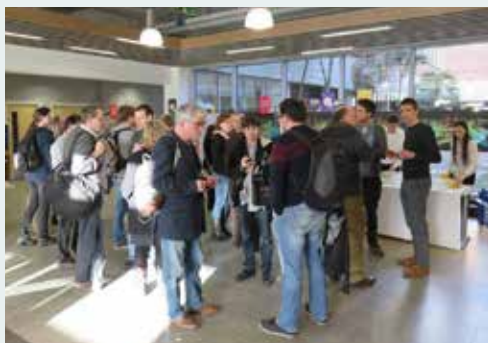




LMS 150TH ANNIVERSARY

UNIVERSITY OF EXETER CELEBRATES THE 150TH ANNIVERSARY OF THE LONDON MATHEMATICAL SOCIETY

A wine reception was held at the University of Exeter on Thursday 26 February 2015 to mark the 150th Anniversary of the London Mathematical Society. The reception took place in the foyer of the Harrison Building, immediately following an interesting and accessible talk in the Mathematics Colloquium entitled *Can frequencies be predicted from mean fields*, given by Professor Laurette Tuckermann (PMMH, France). The reception was also linked to two other mathematics seminars taking place that day, a talk on *Drinfeld's p -adic symmetric regions and moduli of p -divisible group* by Professor Thomas Zink (Bielefeld, Germany) and a talk on *Bayesian design of experiments via Gaussian process emulation* by Professor David Woods (Southampton). At the reception, Dr Nigel Byott (LMS Rep for Exeter) said a few words about the work of the LMS and opportunities to join the Society, and Professor Mark Baldwin (Head of Mathematics) proposed a toast to the continued health of mathematics and the London Mathematical Society. The reception was attended by around 60 people.



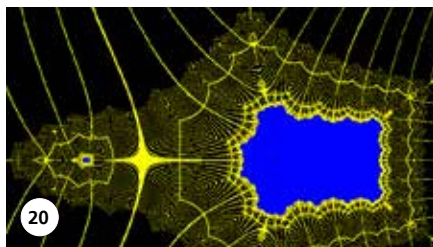
This event is part of a series of such receptions being hosted across the UK by mathematics departments, celebrating the 150th Anniversary of the LMS. For further details, and to see if such an event has been organised for your department, visit www.lms.ac.uk/2015-events-listing. See the back page for images of celebrations from other university departments.

SOCIETY MEETINGS AND EVENTS

- 9 May: LMS-BSHM De Morgan Day, London [page 24](#)
- 29 May: Spitalfields Day, York [page 16](#)
- 25 June: Popular Lectures, London [page 39](#)
- 3 July: Graduate Student Meeting, London [page 25](#)
- 3 July: Society Meeting, Hardy Lecture, London [page 24](#)
- 7 July: Midlands Regional Meeting, Warwick [page 14](#)

Contents

No. 447 May 2015



150th Anniversary Events

| | |
|--------------------------------------|----|
| Anniversary Celebrations Events..... | 8 |
| Exeter Celebrates Anniversary..... | 1 |
| LMS-EMS Mathematical Meeting..... | 13 |

Awards

| | |
|------------------------------|---|
| Abel Prize Winners 2015..... | 3 |
| Fermat Prize..... | 7 |

Calendar of Events 46

LMS Items

| | |
|---|----|
| General Meeting..... | 4 |
| Invited Lecturer 2016..... | 12 |
| Spitalfields Day - Call for Proposals 2016..... | 14 |

LMS Meetings

| | |
|---|----|
| De Morgan Day..... | 24 |
| Diophantine Equations LMS-CMI Research School..... | 23 |
| Graduate Student Meeting..... | 25 |
| Hardy Lecture Tour..... | 17 |
| Hardy Lecture, London..... | 28 |
| LMS-Gresham College Joint Meeting..... | 22 |
| Midlands Meeting..... | 15 |
| Popular Lecture London..... | 29 |
| Popular Lectures..... | 27 |
| Spitalfields Day..... | 16 |

Meetings

| | |
|--|----|
| Advances in Continuous Optimization..... | 39 |
| British Combinatorial Conference..... | 39 |
| British Topology..... | 38 |
| Cauchy Problem in Kenetic Theory..... | 38 |
| Celebrating New Appointments..... | 32 |
| Clay Research Conference..... | 38 |
| Cluster Algebras and Finite Dimensional Algebras..... | 32 |
| Combinatorics Colloquia..... | 37 |
| Dynamic Days Europe..... | 21 |
| ECSTATIC..... | 33 |

| | |
|---|----|
| Geometric Rigidity..... | 36 |
| Grothendieck Memorial Conference..... | 34 |
| Integrable and Conformal Field Theories..... | 34 |
| Iwasawa 2015..... | 31 |
| LMS WIMCS - Bath Analysis Day..... | 37 |
| Model Theory, Topological Dynamics..... | 36 |
| Permutation Patterns..... | 36 |
| Postgraduate Group Theory Conference..... | 33 |
| Random Walks on Graphs and Potential Theory..... | 35 |
| Simple Groups..... | 35 |
| UKHMD..... | 33 |
| Young Functional Analysts' Workshop..... | 34 |

News

| | |
|----------------------------------|----|
| European News..... | 6 |
| IMU Media Platform..... | 14 |
| Mathematics Policy Round-up..... | 4 |

Records of Proceedings

| | |
|---|----|
| Mary Cartwright Lecture and Society Meeting..... | 19 |
|---|----|

Reports

| | |
|-------------------------------------|----|
| An Afternoon in Low-Dimensions..... | 26 |
| Complex Dynamics Meeting..... | 20 |
| Mary Cartwright Meeting..... | 18 |

Reviews

| | |
|-----------------------------|----|
| Alexandre Grothendieck..... | 44 |
| Incredible Numbers..... | 42 |
| The Newton Papers..... | 43 |

Scholarship and Funding

| | |
|------------------------|---|
| LMS Grant Schemes..... | 9 |
|------------------------|---|

Visits

| | |
|----------------------------|----|
| Farah, Ilijas..... | 30 |
| Katavolos, Aristides..... | 30 |
| Pelinovsky, Dmitry..... | 30 |
| Shemyakova, Ekaterina..... | 31 |
| Srivastava, Sachi..... | 30 |

ABEL PRIZE WINNERS 2015

The President of the Norwegian Academy of Sciences and Letters, Kirsti Strøm Bull announced on 25 March 2015 the winners of the 2015 Abel Prize – considered by many to be the ‘Nobel Prize’ for mathematics.

The annual prize, which carries a monetary award of NOK 6 million (approximately £514,000) was granted to **John F. Nash Jr** and **Louis Nirenberg** for “striking and seminal contributions to the theory of partial differential equations and its applications to geometric analysis.”

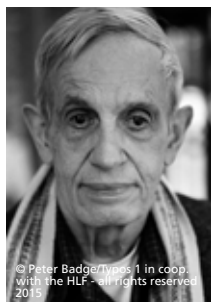
Nash and Nirenberg were described at the press conference in Oslo as ‘two mathematical giants of the twentieth century’. Explaining how they came to their decision, the Abel Committee said, “Their breakthroughs have developed into versatile and robust techniques that have become essential tools for the study of nonlinear partial differential equations. Their impact can be felt in all branches of the theory.”

“Far from being confined to the solutions of the problems for which they were devised,” the Committee added, “the results proven by Nash and Nirenberg have become very useful tools and have found tremendous applications in further contexts.”

Nash, aged 86, spent his career at Princeton University and the Massachusetts Institute of Technology. Nirenberg, aged 90, meanwhile worked at New York University’s Courant Institute of Mathematical Sciences. Despite not formally collaborating on any papers, the Academy said, they influenced each other greatly during the 1950s and, as a result, their work remains of unparalleled relevance today.

Professor Terry Lyons FRS, President of the London Mathematical Society welcomed the announcement, saying, “John Forbes Nash and Louis Nirenberg have, since the 1950s, been changing the mathematics we use to model the world around us. Both have played deep and foundational roles in developing the area known as partial differential equations – the ‘equations’ we use to model diffusive behaviour and relationships. Today this area is one of the cornerstones of modern mathematics. Translated through numerical methods, it is also one of the most significant in terms of applications. It is tremendous that they are so honoured.”

The winners will formally receive the prize from His Majesty King Harald V of Norway at a ceremony in Oslo on 19 May 2015.



Professor John F. Nash Jr



Professor Louis Nirenberg

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Charity registration number: 252660.

GENERAL MEETING

There will be a General Meeting of the London Mathematical Society on Friday 3 July 2015 at 3.30 pm, to be held at the BMA House, Tavistock Square, London WC1H 9JP. The business shall be:

- the appointment of Scrutineers
- announcement of Council's recommendation

for Election to Honorary Membership
 • announcement of LMS prize winners for 2015
 The General Meeting will be followed by a Society meeting. I hope that as many members as possible will be able to attend.

Fiona Nixon
 Executive Secretary

MATHEMATICS POLICY ROUND-UP

April 2015

RESEARCH

Nurse Review of Research Councils: Call for evidence

There has been a call for evidence and views for Sir Paul Nurse to consider as part of his independent review of the research councils. The call for evidence closed on 17 April 2015 and the Council for the Mathematical Sciences (CMS) submitted the views of its constituent bodies. The evidence will be available on both the CMS and LMS websites in due course.

EPSRC launches a science and engineering blog

A new science and engineering blog will provide debate and opinion pieces from leading thinkers on research, innovation and science funding policy.

The blog launched by the Engineering and Physical Sciences Research Council (EPSRC), will seek contributions from scientists and engineers as well as EPSRC staff. The blog can be accessed at www.epsrc.ac.uk/blog/.

REF impact case studies published

Case studies for the mathematical sciences have been published. They can be accessed at <http://tinyurl.com/nck3sea>.

REF impact case study analysis

A new analysis of impact case studies from the 2014 Research Excellence Framework (REF) shows that research carried out by the UK's universities has wide and varied benefits to

the economy, society, culture, policy, health, the environment and quality of life, within the UK and overseas. More information is available at <http://tinyurl.com/qy2wj8>.

HIGHER EDUCATION

Higher education funding

The Higher Education Funding Council for England (HEFCE) will allocate £3.97 billion to 130 universities and higher education colleges and 214 further education and sixth form colleges for the academic year 2015-16. For teaching funding £684 million has been allocated for science, technology, engineering and mathematics (STEM) and other high cost subjects. More information is available at <http://tinyurl.com/nnwewsm>.

SCHOOLS AND COLLEGES

ACME calls for views on Initial teacher education



'What do teachers need during their training to ensure they can support high-quality mathematics

learning in primary and secondary education?'

To explore this question, and the key components of initial teacher education of teachers of mathematics, the Advisory Committee on Mathematics Education (ACME) launched a discussion paper – *Initial teacher education of teachers of mathematics at primary and secondary: have your say* – in March. The deadline for submissions was 15 April 2015. More information is available at <http://tinyurl.com/pd69xcd>.

Major push for more mathematics and physics teachers

From April, fast track training and incentives to get career changers, former teachers and top graduates into mathematics and science teaching began – as part of a major push to transform teaching in these vital subjects

With more than seven million jobs in the UK expected to be in the science-based industries by 2030 and engineering enterprises already employing more than 5.4 million, the move is aimed at making sure future generations are able to compete with their international counterparts for the best job. More information is available at <http://tinyurl.com/ly32utw>.

Over half of primary school teachers say science is getting squeezed out

The CBI has revealed the obstacles that primary schools and teachers have to overcome if they are to inspire future generations of scientists and engineers.

The research shows that the majority of primary teachers believe science has become less of a curriculum priority, with over a third of schools now providing less than the recommended two hours of science education a week. More information is available at <http://tinyurl.com/k77II5t>.



OTHER

RCUK publishes first independent review of its open access policy

Research Councils UK (RCUK) has published the first independent review of the implementation of the *RCUK Policy on Open Access*.

Chaired by Professor Sir Bob Burgess, former University of Leicester Vice-Chancellor, the review received over 85 submissions of written evidence highlighting how the policy is working in practice, with many positive responses about the principle of open access

publishing. The independent review panel, made up of key experts across the disciplines in research, higher education, open access and publishing, also held oral evidence sessions with publishers and learned societies, plus visited institutions to gain a deeper understanding of the impact of the policy in practice. More information is available at www.rcuk.ac.uk/media/news/openaccess/.

Science and Innovation Strategy: Evidence House of Lords Science and Technology Committee

The Rt Hon Greg Clark MP, Minister of State for Universities, Science and Cities gave evidence to the Committee in March on the government's *Science and Innovation Strategy*. A transcript of the evidence is available at <http://tinyurl.com/o7btptp>.

Research Councils Diversity Data

RCUK published a statement of expectations on Equality and Diversity in January 2013 outlining its commitment to ensuring that the best potential researchers from a diverse population are attracted into research careers. Building on this RCUK has initiated a programme of activities which includes analysing and publishing its own diversity data. More information is available at www.rcuk.ac.uk/media/news/240315/.



Gender equality in education: OECD report

Less than one in 20 girls considers a career in science, technology, engineering or mathematics (STEM) compared to one in five boys, despite similar performances in the OECD's PISA science test.

OECD PISA surveys have shown that girls lack the same self-confidence as boys in science and mathematics and new analysis reveals striking differences in parental encouragement that exacerbate the problem.

Teachers could do more to boost the performance of both boys and girls in mathematics, a subject where boys do better in around half of participating countries. Teaching

strategies that require students to explain how they solved a mathematics problem, apply what they have learned outside of the classroom and work more independently, improve results across the board and particularly for girls.

The report also reveals that teachers consistently give better marks to girls than boys in mathematics, even when they perform similarly in the OECD PISA mathematics test. The evidence suggests this may be because girls are more attentive in class and behave better and are marked up as a result. In the long term, the report says, this will hurt rather than help girls, as employers reward people for what they know and can do more than grades at school.

