



LONDON
MATHEMATICAL
SOCIETY
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NEWSLETTER

No. 465 January 2017

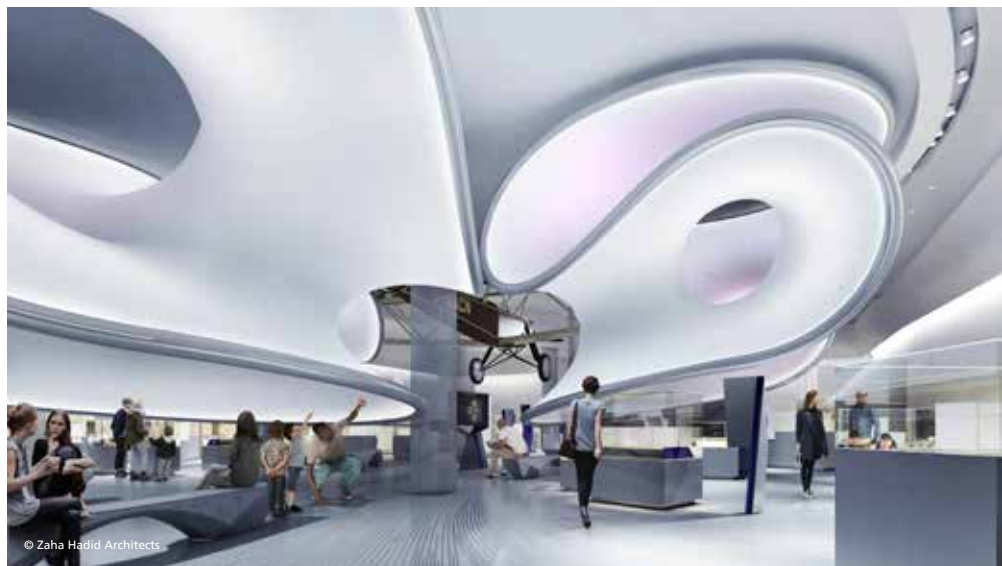
MATHEMATICS: THE WINTON GALLERY OPENS AT THE SCIENCE MUSEUM, LONDON

On 8 December 2016 the Science Museum opened a pioneering new gallery that explores how mathematicians, their tools and ideas have helped shape the modern world over the last 400 years. *Mathematics: The Winton Gallery* places mathematics at the heart of all our lives, bringing

the subject to life through remarkable stories, artefacts and design.

More than 100 treasures from the Science Museum's world-class science, technology, engineering and mathematics collections help tell powerful stories about how mathematical practice

(Cont'd on page 3)



View of the Handley Page 'Gugnunc' aircraft at the centre of *Mathematics: The Winton Gallery*

SOCIETY MEETINGS AND EVENTS 2017

- 3 April: Society Meeting at BMC, Durham
- 18–22 April: LMS Invited Lectures, Newcastle *page 26*
- 5 May: Mary Cartwright Lecture, London
- 1 June: Northern Regional Meeting, York
- 30 June: Society Meeting, London
- 30 June: Graduate Student Meeting, London
- 11 December: SW & South Wales Regional Meeting, Cardiff

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has shaped and been shaped by some of our most fundamental human concerns – including money, trade, travel, war, life and death.

From a beautiful 17th-century Islamic astrolabe that used ancient mathematical techniques to map the night sky to an early example of the famous Enigma machine, designed to resist even the most advanced mathematical techniques for codebreaking, each historical object has an important story to tell about how mathematics has shaped our world. Archive photography and film helps capture these stories and digital exhibits alongside key objects introduce the wide range of people who made, used or were affected by each mathematical device.

Dramatically positioned at the centre of the gallery is the Handley Page ‘Gugnunc’ aircraft, built in 1929 for a competition to construct a safe aircraft. Ground-breaking aerodynamic research influenced the wing design of this experimental aircraft, helping transform public opinion about the safety of flying and securing the future of the aviation industry. This aeroplane highlights perfectly the central theme of the gallery about how mathematical practice is driven by, and influences, real-world concerns and activities.

Mathematics also defines Zaha Hadid Architects’ design for the gallery. Inspired by the Handley Page aircraft, the gallery is laid out using principles of mathematics and physics. These principles also inform the three-

dimensional curved surfaces representing the patterns of airflow that would have streamed around this aircraft.

Patrik Schumacher, Partner at Zaha Hadid Architects, recently noted that mathematics was part of Zaha Hadid’s life from a young age and was always the foundation of her architecture, describing the new mathematics gallery as ‘an important part of Zaha’s legacy in London’. Gallery curator David Rooney, who was responsible for the Science Museum’s recent award-winning *Codebreaker: Alan Turing’s Life and Legacy* exhibition, explained that the gallery tells ‘a rich cultural story of human endeavor that has helped transform the world’.

The mathematics gallery was made possible through an unprecedented donation from long-standing supporters of science, David and Claudia Harding. Additional support was also provided by Principal Sponsor Samsung, Major Sponsor MathWorks and a number of individual donors.

A lavishly illustrated new book, *Mathematics: How It Shaped Our World*, written by David Rooney and published by Scala Arts & Heritage Publishers, accompanies the new display. It expands the stories covered in the gallery and contains an absorbing series of newly commissioned essays by prominent historians and mathematicians including June Barrow-Green, Jim Bennett, Patricia Fara, Dame Celia Hoyles and Helen Wilson, with an afterword from Dame Zaha Hadid with Patrik Schumacher.

Editorial team

<http://newsletter.lms.ac.uk>

Editorial office

London Mathematical Society,
De Morgan House, 57–58 Russell
Square, London WC1B 4HS
(t: 020 7637 3686;
f: 020 7323 3655)

Events calendar

Updates and corrections to
calendar@lms.ac.uk

Articles

Send articles to
newsletter@lms.ac.uk

Advertising

For rates and guidelines see
newsletter.lms.ac.uk/rate-card

General Editor

Mr A.J.S. Mann
(a.mann@gre.ac.uk)

Reports Editor

Professor I. A. Stewart
(i.a.stewart@durham.ac.uk)

Reviews Editor

Professor D. Singerman
(d.singerman@soton.ac.uk)

Administrative Editor

S.M. Oakes
(newsletter@lms.ac.uk)

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LMS COUNCIL 2016-17

As a result of the annual election in November 2016, membership of the Council is as follows (see photographs on the following page):

| | |
|-----------------------------|--|
| President | Professor S. Tavaré (University of Cambridge) |
| Vice-Presidents | Professor K.A. Brown, FRSE (University of Glasgow) |
| | Professor J.P.C. Greenlees (University of Sheffield) |
| Treasurer | Professor R.T. Curtis (University of Birmingham) |
| General Secretary | Professor S.A. Huggett (University of Plymouth) |
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| Publications Secretary | Professor J.R. Hunton (University of Durham) |
| Education Secretary | Professor F.A. Rogers (King's College London) |
| Member-at-Large (Librarian) | Professor J.E. Barrow-Green (Open University) |
| Members-at-Large of Council | Professor A.V. Borovik (University of Manchester) |
| | Professor T.E. Brendle (University of Glasgow) |
| | Dr F.W. Clarke (University of Swansea) |
| | Professor D.E. Evans (University of Cardiff) |
| | *Dr A.D. Gardiner |
| | Dr C.A. Hobbs (University of the West of England) |
| | *Professor S. Howison (University of Oxford) |
| | *Dr D. Maclagan (University of Warwick) |
| | *Professor G.M. Stallard (Open University) |
| | *Dr A. Vdovina (University of Newcastle) |
| | Professor S. Zerbes (University College London) |

* Members continuing the second year of their two-year election in 2015.

LMS Nominating Committee

Also at the AGM, the following were elected to the Nominating Committee:

Professor D.R Heath Brown (University of Oxford) - three-year term

Professor U.L. Tillmann (University of Oxford) – three-year term

Professor M. Mazzocco (Loughborough University) – two-year term

Professor S.R. Blackburn (Royal Holloway, University of London) – one-year term

Continuing members of the Nominating Committee are John Toland (Chair), Sarah Rees and Alex Wilkie. Council will also appoint a representative.



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University of Cambridge



Professor Ken Brown
Vice President
University of Glasgow



Professor John Greenlees
Vice President
University of Sheffield



Professor Rob Curtis
Treasurer
University of Birmingham



Professor Stephen Huggett
General Secretary
University of Plymouth



Professor Iain Stewart
Programme Secretary
University of Durham



Professor John Hutton
Publications Secretary
University of Durham



Professor Alice Rogers
Education Secretary
King's College, London



Professor June Barrow-Green
Librarian (Member-at-Large)
Open University



Professor Alexandre Borovik
Member-at-Large
University of Manchester

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Professor Tara Brendle
Member-at-Large
University of Glasgow



Dr Francis Clarke
Member-at-Large
University of Swansea



Professor David Evans
Member-at-Large
University of Cardiff



Dr Tony Gardiner
Member-at-Large



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Member-at-Large
University of the West of England



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Member-at-Large
University of Oxford



Dr Diane MacLagan
Member-at-Large
University of Warwick



Professor Gwyneth Stallard
Member-at-Large
Open University



Dr Alina Vdovina
Member-at-Large
University of Newcastle



Professor Sarah Zerbes
Member-at-Large
University College London

RETIRING MEMBERS OF COUNCIL

Professor David Evans and Professor Beatrice Pelloni stepped down as Members-at-Large of Council at the 2016 AGM. Council wishes to recognise and thank them for the service they have given to the Society and to the wider mathematical community.

Professor Evans was elected to Council in 2013. He has supported the Society through his membership of various committees, including Nominating Committee and Programme Committee, on which he will continue to serve. He has also been active in the Society's publishing activities and was Editor of the *Bulletin of the LMS* from 2012 to 2014.

Professor Pelloni was elected to Council

in 2012. She was until recently Chair of the Research Meetings Committee, and has represented European Women in Mathematics on the LMS Women in Mathematics Committee and been a strong supporter of the need to address issues surrounding diversity in mathematics. She was also an LMS delegate to the European Mathematical Society Council.

The Society would also like to express its thanks to Professor Terry Lyons who has attended Council for the last year as immediate past president. A detailed account of Professor Lyons' contributions to the Society are available in the January 2015 *LMS Newsletter*.

