–13 AMS-EMS-SPM International Meeting, Porto, Portugal (442)

JULY 2015

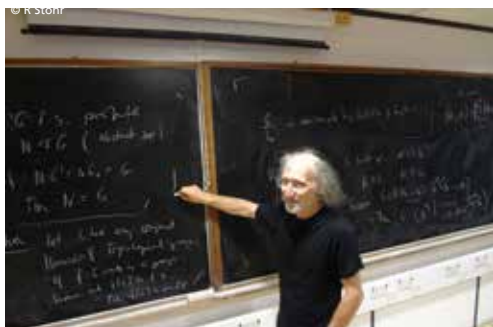
20–31 LMS Undergraduate Summer School, Loughborough (442)

LMS-FUNDED MEETINGS

BRIAN HARTLEY MEMORIAL DAY held at the University of Manchester on 8 October 2014 (report on page 15)



Mahmut Kuzucuoğlu (Ankara)
*Automorphisms of homogenous finitary
symmetric groups*



Dan Segal (Oxford)
'Subgroups of finite index in profinite groups'
35 years on

OPERATOR THEORY WORKSHOP held at Queen's University Belfast from 3 to 5 September 2014 (report on page 17)



The organiser, Martin Mathieu, giving thanks to the
participants and helpers at the dinner



Yvonne Mathieu playing her music
after the dinner



Participants