The full report *The ABC of Gender Equality in Education: Aptitude, Behaviour and Confidence* is available at <http://tinyurl.com/mt8onft>.

Why are girls stepping out of STEM?



Women make up nearly half of Britain's workforce, but only one in 10 have a position in Science, Technology, Engineering and Mathematics (STEM) areas.

'With the advancement of STEM skills fundamental to the future success of UK plc, encouraging more women to pursue a career in STEM needs to be part of the solution'. More information is available at <http://tinyurl.com/ovk8dnn>.

Dr John Johnston
Joint Promotion of Mathematics

EUROPEAN NEWS

EMS Newsletter



The March 2015 edition of the European Mathematical Society Newsletter can be found online (<http://tinyurl.com/ovk8dnn>).

Three members of the editorial board ended their term of office and are replaced by new

members: Jean-Luc Dorier (Geneva), Javier Fresán (ETH, Zürich) and Vladimir L. Popov (Steklov Institute, Russia).

The *Newsletter* is introducing a *Young Mathematicians' Column*. Articles on EMS business include a summary of the EMS paper on *Open Access* and a report on the EMS Executive Committee Meeting in Barcelona in November 2014. There are calls for nominations for ten EMS Prizes as well as the Felix Klein Prize and the Otto Neugebauer Prize for

the History of Mathematics. An article by Sir Michael Atiyah on the pre-history of the EMS contributes to the celebrations of its 25th Anniversary. A feature article by Günther Ziegler (FU, Berlin) entitled *Cannons at Sparrows* entertainingly describes an assault by heavy machinery on a seemingly innocuous geometrical problem posed by R. Nandakumar and R. Ramana Rao, and another by Joan Cerdà (Universitat de Barcelona) looks at *Weierstrass and Uniform Approximation*. Luc Illusie and Michel Raynaud (Université Paris-Sud) give an outline of the revolutionary approach to algebraic geometry instigated by Alexandre Grothendieck, and there is an interview by Ulf Persson (Chalmers UT, Sweden) with the Fields Medallist Artur Avila.

Further articles on mathematics and on didactics as well as the usual book reviews and problem challenges complete the package: a good read.

David Chillingworth
LMS/EMS Correspondent



FERMAT PRIZE 2015 FOR MATHEMATICS RESEARCH

Université Toulouse III - Paul Sabatier

The FERMAT PRIZE rewards research works in fields where the contributions of Pierre de Fermat have been decisive:

- Statements of Variational Principles and Partial Differential Equations
- Foundations of Probability and Analytical Geometry
- Number theory

The spirit of the prize is focused on rewarding research results accessible to a large audience of professional mathematicians within these fields.

The amount of the Fermat prize has been fixed at 20 000 Euros. It is awarded every other year in Toulouse by the Conseil Régional Midi-Pyrénées. The fourteenth award will be announced in December 2015.

Closing date for applications to the 2015 Fermat Prize : 30 June 2015

Presentation in Toulouse and Fermat Prize award ceremony : Spring 2016

For more informations, in particular about the application formalities, please consult the Internet page

<http://www.math.univ-toulouse.fr/FermatPrize>

Alternatively, requests may be sent at

[Prix.Fermat@math.univ-toulouse.fr](mailto: Prix.Fermat@math.univ-toulouse.fr)



Winners of the former editions : A. Bahri, K.A. Ribet (1989) – J.-L. Colliot-Thélène (1991) – J.-M. Coron (1993) – A.J. Wiles (1995) – M. Talagrand (1997) – F. Bethuel, F. Hélein (1999) – R. L. Taylor, W. Werner (2001) – L. Ambrosio (2003) – P. Colmez, J.F. Le Gall (2005) – C. Khare (2007), – E. Lindenstrauss, C. Villani (2009), – M. Bhargava, I. Rodnianski (2011) – C. De Lellis, M. Hairer (2013).

CELEBRATING 150 YEARS OF THE LONDON MATHEMATICAL SOCIETY



LONDON
MATHEMATICAL
SOCIETY
150 YEARS

The following meetings and events are part of the year-long programme celebrating the 150th LMS Anniversary in 2015. Full details of the anniversary programme of activities are available on the LMS website at www.lms.ac.uk/2015.

May - June

Exhibition of LMS Members'

Correspondence from the Archives of the Royal Society

1 May - 31 July 2015, The Royal Society, London

150th Anniversary Departmental Celebration

Loughborough University, 8 May

Joint LMS-BSHM De Morgan Day

9 May, De Morgan House, London
(see page 24)

LMS-Gresham Lecture: Reidun Twarock

20 May, The Museum of London
(see page 22)

150th Anniversary Departmental Celebration

University of Manchester, 20 May

150th Anniversary Departmental Celebration

University of Leicester, 3 June

150th Anniversary Departmental Celebration

Plymouth University, 12 June

150th Anniversary Hardy Lecture Tour

Imperial College, 17 June (see page 17)

150th Anniversary Hardy Lecture Tour

University of Oxford, 18 June (see page 17)

Anniversary Dinner

18 June, Goldsmiths' Hall, City of London

150th Anniversary Hardy Lecture Tour

University of Bath, 19 June (see page 17)

150th Anniversary Departmental Celebration

University of Bath, 19 June

150th Anniversary Departmental Celebration

Oxford Brookes University, 22 June

150th Anniversary Departmental Celebration

University of Strathclyde, 22 June

150th Anniversary Departmental Celebration

University of Glasgow, 22 June

150th Anniversary Departmental Celebration

University of Lancaster, 24 June

Popular Lectures London

25 June (see page 29)

150th Anniversary Hardy Lecture Tour

University of Loughborough, 26 June
(see page 17)

150th Anniversary Hardy Lecture Tour

University of Leeds, 29 June (see page 17)

Royal Society Summer Science Exhibition

30 June – 5 July, London

July - September

150th Anniversary Hardy Lecture Tour

University of Kent, 1 July (see page 17)

150th Anniversary Departmental Celebration

University of Kent, 1 July

LMS-CMI Research School

Regularity and Analytic Methods in Combinatorics

1-5 July, University of Warwick

150th Anniversary Departmental Celebration

University of Chester, 3 July

LMS Graduate Student Meeting:

3 July, London (see page 25)

LMS Meeting & Hardy Lecture: Nalini Joshi

3 July, London (see page 28)

LMS-CMI Research School

Developments in Modern Probability

5-10 July, University of Oxford

Enhanced Midlands Regional Meeting

7-10 July, University of Warwick (see page 15)

Durham Symposium

Permutation Groups and Transformation Semigroups

20-30 July, Durham University

Durham Symposium

New Moonshines, Mock Modular Forms and

String Theory

3-12 August, Durham University
Young Researchers in Mathematics Conference

17-20 August, University of Oxford
Local Heroes Exhibition Dundee

22 August – 1 November

Local Heroes Exhibition Tenby

7 September – 23 October

LMS-CMI Research School

Diophantine Equations

15-19 September, Hay-on-Wye (see page 23)

Computer Science Colloquium

17 September, The Royal Society, London

150th Anniversary Departmental Celebration

University of Birmingham, 18 September

Joint Anniversary Mathematical Weekend Meeting with the European Mathematical Society

18-20 September, University of Birmingham
 (see page 13)

Open House

19-20 September, De Morgan House, London

Popular Lectures Birmingham

23 September (see page 27)

150th Anniversary Departmental Celebration

University of Lancaster, 30 September

October - December

Local Heroes Exhibition Carrickfergus

10-18 October

150th Anniversary Departmental Celebration

Queen Mary University, 12 October

Popular Lectures Glasgow

21 October (see page 27)

Bloomsbury Festival

22-25 October, London

Popular Lectures Leeds

11 November (see page 27)

LMS Anniversary Prize Giving

AGM and Annual Dinner

13 November, London

Mathematics Festival @ The Science Museum

24-29 November, London

Joint Meeting with the Institute of Physics and Royal Astronomical Society

28-29 November, QMUL, London

Joint Meeting with the Edinburgh Mathematical Society

10-11 December, ICMS, Edinburgh

Enhanced South West and South Wales Regional Meeting

14-17 December, University of Southampton

LMS Prospects in Mathematics

15-16 December, Loughborough

LMS GRANT SCHEMES

Next Closing Date for Research Grant Applications: 15 May 2015

Applications are invited for the following grants:

Conferences (Scheme 1)

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

Celebrating New Appointments (Scheme 1)

Grants of **up to £600** are available to provide partial support for meetings held in the United

Kingdom to celebrate the new appointment of a lecturer at a UK university.

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

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

- Applications received by **15 May 2015** will be considered at a meeting in March.
- Applications should be submitted well in advance of the date of the event for which funding is requested.
- Normally grants are not made for events which have already happened or where insufficient time has been allowed for processing of the application.

Queries regarding applications can be addressed to the Grants Administrators (see below) who will be pleased to discuss proposals informally with potential applicants and give advice on the submission of an application.

- Grants Administrators: Anthony Byrne and Elizabeth Fisher (tel: 020 7927 0807/ 020 7291 9973, email: grants@lms.ac.uk).

OTHER LMS GRANTS AND FUNDING**Research Workshop Grants**

The Society offers grants to support Research Workshops held in the UK. Requests for support (for travel and subsistence of partici-

pants, and reasonable associated costs) in the range **£1,000-£10,000** will be considered. The maximum award is **£10,000**, but a typical award is in the range of **£3,000 - £5,000**. Applications for partial support of workshops with other sources of support will be considered. Applications should normally be submitted 12 months in advance of the proposed workshop. For further information visit: www.lms.ac.uk/content/research-workshops-grants.

Young British and Russian Mathematicians Scheme

Next Deadline: 15 May 2015

Visits to Russia

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

1. A brief academic case for the visit, including a description of your current research interests, and an outline of your planned work during the visit (no more than one side of A4).
 2. A brief CV (no more than one side of A4).
 3. A brief budget.
 4. A letter of invitation from the head of the host department in Russia, which must state explicitly that your accommodation and subsistence expenses will be met by them. This should include provisional dates for the visit.
- Financial and academic reports will be required after the visit. In exceptional circumstances, applications may be considered from strong research students who are close to finishing their doctorates. Applications should include a strong case and the student should obtain a letter of recommendation from his/her supervisor.

Visits to Britain

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

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

Financial and academic reports will be required after the visit.

Further details of the Scheme can be found on the LMS website: www.lms.ac.uk/content/international-grants. Applications received by 15 May 2015 will be considered at a meeting in March. Enquiries should be made to the Grants Administrators: Anthony Byrne and Elizabeth Fisher (email: grants@lms.ac.uk).

Spitalfields Days

Next Deadline: 15 May 2015

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

Grace Chisholm Young Fellowship

Next deadline: 30 June 2015

The Society offers two fellowships of **£1,000** (consisting of £500 personal support and £500

contribution to a host institution) each year to mathematicians who need support when their mathematical career is interrupted by family responsibilities, relocation of partner, or other similar circumstance.

These fellowships, named after Grace Chisholm Young, aim to provide some support, making possible some continuous mathematical activity, so enabling the fellow to be in a position to apply for posts when circumstances allow. The Fellowship will give an endorsement of the holder's status as a mathematician, so that the break in formal employment should not prevent them from resuming a career as a mathematician at a later stage. Please see the website for further details: www.lms.ac.uk/grants/grace-chisholm-young-fellowships.

Small Grants for Education

Next Deadline: 31 August 2015

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

Teacher CPD Grants

Next Deadline: 31 August 2015

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

- a) Develop their subject knowledge.
- b) Engage in a deeper understanding of how to develop mathematical thinking
- c) Appreciate the interconnectivity of mathematical topics
- d) Update themselves on mathematics curriculum reform

e) Use technology when and where appropriate

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

Computer Science Small Grants (Scheme 7)

Next Deadline: 15 November 2015

Funding for grants **up to £500** is available to support a visit for collaborative research at the interface of Mathematics and Computer Science either by the grant holder to another institution within the UK or abroad, or by a named mathematician from within the UK or abroad to the home base of the grant holder. Please see the website for further details: www.lms.ac.uk/content/computer-science-small-grants-scheme-7.

Childcare Supplementary Grants

Next deadline: 15 May 2015

Grants of **up to £200** are available to parents working in mathematics to help with the cost of childcare when attending a conference or research meeting. The Society believes that all parents working in mathematics should be able to attend conferences and research meetings without being hindered by childcare costs. Institutions are expected to make provision for childcare costs and parents are encouraged to make enquiries. However, where this is not available, the Society administers a Childcare Supplementary Grants Scheme. Please see the website for further details: www.lms.ac.uk/content/childcare-supplementary-grants.

LMS INVITED LECTURER 2016

PROFESSOR EDGAR KNOBLOCH



LONDON
MATHEMATICAL
SOCIETY
150 YEARS

12



The London Mathematical Society is pleased to announce the LMS Invited Lecturer 2016 is Professor Edgar Knobloch (UC Berkeley).

Professor Edgar Knobloch is a Professor of Physics at the University of California, Berkeley, and a former Professor of Applied Mathematics at the University of Leeds. As an undergraduate student, he studied mathematics at the University of Cambridge (1971-1974), before going on to obtain a PhD in Astronomy from Harvard University (1978). He has written seminal papers on fluid dynamics, nonlinear dynamics and bifurcation theory, particularly equivariant bifurcation theory, and the theory pattern formation. He is a

world leader in the study of spatially localised structures in systems described by partial differential equations. He is responsible for the discovery (and the name) of the snakes-and-ladders structure of the bifurcation diagram that organises spatially localised structures in systems with non-conserved dynamics. He is a Fellow of SIAM and also a Fellow of the American Physical Society and one of the two Editors-in-Chief of *Nonlinearity*. He is also editor of SIAM *Journal on Applied Dynamical Systems*, *Journal of Nonlinear Science* and *Fluid Dynamics Research*.

Professor Knobloch will give the LMS Invited Lecture Series 2016 on *Dynamics, Patterns and Spatially Localised Structures* at Loughborough University in March 2016.