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LONGSTANDING MEMBERS

The following is a list of members who have completed 50 years or more of membership of the London Mathematical Society.

| | |
|-----------------------------------|-------------------------|
| More than 70 years in 2017 | |
| 17 Mar 1943 | Dyson, F.J. |
| 23 May 1946 | Huppert, E.L. |
| 70th Anniversary in 2017 | |
| 20 Mar 1947 | Hayman, W.K. |
| More than 65 years in 2017 | |
| 18 Mar 1948 | Isaacs, G.L. |
| 18 Mar 1948 | Reade, M.O. |
| 13 Dec 1948 | Fishel, B. |
| 20 Jan 1949 | Borwein, D. |
| 65th Anniversary in 2017 | |
| 20 Mar 1952 | Swinnerton-Dyer, H.P.F. |
| 18 Dec 1952 | Reeve, J.E. |
| More than 60 years in 2017 | |
| 18 Jun 1953 | Marstrand, J.M. |

| More than 60 years in 2017 | |
|-----------------------------------|------------------|
| 18 Jun 1953 | Rayner, M.E. |
| 17 Dec 1953 | Ringrose, J.R. |
| 17 Dec 1953 | Samet, P.A. |
| 18 Feb 1954 | Cohen, D.E. |
| 18 Feb 1954 | James, I.M. |
| 17 Jun 1954 | Taylor, S.J. |
| 25 Nov 1954 | Amson, J.C. |
| 27 Jan 1955 | Atiyah, M.F. |
| 24 Feb 1955 | Rayner, F.J. |
| 24 Mar 1955 | Farahat, H.K. |
| 12 May 1955 | Harrop, R. |
| 12 May 1955 | Murdoch, B.H. |
| 12 May 1955 | Wall, G.E. |
| 15 Dec 1955 | Armitage, V.J. |
| 19 Jan 1956 | Bowers, J.F. |
| 15 Mar 1956 | Edmunds, D.E. |
| 19 Apr 1956 | Penrose, R. |
| 14 Jun 1956 | Perry, R.L. |
| 15 Nov 1956 | Edwards, D.A. |
| 60th Anniversary in 2017 | |
| 14 Mar 1957 | Brown, R. |
| 13 Jun 1957 | Brown, A.L. |
| 18 Jun 1957 | Russell, D.C. |
| 21 Nov 1957 | Wallington, J.E. |
| 19 Dec 1957 | Longdon, L.W. |
| 19 Dec 1957 | Mohamed, I.J. |
| 19 Dec 1957 | Monk, D. |
| 19 Dec 1957 | Newman, M.F. |
| More than 55 years in 2017 | |
| 20 Mar 1958 | Keedwell, D. |
| 20 Mar 1958 | Wallace, D.A.R. |
| 17 Apr 1958 | Macdonald, I.G. |
| 15 May 1958 | Foster, D.M.E. |

| More than 55 years in 2017 | |
|----------------------------|--------------------|
| 17 Dec 1958 | De Barra, G. |
| 18 Dec 1958 | Birch, B.J. |
| 15 Jan 1959 | Blackburn, N. |
| 16 Apr 1959 | Burgess, D.A. |
| 16 Apr 1959 | Manogue, J.F. |
| 21 May 1959 | Ingram, G. |
| 18 Jun 1959 | Carter, R.W. |
| 17 Dec 1959 | Eames, W.P. |
| 17 Dec 1959 | Hoskins, R.F. |
| 17 Dec 1959 | West, A. |
| 17 Mar 1960 | Guy, R.K. |
| 17 Mar 1960 | Harris, D.J. |
| 18 Mar 1960 | Strauss, D. |
| 19 May 1960 | Hoare, A.H.M. |
| 17 Nov 1960 | Morris, A.O. |
| 15 Dec 1960 | Turner Smith, R.F. |
| 16 Mar 1961 | Rhodes, F. |
| 18 May 1961 | Sklar, A. |
| 15 Jun 1961 | Button, L.G. |
| 15 Jun 1961 | Dey, I.M.S. |
| 15 Jun 1961 | Dlab, V. |
| 15 Jun 1961 | Robertson, S.A. |
| 16 Nov 1961 | Croft, H.T. |
| 21 Dec 1961 | Barry, P.D. |
| 21 Dec 1961 | Davies, R.O. |
| 21 Dec 1961 | Rutter, J.W. |
| 21 Dec 1961 | Sands, A.D. |
| 21 Dec 1961 | Wall, C.T.C. |
| 55th Anniversary in 2017 | |
| 18 Jan 1962 | Ezeilo, J.O.C. |
| 18 Jan 1962 | Kingman, J.F.C. |
| 15 Mar 1962 | Baumslag, B. |
| 26 Apr 1962 | Cohn, J.H.E. |
| 26 Apr 1962 | Williams, S.O. |

| 55th Anniversary in 2017 | |
|-----------------------------------|-------------------|
| 17 May 1962 | Mullin, A.A. |
| 17 May 1962 | Thompson, A.C. |
| 21 Jun 1962 | Peters, J.E. |
| 15 Nov 1962 | Gaffney, M.P. |
| 20 Dec 1962 | Douglas, A.J. |
| 20 Dec 1962 | Pears, A.R. |
| 20 Dec 1962 | Roberts, J.B. |
| 20 Dec 1962 | Wallace, E.W. |
| More than 50 years in 2017 | |
| 17 Jan 1963 | Beardon, A.F. |
| 17 Jan 1963 | Blyth, T.S. |
| 17 Jan 1963 | Dugdale, J.K. |
| 17 Jan 1963 | Epstein, D.B.A. |
| 17 Jan 1963 | Garling, D.J.H. |
| 17 Jan 1963 | Piper, F.C. |
| 17 Jan 1963 | Robinson, W.J. |
| 17 Jan 1963 | Whittington, J.E. |
| 18 Apr 1963 | Bernau, S.J. |
| 18 Apr 1963 | Sutherland, W.A. |
| 15 May 1963 | Ault, J.C. |
| 16 May 1963 | Harte, R.E. |
| 16 May 1963 | Lee, P. |
| 16 May 1963 | Sondheimer, E.H. |
| 16 May 1963 | Weinmann, A. |
| 16 May 1963 | White, D.J. |
| 20 Jun 1963 | Duren, P.L. |
| 20 Jun 1963 | Pym, J.S. |
| 20 Jun 1963 | Rogosinski, H.P. |
| 21 Nov 1963 | Bechtell, H.F. |
| 21 Nov 1963 | Curtis, C.W. |
| 21 Nov 1963 | Eggan, L.C. |
| 21 Nov 1963 | Lowe, P.G. |
| 19 Dec 1963 | Heywood, P. |
| 19 Dec 1963 | Knowles, J.D. |

| More than 50 years in 2017 | |
|----------------------------|---------------------|
| 19 Dec 1963 | Watters, J.F. |
| 16 Jan 1964 | Craven, B.D. |
| 16 Jan 1964 | Shawyer, B.L.R. |
| 16 Jan 1964 | Steer, B.F. |
| 21 May 1964 | Brown, W.G. |
| 25 Jun 1964 | Erdos, J.A. |
| 19 Nov 1964 | Evans, E.A. |
| 19 Nov 1964 | Roseblade, J.E. |
| 19 Nov 1964 | Vincent Smith, G.F. |
| 16 Dec 1964 | Larman, D.G. |
| 16 Dec 1964 | Nelson, R. |
| 16 Dec 1964 | Reid, G.A. |
| 17 Dec 1964 | Ledgard, R. |
| 17 Dec 1964 | Morton, H.R. |
| 17 Dec 1964 | Neumann, P.M. |
| 21 Jan 1965 | Kegel, O.H. |
| 21 Jan 1965 | Walker, G. |
| 10 Apr 1965 | Batty, J.C.R. |
| 20 May 1965 | Hirst, K.E. |
| 17 Jun 1965 | Dodson, M.M. |
| 17 Jun 1965 | McGregor, M.T. |
| 18 Nov 1965 | Gardiner, C.F. |
| 18 Nov 1965 | Giblin, P.J. |
| 18 Nov 1965 | Harvey, W.J. |
| 18 Nov 1965 | Reade, J.B. |
| 18 Nov 1965 | Robinson, D.J.S. |
| 16 Dec 1965 | Evans, W.D. |
| 20 Jan 1966 | Bramwell, M.C. |
| 20 Jan 1966 | Elworthy, K.D. |
| 21 Jan 1966 | Rourke, C.P. |
| 17 Feb 1966 | Stewart, W.B. |
| 4 Apr 1966 | Baker, A. |
| 21 Apr 1966 | Wehrfritz, B.A.F. |
| 19 May 1966 | Stephens, N.M. |

| | |
|-----------------------------------|-------------------|
| More than 50 years in 2017 | |
| 17 Nov 1966 | Dempster, M.A.H. |
| 17 Nov 1966 | Moss, R.M.F. |
| 17 Nov 1966 | Rudolfer, S.M. |
| 17 Nov 1966 | Stephenson, W. |
| 17 Nov 1966 | Stratton, A.E. |
| 15 Dec 1966 | Eke, B.G. |
| 15 Dec 1966 | Jackson, T.H. |
| 15 Dec 1966 | Lance, E.C. |
| 15 Dec 1966 | Michael, I.M. |
| 15 Dec 1966 | Pretzel, O. |
| 50th Anniversary in 2017 | |
| 16 Feb 1967 | Dye, R.H. |
| 16 Feb 1967 | Fenn, R.A. |
| 16 Feb 1967 | Ford, J.W.M. |
| 16 Mar 1967 | Bryant, R.M. |
| 16 Mar 1967 | Rowlands, K. |
| 16 Mar 1967 | Williams, C.M. |
| 20 Apr 1967 | Chowdhury, M.R. |
| 20 Apr 1967 | von Randow, R.R. |
| 20 Apr 1967 | Wood, G.V. |
| 18 May 1967 | Lickorish, W.B.R. |
| 16 Nov 1967 | Churchhouse, R.F. |
| 16 Nov 1967 | Collins, M.J. |
| 16 Nov 1967 | Dolan, P. |
| 16 Nov 1967 | Dunwoody, M.J. |
| 16 Nov 1967 | McKay, J. |
| 16 Nov 1967 | Stakgold, I. |
| 16 Nov 1967 | Walker, M.A. |
| 16 Nov 1967 | Whitelaw, T.A. |
| 21 Dec 1967 | Calder, A.G.R. |
| 21 Dec 1967 | Davies, P.L. |
| 21 Dec 1967 | Rennison, J.F. |
| 21 Dec 1967 | Sharp, R.Y. |
| 21 Dec 1967 | Tall, D.O. |

LMS GRANT SCHEMES

Next closing date for Research Grant applications: 22 January 2017

Applications are invited for the following grants:

Conferences (Scheme 1)

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

Celebrating new appointments (Scheme 1)

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

Postgraduate Research Conferences (Scheme 8)

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

Visits to the UK (Scheme 2)

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

Research in Pairs (Scheme 4)

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

UK to the home base of the grant holder.

International Short Visits (Scheme 5)

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

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

- Applications received by **22 January 2017** will be considered at a meeting in February.
- Applications should be submitted well in advance of the date of the event for which funding is requested.
- Grants are not awarded for events which have already happened, and in cases where insufficient time has been allowed for processing of the application, the Programme Committee reserves the right to decline funding.

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

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 participants, 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.

Undergraduate Research Bursaries in Mathematics 2017

Next deadline: 16 February 2017

Open to Undergraduate Students in the intermediate years (i.e. 2/3, 2/4 or 3/4) of their undergraduate degree to undertake the project during the summer vacation. Students in the final year of their degree intending to undertake a taught Masters degree immediately following their undergraduate degree may apply. (First-year undergraduates are not eligible.) The purpose of the awards is to give experience of research to undergraduates to explore the potential of becoming a researcher and to encourage them to consider a career in scientific research. The awards provide support for the student at a rate of £180 per week (or £190 per week in London), for a period of between six and eight weeks. For more information and an application form visit: www.lms.ac.uk/grants/undergraduate-research-bursaries.

Spitalfields Days

Next deadline: 31 January 2017

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. Visit the website for further details: www.lms.ac.uk/content/spitalfields-days.

Grace Chisholm Young Fellowship

Next deadline: 30 June 2017

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. Visit the website for further details: www.lms.ac.uk/grants/grace-chisholm-young-fellowships.

Small Grants for Education

Next deadline: 31 January 2017

Funding for grants **up to £800** is available to stimulate interest and enable involvement in mathematics from Key Stage 1 (age 5+) to Post-graduate 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. Visit the website for further details: www.lms.ac.uk/content/small-grants-education.

Teacher CPD Grants

Next deadline: 31 January 2017

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:

- Develop their subject knowledge.
- Engage in a deeper understanding of how to develop mathematical thinking.
- 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: www.lms.ac.uk/grants/teacher-cpd-grants.

Computer Science Small Grants (Scheme 7)

Next deadline: 15 April 2017

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. Visit the website for further details: www.lms.ac.uk/content/computer-science-small-grants-scheme-7.

Caring Supplementary Grants

Next deadline: 22 January 2017

Grants of **up to £200** are available to parents and carers 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. Visit the website for further details: www.lms.ac.uk/content/childcare-supplementary-grants.

LMS COUNCIL DIARY

11 November 2016: A personal view

The November meeting of Council has a somewhat different feeling than others; the anticipation of the AGM and Annual Dinner lend a certain energy to the preceding Council meeting.