The annual Invited Lecturers scheme aims to bring a distinguished overseas mathematician to the United Kingdom to present a small course of about ten lectures spread over a week. 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.



LONDON
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SOCIETY
150 YEARS

Joint Anniversary Weekend LMS-EMS Mathematical Meeting

Birmingham, 18-20 September, 2015

To celebrate the 150th year of the London Mathematical Society (LMS) and the 25th year of the European Mathematical Society (EMS) we are organising a mathematical weekend, to be held in Birmingham from Friday 18th to Sunday 20th September 2015. All mathematicians, from Europe and elsewhere, are warmly invited to participate.

We hope to see you in Birmingham.

Plenary speakers

- Noga Alon, Tel Aviv, Princeton
- Keith Ball, Warwick
- Béla Bollobás, Cambridge, Memphis
- Timothy Gowers, Cambridge
- Stefanie Petermichl, Toulouse
- Aner Shalev, Jerusalem

Invited Special Lecture Speakers

Algebra Special Lectures

- Ben Klopsch, Düsseldorf
- Martin Liebeck, London
- Gunter Malle, Kaiserslautern
- Bob Oliver, Paris
- Cheryl Praeger, Western Australia
- Donna Testerman, Lausanne

Analysis Special Lectures

- Franck Barthe, Toulouse
- Tony Carbery, Edinburgh
- Tuomas Hytönen, Helsinki
- Sandra Pott, Lund
- Christoph Thiele, Bonn
- Luis Vega, Bilbao
- Julia Wolf, Bristol



Organising Committee

Chris Parker
Anton Evseev
Maria Reguera
Andrew Treglown

Scientific Committee

Gabriel Navarro, Valencia
Angelika Steger, Zürich
Ana Vargas, Madrid

Combinatorics Special Lectures

- Jozsef Balogh*, Illinois
- Mihyun Kang, Graz
- Michael Krivelevich, Tel Aviv
- Marc Noy, Barcelona
- Wojciech Samotij, Tel Aviv
- Mathias Schacht, Hamburg
- Benny Sudakov, Zurich

History Special Lectures

- Niccolò Guicciardini, Bergamo

To register, please visit web.mat.bham.ac.uk/emslmsweekend/spkrs.html

IMU MEDIA PLATFORM

The International Mathematical Union (IMU) is now providing a Media Platform, see www.mathunion.org/Publications/historic-material/. This project is aimed at setting up a collection of photographs relevant for IMU and the mathematics community at large. The IMU is providing the platform for use by members who all have free access to upload, search and download photographs. Registration is free and open to all. Uploaded photos are screened prior to publication.

The regulations governing the use of the

platform and the instructions on how to use it are contained in the Terms and Conditions of Use for the Platform: <http://tinyurl.com/ln4ko8a> as well as the Licence Agreement between Right Holders and Users: <http://tinyurl.com/mgtg4l2>.

The IMU invites you to contribute to this photo collection. Become a member of the IMU Media Platform and share photos that you think are of interest to the mathematical community. Advertise the IMU Media Platform to your colleagues.



LONDON
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150 YEARS

SPITALFIELDS DAY

Call for proposals

The London Mathematical Society is pleased to offer grants of **up to £1,000** 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 £1,000 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 **15 May 2015**. (Subsequent deadlines are 15 September 2015 and 31 January 2016. Please note the Society cannot fund events retrospectively so applicants are advised to apply well in advance of the event).

LMS SPITALFIELDS DAY 2015

In 2015, the LMS Programme Committee will support the following Spitalfields Day:

Mathematics of Quantum Uncertainty: New Advances and Prospects, University of York; 29 May 2015 (see page 16).

LMS SPITALFIELDS DAY 2014

In 2014, the LMS Programme Committee supported the following Spitalfields Day:

Theory of Water Waves, INI, University of Cambridge



LMS 150th Anniversary

Midlands Regional Meeting

University of Warwick

Schedule

- Opening of the meeting
- R. Guralnick (Los Angeles)
Title (tbc)
- C. Roney-Dougall (St Andrews)
Title (tbc)
- Tea/Coffee
- Poster Session
- Wine Reception and Dinner

**7th July
2015**

15

These lectures are aimed at a general mathematical audience. All interested, whether LMS members or not, are most welcome to attend this event. For further details and to register and to reserve a place at the dinner, please visit www2.warwick.ac.uk/fac/sci/math/research/events/2014-15/nonsymposium/lmsreg/

The cost of the dinner is to be confirmed, but will include drinks.

The meeting forms part of a workshop on Finite Simple Groups and Related Topics from 8-10 July 2015. For further details visit www2.warwick.ac.uk/fac/sci/math/research/events/2014-15/nonsymposium/lmsreg/ or contact the organiser, Inna Capdeboscq.

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.

THE UNIVERSITY of York

LONDON
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150 YEARS

LMS 150th Anniversary

Spitalfields Day

29 May
2015

Mathematics of Quantum Uncertainty: New Advances and Prospects

University of York, Exhibition Centre, Room P/L/002

Pekka Lahti (Turku, Finland)

Quantum Incompatibility

Reinhard Werner (Hannover, Germany)

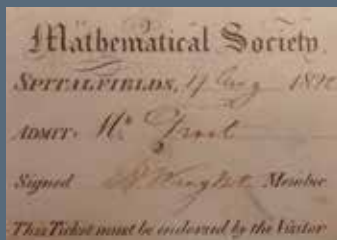
Measurement Uncertainty Relations

Madalin Guta (Nottingham)

Spectral thresholding quantum tomography for low rank states

Paul Busch (York)

Quantum Measurement Uncertainty – A simple demonstration



This one-day Symposium will offer a set of survey lectures on quantum uncertainty that is accessible to a broad, mathematically-minded audience to review the latest developments and outline possible applications. The uncertainty principle is a cornerstone of one of the fundamental theories of modern physics: quantum mechanics. The Symposium focuses on an important aspect of the principle: Heisenberg's famous error-disturbance relation. The framework of operational quantum theory, now routinely used in quantum information theory, provides the basis for novel forms of measurement uncertainty relations that are open to experimental testing and may be expected to inform ultimate quantum bounds for applications in quantum metrology and quantum control.

All interested are most welcome to attend this event. For further details and to register, email the organiser Paul Busch (paul.busch@york.ac.uk). There are some funds available to contribute in part to the expenses of members of the Society or research students to attend the day. Requests for support, including an estimate of expenses, may be addressed to the organiser.

The London Mathematical Society believes that it is important for recent developments in specialist topics to be made known to the general mathematical community, and in particular to research students. It therefore provides funds to the organisers of these meetings so that they can provide a day of survey lectures, accessible to a general mathematical audience. These days are called Spitalfields Days, in honour of the Spitalfields Mathematical Society: a precursor of the London Mathematical Society which flourished from 1717 to 1845.

The Spitalfields Day is the first part of the two-day event 'Quantum Uncertainty Days @ York'. The second part is a more specialised workshop on Saturday 30 May. Places on this workshop are limited. For enquiries please contact the organiser. Further information is available at <http://maths.york.ac.uk/www/node/14875>.

London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS.
Tel +44 (0)20 76373686; Fax +44 (0)20 7323 3655; Email: lms@lms.ac.uk; Web: www.lms.ac.uk; Registered charity no. 252660



LONDON
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150 YEARS

LMS 150th Anniversary

Hardy Fellow

The Society is pleased to announce **Professor Nalini Joshi (Sydney)** as the 2015 Hardy Fellow.



In celebration of the 150th Anniversary, the LMS is hosting a special Hardy Fellowship in 2015. The Fellowship was founded in 1967 in memory of G.H. Hardy in recognition of outstanding contribution to both mathematics and to the Society. The Hardy Fellowship is a lecture tour of the UK by a mathematician with a high reputation in research.

17

Nalini Joshi will visit the UK in June and July 2015 and she will give talks at:

Imperial

17 June

Organiser:

John Gibbons

Oxford

18 June

Organiser:

Lionel Mason

Bath

19 June

Organiser:

Antal Jaraí

Glasgow

22 June

Organiser:

Jon Nimmo and
Claire Gilson

Lancaster

24 June

Organiser:

Alexander Belton

Loughborough

26 June

Organiser:

Marta Mazzocco

Leeds

29 June

Organiser:

Frank Nijhoff

Kent

1 July

Organiser:

Peter Clarkson

London

3 July

Organiser:

LMS

For further information on attending each lecture, please contact the local organisers.

For general enquiries about the Hardy Lectures, please contact Elizabeth Fisher

lmsmeetings@lms.ac.uk

MARY CARTWRIGHT LECTURE AND SOCIETY MEETING 2015

Report

The Mary Cartwright Lecture is one of the annual events in the calendar of the London Mathematical Society and celebrates the important role of female mathematicians. It was established in 2000 and named after the distinguished British mathematician Dame Mary Lucy Cartwright, FRS. Unlike for other LMS lectures, the selection of the Mary Cartwright Lecturer is in the hands of the Women in Mathematics Committee.

This year's lecture was the 15th in the series, which aligns nicely with the 150th anniversary of the LMS, and took place at De Morgan House in London on Friday 27 February. The 2015 Mary Cartwright Lecturer was Maria J. Esteban, Research Director at CNRS, working at CEREMADE of Université Paris-Dauphine. Her main research areas are nonlinear partial differential equations, variational methods and mathematical and numerical methods in quantum mechanics and quantum chemistry. She also takes a keen interest in research policy and is currently President Elect of the International Council for Industrial and Applied Mathematics, to serve as President between 2015 and 2019. For her public service she was appointed Knight of the National Order of Merit by the President of the French

Republic in 2012. She is also on this year's Abel Prize committee.

The meeting itself was opened by the LMS President Professor Terry Lyons, who quickly pursued the usual LMS agenda items



Mathieu Lewin

such as election of new members. We also witnessed one of those newly elected signing the Membership Book. This was followed by the opening lecture given by Mathieu Lewin, a colleague of Maria Esteban at CEREMADE. The topic of his lecture was Bose-Einstein condensation, which is a state of matter of a gas of bosons that appears when the gas is cooled to temperatures close to absolute zero and the interactions among the particles are very weak. This is a purely quantum level feature which cannot be explained by classical Hamiltonian dynamics. The properties of Bose-Einstein condensation have been studied for some time now, but Mathieu's contribution is in the research into mathematical models which would successfully explain why Bose-Einstein condensation actually appears.

After a refreshing cup of tea it was time for Maria Esteban's talk entitled *Eigenvalue problems in relativistic quantum mechanics, theory and applications*. Her starting point was an abstract theorem in functional analysis which gives a min-max characterization of the eigenvalues in a gap of the essential spectrum of a self-adjoint unbounded operator on a Hilbert space. She then went on to explain how to use this theorem to construct robust algorithms for computations in relativistic quantum mechanics and chemistry or to derive



Maria Esteban

a relativistic version of Hardy's inequality. The philosophy of the talk was to illustrate how an abstract mathematical result can prove extremely useful in solving concrete problems of more applied sciences. Indeed her work has not only been published in mathematical journals, but also in leading physics and chemistry periodicals.

Both speakers initiated a lively discussion among the participants during the wine reception following the lectures. This was enriched by the suspiciously looking yet delicious canapés served with the wine by the friendly staff at De Morgan House.

Oldřich Spáčil
University College London

RECORDS OF PROCEEDINGS AT LMS MEETINGS

MARY CARTWRIGHT LECTURE AND SOCIETY MEETING

held on 27 February 2015 at De Morgan House, Russell Square, London. Over 40 members and visitors were present for all or part of the meeting.

The meeting began at 3.30 pm with The President, Professor Terry Lyons FRS, in the Chair.

Thirty-one members were elected to Ordinary membership: Delbrin Ahmed, Tahnai Al-Karkhi, Isaac Ben-Akiva, Amitava Bhattacharya, Paul Blake, Richard Boys, Yves Capdeboscq, Mohamed Chahi, Paul Deane, Mamoni Dhar, Anthony Dooley, Nadav Drukker, Eleni Efstathiou, Julia Goedecke, Joseph Grant, Benoit Huard, Muzaffar Hussain, Bashiru Kehinde, Evgeny Khukhro, Dmitry Korshunov, Daniel Kral, Ian MacDonald, Justin McInroy, Yuri Netrusov, Mohamed Tarek Hussein Mohamed Ouda, Andrea Prinsloo, Kusumlata Rajak, Sakura Schafer-Nameki, Marco Schlichting, David Solomon, John Williamson.

Twenty-one members were elected to Associate membership: Ghaliyah Alhamzi, Lawrence Barrott, Jack Culbert, Courtney Hall, Hamza Hawa, Habeebat Ibraheem, Fatimah Kamankesh, Joseph Karmazyn, Thomas Kecker, Sidhant Law, Stephen Nand-Lal, Olajide Taiwo Ross, Ilitsa Roustemoglou, David Seifert, Sidra Shuja, Oldrich Spacil, Liron Speyer, Sascha Troscheit, Ioannis Tsartsafis, Ruari Walker, Christopher White.

Five members were elected to Reciprocity membership: Ralph Lazarus, Haruhisa Nakajima, Manish Sharma, Mark Sepulveda, A Th.

One member signed the book and was admitted to the Society.

Professor Gwyenth Stallard introduced a lecture given by Professor Mathieu Lewin on *Bose-Einstein condensation: history, model and recent mathematical results*.

After tea, Professor Stallard introduced the Mary Cartwright Lecture given by Professor Maria Esteban on *Eigenvalue problems in relativistic quantum mechanics, theory and applications*.

The President, Professor Lyons, expressed the thanks of the Society to the Women in Mathematics Committee for putting on a successful meeting.

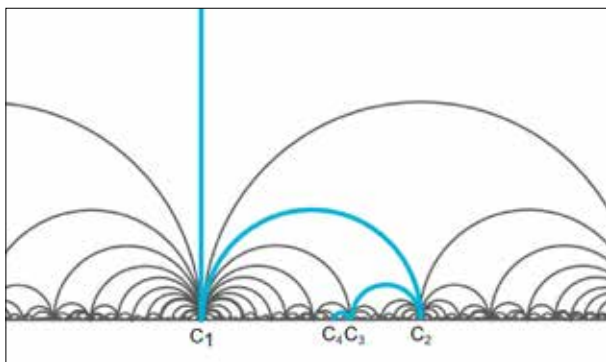
Afterwards, a reception was held at De Morgan House, followed by dinner hosted at the Ambassadors Bloomsbury Hotel.

COMPLEX DYNAMICS POSTGRADUATE CONFERENCE

Report

The *Postgraduate Conference in Complex Dynamics* (PCCD15) was held at De Morgan House, London, from 13 to 15 March 2015. It brought together PhD students and postdoctoral researchers from Europe who had the opportunity to present and discuss their projects as well as talk about new research approaches and methods. There were over 30 participants from several different countries, mainly UK, Germany and France.

The programme consisted of five sessions each of them with a keynote lecture and three student talks. Our invited speakers were world experts from five universities in the UK which undertake research in this area: Adam Epstein (Warwick), Dan Nicks (Nottingham), Mary Rees, FR5 (Liverpool), Gwyneth Stallard, OBE (Open) and Sebastian van Strien (Imperial). We encouraged all the participants to present their research giving a short talk. The sessions were chaired by researchers



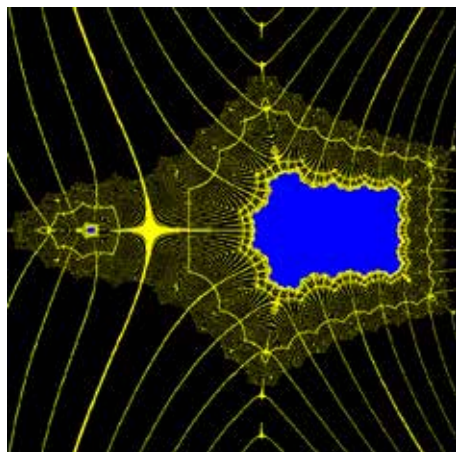
Paths in the Farey Graph from Mairi Walker's talk

from The Open University: Matthew Jacques, John Osborne, Mairi Walker and we, the organisers Vasiliki Evdoridou and David Martí-Pete.

The talks covered a wide range of topics in complex dynamics: transcendental dynamics, rational dynamics, quasiregular maps and functions of several complex variables, and also hyperbolic geometry and Kleinian groups.

A group visit to the Science Museum was organised for Friday afternoon.

More information may be found on the website www.maths.open.ac.uk/pccd15 which also contains the slides of the talks.



Spider's Web from Gwyneth Stallard's talk



The organisers Vasiliki Evdoridou and David Martí-Pete



Attendees at the Postgraduate Conference in Complex Dynamics at De Morgan House

We thank the London Mathematical Society and The Open University for funding our conference and De Morgan House for providing a very friendly environment. We also want to thank our supervisors Phil Rippon and

Gwyneth Stallard for their support, and all the participants without whom this conference would not have been possible.

Vasiliki Evdoridou and David Marti-Pete
The Open University

DYNAMICS DAYS EUROPE

Dynamics Days Europe will take place from 6 to 10 September 2015 at the University of Exeter. This is a major international research conference in applied mathematics with a focus on nonlinear dynamics and applications in science and technology. It is an interdisciplinary forum that brings mathematicians together with scientists from biology, chemistry, physics, and engineering to work on all areas of dynamical systems, from mathematical foundations to perspectives in modeling, applications, and experiment. This allows for an exchange of ideas between researchers in different fields under nonlinear dynamics as a common umbrella. The programme will include plenary talks, minisymposia, contributed talks, and posters. Minisymposia are sessions that center around a specific topic or theme.

In contrast to previous *Dynamics Days* conferences, the aim is to make the mathematical aspects of dynamical systems theory a key focus area of the conference. Plenary talks on hyperbolic dynamical systems and partial

differential equations are scheduled. Invited speakers include:

- Sandra Chapman (University of Warwick)
- Michel Crucifix (UC Louvain)
- Blas Echebarria (UPC Barcelona)
- Michael Field (Rice University & Imperial College)
- Suzanne Fielding (Durham University)
- Björn Hof (IST Austria)
- Barbara Niethammer (Universität Bonn)
- Alberto Pinto (INESC, Portugal)
- Marc Timme (MPI Göttingen)

Deadlines: 17 May - first deadline for abstract submission; 17 May - travel support applications; 31 May - early registration.

The conference is supported by an LMS Conference grant. Due to this support the organisers will be able to offer travel bursaries for early career researchers and researchers without their own funding in particular for mathematicians from the United Kingdom. For more details visit the conference homepage at <http://ex.ac.uk/dd2015>.



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THE LONDON MATHEMATICAL SOCIETY
JOINTLY WITH GRESHAM COLLEGE

Wednesday, 20 May 2015

6:00pm at The Museum of London

*Geometry: A New Weapon in the
Fight Against Viruses*

Professor Reidun Twarock

University of York

Viruses like the common cold look like tiny footballs and mathematics can therefore help to understand how they form and evolve. Our highly interdisciplinary approach in understanding and combating viruses, in which mathematics plays a key role, provides surprising new avenues in our fight against viral disease.

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



Heilbronn Institute for
Mathematical Research



LONDON
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130 YEARS

DIOPHANTINE EQUATIONS

LMS-CMI Research School

Baskerville Hall, Hay-on-Wye

15-19 September 2015

Organisers: Tim Dokchitser (Bristol), Vladimir Dokchitser (Warwick)

The course will give an overview of the existing methods for investigating integer and rational solutions to Diophantine equations. It will include both the algebraic, analytic and model theory aspects of the subject. The course will take the format of three 6-hour mini-courses, supported by exercise classes. The three mini-courses are:

1. Rational Points.

A. Rational points on curves. **Michael Stoll (Bremen)**

B. Higher-dimensional varieties. **Alexei Skorobogatov (Imperial)**

2. Integral Points.

A. Basic methods and solubility. **Jennifer Park (McGill)**

B. Analytic methods. **Trevor Wooley (Bristol)**

3. Elliptic and Modular Curves.

A. Elliptic curves. **Tim and Vladimir Dokchitser**

B. Modularity. **Andrew Granville (Montreal/UCL)**

For further information please visit: www.maths.bris.ac.uk/~matyd/DE/

Applications

Applications should be made using the registration form available via the Society's website at: www.surveymonkey.com/s/RYPBY5 and applicants should have a letter of support sent to the organisers at DiophantusBaskerville@gmail.com. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **15 June 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 and early career researchers will be charged a registration fee of **£150**. 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 (£250), **£500** 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 15 August 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.

| *b s h m* |

LONDON
MATHEMATICAL
SOCIETY
150 YEARS

LMS 150th Anniversary

BSHM-LMS De Morgan Day

De Morgan House, Russell Square, London
(nearest tube: Russell Square)

9 May
2015

Programme

- 10.00 Arrival and Coffee
10.30 Society Meeting
Adrian Rice, *An Introduction to the Life and Work of Augustus De Morgan*
11.30 Chris Hollings, *A Batch of Observations & Enquiries: The Correspondence of Ada Lovelace and Augustus De Morgan*
12.00 Sloan Despeaux, *Augustus De Morgan's 'Budget of Paradoxes'*
1.00 Lunch
2.00 John Heard, *Augustus De Morgan and the Early History of the London Mathematical Society*
3.00 Ian Stewart, *Augustus De Morgan and George Boole*
4.00 Tea
4.30 Wilfrid Hodges, *The Influence of Augustus De Morgan*
5.30 Reception
7.00 Dinner (venue tbc)



Registration: To register contact Elizabeth Fisher (lmsmeetings@lms.ac.uk) by Friday 1st May. Late registrations for places may still be accepted, subject to availability. The reception will be followed by a dinner at venue tbc, at a cost tbc per person, inclusive of wine. If you would like to attend the dinner, please contact Elizabeth Fisher by Friday 1st May. 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 Elizabeth Fisher for further information.

The London Mathematical Society is the UK's learned society for mathematics. Founded in 1865 for the promotion and extension of mathematical knowledge, the Society has a membership of over 2500 drawn from all parts of the UK and overseas. London Mathematical Society, De Morgan House, 57-58 Russell Square, London, WC1B 4HS. +44 (0)20 7637 3686. www.lms.ac.uk. Registered Charity No. 252660.



LONDON
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150 YEARS

LMS 150th Anniversary Graduate Student Meeting

3 July
2015

BMA House, Tavistock Square, London, WC1H 9JP

Preliminary Programme

| | |
|-------|---|
| 10.00 | Coffee and Registration |
| 10.30 | First Speaker |
| 11.30 | Coffee/Tea |
| 11.45 | Graduate student talks |
| 13.15 | Lunch |
| 13.55 | Award prizes |
| 14.00 | Second Speaker |
| 15.00 | Close of Meeting |
| 15.30 | LMS Society Meeting and Hardy Lecture (see below) |

This meeting is intended as an introduction to the Society Meeting later in the day. All graduate students (and indeed any other mathematicians) will be very welcome.



Registration

To register, please email Elizabeth Fisher (lmsmeetings@lms.ac.uk) by email by 18 June. Places are free and all refreshments including lunch will be provided.

Student Talks

Students are invited to give short talks (15 minutes) aimed at a general mathematical audience. Prizes will be awarded for the best two talks. If you would like to give a talk, please email Rod Halburd (r.halburd@ucl.ac.uk) by 1 June.

Funding for Travel and Accommodation

For students who attend both the Graduate Student Meeting and the LMS General Meeting, the Society can offer funding of up to £50 towards travel costs and funding of up to £50 towards travel costs and funding of up to £50 towards accommodation costs (for those travelling long distances).

LMS Society Meeting and Hardy Lecture

The LMS Society Meeting is open to all. Marta Mazzocco (Loughborough) will give the first lecture and Nalini Joshi (Sydney) will give the 150th Anniversary Hardy Lecture. The meeting will also be held at BMA House, and after the Society Meeting there will be a reception at De Morgan House (57-58 Russell Square). For further details see: <http://www.lms.ac.uk/content/society-meetings>

AN AFTERNOON IN LOW-DIMENSIONS

Report

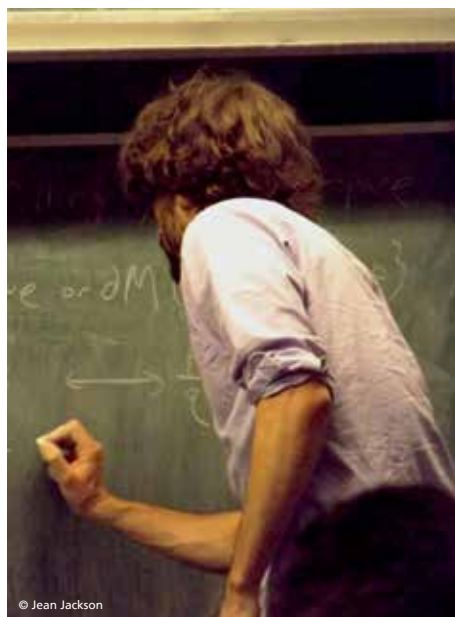
This was an afternoon meeting that was organized around an LMS “celebrating new appointments” grant. It took place on 20 March 2015 at the University of Glasgow. As described on the meeting’s homepage (<http://tinyurl.com/le6bns7>) the aim of the workshop was to study some aspects of low-dimensional topology, through the lens of invariants like Khovanov homology and Heegaard Floer theory. The intention was to focus on context and background, and place emphasis on postgraduate participation.

The speakers were Jonathan Hanselman (UT Austin), Jake Rasmussen (Cambridge) and Liam Watson (Glasgow).

In keeping with the LMS grant’s theme, Watson’s lecture gave an overview of the subject and presented some open problems and conjectures related to homology theories in low-dimensions. This centered

on a conjectural relationship between Heegaard Floer homology and the fundamental group by way of left-orderable groups. In particular, three notions of *simplicity* were introduced and their relationships discussed: Non-left-orderable groups; homologically thin knots; and Heegaard Floer homology lens spaces (known as *L-spaces*).

Hanselman’s lecture built on this introductory material, presenting joint work-in-progress with Watson on the conjectural equivalence between L-spaces and manifolds with non-left-orderable fundamental group in the case of graph manifolds. This appeals to a version of Heegaard Floer homology for manifolds with boundary called bordered Floer homology. Hanselman introduced the algebraic aspects of the machinery, as well as the basics of the *loop calculus*, which is



Jonathan Hanselman



Brendan Owens and Spiros Adams-Florou discussing during the coffee break

essential in proving the main results.

Finally, Rasmussen's lecture concluded the meeting by revisiting knot invariants and their categorifications. The basics of the Alexander, Jones, and HOMFLY polynomials were reviewed, with emphasis on the representation theoretic definitions. Using this, Rasmussen derived formulas for each of these polynomial invariants under twisting. These formulas point to behavior that one might expect for the related homology theories that categorify these invariants. In the case of Khovanov homology, for example, this behavior has yet to be fully understood. Rasmussen discussed what is known and what some of the open problems are, part of a joint project with Gorsky, Oblomkov, and Shende.

In all, the meeting gave a snapshot of

the state of the art in the field. There were approximately 40 participants from Aberdeen, Cambridge, Durham, Edinburgh, Glasgow, Heriot-Watt, Imperial and Oxford. Postgraduates from each of these institutions participated and represented nearly half of the audience. This seems to point to a healthy level of activity in the UK within this exciting field.

Additional funds for this meeting from the European Commission (CIG HFFUNDGRP), the Glasgow Mathematical Journal Trust, and the School of Mathematics and Statistics at the University of Glasgow are gratefully acknowledged. The hard work by the School of Mathematics

and Statistics support staff was an essential component to the success of this meeting.