The General Secretary updated Council on a proposal from the Activities Review Group. The group's suggestion was to replace the Programme Committee and the Research Meetings Committee with three new Committees: Society Lectures and Meetings, Research Grants, and Early Career Research. Council agreed this restructuring would more clearly delineate of the activities of each committee and balance workload. The Activities Review Group will present a more detailed report to Council in February. Council also agreed that Communications should be considered by the Activities Review Group as well, with the possibility of removing public engagement from the remit of the Education Committee.

Other agenda items of note included a report from the Treasurer describing, among other things, the LMS's recent property in-

vestments; a full financial report was of course also given later at the AGM. Council also heard from Vice-President Brown that HEFCE had announced the launch of a consultation in November 2016 on the next REF, though this has since been postponed. Council will be contacted for further discussion as soon as the consultation goes live.

A substantial portion of the meeting was devoted to a presentation by Alan Wilson, Chief Executive of the Alan Turing Institute. Professor Wilson discussed the current staffing of the ATI, its programme activities, and funding bodies. He also noted some challenges facing the ATI, including the full representation and integration of the mathematical sciences amongst its strategic priorities (Engineering, Technology, Defence and Security, Smart Cities, Financial Service, and Health and Wellbeing), and ensuring that ATI exists as a truly national organisation. A number of interesting points were raised in subsequent discussion, including the extent of scope for resident mathematicians at ATI, the appeal of calls for Research Fellows to

mathematicians, and the level of engagement between ATI and individual departments within institutions, an area in which Alan Wilson felt the LMS could be a key asset.

The meeting closed with Council offering

thanks to members leaving Council: David Evans and Beatrice Pelloni, and we dispersed to find our way to the BMA for the AGM and an enjoyable afternoon of mathematics.

Tara Brendle

DE MORGAN HOUSE

On 16 February 2017, the London Mathematical Society will have been at De Morgan House (DMH) for 19 years. The Society moved from its previous premises in Burlington House and purchased the long leasehold on 57–58 Russell Square in 1998, renaming the property in honour of the first LMS President, Augustus De Morgan.

Initially housing only a handful of LMS staff, the six-level Grade II listed twin Georgian terraces were chosen for three main reasons: their proximity to the LMS Library at UCL; to allow room to expand the LMS administration; and to serve as a fitting and prestigious meeting space and headquarters for the Society.

Some space on the upper floors is used for commercial tenancies and today there is a full house of five commercial tenants, ranging from other mathematical bodies to city investment companies.

The largest project undertaken since occupying the building was the 2005 redevelopment of the lower-ground floor to create a suite of conference facilities. The project was completed and the new facilities launched in 2006. Now in its eleventh year of operation, DMH Conference Facilities is a well-established central London venue partnered with one of the capital's leading catering companies. It hosts events of all shapes and sizes, from small boardroom meetings to larger training days, product launches and summer receptions in the garden. Of course, one of the main purposes of the space is use by the Society, and the Conference Facilities still hosts all LMS Council and Committee meetings and many more LMS events. The Society offers support to similar mathematical bodies with significant discounts

on the conference facilities, meaning that the LMS hosts many mathematical meetings and events in addition to its own.

For the past six years, the LMS has taken part in Open House London, welcoming over 2,000 visitors in total. This event takes place annually in September, with buildings of architectural interest opening their doors to the public. Open House has seen up to 400 visitors in one day coming to view DMH, in particular the original fireplaces and high ceilings.

One room at DMH is still kept as a Member's Room and is named after mathematician Samuel Verblunsky. The room is intended as a place to meet, study, read and go online. All members are encouraged to visit DMH, use the facilities, attend its events, try the meeting rooms and see the fine building the Society is fortunate to call home.

Dominic Clark
Group Head, Conferences & Building
London Mathematical Society



De Morgan House



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LMS PRIZES 2017

CALL FOR NOMINATIONS

The London Mathematical Society welcomes nominations for the 2017 prizes, to recognise and celebrate achievements in and contributions to mathematics.

In 2017, the LMS Council expects to award:

PÓLYA PRIZE is awarded in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom.

SHEPHARD PRIZE is awarded to a mathematician or mathematicians for making a contribution to mathematics with a strong intuitive component which can be explained to those with little or no knowledge of university mathematics, though the work itself may involve more advanced ideas.

SENIOR WHITEHEAD PRIZE – grounds for the award may include work in, influence on or service to mathematics, or recognition of lecturing gifts in the field of mathematics

NAYLOR PRIZE AND LECTURESHIP IN APPLIED MATHEMATICS – grounds for the award may include work in, and influence on, and contributions to applied mathematics and/or the applications of mathematics, and lecturing gifts.

SENIOR ANNE BENNETT PRIZE – grounds for the award are work in, influence on or service to mathematics, particularly in relation to advancing the careers of women in mathematics.

WHITEHEAD PRIZES – for work in and influence on mathematics.

BERWICK PRIZE is awarded to the author(s) of a definite piece of research actually published by the Society during the eight years ending on 31 December 2016.

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

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

Closing date for nominations: Tuesday 24 January 2017



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Mathematical Research



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LMS RESEARCH SCHOOLS CALL FOR PROPOSALS

The London Mathematical Society invites proposals for Research Schools to be held in the UK in 2018.

Up to £20,000 is available per Research School which provides training for young researchers in a core area of mathematics. The new series of courses builds on the research schools, previously supported by the Society and Clay Mathematics Institute, and aims at the highest international standing by allowing for support of both international lecturers and participants. The Research Schools are also supported by the Heilbronn Institute for Mathematical Research.

Prospective organisers should send an outline proposal to Elizabeth Fisher (Research.Schools@lms.ac.uk) by **31 January 2017**.

Outline proposals should discuss:

- The general mathematical area of the proposed Research School and its importance.
- The aims of the Research School, its appropriateness to the Research School programme and the likely level of demand for the Research School.
- The names and affiliations of the lecturers, titles of their courses and brief syllabuses.
- The provision for tutorial support.

Outline proposals should be no more than two A4 sides in length.

For further details about the Research Schools, please visit the Society's website: www.lms.ac.uk/events/lms-research-schools.

A list of previously supported Research Schools and Short Courses can be found at: www.lms.ac.uk/events/past-research-schools-and-short-courses.

Before submitting: Organisers are welcome to discuss informally their ideas with the Chair of the Research Meetings Committee, Professor Chris Parker (RMC.Chair@lms.ac.uk).



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London Mathematical Society Undergraduate Research Bursaries in Mathematics 2017

Nature of Awards

The purpose of the awards is to give experience of research to undergraduates to explore the potential of becoming a researcher and to encourage them to consider a career in scientific research.

The awards provide support for the student at a rate of £180 per week (or £190 per week in London), for a period of between 6 and 8 weeks.

The closing date for receipt of applications is 5pm Thursday 16 February 2017.

Eligibility

- Students may only take up the award during the summer vacation between the **intermediate years (i.e. 2/3, 2/4 or 3/4)** of their undergraduate degree. Students in the final year of their degree intending to undertake a taught Masters degree immediately following their undergraduate degree may apply. Applications on behalf of first-year undergraduates will not be considered.
- Researchers in Mathematics at universities and research institutions within the UK are eligible to apply. Interdisciplinary projects will be considered providing the project has significant mathematical content.
- **Postdoctoral researchers and new lecturers**, early in their careers are also encouraged to apply, and should note this on the application form.
- Only **one** application should be submitted by a supervisor.
- **Departments are asked to provide match-funding for half of the grant awarded** (for example, for a 6 week grant at £180 per week, departments will be asked to contribute £540 and the Society will contribute £540). Departments offering match-funding will be able to receive funding for up to 4 half-funded Bursaries. Departments not willing to provide match-funding will only be able to receive funding for up to 2 Bursaries. Please bear in mind that this is a national scheme with a limited number of bursaries.
- **Mature students** are eligible to apply, but must not have a previous degree in any subject.
- Students will normally be expected to be on track for a first class degree in order to be considered.
- Students must be **registered at a UK institution** for the majority of their undergraduate degree.
- Supervisors and students do not necessarily have to be based at the same institution, however we expect that they will work together at the same institution for the duration of the project and have regular meaningful personal contact (an average of 1 hour per week meeting in person is the minimum expected).
- Bursaries will not be awarded for projects that are a part of degree work, or that take place overseas for more than 50% of the project time.
- Bursaries will only be granted for the student named on the application form; awards are not transferable between students.

How to apply

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

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

LMS HARDY LECTURESHIP TOUR 2018

Nominations Sought



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The Society is seeking nominations for a Hardy Lecture Tour in 2018.

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

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

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

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

The Hardy Lectureship is not restricted to mathematicians working in any specific area of mathematics.



Jacob Lurie (Harvard) 2016 Hardy Lecturer

Previous lecturers include: 2016 **Jacob Lurie** (Harvard), 2015 **Nalini Joshi** (Sydney), 2014 **Percy Deift** (NYU), 2012 **Etienne Ghys** (Lyon).

The London Mathematical Society will fund:

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

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

Nominations must have the support of the host department(s), and should be sent by the Head of Department to the Programme Secretary (lmsmeetings@lms.ac.uk). The closing date for proposals is **31 January 2017**.

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

MATHEMATICS POLICY ROUND-UP

January 2017

RESEARCH

Increased funding for R&D

In its Autumn Statement the government announced that there would be increased funding for science R&D. The exact details of how the money will be spent have not been announced. The following information was outlined in the Statement.

'Research and Development (R&D) is a key driver of economic growth and is a vital part of the government's Industrial Strategy. To help boost UK productivity the NPIF will provide an additional £4.7 billion by 2020-21 in R&D funding. This extra £2 billion a year by the end of this Parliament is an increase of around 20% to total government R&D spending, and more than any increase in any Parliament since 1979. Through the National Productivity Investment Fund (NPIF) the government will fund:

- Industrial Strategy Challenge Fund – a new cross-disciplinary fund to support collaborations between business and the UK's science base, which will set identifiable challenges for UK researchers to tackle. The fund will be managed by Innovate UK and research councils. Modelled on the USA's Defense Advanced Research Projects Agency programme the challenge fund will cover a broad range of technologies, to be decided by an evidence-based process.
- Innovation, applied science and research – additional funding will be allocated to increase research capacity and business innovation, to further support the UK's world-leading research base and to unlock its full potential. Once established, UKRI will award funding on the basis of national excellence and will include a substantial increase in grant funding through Innovate UK.'

More information is available at <http://tinyurl.com/he8dkm9>.

Leaving the EU: Implications and opportunities for science and research

The House of Commons Science and Technology Committee has published its report titled *Leaving the EU: implications and opportunities for science and research*. Details available at <http://tinyurl.com/zhjb5b>.

Amongst other points the committee has demanded that the government 'should make an immediate commitment to exempt EU scientists and researchers already working in the UK from wider potential immigration controls'.

SCHOOLS AND COLLEGES

The Trends in International Maths and Science Study (TIMSS)

The study for 2015 shows that East Asian countries are maintaining their 20 year lead for students aged 10 and 14.

The study is published by the International Association for the Evaluation of Educational Achievement (IEA), the study is the longest running, large scale international assessment of mathematics and science education in the world

In the latest TIMSS tests, England has fallen by one place in mathematics at both primary level, from ninth to 10th, and secondary level, from 10th to 11th. Northern Ireland has improved to sixth at primary level. More information is available at <http://tinyurl.com/z8tldp>.

High-quality ITE for all teachers of mathematics

The Advisory Committee on Mathematics Education (ACME) published its report, *Beginning teaching: best in class?* in 2015.

Two leaflets are now available for ITE providers and STEM policymakers that summarise the key messages. More information is available at <http://tinyurl.com/jek2qsq>.

Closing the STEM skill gap

The House of Commons Science and Technology Committee has launched an inquiry to look at closing the STEM skills gap. Throughout its recent inquiries, the Science and Technology Committee has repeatedly received evidence that the UK is facing STEM skill shortages, often in key growth sectors, like big data.