Liam Watson
University of Glasgow



LMS 150TH ANNIVERSARY POPULAR LECTURES 2015

The London Mathematical Society Popular Lectures present exciting topics in mathematics (and its applications) to a wide audience. As a part of the celebrations to mark the LMS 150th anniversary there will be four popular lectures held this year rather than the normal two. Full details and abstracts for the talks are available on the LMS website at www.lms.ac.uk/events/popular-lectures.

For 2015, the popular lecturers are **Martin Hairer, FRS** (University of Warwick), **Ben Green, FRS** (University of Oxford), **Hannah**

Fry (UCL) and **Ruth King** (University of St Andrews). Popular Lectures will take place in:

- London on 25 June
- Birmingham on 23 September
- Glasgow on 21 October
- Leeds on 11 November.

Each venue will host two of the speakers. The Popular Lectures have proved to be a very successful series and we hope that as many members as possible will be able to attend in 2015.



LONDON
MATHEMATICAL
SOCIETY
150 YEARS



LONDON
MATHEMATICAL
SOCIETY
150 YEARS

LMS 150th Anniversary Society Meeting and Hardy Lecture

3rd July
2015

3:30pm

BMA House, Tavistock Square, London (nearest tube: Euston)

Schedule

- 3.30 Opening of the meeting and LMS business,
including the announcement of the 2015
Prize winners (open to all)

Marta Mazzocco (Loughborough)

Title to be confirmed

- 4.45 Tea/Coffee

- 5.15 **Nalini Joshi (Sydney) – 150th
Anniversary Hardy Lecturer**

Title to be confirmed

- 6.30 Reception at De Morgan House

- 7.30 Society Dinner



These lectures are aimed at a general mathematical audience. All interested, whether LMS members or not, are most welcome to attend this event.

To register for your place at the meeting, please email Elizabeth Fisher (lmsmeetings@lms.ac.uk). If you would like to attend the Society Dinner, please email Elizabeth Fisher (lmsmeetings@lms.ac.uk).

The cost to attend the Society Dinner is £35.00 per person (inclusive of wine).



LONDON
MATHEMATICAL
SOCIETY
150 YEARS

Popular Lectures 2015

Institute Of Education, London – Logan Hall

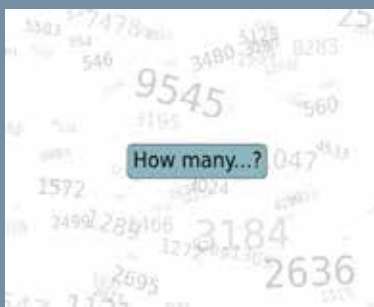
25th June

7:00pm

Dr Ruth King
University of St Andrews

How many...?

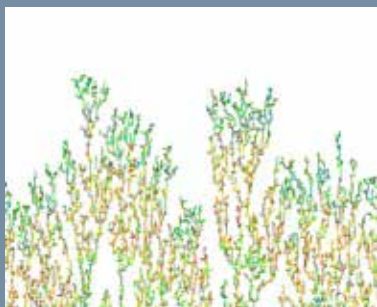
This talk will discuss how we may be able to provide an answer to the question of “How many...?” when we cannot count the population of interest.



Professor Martin Hairer, FRS
University of Warwick

The mathematics of randomness

From the gambling machines in a Casino to the predictions of next week's weather, the world that surrounds us is governed by seemingly random events. How do mathematicians make sense of this and what does it even mean to "predict" something inherently random?



Lectures commence at 7.00 pm, refreshments at 8.00 pm, ends at 9.30pm. Abstracts for the lectures are at www.lms.ac.uk/events/popular-lectures.

Admission is free, with ticket. Register by Thursday 18 June. To register for tickets, please register online at www.lms.ac.uk/civicrm/event/info?reset=1&id=4.

VISIT OF SACHI SRIVASTAVA

Dr Sachi Srivastava (University of Delhi, India) will be visiting the UK from 8 June to 6 July 2015. Dr Srivastava's research expertise includes operator theory with applications to PDEs and quantum dynamical semigroups. She will give research presentations at:

- Newcastle University, 9 June (contact Evgenios Kakariadis: Evgenios.Kakariadis@newcastle.ac.uk)
- University of Lancaster, 12 June at 3.00 pm (contact Garth Dales: g.dales@lancaster.ac.uk)
- University of Leeds, 16 June (contact Charles Read: C.J.Read@leeds.ac.uk)
- University of Oxford, 18 June at 5.00 pm (contact Charles Batty: charles.batty@sjc.ox.ac.uk)

Dr Srivastava's host from 17 June to 7 July will be Charles Batty. The visit is supported by an LMS Scheme 2 grant.

VISIT OF ILIJAS FARAH

Professor Ilijas Farah (York University, Toronto) will be visiting the UK from 22 June to 3 July 2015. He is a set-theorist by training, who has become a pioneer in applications of set theory to functional analysis. By bringing techniques and ideas from logic, he has settled a number of long-standing open questions in operator algebras. During his visit, Professor Farah will lecture at:

- University of Aberdeen, North British Functional Analysis Seminar, 23 June (two lectures) (contact Aaron Tikuisis: a.tikuisis@abdn.ac.uk)
- University of Glasgow, 30 June (contact Joachim Zacharias: joachim.zacharias@glasgow.ac.uk)
- Lancaster University, 1 July (contact Yemon Choi: y.choi1@lancaster.ac.uk)

For further details contact Aaron Tikuisis (a.tikuisis@abdn.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF ARISTIDES KATAVOLOS

Professor Aristides Katavolos (University of Athens) will be visiting the UK from 31 May to 12 June 2015. Professor Katavolos works on the interface between Harmonic Analysis and Operator Algebra Theory. This activity is part of an ongoing programme on the interplay between group/semigroup actions, creation operators and operator algebras. During his visit he will lecture at:

- Department of Mathematics and Statistics, Lancaster University, during 31 May - 4 June (contact Steve Power: s.power@lancaster.ac.uk)
- School of Mathematics and Statistics, Newcastle University, during 4-8 June (contact Evgenios Kakariadis: evgenios.kakariadis@ncl.ac.uk)
- Pure Mathematics Research Centre, Queen's University Belfast, during 8-12 June (contact Ivan Todorov: i.todorov@qub.ac.uk)

For further details contact Evgenios Kakariadis (evgenios.kakariadis@ncl.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF DMITRY PELINOVSKY

Professor Dmitry Pelinovsky (McMaster University, Canada) will visit University College London and the universities of Reading and Bath and Imperial College London from 25 May to 8 June 2015. Professor Pelinovsky has made significant contributions to the theory of nonlinear partial differential equations and discrete dynamical systems, with applications to nonlinear waves in fluids, lattices, and atomic gases. His most important results to date include justification of amplitude equations in periodic potentials and lattices, stability of nonlinear waves in Hamiltonian dynamical systems, and analysis of bifurcations of travelling waves. During his visit, he will give the following presentations:

- University College London, 26 May
Properties of reduced Ostrovsky and short-pulse equations
- University of Reading, 2 June
Propagation of Gaussian solitary waves in granular chains with Hertzian interactions
- University of Bath, 4 June
Orbital stability of Dirac solitons in the massive Thirring model

For further details please contact Ted Johnson (e.johnson@ucl.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF EKATERINA SHEMYAKOVA

Professor Ekaterina Shemyakova (SUNY New Paltz, New York, USA) will be visiting the UK the second half of May and early June 2015. Her research concerns integrable systems, differential geometry, algebra and computational mathematics. During her visit, Professor Shemyakova will give talks at:

- University of Glasgow, Integrable Systems and Mathematical Physics Seminar, Friday 22 May at 3 pm, *Invertible Darboux transformations and analogs of Laplace transformations*
(contact Jonathan Nimmo: Jonathan.Nimmo@glasgow.ac.uk)
- University of Manchester, Manchester Geometry Seminar, Monday 18 May at 3 pm, *Darboux transformations for supersymmetric operators*
(contact Theodore Voronov: theodore.voronov@manchester.ac.uk)
- Loughborough University, Mathematical Physics Seminar, Wednesday 27 May at 4 pm, *New type of Darboux transformations*
(contact Alexander Veselov: A.P.Veselov@lboro.ac.uk)

For further details contact Theodore Voronov (theodore.voronov@manchester.ac.uk). The visit is supported in part by an LMS Scheme 2 grant.

IWASAWA 2015

Iwasawa 2015 is to be held on 13 July 2015, in conjunction with an EPSRC funded workshop on *Computations in Non-Commutative Iwasawa Theory*, being held from Monday 13 to Friday 17 July 2015 at King's College London.

Iwasawa 2015 is the sixth conference in the series following conferences in Besancon, Limoges, Irsee, Toronto and Heidelberg. The meeting aims to bring together different strands of research in and closely related to the area of Iwasawa theory. Speakers for the conference include:

- Ashay Burungale (UCLA)
- Ted Chinburg (UPenn)
- Henri Darmon (McGill)
- Samit Dasgupta (UCSC)
- Mladen Dimitrov (Lille)
- Tim Dokchitser (Bristol)
- Olivier Fouquet (Orsay)
- Michael Harris (Paris and Columbia)
- Ming-Lun Hsieh (NTU, Taipei)

- Dohyeong Kim (IBS-CGP)
- Guido Kings (Regensburg)
- Andreas Nickel (Bielefeld)
- Raghuram (IISER, Pune)
- Takamichi Sano (Keio)
- Chris Skinner (Princeton)
- Ki-Seng Tan (NTU, Taipei)
- Eric Urban (Columbia)
- Otmar Venjakob (Heidelberg)

The scientific committee for *Iwasawa 2015* consists of John Coates (Cambridge), Ralph Greenberg (Washington), Cornelius Greither (München), Masato Kurihara (Keio), Thong Nguyen Quang Do (Besancon).

There is a registration fee of £50 (£10 per day). Funds are available to contribute to the expenses of research students based in the UK to attend the conference.

For further details see the website <http://tinyurl.com/o7ytryl> or contact one of the organisers at david.burns@kcl.ac.uk or mahesh.kakde@kcl.ac.uk. The meeting is supported by an LMS Conference grant and EPSRC.

CELEBRATING NEW APPOINTMENTS IN MATHEMATICS AT THE UNIVERSITY OF SOUTH WALES

This two day event will take place on 23 and 30 June 2015 at the University of South Wales. It will consist of four sessions of talks, each hosted by a new lecturer. The sessions will cover Combinatorics, Cryptography & Information Security, Numerical Modelling of the Atmosphere, Operational Research, and Group Theory, and will include invited mathematicians in their research areas.

The purpose of this event is to bring together people working in these new areas of research at the University of South Wales. This will provide an opportunity to strengthen research networks in these areas, leading to collaborations within mathematics at the University of South Wales and in the wider research community.

Tuesday 23 June

Session 1 Combinatorics, Cryptography & Information Security

- Sian-Kathryn Jones (University of South Wales)
- Hannah Davies (University of South Wales)
- Derek Smith (Emeritus Professor, University of South Wales)

Session 2 Numerically Modelling the Atmosphere

- James Kent (University of South Wales)
- John Thuburn (University of Exeter)
- Ayoe Buus Hansen (NIWA, New Zealand)

Tuesday 30 June

Session 3 Operational Research

- Penny Holborn (University of South Wales)
- Rhod Lewis (Cardiff University)
- Izabela Komenda (Aneurin Bevan University Health Board)

Session 4 Group Theory

- Nick Gill (University of South Wales)

- Ian Short (Open University)
- John Britnell (Imperial)

There is no registration fee, but please register your attendance or obtain any further details by contacting Nick Gill (Nicholas.Gill@southwales.ac.uk).

The meeting is supported by an LMS Conference grant celebrating new appointments and the University of South Wales.

CLUSTER ALGEBRAS AND FINITE DIMENSIONAL ALGEBRAS

A workshop on *Cluster Algebras and Finite Dimensional Algebras* will be held at the University of Leicester from Wednesday 3 to Friday 5 June 2015. Since their inception in 2002 cluster algebras have given rise to new developments in many different areas. One such area is the representation theory of finite dimensional algebras. The focus of this workshop is on the representation theoretic aspects of cluster algebras and more particularly, it will concentrate on the many newly emerging finite dimensional algebras related to cluster algebras such as cluster-tilted algebras, Jacobian algebras, dimer algebras and Brauer graph algebras. Speakers include:

- Claire Amiot (Grenoble)
- Karin Baur (Graz)
- Peter Jorgensen (Newcastle)
- Martin Kalck (Edinburgh)
- Alastair King (Bath)
- Philipp Lampe (Bielefeld)
- Robert Marsh (Leeds)
- David Pauksztello (Manchester)
- Ralf Schiffler (Connecticut)
- Yu Zhou (Trondheim)

The organizers have limited support for young researchers (in particular for UK based research students). For more information visit the website <http://tinyurl.com/ok88ow2> or contact the organizers Ilke Canakci (ic74@le.ac.uk) and Sibylle Schroll (schroll@le.ac.uk). The workshop is supported by an LMS Conference grant, the EPSRC network grant REPNET and the University of Leicester.

GROUP THEORY POSTGRADUATE CONFERENCE

The 17th annual *Postgraduate Group Theory Conference* (PGTC) will take place at the University of Bristol from Tuesday 30 June to Friday 3 July 2015. The PGTC is an annual student-organised conference to bring together postgraduates working in mathematics with an interest in group theory and related areas. It is intended to be a relaxed and stimulating environment to meet and exchange ideas, where all participants are encouraged to contribute a short talk. Plenary talks will be given by:

- Sarah Hart (Birkbeck, University of London)
- Karin Erdmann (University of Oxford)

For more information or to register please see www.maths.bris.ac.uk/~masfp/PGTC or contact the organisers at pgtc15@gmail.com. The conference is supported by an LMS Postgraduate Research Conference grant, the Heilbronn Institute for Mathematical Research and the University of Bristol School of Mathematics.

ECSTATIC

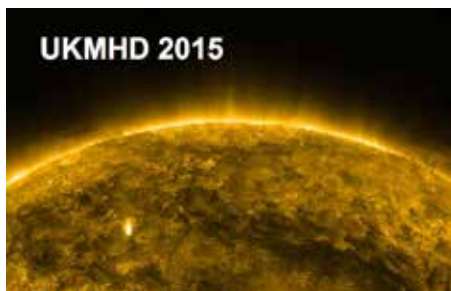
ECSTATIC (Early Career Stage Topologists at Imperial College) is a two-day workshop aimed at young researchers (ie PhD students and postdocs) interested in topology. The workshop will take place at Imperial College London from Thursday 11 to Friday 12 June 2015. The two invited speakers are:

- Andrew Ranicki (Edinburgh) *The role of the number 8 in topology*
- Liam Watson (Glasgow) *Loop calculus, L-spaces, and left-orders*

The main aim of the workshop is to encourage young researchers to give talks themselves on their area of research. Some funding is available for travel and accommodation. For further details visit the website

at www3.imperial.ac.uk/geometry/seminars/ecstatic.

The conference is supported by an LMS Postgraduate Research Conference grant (Scheme 8), TCC Oxford and Imperial College London.



The annual UKMHD conference will be hosted by the Department of Mathematics and Information Science, Northumbria University, Newcastle upon Tyne, on Thursday 14 and Friday 15 May 2015. The meeting is the premier gathering of the magnetohydrodynamics (MHD) community in the UK and covers all aspects of MHD theory such as instabilities, dynamos, turbulence as well as solar, laboratory and industrial plasmas. The invited speakers are:

- Joanne Mason (Exeter) *MHD dynamos and turbulence*
- Ken McClements (UKAEA) *MHD description of fusion*
- Alan Hood (St Andrews) *MHD in the solar atmosphere*
- Andrew Hillier (Cambridge) *Prominences: instabilities in magnetised plasma*

The registration fee is £45, closing on 7 May 2015. The philosophy of the meeting is to encourage young researchers to attend and present their work. To further this, funds are available to contribute to the travel expenses of research students and early career researchers. Further information is available on the website <https://sites.google.com/site/ukmhd2015/> or contact the organisers at ukmhd2015@northumbria.ac.uk. The meeting is supported by an LMS Conference grant, STFC and Northumbria University.



YOUNG FUNCTIONAL ANALYSTS' WORKSHOP

A postgraduate conference on *Functional Analysis* will take place at Imperial College London from Wednesday 10 to Friday 12 June 2015. The aim of this workshop is to offer young researchers in Functional Analysis and its related applications an opportunity to meet each other and gain valuable experience in discussing and presenting their work by giving talks as well as presenting posters in front of a sympathetic audience. Invited speakers include:

- Ari Laptev (Imperial College London)
- Anthony Dooley (Bath University)
- Luca Fanelli (SAPIENZA Università di Roma)
- Ivan Gentil (Université Claude Bernard Lyon 1)
- Alain Valette (Université de Neuchâtel)

There is some financial support available to cover travel expenses and accommodations. For more information, visit the website: <https://sites.google.com/site/yfawuk>, or contact the organisers Chiara Taranto (c.taranto13@imperial.ac.uk) and Yong Sul Won (ysw09@imperial.ac.uk).

The conference is supported by an LMS Postgraduate Research Conference grant (Scheme 8), Oxford Taught Course Centre and the Department of Mathematics of Imperial College London.

GROTHENDIECK MEMORIAL CONFERENCE

The *Grothendieck Memorial Conference* will take place at Imperial College London from 4 to 5 June 2015. This event is the London session of the *London-Paris Number Theory Seminar* which meets twice a year, in London in June and in Paris in November. There will be several colloquium style talks suitable for PhD students and young researchers. Speakers include:

- Yves André (Ecole Normale Supérieure, Paris) TBA
- John Coates (Cambridge University) *Quad-*

ratic twists of elliptic curves

- Luc Illusie (Université Paris-Sud) *Grothendieck and algebraic geometry*
- Jan Nekovář (Institut de Mathématiques de Jussieu, Paris) *Generalised modular parametrisations of elliptic curves*
- René Pannekoek (Imperial College London) TBA
- Mohamed Sadli (Exeter University) *Grothendieck anabelian section conjecture*
- Leila Schneps (Institut de Mathématiques de Jussieu, Paris) TBA
- Nick Shepherd-Barron (King's College London) TBA

For further information visit the website at wwwwf.imperial.ac.uk/~anskor/Grothendieck.htm or email Alexei Skorobogatov (a.skorobogatov@imperial.ac.uk).

INTEGRABLE AND CONFORMAL FIELD THEORIES

The 19th in a series of short annual meetings on integrable and conformal field theories will be held at Durham University from Friday 12 to Saturday 13 June 2015. These meetings promote the cohesion between UK researchers working in areas related to quantum integrable models, give young academics (PhD students and Postdocs) the opportunity to present their results and thereby allow them to establish themselves within the community, and showcase recent developments within the field by inviting key international speakers.

The meeting consists of four long and four short talks spread over Friday afternoon and Saturday morning. Keynote speakers include:

- Denis Bernard (ENS Paris)
- Fabian Essler (Oxford)
- Balt Van Rees (CERN/Durham)

The organisers have limited support for young UK-based researchers. The deadline for applying for support is **8 May 2015**. For more information visit the website <http://tinyurl.com/l3y8tpv> or contact the local organisers Peter Bowcock, Patrick Dorey and

Anne Taormina by email (icft.2015@durham.ac.uk).

The meeting is supported by an LMS Conference grant, the IOP Mathematical and Theoretical Physics Group and the Department of Mathematical Sciences at Durham.

SIMPLE GROUPS, REPRESENTATIONS AND RELATED TOPICS

A three-day conference on *Simple Groups, Representations and Related Topics* will be held at the University of Cambridge from 13 to 15 July 2015, in honour of Martin Liebeck and Jan Saxl. The aim of this meeting is to bring together leading international experts in the study of finite and algebraic simple groups and their representations. Invited speakers include:

- Michael Aschbacher (Caltech)
- Jonathan Brundan (University of Oregon)
- Joanna Fawcett (University of Western Australia)
- Nick Gill (University of South Wales)
- Robert Guralnick (University of Southern California)
- Alastair Litterick (University of Auckland)
- Gunter Malle (TU Kaiserslautern)
- Ben Martin (University of Aberdeen)
- Peter Neumann (University of Oxford)
- Eamonn O'Brien (University of Auckland)
- Cheryl Praeger (University of Western Australia)
- László Pyber (Alfréd Rényi Institute, Budapest)
- Aner Shalev (Hebrew University of Jerusalem)
- Donna Testerman (EPFL, Lausanne)
- John Thompson (University of Florida)
- Pham Huu Tiep (University of Arizona)

PhD students and early career researchers are strongly encouraged to attend, and some support is available. A conference dinner at Caius College will take place on 14 July. For further information, consult the website www.dpmms.cam.ac.uk/~dis20/liebeck saxl or contact the organisers via liebeck saxl2015@gmail.com.

gmail.com.

The meeting is organised by Tim Burness, Gary Seitz and David Stewart, and it is supported by an LMS Conference grant, the Heilbronn Institute for Mathematical Research, the National Science Foundation, Imperial College and the University of Cambridge.

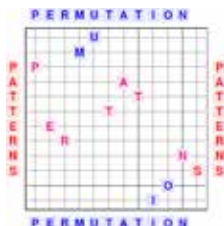
RANDOM WALKS ON GRAPHS AND POTENTIAL THEORY

A conference on *Random Walks on Graphs and Potential Theory* will take place at the Warwick Mathematics Institute from Monday 18 to Friday 22 May 2015. This meeting will gather experts from several fields of mathematics in which random walks play a role, in order to emphasise the breadth of the topic and facilitate interactions. Invited speakers include:

- Omer Angel (UBC)
- Márton Balázs (Bristol)
- Johannes Carmesin (Hamburg/Cambridge)
- Ronen Eldan (University of Washington)
- Ori Gurel-Gurevich (Hebrew University, Jerusalem)
- Antoine Gournay (Neuchatel)
- Ben Hambly (Oxford)
- Vadim Kaimanovich (University of Ottawa)
- Daniel Lenz (Jena)
- Peter Moerters (Bath)
- Thomas Sauerwald (Cambridge)
- Alessandro Sisto (ETH)
- Perla Sousi (Cambridge)
- Stephan Wagner (Stellenbosch)
- Anita Winter (Duisburg-Essen)
- Wolfgang Woess (TU Graz)
- Alex Zhai (Stanford)

There is no registration fee, but all participants are requested to register. Some funding is available to cover the expenses of PhD students from the UK. Further information and updates are available at <http://tinyurl.com/qzjjasu>. The meeting is supported by EPSRC, an LMS Conference grant and a Warwick IPF grant.

PERMUTATION PATTERNS 2015



The 13th International *Permutation Patterns* Conference will take place in De Morgan House, London, 15 to 19 June 2015. The purpose of the meeting is to

promote the combinatorial study of permutations (interpreted broadly), and to give researchers in this and neighbouring areas an opportunity to exchange results and ideas.

The conference will comprise a number of contributed talks, as well as presentations by the following invited speakers:

- Bruce Sagan (Michigan State University)
- Peter Cameron (University of St Andrews/Queen Mary, University of London)

Registration is open until 1 May. For full details, and to register, visit the conference website at <https://sites.google.com/site/pp2015london/>. The conference is supported by an LMS Conference grant, and financial and administrative support from The Open University.

MODEL THEORY, TOPOLOGICAL DYNAMICS AND REAL ALGEBRAIC GEOMETRY

The *Model Theory, Topological Dynamics and Real Algebraic Geometry* meeting will be held at the University of Central Lancashire, Preston, on 25 June 2015. The meeting will focus on the interactions between model theory (a branch of mathematical logic) and topological dynamics, with emphasis on the study of the actions of a definable group on its type space, and applications to real algebraic geometry. The aim is to bring together students and researchers interested in learning more and participating in the development of this

new topic. The speakers will be:

- Davide Penazzi (University of Central Lancashire)
 - Jakub Gismatullin (University of Wrocław)
 - Marcus Tressl (University of Manchester)
- The meeting will be followed by a reception and a dinner. A small amount of funds is available to contribute to the expenses of research students attending the meeting.

For further information and to register contact the organizer Dr Davide Penazzi (dpenazzi@uclan.ac.uk). More information is available on www.star.uclan.ac.uk/celebratory_penazzi. The meeting is supported by an LMS Conference grant celebrating new appointments.

GEOMETRIC RIGIDITY

A workshop on *Geometric Rigidity* will take place in the Department of Mathematics and Statistics at Lancaster University from Wednesday 10 to Thursday 11 June 2015. The workshop will bring together leading experts and beginning researchers to discuss aspects of flexibility and rigidity for geometric frameworks arising in and inspired by the mathematical, engineering and physical sciences. The aim of the workshop is to strengthen research links between those working in mathematics (particularly combinatorics, discrete geometry and analysis) and those working in application areas (which are represented here in structural engineering, computer science, materials science and theoretical chemistry). The main speakers are:

- Bill Jackson (Queen Mary, University of London)
- Simon Guest (University of Cambridge)
- Adil Mughal (University of Aberystwyth)
- Stephen Power (Lancaster University)
- Oleg Karpenkov (University of Liverpool)
- Anthony Nixon (Lancaster University)
- James Cruickshank (NUI Galway)
- Bernd Schulze (Lancaster University)
- Patrick Fowler (University of Sheffield)

- John Owen (Siemens PLC)
- Derek Kitson (Lancaster University)

For further information visit the website at <http://tinyurl.com/p4c4zjs> or contact Derek Kitson (d.kitson@lancaster.ac.uk). The workshop is supported by an LMS Conference grant celebrating new appointments and the Department of Mathematics and Statistics at Lancaster University.

LMS WIMCS - BATH ANALYSIS DAY

LMS WIMCS - Bath Analysis Day will take place at the Department of Mathematics, Aberystwyth University on Wednesday 27 May 2015 from 10:00 - 17:00. The meeting, which is open to all, will provide an opportunity to established as well as junior researchers in the areas of analysis and applications to present their recent results. The speakers include:

- Geoffrey Burton (Bath)
Rearrangements of functions and steady planar vortices
- Peter Gordon (Akron, Ohio)
Gelfand problem and autoignition of laminar jets
- Volodymyr Kushch (Kiev, Ukraine)
Maxwell homogenization scheme as a rigorous method of micromechanics
- Andrew Neate (Swansea)
Stochastic mechanics and the semiclassical Kepler/Coulomb problem
- Karl Michael Schmidt (Cardiff)
On the spectral density of Dirac operators with divergent potentials

This is the second event in the series of four workshops scheduled during the year in Swansea, Aberystwyth, Cardiff and Bath in the framework of the LMS Joint Research Groups in the UK (Scheme 3 grant) project. The first one took place in Swansea University on 20 March 2015 (math.swansea.ac.uk/staff/vm/LMS-WIMCS-Bath-2015/).

For further information visit the meeting webpage at http://horizon2020.imaps.aber.ac.uk/wimcs_aber_2015/ or contact Gennady Mishuris (ggm@aber.ac.uk).