The Committee is inviting written evidence on measures that organisations, businesses, schools, colleges and individuals have taken to close the STEM skills gap. These could include, but are not limited to, apprenticeships, vocational courses, mentoring, teacher placements in industry and establishing links between business and schools and colleges.

Submissions should outline:

- the STEM skills that were needed but were found to be in short supply or missing;
- how this particular skills need has been addressed, including specific details of the measures introduced (eg whether

the measures are focused on developing generic skills (such as management), sector-specific skills or raising awareness, how they have been implemented and delivered, and how many people have taken/are currently taking part);

- the cost of the measures and how they have been funded; and
- the results of any evaluation of the measures/schemes introduced.

The closing date for written submissions is **Friday 13 January 2017**. More information is available at <http://tinyurl.com/zg426oy>.

My Science Inquiry

The House of Commons Science and Technology Committee has decided to create an open opportunity for the science community and the wider public to suggest science and technology areas for scrutiny. More information is available at <http://tinyurl.com/hakkugm>.

Dr John Johnston
Joint Promotion of Mathematics

L'ORÉAL UK & IRELAND FELLOWSHIPS FOR WOMEN IN SCIENCE 2017

Applications now open

Over 18 years ago, L'Oréal and UNESCO founded the For Women in Science programme to promote and highlight the importance of ensuring greater participation of women in science.

Each year, the International Programme recognises the achievements of exceptional female

scientists and awards them with fellowships to help further their research. In 2017, five awards of £15,000 each, will be offered to outstanding

female post-doctoral researchers in the UK and Ireland. Adjudicated by a panel of eminent scientists, the fellowships can be used in any number of ways - from purchasing new equipment to paying for childcare costs - to enable women scientists to further their careers and facilitate world class research. In total more than 2,000 women in over 100 countries have been recognised for their research and received funding to further their studies.

The Fellowship is in partnership with the UK National Commission for UNESCO and the Irish National Commission for UNESCO, with the support of The Royal Society.

Applications close on **Wednesday 25 January 2017**. Apply now at www.womeninscience.co.uk.



SOMERVILLE TO FEATURE ON THE SCOTTISH £10 NOTE

In 2017 the Royal Bank of Scotland (RBS) will release into circulation a £10 note featuring a portrait of Mary Somerville, and a quote from her publication *On the Connexion of the Physical Sciences*.

In December 2015 it was announced that the person to appear on the new Scottish polymer £10 note would be selected by the public; over one hundred Scottish figures who had contributed to science and innovation were nominated. Mary Somerville, Thomas Telford and James Clerk Maxwell made up the short list, from which Somerville was chosen by a public vote on the RBS Facebook page in February of last year.

Mary Fairfax (later Somerville) was born in Jedburgh on 26 December 1780. She grew up in Burntisland, Fifeshire, where she loved to explore the coast and investigate the local sea and plant life. As a young teenager she discovered a most curious puzzle, published in a monthly magazine alongside pictures of ladies' dresses, which involved 'strange looking lines mixed with letters, chiefly X's and Y's' [1, Pg. 37]. At the time, Somerville was only able to discover the name of this unusual new mathematics: 'Algebra'. As testament to her determination and tenacity, without any encouragement whatsoever Somerville proceeded to obtain a copy of Euclid's *Elements* and begin her mathematical studies.

In 1813 Somerville began corresponding with William Wallace, Mathematical Master at the Royal Military College; under his guidance, at the age of 33, she began her studies of French analysis. This would lead in 1831 to the publication of *Mechanism of the Heavens*, a translation and elucidation of Laplace's *Mécanique Céleste*. This pioneering text utilised the work of Poisson and



others to modernise the work of Laplace, and introduced it to a British audience. Her book was so technically advanced that it was immediately introduced as a recommended text for the most highly achieving students at the University of Cambridge.

Somerville went on to publish works in most branches of scientific discovery, and throughout her life she corresponded with some of the most influential scientists and mathematicians of the time. Her love of mathematics continued until the day she died, aged 91, when she revised her original work *On the Theory of Differences*, a treatise on the differential calculus which was never published.

Somerville wrote in her memoirs 'I was conscious that I had never made a discovery myself, that I had no originality... That spark from heaven is not granted to the sex [women]' [1, Pg. 145]. Such negative opinions of women impacted Somerville throughout her life, and continue to impact mathematicians today. Thus it is fantastic that we are now able to begin recognising and appreciating Somerville's contributions to science in such a visible and exciting way.

Brigitte Stenhouse
Somerville College, Oxford

References

[1] McMillan, D., Ed. *Queen of Science, Personal Recollections of Mary Somerville*, Canongate Classics, 2001.

SUBLIME SYMMETRY

A fascinating exhibition showcasing the intricate mathematical patterns behind William De Morgan's ceramic designs

Friday 9 December 2016 saw the official opening of the exhibition *Sublime Symmetry - The Mathematics behind De Morgan's Ceramic Designs* organised by the De Morgan Foundation at the New Walk Museum and Gallery in Leicester, which features mathematically inspired ceramic tiles and pottery by Victorian Arts and Crafts ceramic artist William De Morgan (1839-1917). De Morgan was the son of Augustus de Morgan (1806-1871), one of the leading mathematician and logician of his time and the founding president of the London Mathematical Society. The exhibition not only showcases some of the most extraordinary ceramic objects of De Morgan, but also thoroughly manages to illustrate his intricate designs based on deep mathematical insights into the two and three dimensional pattern making processes. Many of the featured designs of the exhibited ceramics are the result of de Morgan's preoccupation with complicated symmetrical patterns he first saw in medieval, Indian and Islamic tiles and pottery as well as of his own love for geometry initiated through his father. Some of the exhibits even seem to point all the way to M.C. Escher's mathematically influenced art works.

De Morgan's ceramics harmoniously display beauty and symmetry and single him out as an outstanding Victorian designer with extraordinary mathematical skills. The exhibition

certainly will attract mathematicians and art lovers alike.

The opening ceremony featured introductions and greetings by Sarah Levitt (Head of Arts and Museums, Leicester City Council), Jean McMeakin (Chair of the Trustee Board of the De Morgan Foundation), Piara Singh Clair (Councillor and Assistant City Mayor of Leicester), Sarah Hardy (Exhibition Curator, De Morgan Foundation) and Frank Neumann (Department of Mathematics, University of Leicester and LMS representative).

The exhibition, which is also partially supported by the LMS is touring the country and was shown already in Burnley, Barnsley and Torbay. It will be in Leicester until 4 March 2017 after which it can be seen for a final period from 12 March to 3 September 2017 at the William Morris Gallery in Walthamstow. The entrance is free and there are many local educational outreach activities planned throughout the exhibition periods. Especially mentioned should be the upcoming *Sublime Symmetry Symposium: Celebrating William De Morgan and synergies between mathematics and art* organised by the De Morgan Foundation on 13 January 2017 at De Morgan House, the LMS headquarter at Russell Square in London (see page 50).

Frank Neumann
University of Leicester



Bull Vase, decorated by Joe Juster. The tails of the bulls wrap around the handles.



Symmetrical tile panel, based on an Indian design.



Jean McMeakin, Sarah Hardy, Piara Singh Clair, Sarah Levitt, Frank Neumann



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Microlocal Analysis and Applications

LMS-CMI Research School

Cardiff

26 June – 1 July 2017

Organisers: S. Eswarathan (Cardiff), C. Guillarmou (ENS, Paris), R. Schubert (Bristol)

Microlocal analysis is a study of partial differential equations through the lens of symplectic geometry and Fourier analysis. The field has a wide range of applications towards, and not limited to, spectral theory, scattering theory, inverse problems, and dynamical systems. The purpose of this school is to introduce graduate students and young researchers to both its foundations and recent applications.

Lecture Courses

Alexander Ströhmaier (Loughborough) & **Jared Wunsch** (Northwestern University)

Basic ideas in Microlocal Analysis

Stephane Nonnenmacher (Université de Paris-Sud, 11) & **Andrew Hassell** (Australian National University)

Scattering Theory and Spectral Theory

Viviane Baladi (Institut de Mathématiques de Jussieu) & **Colin Guillarmou** (Ecole Normale Supérieure, Paris)

Pollicott-Ruelle Resonances, Mixing in Dynamical Systems, and X-ray Transform

These lecture courses will be supplemented by tutorial sessions.

Distinguished Speakers

Maciej Zworski (Spectral Theory, University of California, Berkeley), Gunther Uhlmann (Inverse Problems, University of Washington, Seattle), Mark Pollicott (Dynamical Systems, University of Warwick)

A website with further information will be available by December 2016.

Apply online (www.surveymonkey.co.uk/r/RS-32-MicrolocalAnalysis) by **31 March 2017**. Research students, post-docs and those working in industry are invited to apply.

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

Fees

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

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

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

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

Fees are not payable until a place at the Research School is offered but will be due by 26 May 2017.



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New Trends in Representation Theory - The Impact of Cluster Theory in Representation Theory

LMS-CMI Research School

University of Leicester

19-23 June 2017

Organisers: Karin Baur (U Graz) and Sibylle Schroll (Leicester)

The focus of the course is on recent advances that have emerged in representation theory through cluster theory: n -representation theory, integrable systems and friezes, and silting and infinite dimensional representations. These areas of mathematics are enriched by their interactions with other areas of mathematics such as category theory, dynamical systems and mathematical physics.

Lecture Courses

Peter Jorgensen (Newcastle) *n-representation theory*

Sophie Morier-Genoud (Paris) *Integrable systems and friezes*

Lidia Angeleri-Hügel (Verona) *Infinite dimensional representations*

These lecture courses will be supplemented by tutorial sessions.

Guest lectures: **M. Herschend** (Uppsala), **P.-G. Plamondon** (Orsay) and **M. Prest** (Manchester)

For further information, please visit: <https://sites.google.com/site/clustertheoryinrepththeory/>

Apply online (www.surveymonkey.co.uk/r/RS-28-NewTrendsInRepresentationTheory) by **24 March 2017**. Research students, post-docs and those working in industry are invited to apply.

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

Fees

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

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

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

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

Fees are not payable until a place at the Research School is offered but will be due by 19 May 2017.



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LMS INVITED LECTURER 2017

Professor Jim Agler (UCSD)

Function Theory by Hilbert Space Methods

18-22 April 2017, Herschel Building, Newcastle University

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

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

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

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

Guest Lectures

There will also be supplementary lectures by:

Professor John McCarthy (Washington University in St. Louis, USA)

Research interests: Analysis, especially Operator Theory and one/several Complex Variables

Associate Professor Greg Knese (Washington University in St. Louis, USA)

Research interests: Complex Function Theory, Operators, Harmonic Analysis

Assistant Professor Kelly Bickel (Bucknell University, Lewisburg, PA, USA)

Research interests: Multivariate Operator Theory, Several Complex Variables, Harmonic Analysis

Accommodation, Travel Funding and Registration

Accommodation will be provided at the Osborne Hotel.

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

1 April 2017.

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



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CECIL KING TRAVEL SCHOLARSHIP

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

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

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

Applications should be made using the form available on the Society's website (<https://www.lms.ac.uk/prizes/cecil-king-travel-scholarship>) or by contacting education@lms.ac.uk. The closing date for applications is **Friday 31 March 2017**. It is expected that interviews will take place in London in late May or early June.

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

The London Mathematical Society is a registered charity for the promotion of mathematical knowledge.

MATHEMATICAL LIMERICK

A highlight of the MathsJam recreational mathematics conference in November 2016 was a limerick written and presented by the puzzle expert Laurie Brokenshire. We are grateful to Laurie for permission to publish his limerick.

An exotic mathematical dancer
Wore a one-sided dress to enhance her.
When asked to let rip
And do a Möbius strip,
She simply de-Kleined to answer...