TWO ONE-DAY COLLOQUIA IN COMBINATORICS 2015

Two linked one-day *Colloquia in Combinatorics* will be taking place in London. The first day will be held at Queen Mary, University of London, on Wednesday 13 May; the second will take place at the London School of Economics and Political Science on Thursday 14 May. It is hoped that the talks will be of wide interest to all those working in combinatorics or related fields. The schedule is as follows:

Queen Mary, University of London

13 May – 10.30 am with coffee from 10 am

Maths Lecture Theatre, Mathematical Sciences Building

- Anita Liebenau (Warwick)
- Ron Peled (Tel Aviv)
- Alex Scott (Oxford)
- Olof Sisask (Stockholm)
- Greg Sorkin (London)
- Stéphan Thomassé (Lyon)

London School of Economics

14 May – 10.30 am with coffee from 10 am

New Theatre, East Building

- Christina Goldschmidt (Oxford)
- Tim Gowers (Cambridge)
- Will Perkins (Birmingham)
- Alexey Pokrovskiy (Berlin)
- Lex Schrijver (Amsterdam)
- Frank Vallentin (Köln)

Anyone interested is welcome to attend. Funds are available to contribute to the expenses of UK-based research students to attend the meetings. Further details can be obtained from www.lse.ac.uk/maths/Seminars/Colloquia_2015.aspx or from Rebecca Lumb (r.c.lumb@lse.ac.uk).

There are also some funds available from the London Mathematical Society for help with childcare costs. Further details can be found on their website www.lms.ac.uk/content/child-care-supplementary-grants. Support for this event from the London Mathematical Society and the British Combinatorial Committee is gratefully acknowledged by the organisers.

BRITISH TOPOLOGY MEETING

The 30th *British Topology Meeting* (BTM30) will take place in the Pure Mathematics Research Centre, School of Mathematics and Physics, of Queen's University Belfast from Monday 7 to Wednesday 9 September 2015.

The main focus of the meeting will be homotopy theory and its links to other areas such as geometry, combinatorics, higher category theory and homology. There will be opportunities for contributed talks; the organisers particularly welcome contributions from PhD students and postdoctoral researchers. The list of speakers includes:

- Carles Casacuberta (Barcelona)
- Graham Ellis (Galway)
- Eva Maria Feichtner (Bremen)
- Andrew Tonks (Leicester)

More information on the programme and registration procedure will be available on the conference webpage www.qub.ac.uk/puremaths/btm30/home.html. The organisers are David Barnes and Thomas Huettemann. The meeting is supported by Queen's University Belfast and an LMS Conference grant.

THE CAUCHY PROBLEM IN KINETIC THEORY

The Cauchy Problem in Kinetic Theory: Recent Progress in Collisionless Models conference will be held from 7 to 11 September 2015 at Imperial College London. The field of collisionless kinetic theory has seen a revived interest in recent years. This conference aims to harness this renewed interest to generate momentum and attract young researchers to this field.

Some of the most influential results of the last decades are due to Walter Strauss, Bob Glassey and Jack Schaeffer: three mathematical generations. The conference will use this opportunity to mark their contributions to this field. In particular, Bob's 70th birthday, as well as the 20th anniversary of the publication of his book *The Cauchy Problem in Kinetic Theory*. Speakers include:

- Claude Bardos (Paris)
- Irene Gamba (Austin)
- Bob Glassey (Indiana)
- Clement Mouhot (Cambridge)
- Jack Schaeffer (Carnegie Mellon)
- Walter Strauss (Brown)

This conference will be a unique opportunity for the top specialists and some of the brightest young researchers and students to meet. Support from the LMS will allow research students from the UK to participate and learn about this exciting field of mathematical analysis.

For further information and to register, visit the conference website, at: wwwf.imperial.ac.uk/~jbenartz/conference. The conference is supported by an LMS Conference grant

CLAY RESEARCH CONFERENCE AND WORKSHOPS



The 2015 *Clay Research Conference* will be held on 30 September at the Mathematical Institute of the University of Oxford. The plenary speakers are:

- Charles Fefferman (Princeton)
- Mike Hopkins (Harvard)
- Andrei Okounkov (Columbia)
- Peter Scholze (Bonn)

The 2014 Clay Research Award will be presented to Maryam Mirzakhani for her many significant contributions to geometry and ergodic theory. The recipient of the 2015 Clay Research Award will also be announced.

Associated workshops will be held throughout the week of the conference, 28 September - 2 October:

- *Algebraic Topology: Manifolds Unlocking Higher Structures* (Mike Hopkins and Ulrike Tillmann)
- *Geometry and Dynamics of Moduli Spaces* (Alex Eskin, Giovanni Forni, and Anton Zorich)
- *Motives and Automorphic Forms* (Minhyong Kim and Peter Scholze)
- *Water Waves and Related Fluid Models* (Alexandru Ionescu and Steve Shkoller)

Registration for the *Clay Research Conference* is free but required. Participation in the workshops is by invitation; a limited number of additional places is available. Limited accommodation is available for PhD students and early career researchers. For more information email Naomi Kraker at admin@claymath.org. For full details, including the schedule, titles and abstracts when they become available, see www.claymath.org.

ADVANCES IN CONTINUOUS OPTIMIZATION

The 13th EUROPT workshop on *Advances in Continuous Optimization* will take place in Edinburgh from 8 to 10 July 2015. The workshop will focus on the theory, algorithms, software and applications of modern techniques of continuous optimization. In particular, the workshop will address recent developments in both convex and non-convex optimization, including areas such as large-scale optimization and linear algebra techniques in optimization. The mathematical theory of modern optimization techniques involves studying the convergence properties, providing the worst-case complexity estimates for the new algorithms as well as developing new computational mathematics techniques to achieve the maximum practical efficiency of the new methods. The workshop aims to bring together experts in these fields from the UK and overseas. The plenary speakers are:

- Serge Gratton (CERFACS-IRIT, Toulouse)
- Sven Leyffer (Argonne National Laboratory)
- Panos Pardalos (Univ of Florida)
- Lieven Vandenbergh (Univ of California)

Before **15 May 2015** the registration fee is £150 (standard) and £75 (PhD student). Afterwards the respective fees will be £200 and £100. The organisers have limited support for young researchers and PhD students. For further information visit the website at www.maths.ed.ac.uk/hall/EUROPT15/.

The meeting is supported by an LMS Conference grant as well as EUROPT, NAG and MOSEK.

BRITISH COMBINATORIAL CONFERENCE

The 25th *British Combinatorial Conference* will take place at the Mathematics Institute, University of Warwick from Monday 6 to Friday 10 July 2015. The invited talks are:



- Manuel Bodirsky (TU, Dresden)
Ramsey classes: examples and constructions
- Xing Chaoping (Nanyang Technological University)
Constructions of block codes from algebraic curves over finite fields
- David Conlon (University of Oxford)
Graph Ramsey theory
- Stefanie Gerke (Royal Holloway, University of London)
Controllability and matchings in random bipartite graphs
- Gil Kalai (Hebrew University of Jerusalem)
Some old and new problems in combinatorial geometry I: Around Borsuk's Problem
- Tomasz Łuczak (Adam Mickiewicz University, Poznań)
Randomly generated groups
- Gary McGuire (University College Dublin)
Curves over finite fields and linear recurring sequences
- Sergey Norin (McGill University, Montreal)
Recent developments in the graph minor theory
- Nik Ruskuc (University of St Andrews)
Well quasi-order in combinatorics: embeddings and homomorphisms

Registration is open until **15 June**. Early registration (with reduced fee) is open until 30 April. The local organizers are: Artur Czumaj, Agelos Georgakopoulos, Dan Kral, Vadim Lozin (chair), Oleg Pikhurko. For further information visit the conference website at <http://tinyurl.com/nexwd3y> or email: 25bcc@warwick.ac.uk.

HIGHLIGHTS IN MATHEMATICS

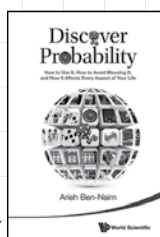
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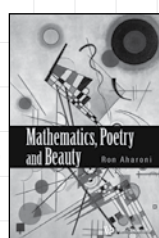
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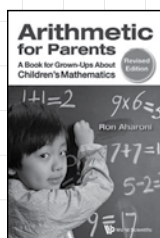
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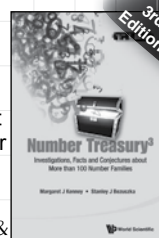
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William Benter Prize in Applied Mathematics 2016

Call for *NOMINATIONS*

The Liu Bie Ju Centre for Mathematical Sciences of City University of Hong Kong is inviting nominations of candidates for the William Benter Prize in Applied Mathematics, an international award.

The Prize

The Prize recognizes outstanding mathematical contributions that have had a direct and fundamental impact on scientific, business, financial, and engineering applications.

It will be awarded to a single person for a single contribution or for a body of related contributions of his/her research or for his/her lifetime achievement.

The Prize is presented every two years and the amount of the award is US\$100,000.

Nominations

Nomination is open to everyone. Nominations should not be disclosed to the nominees and self-nominations will not be accepted.

A nomination should include a covering letter with justifications, the CV of the nominee, and two supporting letters. Nominations should be submitted to:

Selection Committee

c/o Liu Bie Ju Centre for Mathematical Sciences
City University of Hong Kong
Tat Chee Avenue
Kowloon
Hong Kong

Or by email to: lbj@cityu.edu.hk

Deadline for nominations: 30 September 2015

Presentation of Prize

The recipient of the Prize will be announced at the **International Conference on Applied Mathematics 2016** to be held in summer 2016. The Prize Laureate is expected to attend the award ceremony and to present a lecture at the conference.

The Prize was set up in 2008 in honor of Mr William Benter for his dedication and generous support to the enhancement of the University's strength in mathematics. The inaugural winner in 2010 was George C Papanicolaou (Robert Grimmett Professor of Mathematics at Stanford University), the 2012 Prize went to James D Murray (Senior Scholar, Princeton University; Professor Emeritus of Mathematical Biology, University of Oxford; and Professor Emeritus of Applied Mathematics, University of Washington), the winner in 2014 was Vladimir Rokhlin (Professor of Mathematics and Arthur K. Watson Professor of Computer Science at Yale University).

The Liu Bie Ju Centre for Mathematical Sciences was established in 1995 with the aim of supporting world-class research in applied mathematics and in computational mathematics. As a leading research centre in the Asia-Pacific region, its basic objective is to strive for excellence in applied mathematical sciences. For more information, visit <http://www.cityu.edu.hk/lbj/>

REVIEWS

INCREDIBLE NUMBERS by Professor Ian Stewart, TouchPress Limited, 2014, £7.99 available at:

<https://itunes.apple.com/gb/app/incredible-numbers-by-professor/id824146218?mt=8>

As a writer, Ian Stewart is renowned for engaging general audiences with the wonders of mathematics. His latest creation is *Incredible Numbers*: an iPad application conceived in collaboration with innovative developers TouchPress. Released last year, and with the aim to “convince you that maths is beautiful”, the app has already received outstanding reviews from inside and outside of the maths community. It is a new venture for Ian Stewart and, significantly, it may be the first of its kind.

In the four years since iPad’s launch, we have seen the development of hundreds of apps aimed to educate in mathematics: from simple arithmetic games to experimental scientific calculators. In turn, established maths web applications (such as Wolfram Alpha and Geogebra) created new versions for iPad and iPhone. Improvements in this large touch-screen technology, alongside the impetus for educators to convey mathematics in a visually meaningful way, has leant itself to quick advancements in interactive maths demonstrations. As widely available as these visual tools are becoming, they are still pitched at those in the know. It seems that translating this capability to the popular maths forum is no easy task. Luckily, capturing beautiful and puzzling maths has long been Stewart’s forte. In this, he doesn’t disappoint.

There are 23 articles by Stewart that read like short text book explanations. The eight overarching themes include seminal topics such as pi and infinity, as well as more contemporary areas such as ciphers and music. These stand-

alone subjects are largely unrelated, but this is not unusual in popular mathematics. Familiar areas are revived with fresh visuals, for example there is some beautiful natural photography to demonstrate the Fibonacci sequence. In the primes section you can scroll through numbers up to 999, and for each there is an animation to segment that number of dots into a progression of prime numbers, brilliantly illustrating its factorisation. In the section on coding, sliding scales are used to depict decryption

using modular arithmetic, and there is a useful representation of the ever topical enigma machine. Sound is also used: as well as learning about waves, you can listen while experimenting with musical notes where harmonious intervals are depicted above a

keyboard. As with all the articles, you can switch back to the text at any point and your place is kept in the demonstration. One touch on the numbers or the mathematicians mentioned in the text, and you can find out further historical information.

There is a temptation to use all of the latest functionality when creating with new technology, just because you can. But with *Incredible Numbers*, the interactive diagrams add greatly to the content. Within the app you jump from text to tool constantly, but the navigation is seamless and satisfyingly hierarchical. Because the article layout follows the conventions of a book (or text book) the placement of these maths demonstrations seems natural. In many cases they are useful as static illustrations, so if you’re just skimming the text, their dynamism



is a bonus, although some of the floating animations can make the text itself harder to read. Despite this, it is still written in the understandable and accessible style that you would expect from a prolific popular mathematics writer. And, traditionally, there are some classic puzzles at the end (transformed into games, of course).

For a popular maths audience, it touches all bases. There is real maths explanation and historical background, without volumes of writing and daunting equations. It is like an electronic book in that it runs on the device itself, without internet access being required, so is perfect for an interactive read while commuting, for instance. You can delve into a topic to any level you want: reading the explanation in depth, skimming the maths shown, or heading straight for the part where you get to play around with it. Many aspects would be wonderful for children to pursue curiosity through experimentation, and it may be a valuable addition to an educator's toolbox of demonstrations. But if

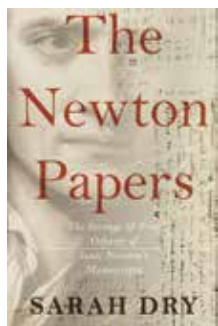
your tablet isn't an iPad, or if you are looking for programmable interactive graphs to use in the classroom/lecture theatre/pub you may want to check out Geogebra instead.

It has the same problem of other popular maths texts: the intended audience is not clear. But this may be no bad thing. For mathematicians and seasoned readers the content is unlikely new, but the dynamic aspects should still appeal. For newbies, and tech-savvy youngsters, it has all the appeal of a first Stewart book: introducing the general audience to the beauty of mathematics. It is among the first apps to attempt to combine this with interactive technology, and it is largely successful in both. For the cost of a cheap book, and in support of a new genre, I recommend this app to any of the above.