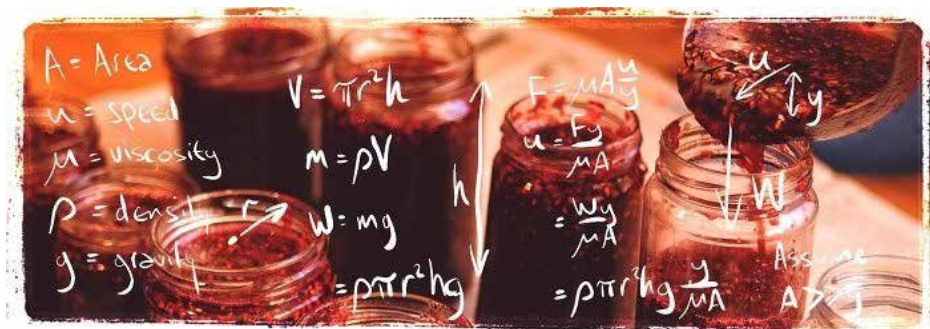
MATHSJAM

MathsJam is a monthly opportunity for like-minded self-confessed maths enthusiasts to get together in a pub and share stuff they like: puzzles, games, problems, or just anything they think is cool or interesting.

MathsJam meet on the second to last Tuesday of every month, from 7 pm in the evening. Events happen simultaneously in locations around the UK (and the world!) For more

details of local events visit the website at <http://tinyurl.com/hnfulzv>. You can follow the activity by looking at the @MathsJam twitter feed.

There is also an annual MathsJam conference, over a weekend usually in early November, where a succession of "lightning talks" presents a wide range of interesting mathematical ideas. See <http://mathsjam.com/conference> for more information.



IMU BREAKOUT GRADUATE FELLOWSHIPS

Thanks to a generous donation by the winners of the *Breakthrough Prizes in Mathematics* – Ian Agol, Simon Donaldson, Maxim Kontsevich, Jacob Lurie, Terence Tao and Richard Taylor – the International Mathematical Union (IMU) with the Friends of the IMU and The World Academy of Sciences last April launched a fellowship program to support post-graduate studies in a developing country leading to a PhD degree in the mathematical sciences. The 2016 recipients of fellowships are:

- **Do Thai Duong** a Vietnamese PhD student at the Institute of Mathematics of the Vietnam Academy of Science and Technology
 - **María Alejandra Ramírez Luna** a Colombian PhD student at the Universidad del Valle, Colombia
 - **Abebe Regassa Tufa** an Ethiopian PhD student at the University of Botswana
- For more information see www.mathunion.org/cdc.

RAMANUJAN PRIZE 2017

Call for Nominations

The Ramanujan Prize for young mathematicians from developing countries has been awarded annually since 2005. The Prize is funded by the Department of Science and Technology of the Government of India (DST). It is administered jointly by the Abdus Salam International Centre for Theoretical Physics (ICTP), the International Mathematical Union (IMU) and the DST.

The Ramanujan Prize is usually awarded to

one person, but may be shared equally among recipients who have contributed to the same body of work. The Prize is awarded annually to a researcher from a developing country who is less than 45 years of age on 31 December of the year of the award, and who has conducted outstanding research in a developing country.

Nominations can only be made by using the online system at <http://tinyurl.com/j587vf6>. The deadline for nominations is **1 February 2017**.

EUROPEAN NEWS

ERC consolidator grants

A call for the next round of European Research Council (ERC) consolidator grants has been issued: the deadline for applications is **9 February 2017** (before the likely Brexit date!). See <https://erc.europa.eu/consolidator-grants>.

Research visits in Africa

The Committee for Developing Countries (CDC) of the European Mathematical Society (EMS), with the support of the Simons Foundation, has set up a programme of research visits to foster research opportunities for young and estab-

lished researchers in Africa. The programme is open to all areas of pure and applied mathematics and statistics and it is directed to fellows based in Africa. See www.euro-math-soc.eu/ems-simons-africa.

EMS Newsletter

The December 2016 edition of the Newsletter is now available online, featuring interviews with Sir Michael Atiyah and Ernest Borisovich Vinberg. See www.euro-math-soc.eu/newsletter.

David Chillingworth
LMS/EMS Correspondent

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Example: see page 42.

Further details, including format and dimensions, are at <http://newsletter.lms.ac.uk/rate-card/>



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SPITALFIELDS DAY 2017

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 **31 January 2017**. Subsequent deadlines are 15 May and 15 September 2017. Please note the Society cannot fund events retrospectively so applicants are advised to apply well in advance of the event.

Previously supported Spitalfields Days have included:

2015

York *Mathematics of Quantum Uncertainty: New Advances and Prospects*

- Pekka Lahti (Turku, Finland)
- Reinhard Werner (Hannover, Germany)
- Madalin Guta (Nottingham)
- Paul Busch (York)

2014

INI, Cambridge *Theory of Water Waves*

- Mark Groves (Loughborough, Saarland)
- Guido Schneider (Stuttgart)
- Steve Shkoller (Oxford)
- Eugene Varvaruca (Reading)



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Christopher Zeeman Lecture and Medal Presentation

Rob Eastaway

Wednesday 22 March 2017 at 6.00 p.m. followed by a reception
at The Royal Society, Carlton House Terrace,
London, SW1Y 5AG
Registration will open at 5.30 p.m.

Maths, Teamwork and Googlies



Abstract: Maths is usually regarded as a solo activity, yet some of the richest mathematical experience can come from collaboration: think of Hardy and Ramanujan...Lovelace and Babbage... Duckworth and Lewis. Rob Eastaway takes a light-hearted look back at some of his own mathematical partnerships that have explored games, puzzles, mathematical modelling of everyday life... and even (a little bit of) cricket.

Rob Eastaway will give the Christopher Zeeman Lecture and be presented with the Christopher Zeeman Medal, which is awarded biennially by the Institute of Mathematics and its Applications and the London Mathematical Society.

Admission to the lecture and reception is by ticket only.

For tickets please contact Alison Penry at the IMA, Catherine Richards House, 16 Nelson Street, Southend-on-Sea, SS1 1EF or email alison.penry@ima.org.uk by **1 March 2017**. Tickets are free of charge and will be allocated on a first come, first served basis.

Please confirm whether you wish to attend the lecture and reception, or the lecture only.

RECORDS OF PROCEEDINGS AT LMS MEETINGS

ANNUAL GENERAL MEETING AND SOCIETY MEETING

11 NOVEMBER 2016

at the British Medical Association House, London. About 100 members and visitors were present for all or part of the meeting.

The meeting began at 3:00 pm, with the President, Professor Simon Tavaré, FRS, in the Chair. Members who had not yet voted were invited to hand their ballot papers to the Scrutineers, Professors Chris Lance and Rodney Sharp.

The Vice-President, Professor John Greenlees, presented a report on the Society's activities and the President invited questions.

The Treasurer, Professor Robert Curtis, presented his report on the Society's finances during the 2015-16 financial year and the President invited questions.

Copies of the Trustees Report for 2015-16 were made available and the President invited members to adopt the Trustees Report for 2015-16 by a show of hands. The Trustees Report for 2015-16 was adopted.

The President proposed Messrs Kingston Smith be re-appointed as auditors for 2016-17 and invited members to approve the re-appointment by a show of hands. Messrs Kingston Smith were re-appointed as auditors for 2016-17.

Thirty people were elected to Ordinary Membership: Julio Andrade, Ginestra Bianconi, Laura Ciobanu, Emilie Dufresne, Raluca Eftimie, Radek Erban, Bharat Gajaria, Julia Gog, Narges Haghi, Heather Harrington, Muhammad Kamran Jamil, Azadeh Khaleghi, Lisa Lambert, Gandalf Lechner, Benjamin Martin, Ime Nkana, John Orr, Roberto Pagliari, Ratana Peang, Clelia Pech, Nansen Petrosyan, Elisa Postinghel, Filip Rindler, Carola-Bibiane Schönlieb, Lubna Shaheen, Simon Smith, Awais Talib, Anitha Thillaisundaram, Ivan Tyukin, Ittay Weiss and Simon Wood.

Eighty-six people were elected to Associate Membership: Mohammed Abdulameer, Michael Adamer, Andrew Allan, Christos Aravanis, John Armitage, Vahagn Aslanyan, Anvarbek Atayev, Nikolaos Athanasiou, Emma Bailey, Francesca Balestrieri, Raghvendra Bansal, Tobias Barker, Bartosz Bartmanski, Jamie Beacom, Joshua Boddy, James Cann, Matteo Capoferri, Aurelio Carlucci, Paisley-Mae Carter, Matteo Casati, Jonathan Chetwynd-Diggle, Joshua Ciappara, Cristiana De Filippis, Philip Dittmann, Sukru Ugur Efem, Tim Espin, Sebastian Eterovic, Elia Fioravanti, Marc-Antoine Fiset, James Foster, Kelli Francis-Staite, Josephine French, Hadleigh Frost, Gyorgy Pal Geher, Franz Gmeineder, Eloise Hamilton, Emmet Haverty-Stacke, Joshua Jackson, Ellen Jolley, Alissa Kamilova, Sungkyung Kang, Adam Keilthy, Gull e Zahra Khan, Kristian Kiradjiev, Dominik Kobos, Attila Kovacs, Matthew Lau, Jiawei Li, Alex Margolis, Alejandro Martinez, David Kohan Margzgão, Richard Mathers, Avi Mayorcas, Houry Melkonian, Natasha Morrison, Elena Natterer, Sina Nejad, Abraham Ng, Chris Nicholls, Shaun Chen Yang Ong, Nina Otter, Edmund Adam Paxton, Imanol Perez, Noemi Picco, Samara Pillay, Adam Proszinski, Ali Raza, Asbjørn Nilsen Riseth, Craig Robertson, Caoimhe Rooney, Carlos Alfonso, Ruiz Guido, Sanam Sachdeva, Thomas Santoli, Simon Schulz, Hasan Shlaka, Sukhdev Singh, Ioan Stanciu, Grigalius Taujanskas, David Thomas, Joe Thomas, Mary Thoubaan, Jonathan Tsang, Tabea Tscherpel, Federico Vigolo, Eleanor Walker, Aled Walker, Ruoyi Wang, Yixuan Wang, Timothy Westwood, Nicholas Wilkins, Weiye Yang and Filip Zivanovic.

Seven people were elected to Reciprocity Membership: Frederick Dashiell, Jr, André Erhardt, Manish Gupta, Geoff Prince, Steven Rayan, Catherine Roberts and Thomas Ross White.

Seventy-three people were elected to Associate Membership for Teacher Training Scholars: Hina Adham, Howard Adkins, Sumaya Ahmed, Priyanka Ambasana, Lucy Arnold, Amanda Arthur, Christopher Baker, Kurtis Bateman, Prina Bhandari, Jacob Blair, Alaistair Brown, Diarmuid Browne, Zara Carey, Aimee Carmichael, Jessica Clifton, Kelly Cui Edwards, Amalee Dassanayake, Andrew Doyle, Keith Doyle, Zahras Duwahir, Max Fawcett, Shaun Fields, Rebecca Foxcroft, Alex Funnell, Andrea Galinho, Damien Gow, Lee Griffiths, Edward Hamilton, Hannah Hide, Sophie Hill, Jennifer Holmes,

Liam Hoy, Umar Hussain, Domna Idomenea, Ian Jepson, Joy Kalombo, Anita Lala, Rhianna Legg, Claire Little, Daniel Lloyd, Helena Mandleberg, Chloe Martin, David Maw, Iain Messenger, Luke Moores, Emily Morgan, Dorottya Nemeth, Rebecca New, Annalisa Occhipinti, Folakemi Omowumi, Claudette Oxford-Campbell, James Paterson, Rebecca Pearce, Simon Pegg, Barbara Pellegrino, Daniel Portelli, Kevin Pritchard, Abiramy Rajeswaran, Lewis Ramster, Rebecca Reed, Niamh Regan, Ellie Rendle, Muhammad Mudassar Saeed, Tara Saleh, Kizi Scott, Alyssa Severns, Ella Shaw, Kirstee Simmons, Harrison Smith, Liam Smith, Olivia Swinscoe, Sally Tattersall, Amelia Taylor, Michael Thompson, Lara Timmins, Jonathan Turley, Michael Walden, Emily Wildig, Jack Wood, Destina Yagmur and Wojcieh Zaremba.

Eleven members signed the book and were admitted to the Society.

The President, on Council's behalf, presented certificates to the 2016 Society Prize-winners:

De Morgan Medal: Professor Sir Timothy Gowers, FRS (Cambridge)

Fröhlich Prize: Professor Dominic Joyce, FRS (Oxford)

Whitehead Prizes: Dr Arend Bayer (Edinburgh) and Dr Carola-Bibiane Schönlieb (Cambridge)

Whitehead Prizes were also awarded to Dr Gustav Holzegel (Imperial College) and Dr Jason Miller (Cambridge) at the Annual Dinner.

Anne Bennett Prize: Dr Julia Wolf (Bristol)

A Senior Berwick Prize was jointly awarded to Dr Keisuke Hara of Mynd Inc and Professor Masanori Hino of the University of Kyoto. However, they were unable to collect their certificates and so their certificates have been sent to them.

Professor Alan R. Champneys, University of Bristol, gave a lecture on *Bumps, blips and bulges; the theory of localised pattern formation*.

After tea, Professor Lance announced the results of the ballot. The following Officers and Members of the Council were elected.

President: Simon Tavaré

Vice-Presidents: Ken Brown, John Greenlees

Treasurer: Robert Curtis

General Secretary: Stephen Huggett

Publications Secretary: John Hunton

Programme Secretary: Iain A. Stewart

Education Secretary: Alice Rogers

Members-at-Large of Council (for 2 year terms): Alexandre Borovik, Tara Brendle, Francis W. Clarke, David E. Evans, Cathy Hobbs and Sarah Zerbes

Member-at-Large (Librarian): June Barrow-Green

Five Members-at-Large who were elected for two years in 2015 have a year left to serve: Tony Gardiner, Sam Howison, Diane MacLagan, Gwyneth Stallard and Alina Vdovina.

The following were elected to the Nominating Committee: Simon R. Blackburn (1-year term), Roger Heath-Brown (3-year term), Marta Mazzocco (2-year term) and Ulrike Tillmann (3-year term). The continuing members of the Nominating Committee are: John Toland (Chair), Sarah Rees and Alex Wilkie. Council will also appoint a representative.

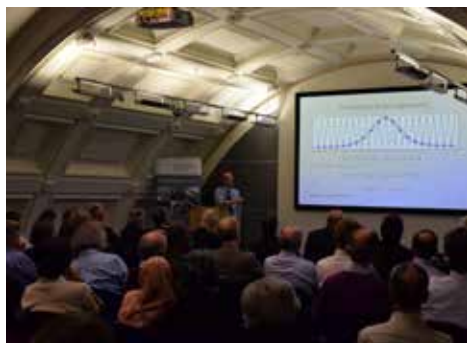
Professor S. Jon Chapman (Oxford) gave the Naylor Lecture 2016 on *Asymptotics beyond all orders: the devil's invention?*

Before closing the meeting, Professor Tavaré thanked the retiring members of Council and welcomed the President Designate; Professor Caroline Series, FRS.

Professor Tavaré also thanked the speakers at the Graduate Student Meeting in the morning; Philippe Trinh (Oxford) and Chris Howls (Southampton), and congratulated the winners of the Graduate Student Talk Prizes; Joe Bailey (Essex) and Houry Melkonian (Heriot-Watt).

After the meeting, a reception was held at BMA House in the Snow Room, followed by the Annual Dinner, which was held in the Paget Suite at BMA House and attended by 80 people.

LMS ANNUAL GENERAL MEETING: 11 NOVEMBER 2016



Jon Chapman (Oxford), Naylor Lecture 2016 on *Asymptotics beyond all orders: the devil's invention?*



Alan Champneys (University of Bristol) lecture on *Bumps, blips and bulges; the theory of localised pattern formation*

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Timothy Gowers, FRS (Cambridge) presented with the De Morgan Medal



LMS President Designate Caroline Series
Ola Tornkvist LMS Editorial Manager



LMS Vice-President, Professor John Greenlees, presenting a report on the Society's activities



LMS Treasurer, Rob Curtis, presenting his report on the Society's finances during the 2015-16 financial year

LMS GRADUATE STUDENT MEETING

Report

As a graduate student, I was given the opportunity to present some of my research in a short talk at the London Mathematical Society Graduate Student Meeting which was held on 11 November 2016 in London, prior to the Naylor Lecture in the afternoon, and during which I was awarded an LMS prize for the best talk. The meeting was targeting graduate researchers as well as other mathematicians from different mathematical backgrounds. The meeting provided an outstanding, informative, and very well organised environment, together with an opportunity to network, learn, and discuss some of the recent discoveries within different mathematical disciplines.

I am a PhD research student in Mathematics studying at the School of Mathematical and Computer Sciences at Heriot-Watt University. My research interests lie in the areas of harmonic analysis, several complex variables, and spaces of analytic functions, within which I investigate basis

and density properties of sets of dilated functions in the Banach spaces $L^r(0,1)$, for all $r > 1$. A special emphasis is placed on the case when these functions are the p -cosine functions which are defined as derivatives of the eigenfunctions p -sine of the non-linear p -Laplacian differential equation on the segment $(0,1)$, for all $p > 1$. The research conducted, together with some recent papers, has the potential to introduce a foundation of Fourier theory of p -sine and p -cosine functions which could have some useful applications in the study of non-continuous signals.

As a member of the London Mathematical Society, I encourage every graduate student to be a part of such a prominent organisation which has the potential to support mathematics as well as mathematicians for continuous professional development.

Houry Melkonian
Heriot-Watt University

VISIT OF ZBIGNIEW PALMOWSKI

Professor Zbigniew Palmowski (Wrocław University of Science and Technology, Poland) will visit the universities of Liverpool, Manchester and London School of Economics and Political Science (LSE) from 1 to 14 February 2017. Professor Zbigniew Palmowski is an internationally leading researcher in applied probability. His research covers numerous applications in finance, insurance and queueing systems. During his visit Professor Palmowski will give lectures at:

- University of Liverpool, Wednesday 1 February at 2 pm; contact Corina Constantinescu (C.Constantinescu@liverpool.ac.uk)
- University of Manchester, Wednesday 8 February at 3 pm; contact Ronnie Loeffen (ronnie.loeffen@manchester.ac.uk)
- LSE, Monday 13 February at 3 pm; contact Erik Baurdoux (E.J.Baurdoux@lse.ac.uk)

For further details contact Ronnie Loeffen (ronnie.loeffen@manchester.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF KEVIN BEANLAND

Dr Kevin Beanland (Washington & Lee University, Virginia, USA) will visit the UK in February/March 2017. Dr Beanland's area of expertise is the geometry of Banach spaces and operator theory, especially the construction of Banach spaces having very rigid structure.

During most of his visit Dr Beanland will be based at Lancaster University. He will lecture in each of the following places:

- Lancaster University, Wednesday 22 February; contact Dr Niels Laustsen (n.laustsen@lancaster.ac.uk)
- University of Cambridge, Wednesday 8 March; contact Dr András Zsák (A.Zsak@dpmms.cam.ac.uk)
- University of Warwick, Thursday 9 March; contact Dr Tomasz Kania (tomasz.marcin.kania@gmail.com)

For further details contact Dr Niels Laustsen (n.laustsen@lancaster.ac.uk). The visit is supported by an LMS Scheme 2 grant.

JOINT MEETING OF THE LONDON MATHEMATICAL SOCIETY, THE ROYAL STATISTICAL SOCIETY, AND THE FISHER MEMORIAL TRUST

Report

The 35th Fisher Memorial Lecture was this year given by Professor Nancy Reid, Professor of Statistical Sciences at the University of Toronto, as part of a day-long event entitled *Data Science: The View From The Mathematical Sciences*, held at the Royal Statistical Society's headquarters in London on 27 October 2016. The event was a joint meeting of the London Mathematical Society, the Royal Statistical Society, and the Fisher Memorial Trust.

The opening lecture was given by Professor Neil Lawrence of the University of Sheffield and was entitled *Computational Perspectives: Fairness and Awareness in the Analysis of Data*. Neil explained how the scale of modern data acquisition is presenting challenges that no single field is equipped to face and is having a direct effect on citizens and society. Neil advocated that the computational and statistical sciences unite so to provide a unified response to the challenges posed by data science.

The next lecture was given by Dr Johan Koskinen of the University of Manchester on *Generative and Estimable Models for Longitudinal Social Networks*. Johan argued that many social networks are highly complex and rarely amenable to standard statistical analysis. He outlined a novel approach to the analysis of longitudinal social networks, inspired by agent-based modelling and simulations of social processes, and illustrated this approach using a model for moves on the housing market. Johan argued that data science is what results when we are willing to eschew disciplinary boundaries in tackling the understanding of complex data.

After tea, The Fisher Lecture was given by Professor Nancy Reid and was entitled



Sir Walter Bodmer, Professor Nancy Reid

Statistical Science and Data Science: Where Do We Go From Here? Nancy is a celebrated theoretical statistician; she has won numerous prizes including the Statistical Society of Canada Gold medal and the Royal Statistical Society's Guy Medal in Silver for her path-breaking and influential paper "Parameter Orthogonality and Approximate Conditional Inference", written jointly with Sir David Cox (whom she paid tribute to at the beginning of her lecture). Nancy is Director of the Canadian Statistical Sciences Institute and is a past president of the Statistical Society of Canada. Nancy was introduced to the audience by the renowned geneticist Sir Walter Bodmer, who was himself super-

vised by Ronald Fisher at Cambridge. Sir Walter explained that the Fisher Memorial Trust was set up after Fisher died, so as to continue his legacy and to encourage and promote the discussion of genetics and statistics.

Nancy's lecture gave some interesting insights into how data science might best be introduced as an academic programme, and she recounted some of the perceptions she had encountered where "statistical science" was unfavourably compared to "big data"; the latter was associated with big machines and high-level computing whereas the former was associated with small data, and therefore less "fun". Nancy went on to describe some of the work she had carried out for the Fields Institute on "Statistical Inference, Learning, and Models for Big Data" during the first half of 2015.

Some observations from this work are that while it is difficult to predict the long-term impact of the rush to data science, there does seem to be an interesting mix of both old and new statistics involved. She noted that statistical models for big data are complex and high-dimensional; it's not just that the "n" is large, but that the "p" is also large. Nancy hoped that the area of data science will discover that the "old core" is important, and she concluded that the next "big thing" might be "smart data".

At the end of the discussion following Nancy's lecture, Nancy was presented with a silver bowl that is given to all Fisher Memorial Lecturers. A wine reception for all attendees followed.

Iain Stewart
LMS Programme Secretary

RECORDS OF PROCEEDINGS AT LMS MEETINGS

ORDINARY MEETING, 27 OCTOBER 2016

at the Royal Statistical Society (RSS) in London as a joint Meeting with the Royal Statistical Society and the Fisher Memorial Trust. Over 100 members and visitors were present for all or part of the meeting.

The meeting began at 2.00 pm with The Royal Statistical Society's President, Professor Peter Diggle, in the Chair.

Professor Diggle welcomed guests and handed over to The President of the London Mathematical Society, Professor Simon Tavaré FRS, for the welcome from the LMS.

No members were elected to Membership.

No members signed the book and were admitted to the Society.

Professor Tavaré then introduced a lecture given by Professor Neil Lawrence (Sheffield) titled *Computational perspectives: Fairness and awareness in the analysis of data*.

Professor Tavaré introduced the second lecture given by Dr Johan Koskinen (Manchester) on *Generative and estimable models for longitudinal social networks*.

Before breaking for tea, Professor Diggle invited Professor Nancy Reid (Toronto) to receive the Royal Statistical Society's Guy Medal in Silver.