Aoife Hunt
University of Greenwich

INCREDIBLE NUMBERS has won the digital book award in the Apps Adult non-fiction category. The digital book awards recognise innovation, creativity and excellence in all aspects of digital book publishing.

THE NEWTON PAPERS *The Strange and True Odyssey of Isaac Newton's Manuscripts* by Sarah Dry, OUP, USA, 2014, pp 256, \$29.95, £19.99, ISBN 978-0-19-995104-8.



When Isaac Newton died, he left behind him a vast and disorganised collection of papers, notebooks and manuscripts. This book attempts to trace what happened to this collection. It opens, as seems to be obligatory at least for TV history, with an enticing vignette –

John Maynard Keynes arriving at an auction in 1936 to buy as many as he could of Newton's manuscripts. To quote the last paragraph of this opener: "Following the papers means following those who were determined to chase the image of Newton through the thickets of his various obsessions. In the process these men, who in addition to Keynes include the

inventor of the kaleidoscope, the discoverer of the planet Neptune, the wife of a self-made Yankee business guru, and a Jewish biblical scholar, became obsessed themselves, both with Newton and with the allure and the danger of glorifying a genius, of glorifying any man." This risks setting the reader up for disappointment – if he or she continues to read the book it may be in the expectation of an entertaining Bill Bryson-esque romp through the history of science. It is not that, but the subject matter of the book is interesting and most readers will find something to take away.

The focus of the book is not on the contents of the manuscripts per se. Only about a third of the documents concerned mathematics and physics. The rest were more problematic for those keen to establish Newton as a paragon of enlightenment thought – extensive writing on alchemy and, worse, manuscripts on religion that would likely have been seen as heretical

had they been published.

Newton's niece Catherine and her husband John Conduitt were given the papers initially, after some wrangling with the other relatives (Newton died intestate), but Conduitt had to post a £2,000 bond against any money made from publishing any of the work. This must have been something of a disincentive to publication. Along with the vast amount of material, and the possible risk to Newton's reputation, it was enough to ensure that only a handful of manuscripts were published. The rest, after Catherine Conduitt's death in 1739, passed to the Portsmouth family, who kept them at the family seat, Hurstbourne Park, until the 1930s when we finally meet Keynes at the auction. Before we get there we follow the tales of the various men who sought, and occasionally gained, access to this and other archives. We hear about controversies such as Newton's treatment of Flamsteed, whether or not Newton had a period of insanity, and whether or not he was an anti-Trinitarian.

There are places where I felt the book could

have been more carefully edited. An entire chapter is devoted to collusion among book dealers, but the next chapter simply states that such collusion did not happen at the auction attended by Keynes, in which case why discuss it? On two occasions proper nouns are given two different spellings on the same page. There are occasional idiosyncratic turns of phrase: "increasing attraction paid to manuscripts" should surely be "increasing attention".

For me the book is most successful when it looks at the changing ways in which manuscripts left by scientists and mathematicians have been treated – from the time when these documents were often viewed as almost worthless (the book mentions a first edition of *Principia* changing hands for four pence), to the present day when such objects are almost venerated. There is good material on the gradual emergence of the study of the history of science. I also enjoyed the last couple of chapters on the *Newton Industry*.

Sarah Hart

Birkbeck, University of London

ALEXANDRE GROTHENDIECK: A MATHEMATICAL PORTRAIT edited by Leila Schneps, International Press of Boston, 2014, pp 315, \$85.00, ISBN 978-1-57146-291-6.



his life. He is best known for having revolutionised algebraic geometry, introducing a level of abstraction and generality which gave rise to some spectacular developments, but which also, in the eyes of his critics, made the subject almost impossible for others to enter.

This book, arising from a conference held in Peyresq in 2008, consists of thirteen chapters on different aspects of Grothendieck's

The figure of Alexandre Grothendieck, who died late last year, still towers over the mathematical landscape, despite his having withdrawn from research (and, indeed, almost completely from society) for the last few decades of

achievements, written by those who knew him and his work, and in some cases studied and collaborated with him. Some chapters are in English, some in French, and some have been translated into English by the editor, Leila Schneps, who over the last quarter-century has done much to nurture into flower the seeds that Grothendieck sowed by organising conferences, editing their proceedings, and translating his work.

The book starts with a chapter by Joe Diestel on Grothendieck's first (and perhaps least well-known) work, revolutionising the theory of Banach spaces, while subsequent contributors include Max Karoubi on his work in K-theory, David Mumford on schemes and functors, and Yuri Manin on motives. In many cases the authors describe not just Grothendieck's results, but how he arrived at them and how they have influenced subsequent developments, together

with their own personal interactions with the man and his ideas.

A particularly good example of this is a short chapter by Robin Hartshorne called "An Apprenticeship", in which he describes first learning about schemes as a student attending Grothendieck's seminars, then starting to make his own discoveries in this area, followed by the daunting challenge of writing up Grothendieck's ideas on duality for publication, and finally his sadness and frustration as Grothendieck's interests turned away from mathematics towards politics and ecology.

Another particularly striking chapter is that by the editor herself on the Grothendieck-Serre correspondence. These letters, published in 2001 and translated into English in 2003, give a fascinating view of Grothendieck's dependence on Serre to test conjectures, to provide examples and counterexamples, and to shake his finger whenever Grothendieck went too far. The chosen extracts and Schneps's commentary on them bring out very graphically the complementary personalities and mathematical viewpoints of these two great figures – Grothendieck speculative and wide-ranging, Serre rigorous and specific. As a bonus, we also get revealing comments about colleagues, and on the tense political situation in France during the main period (1955-1969) of this correspondence, dominated by the Algerian War.

The most remarkable of these views of Grothendieck is a dazzlingly written (and translated) essay by Pierre Cartier on "the interaction between his scientific work and his extraordinary personality". He describes "a childhood devastated by the effect of Nazi crimes, an absent father who soon perished in the torments of the time, a mother who held her son in thrall and permanently affected his relationship with other women; all of this compensated for by an unlimited investment in mathematical abstraction, until psychosis could no longer be held off and came to drown him in the anguish of death – his own and the world's." Along the way he conjures

up numerous vivid images: of Grothendieck working "at night, generally in a horrible room with the plaster falling off the walls, and turning his back to the window (seeking some secret humiliation?"; of Dieudonné, sitting at his worktable from 5 to 8 each morning, transforming an interminable pile of Grothendieck's illegible notes into publishable form; and of a planeload of the Paris establishment, led by Dieudonné in his Dean's robes, rushing to Montpellier to support Grothendieck in a rather ridiculous struggle with the French judicial system. Cartier gives a penetrating psychological analysis of Grothendieck's personality, including the devastating effect of his fractured upbringing, his involvement in the radical movements of the late 1960s, the bitter disappointment at seeing his favoured disciple Deligne complete Grothendieck's preparatory work on the Weil conjecture, and lying deep beneath all this a permanent sense of suffering and betrayal. This chapter reads like a sympathetic but unflinchingly honest obituary; reading it, I had to keep reminding myself that its subject was still alive when it was written.

Other contributors also write with great insight on Grothendieck's mathematical legacy. What comes over strongly is his immense productivity during the early decades of his career, often relying on students and colleagues to write up his prodigious output, and his desire for mathematics to be as natural and as general as possible, often delaying publication until the exposition fitted perfectly into his global view of mathematics.

This collage of viewpoints provides a fascinating cubist portrait of Grothendieck, which will form an excellent complement to the multi-part biography which Wilfried Scharlau is writing. One might complain that the photographs of contributors, taken around the time of their interaction with Grothendieck, do not include one of the man himself. But with pen-portraits as vivid as these, who needs pictures?

Gareth Jones
University of Southampton

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.

MAY 2015

- 6-8 Optimization and Big Data Workshop, Edinburgh (445)
- 8-9 Integrability and All That, Loughborough (445)
- 9 LMS-BSHM De Morgan Meeting, De Morgan House, London (447)
- 12 Variational Methods for Stationary and Evolutionary Problems, Warwick (445)
- 13 Combinatorics Colloquia, Queen Mary University of London and LSE (447)
- 18-20 Wales Mathematical Colloquium, Gregynog Hall, Powys (445)
- 18-22 Random Walks on Graphs and Potential Theory, Warwick (447)
- 20 LMS-Gresham College Joint Lecture, London (447)
- 22-23 Groups in Galway, National University of Ireland (445)
- 23 Symmetry and Group BSHM Conference, Birkbeck College London (446)
- 27 LMS WIMCS Bath Analysis Day (447)
- 28-30 Edinburgh Mathematical Society & Societat Catalana de Matematiques Joint Meeting, Barcelona (443)
- 29 LMS Spitalfields Day, York (447)
- 29-30 Quantum Uncertainty Days @ York, York

JUNE 2015

- 3-5 Cluster Algebras and Finite Dimensional Algebras, Leicester (447)
- 8-12 Relations between Banach Space Theory and Geometric Measure Theory Workshop, Warwick (444)
- 10-11 Geometric Rigidity, Lancaster (447)
- 10-12 Young Functional Analysts' Workshop, Imperial College London (447)
- 10-13 AMS-EMS-SPM International Meeting, Porto, Portugal (442)
- 11-12 ECSTATIC, Imperial College London (447)
- 12-13 Integrable and Conformal Field Theories, Durham (447)
- 14-15 UKMHD, Northumbria University (447)
- 15-19 Permutation Patterns, London (447)
- 15-19 Geometry of Random Walks and SLE, INI Workshop, Cambridge (445)
- 15-19 Fourier-Mukai, 34 Years On, Warwick (446)
- 17 Hardy Lecture, Imperial College (447)

- 18 Hardy Lecture, Oxford (447)
- 19 Hardy Lecture, Bath (447)
- 19-26 Groups, Representations, and Cohomology Workshop and Conference, Isle of Skye (446)
- 20 The Big Picture BSHM Conference, Oxford (446)
- 22 Hardy Lecture, Glasgow (447)
- 22-25 Mathematics and Computation in Music, Queen Mary, University of London (446)
- 22-26 Random and other Ergodic Problems INI Workshop, Cambridge (444)
- 23 Celebrating New Appointments in Mathematics, University of South Wales (447)
- 23-26 Hopf-Galois Theory and Galois Module Structure Workshop, Exeter (445)
- 24 Hardy Lecture, Lancaster (447)
- 26 Hardy Lecture, Loughborough (447)
- 25 Popular Lectures, London (447)
- 25 Model Theory, Topological Dynamics and Real Algebraic Geometry, Lancashire (447)
- 29 Hardy Lecture, Leeds (447)
- 30 Celebrating New Appointments in Mathematics, University of South Wales (447)
- 30-3 Jul Group Theory PostGraduate Conference, Bristol (447)

JULY 2015

- 1 Hardy Lecture, University of Kent (447)
- 1-5 Regularity and Analytic Methods in Combinatorics, LMS-CMI Research School, University of Warwick (446)
- 3 LMS Graduate Student Meeting, London (447)
- 3 Hardy Lecture, LMS Meeting, London (447)
- 5-10 Developments in Modern Probability LMS-CMI Research School, University of Oxford (446)
- 6-9 Symbolic and Algebraic Computation Conference, Bath (446)
- 6-10 Design and Analysis of Experiments in Healthcare INI Workshop, Cambridge (446)
- 6-10 British Combinatorial Conference, Warwick (447)
- 7 LMS Midlands Regional Meeting, Warwick (447)
- 8-10 Advances in Continuous Optimization, Edinburgh (447)
- 13 Iwasawa 2015, King's College London (447)
- 13-15 Simple Groups, Representations and Related Topics Conference, Cambridge (447)
- 13-17 Quantum Groups and Quantum Information Theory, Sussex (445)
- 13-17 Stochastic Processes and their Applications Conference, Oxford (446)
- 20-30 Permutation Groups and Transformation Semigroups LMS-EP SRC Durham Research Symposium, Durham (443)
- 20-31 LMS Undergraduate Summer School, Loughborough (444)
- 27-31 Metric and Analytic Aspects of Moduli Spaces INI Workshop, Cambridge (446)

27-2 Aug International Mathematics Competition for University Students, Bulgaria (446)

AUGUST 2015

3-12 New Moonshines, Mock Modular Forms and String Theory LMS-EPSRC Durham Research Symposium, Durham (444)

17-20 Young Researchers in Mathematics Conference, Oxford

23-28 Heidelberg Laureate Forum, Heidelberg (444)

24-28 European Set Theory INI Conference, Cambridge (445)

30-1 Sep Modern Mathematical Methods in Science and Technology, Kalamata, Greece (445)

SEPTEMBER 2015

6-10 Dynamic Days Europe, Exeter (447)

7-9 British Topology Meeting, Queen's University Belfast (447)

7-11 Cauchy Problem in Kinetic Theory, Imperial College London (447)

14-16 Non-Combinatorial Combinatorics, Warwick

15-19 Diophantine Equations LMS-CMI Research School, Baskerville Hall, Hay-on-Wye (447)

17 LMS Computer Science Colloquium, The Royal

Society London

18-20 LMS/EMS Joint Anniversary Mathematical Meeting, Birmingham (447)

23 LMS Popular Lectures, Birmingham (447)

30 Clay Research Conference, Oxford (447)

OCTOBER 2015

21 LMS Popular Lectures, Glasgow (447)

NOVEMBER 2015

11 LMS Popular Lectures, Leeds (447)

13 LMS AGM, London

19-11 Joint Meeting with the Edinburgh Mathematical Society, ICMS, Edinburgh

DECEMBER 2015

7-11 Combinatorial Mathematics and Combinatorial Computing Australasian Conference, Brisbane, Australia (445)

9-10 Ada Lovelace 200 Symposium: Celebrating the life and legacy of Ada Lovelace, Oxford

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

14-17 LMS South West & South Wales Regional Meeting, Southampton

15-16 LMS Prospects in Mathematics, Loughborough

CAMBRIDGE

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