After tea, The Chairman of the Fisher Memorial Trust, Professor Sir Walter Bodmer FRS, introduced the 35th Fisher Memorial Trust Lecture by Professor Nancy Reid (Toronto) on *Statistical science and data science: where do we go from here?*

After the lecture, Sir Walter presented Professor Reid with a silver bowl to commemorate her Fisher Memorial Lecture.

A reception was held at the Royal Statistical Society.

A dinner was hosted by the Fisher Memorial Trust at The Modern Pantry, Finsbury Square.

YOUNG GEOMETRIC GROUP THEORY MEETING

The sixth *Young Geometric Group Theory Meeting* will be held at the Mathematical Institute, Oxford from 20 to 24 March 2017.

Contemporary geometric group theory (GGT) encompasses diverse areas of mathematics and the aim of this meeting is to bring world-leading mathematicians in GGT together with doctoral students, post-docs and other young researchers, with mini-courses and open discussions on fundamental topics in the area, and plenary lectures on recent breakthroughs. This follows the format of the recent highly successful sequence of Young Geometric Group Theory (YGGT) meetings, held previously in Israel, Poland, Belgium, Germany and France.

Mini-courses will be given by:

- Goulmira Arzhantseva (Vienna)
- Emmanuel Breuillard (Muenster)
- Marc Burger (Zurich)
- Alan Reid (Texas-Austin)

In addition, there will be hour-long talks by Tullia Dymarz (Wisconsin-Madison), Enrico Le Donne (Jyväskylä, Finland), Pierre Py (Strasbourg), Anne Thomas (Sydney), Alireza Golsefidy (California-San Diego), Henry Wilton (Cambridge) and Montserrat Casals-Ruiz (Basque Country).

Register at <http://tinyurl.com/jz3fcoc>. The meeting is organised by Aditi Kar (Royal Holloway London), John MacKay (Bristol) and Anne Thomas (Sydney).

The meeting is supported by an LMS Conference grant, Clay Mathematical Institute, Heilbronn Institute, University of Southampton and Mathematical Institute, Oxford.

YOUNG FUNCTIONAL ANALYSTS' WORKSHOP

The *Young Functional Analysts' Workshop* (YFAW) will be held at the University of Glasgow from 29 to 31 March 2017. YFAW is an annual, student-run conference for PhD students and early career researchers in the various subfields of functional analysis. This

conference provides an ideal opportunity for PhD students to give a short talk on their research in front of a sympathetic audience. In addition, there will be expository talks from five established researchers. The invited speakers are:

- Veronique Fischer (Bath)
- Chris Heunen (Edinburgh)
- Niels Laustsen (Lancaster)
- Sandra Pott (Lund)
- Mike Whittaker (Glasgow)

At present there are funds to support accommodation for around 25 PhD student participants; further information about potential support for travel will be available in early 2017. For more information and registration, visit the website at <https://sites.google.com/site/yfawuk/> or contact the organisers at yfaw2017@gmail.com.

The conference is supported by an LMS Postgraduate Research Conference grant, the Edinburgh Mathematical Society Research Support Fund, the Glasgow Mathematical Journal Trust and the School of Mathematics and Statistics at the University of Glasgow.

PROBABILITY AND STATISTICS RESEARCH STUDENTS CONFERENCE

The 40th *Research Students Conference* (RSC) in Probability and Statistics will be held from 18 to 21 April 2017 at Durham University. The RSC is an annual conference where postgraduate students from the fields of Probability and Statistics come together to present and discuss their work in a relaxed atmosphere. There will be several plenary sessions given by invited speakers, several contributed sessions, a poster session, and a conference dinner held in the great hall of Durham Castle, along with some other social activities in the evenings.

The contributed sessions will take the form of shorter talks given by conference delegates. All conference delegates are encouraged to present a short talk or a poster, however this is not compulsory. The invited

plenary speakers are:

- Peter Avery (Newcastle University)
- Nick Bingham (Imperial College London)
- Denise Lievesley (University of Oxford)
- Michael Goldstein (Durham University)

Further information about the conference and its organisers (rsc.2017@durham.ac.uk), along with details about how to register for this conference can be found on the website www.rsc2017.org.uk. The conference is supported by an LMS Postgraduate Research Conference grant (Scheme 8).

DEVELOPING EFFICIENT METHODOLOGIES FOR MODELLING STOCHASTIC DYNAMICAL SYSTEMS IN BIOLOGY

On Monday 10 April 2017 the University of Bath will host an interdisciplinary conference entitled *Developing Efficient Methodologies for Modelling Stochastic Dynamical Systems in Biology* to celebrate the appointment of Dr Christian Yates as a lecturer in the Department of Mathematical Sciences.

The aim of this conference is to bring together expert mathematicians in the field of stochastic methodological development in order to share methods and analysis, as well as efficient algorithms for simulations in an attempt to bridge the wide range of scales over which biological systems operate. Complete or approximate analytical solutions, efficient simulation algorithms and hybrid numerical simulation methodologies are all tools which facilitate the development of the required multi-scale methodologies and which will be discussed at the conference. Confirmed speakers are:

- Ruth Baker (Oxford)
- Louise Dyson (Warwick)
- Ramon Grima (Edinburgh)
- Christian Yates (Bath)
- Konstantinos Zygalakis (Edinburgh)

There is a small amount of funding to support travel and accommodation (if appro-

priate) for early career researchers traveling from the UK. Make this clear when you register for the conference on eventbrite at <http://tinyurl.com/zq72bpe>. The deadline for requesting support is **30 January 2017** and the deadline for registration is **27 February 2017**. More details are at <http://tinyurl.com/gqhyckb> and for queries email imi-events@bath.ac.uk.

The conference is supported by an LMS Celebrating New Appointments Conference grant, the Institute for Mathematical Innovation, and the Department of Mathematical Sciences of the University of Bath.

COW AND CALF IN CARDIFF

The workshop *2CinC: COW and Calf in Cardiff* will take place at Cardiff University from Thursday 23 to Friday 24 February 2017. It is a joint two-day meeting of the COW algebraic geometry seminar and CALF, its graduate student offspring. New faces are also very welcome. It is hoped to expose the more junior participants to a cross-section of current research interests in UK and European algebraic geometry, while giving them an opportunity to present their own results and receive potentially useful feedback. More generally to encourage interaction and collaboration across the herd. Speakers are:

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

Anyone interested is welcome to attend. There is some support for accommodation and travel of junior participants. More information can be found at <http://tinyurl.com/j94rbxy>. The workshop is supported by an LMS Conference grant and Cardiff University.

GROUP ACTIONS AND COHOMOLOGY IN NON-POSITIVE CURVATURE

19 – 23 June 2017

in association with the Isaac Newton Institute programme

Non-Positive Curvature Group Actions and Cohomology

(3 January – 23 June 2017)



The workshop is the closing event of the semester-long programme *Non-Positive Curvature, Group Actions, and Cohomology*. It is intended as a moment to wrap up the activities, reflecting the vibrant atmosphere of the programme. In addition to providing a forum to disseminate the results obtained during the semester, the workshop will focus on cohomology, which, in several different incarnations, has come to be one of the standard tools to study group actions in non-positive curvature. The following topics will serve as a centrepiece of the workshop:

- Bounded cohomology
- CAT(0) cube complexes
- β -betti numbers
- the Farrell-Jones conjecture
- β -torsion
- the Chern conjecture

The synergy between the energy generated by the programme and the recent exciting developments in the above topics will provide an inspiring starting point for future important research.

Further information available from the website

www.newton.ac.uk/event/npcw05

Closing date for receipt of applications: 19 March 2017

MATHEMATICAL MEDICINE AND MATHEMATICAL PHARMACOLOGY

A workshop on *Mathematical Medicine and Mathematical Pharmacology* will take place at Swansea University from 2 to 3 February 2017. This is the first session of the BioMathematics@Swansea 2017 event, organised by the Centre for Biomathematics, Swansea University.

The topics covered will span a broad spectrum of problems of current interest in oncology and pharmacology and will hopefully stimulate further interactions and research in novel directions. There will be talks on cancer and treatment modelling, biomedical modelling techniques, and mathematical pharmacology.

Research students and early career re-

searchers are encouraged to apply for contributed talk or poster presentation. The closing date for registration is **15 January 2017**. Some financial support is available for students and early career researchers.

The organisers are Dr Gibin Powathil, Dr Lloyd Bridge and Dr Elaine Crooks. Further information can be found at the webpage: <https://mathmedworkshop1.wordpress.com/>.

The event is supported by an LMS Conference grant, the Swansea University College of Science, and the EPSRC-funded network POEMS (Predictive mOdeling for hEalthcare through MathS).

MATHEMATICAL IMAGING WITH PARTIALLY UNKNOWN MODELS

The Cambridge-Heriot Watt interdisciplinary data science workshop on *Mathematical Imaging with Partially Unknown Models* will be held at the University of Cambridge from 20 to 21 February 2017. The aim of this meeting is to gather an interdisciplinary group of leading imaging experts from the applied analysis, statistics, and signal processing communities around this topic. The goal is to promote synergy and cross-fertilisation between these communities and set the basis for a multidisciplinary approach to the problem. Plenary speakers are:

- Gabriel Peyré (Université Paris-Dauphine)
- Silvia Villa (Istituto Italiano di Tecnologia and MIT)
- Yves Wiaux (Heriot-Watt University)
- Juan Carlos de los Reyes (Escuela

Nacional Politécnica de Quito)

- John Aston (University of Cambridge)
- Samuli Siltanen (University of Helsinki/ Graz University of Technology)

The organisers are Marcelo Pereyra (Heriot-Watt) and Carola-Bibiane Schönlieb (Cambridge), alongside local organiser Martin Benning (Cambridge). For more information visit the workshop website at <http://tinyurl.com/zhewxca>.

The meeting is supported by an LMS Conference grant, the School of Mathematical and Computer Sciences of Heriot-Watt University, the Cantab Capital Institute for the Mathematics of Information, and the EPSRC Centre for Mathematical and Statistical Analysis of Multimodal Clinical Imaging at the University of Cambridge.

QUANTUM TOPOLOGY AND CATEGORIFIED REPRESENTATION THEORY

26 – 30 June 2017

in association with the Isaac Newton Institute programme

Homology Theories in Low Dimensional Topology

(26 June 2017 - 30 June 2017)

 **Isaac Newton Institute**
for Mathematical Sciences

The focus of the workshop is on interactions between representation theory and the knot invariants of quantum topology. On the representation theory side, principle objects of interest include categorified quantum groups, their 2-representation theory, and related structures (W-algebras, current algebras, Cherednik algebras, braid groups) which are important in categorical and geometric representation theory. On the topological side, the principle objects of interest are link homologies (Khovanov homology, knot Floer homology, triply-graded link homology) as well as braid groups and mapping class groups.

The workshop will invite speakers who have done work on various topics at the interface of topology and representation theory, including:

1. 2-representations of categorified quantum groups and categorification at roots of unity;
2. Constructions of knot homologies from categorical and geometric representation theory;
3. Representation theoretic structures present within knot homology theories themselves; and
4. Topological constructions whose representation-theoretic origin is not yet well-understood.

Further information available from the website

www.newton.ac.uk/event/htlw04

Closing date for receipt of applications: 19 March 2017



Professor of Mathematics

→ The Department of Mathematics (www.math.ethz.ch) at ETH Zurich invites applications for the above-mentioned position.

→ Successful candidates have an outstanding research record and a proven ability to direct research work of high quality. The new professor will be expected, together with other members of the Department, to teach undergraduate level courses (German or English) and graduate level courses (English) for students of mathematics, natural sciences and engineering. Willingness to participate in collaborative work both within and outside the school is expected.

→ Please apply online at www.facultyaffairs.ethz.ch

→ Applications include a curriculum vitae, a list of publications, a statement of future research and teaching interests, and a description of the three most important achievements. The letter of application should be addressed to the **President of ETH Zurich, Prof. Dr. Lino Guzzella**. The closing date for applications is **28 February 2017**. ETH Zurich is an equal opportunity and family friendly employer and is further responsive to the needs of dual career couples. We specifically encourage women to apply.

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Young researcher at HLF 2016

The Heidelberg Laureate Forum (HLF) annually connects promising young researchers in mathematics and computer science with the top scientists in their fields. For one week in late summer, the Heidelberg Laureate Forum Foundation (HLFF) invites the recipients of the Abel Prize, the ACM A.M. Turing Award, the ACM Prize in Computing, the Fields Medal, and the Nevanlinna Prize to join 200 carefully selected young researchers.

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For more information and online application, please visit:
www.heidelberg-laureate-forum.org

JOE GANI



Professor Joseph Mark Gani, who was elected a member of the London Mathematical Society on 19 December 1963, died on 12 April 2016, aged 91.

Alan Welsh and Sue Wilson write:

Joe Gani was born in Cairo, Egypt

on 15 December 1924. He attended schools in Cairo and Kobe, Japan, and studied at Imperial College London, obtaining a BSc (hons) in 1947 and a DIC in 1948. Joe moved to Australia in 1948 and worked as a lecturer in applied mathematics at the University of Melbourne from 1948-50. Joe spent 1951 as a lecturer in mathematics at Birkbeck College, London, before returning to Australia where he worked in a variety of jobs before becoming a lecturer at the University of Western Australia. Joe was associated with the University of Western Australia from 1953-60. He took leave from the University of Western Australia to join his lifelong friend Ted Hannan as the first PhD students in Statistics at ANU; they both completed their PhDs under the supervision of P.A.P. (Pat) Moran, graduating in 1955. Joe took further leave to spend 1956-7 at the University of Manchester with a Nuffield Fellowship and 1959 at Columbia University, New York. Joe was a Senior Fellow in Statistics at the Australian National University in Pat Moran's department (in the Institute of Advanced Studies) from 1961-4. He then went overseas, becoming a Professor in the Department of Statistics at Michigan State University from 1964-65 and then Professor in the Department of Probability and Statistics at The University of Sheffield from 1965-74. Joe was Director of the Manchester-Sheffield School of Probability and Statistics from 1967-74. He returned to Canberra

to become Chief of the CSIRO Division of Mathematics and Statistics (DMS) from 1974-81. From DMS, he became Professor of Statistics at the University of Kentucky from 1981-85 and then a Professor in the Statistics and Applied Probability Program at the University of California, Santa Barbara from 1985-94. Joe retired in 1994 and returned to Canberra as a Visiting Fellow in the School of Mathematical Sciences (now the Mathematical Sciences Institute). Joe remained active in MSI until early 2015 when a bad fall reduced his mobility.

Joe's PhD research was on the theory of dams and storage, an area suggested by Pat Moran who was doing his own initial work in the area at the time, and on inference on Markov chains. Both remained lifelong interests that he returned to throughout his career. The interest in inference on Markov Chains led to the use of Markov chains in the statistical study of literary texts. Joe also developed a long-term interest in biological modelling. His interest in genetics, sparked off by his wife Ruth who was a biologist by training and by Pat Moran's research, led to research on stochastic models for bacteriophages. Exposure in Manchester to the research of Maurice Bartlett on epidemics led to his own research on stochastic models for epidemics. Both of these created major themes within Joe's research.

Joe founded the *Journal of Applied Probability* in 1964 with the support of the London Mathematical Society, Ted Hannan and Norma McArthur who, together with Joe, became trustees of the Applied Probability Trust. He founded a second journal in applied probability, *Advances in Applied Probability*, in 1969, as well as *Mathematical Spectrum* and *The Mathematical Scientist*.

Joe was elected a Fellow of the Institute of Mathematical Statistics in 1966, the International Statistical Institute in 1968 and the Australian Academy of Science in 1976. He was made an Honorary Life Fellow of the Royal Statistical Society in 1982 and an Honorary Life Member of the Statistical Society of Australia in 1983. Joe was

awarded the Pitman Medal of the Statistical Society of Australia in 1994 and was made a Member of the Order of Australia (AM) in 2000.

The transcript of the very interesting interview (with more details about Joe's life and insights into the kind of person he was) conducted by Eugene Seneta for the

Academy of Science is available at <http://tinyurl.com/j55exl7>. An earlier interview conducted by Chris Heyde is available at <http://www.jstor.org/stable/pdf/2246194.pdf>.

Joe was predeceased by his wife Ruth and is survived by his four children Jonathan, Miriam, Matthew and Sarah, and their children.

ANTHONY ELLUL WILLIAMS



Anthony Ellul Williams, who was elected a member of the London Mathematical Society on 15 June 1944, died on 7 August 2016, aged 96.

Sara Paget writes: Tony Williams was born, an only child, on 18 July 1920 in Birmingham, and was brought up by his parents and uncle in Leamington Spa. A bright child, he went to Leamington Boys' College at the age of eleven, where his best friend was D.J. Enright, the poet and novelist. In 1997 Dennis Enright wrote to Tony: 'I was disgusted when you turned from music to mathematics!'

Tony's father was a natural pianist, and Tony took up the saxophone, which he played in a RAF dance band during WW2. (Because of his fragile health, having had TB when younger, he did not fly.) He retained a passion with great knowledge of both classical music and jazz throughout all of his long life. He met his wife Margaret, from Blackpool, during the war, and they married in 1942. Margaret died in 1988: they had no children.

During his time in the RAF, Tony completed an external degree course in Mathematics, via Downing College, Cambridge. When he was demobbed in 1946, he went to work at the Scientific Computing Service Ltd, 23 Bedford Square, London, run by Dr L.J. Comrie, who had been Superintendent of the Nautical Almanac Office at Greenwich, but had had a row with the Admiralty over the misuse of Government calculations. "When he heard that I was planning to join the Scientific Civil Service, [Comrie] tried to persuade me otherwise, saying that I could go to Elliott Brothers at Borehamwood. Anyway I joined the Royal Naval Scientific Service, and from 1947 worked at the Admiralty Compass Observatory in Slough as an Experimental Officer, appointed to be 'the mathematician'. I ended up in the Department of Operational Research in Whitehall, until, in 1953, as an SSO, I was lent to the Admiralty Research Laboratory for the job at Portballintrae, Northern Ireland."

From there, in the late 1950s, Tony became Head of Mathematics and Computing Division for the Admiralty Underwater Establishment Division, which became the Ministry of Defence, based at Portland Bill, until he retired at sixty years of age. He retained his interest in mathematics in his retirement, working on relativity theory in his late eighties.

He always described himself as a 'friendly recluse'; one faithful friend who had known him for some sixty years, described him as 'the last gentleman I know'.

THE CASE OF THE ACADEMICIAN NIKOLAI NIKOLAEVICH LUZIN

edited by Sergei Demidov, Boris V. Lëvshin, translated by Roger Cooke,
AMS History of Mathematics, V.43, 2016, pp 416, £59.95, US\$59, ISBN 978-1470426088.



The Moscow mathematical school, which flourished during the “golden years” of the sixties was created by two men: D.F. Egorov (1869-1931) and N. Luzin (1883-1950).

When the “Luzin affair” started in 1936, repression was already

brutally striking intellectuals in general and mathematicians in particular. Egorov had been exiled to Kazan where he went on hunger strike and starved to death in 1931. N. M. Gunther, professor at Leningrad University, who inspired the generalized functions of Sobolev, had been forced to retire from his position as the head of the mathematical community in Leningrad and Luzin left his position at the University of Moscow.

After a vicious polemic against Luzin in *Pravda*, probably initiated by E. Kolman, a zealous ideologue, Luzin was accused of stealing results from his students, sending one of them (M.Y. Suslin) off to die in the provinces. He was also accused of systematically and deliberately acting contrary to the interests of the USSR.

All these accusations, many of them supported by Luzin’s students, led to a hearing in the academy of Sciences consisting of five sessions in July of 1936 of “*The Commission of the USSR Academy of Sciences in the matter of Academician N. Luzin*”. Their transcripts constitute the essential part of this remarkable book.

What happened to Luzin might have been one more example of the tragic times of Stalin’s Russia in the thirties. Although the accusers, especially his best student Alexandrov, thought that their actions would remain

a secret, a carbon copy of the notes of the hearing was discovered in the 1990s.

These notes reveal the fights and dissensions between the two generations of mathematicians, Luzin against his students, soon to become the best mathematicians in Russia, Alexandrov, Kolmogorov and many others testifying against their teacher. These attacks could very well have sent him to exile or even death.

In a milder form this conflict between generations occurred in the West as well. For example, in France with Denjoy-Baire-Lebesgue fighting against Weil and Cartan [G-K].

Luzin had been collaborating with French mathematicians and they were ready to help him, although under the influence of the Communist Party some like Hadamard refused to manifest any solidarity.

André Weil, one of the founders of the Bourbaki group was invited to the First International Conference on Topology, in September 1936, that was organised by his friend Alexandrov. Weil behaved as a strong supporter of Alexandrov and of the Stalinist regime at the peak of Stalinist repression!

He realized his mistake later [W] but did not say a word for Luzin. This showed a radically different attitude to that of his sister Simone who always put morality and humanity above socio-political reasons. The case of Andre Weil was studied carefully by Pierre Dugac, a French historian of mathematics. Because of Weil’s unpleasant attitude he did not dare to publish his conclusions in French [DY]. Dugac preferred to keep it for the Russian version [D2].

In the end, Luzin was saved from prison or worse when the hearings were abruptly halted, evidently on direct orders from the Central Committee of the Communist Party. It may be that the decision was influenced by a letter sent by the distinguished scientist Petr Kapitsa to Molotov in support of the great mathematician.

An epilogue to this Shakespearian tragedy was given-but maybe not the last word-in 2012 due to the action of S. Kutateladze and other Russian mathematicians from the Academy. The Presidium then rehabilitated the memory of Luzin.

This important work of the history of Science is of a very high quality (even though there are errors in the index and captions to photos), one of the "devoirs de memoire" (duties to remember) accomplished in the domain of Russian science and technology in the twentieth century. One can only hope that this task will continue to be pursued and deepened.

Jean-Michel Kantor

Institut Mathématique de Jussieu, Paris

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NAMING INFINITY: A TRUE STORY OF RELIGIOUS MYSTICISM AND MATHEMATICAL CREATIVITY

by Loren Graham and Jean-Michel Kantor, Belknap Press, 2009, £20.95, ISBN 978-0674032934.



The book *Naming Infinity* by Loren Graham and Jean-Michel Kantor, referenced above, has apparently never been reviewed by the LMS Newsletter so now we include, with permission, a version of the review from Times Higher Education (30 April 2009)

written by Tony Mann. The full review can be found at <http://tinyurl.com/z5vbfsr>.

This absorbing book tells astonishing stories about some of the most important developments in mathematics of the past century. It begins with an episode that might seem to have little to do with the discipline: the attack in 1913 by a Russian gunboat on the Pantaleimon Monastery on Mount Athos. This was an attempt to suppress the controversial doctrine of "Name Worshipping", which centred on

the practice of chanting the names of Christ and God to achieve an ecstatic trance. After the storming of the monastery, the Name Worshippers went underground in Russia, but adherents continued the practice even after the Revolution.

The authors' thesis is that Name Worshipping underlay the development of descriptive set theory, the study of subsets of the real number line and one of the major areas of 20th-century mathematics: this arose from the work of Georg Cantor on infinity and was developed by the French mathematicians Emile Borel, Henri Lebesgue and Rene Baire, before being taken up in Russia by Dmitri Egorov and others.

Naming Infinity argues that Egorov and his colleagues Pavel Florensky and Nikolai Luzin were influenced by Name Worshipping and by analogies between the naming of sets, which in a sense brings them into existence, and the mystical power of the name of God in the "Jesus Prayer" incanted by Name Worshippers.

First, we are told about Borel, Lebesgue and Baire. This story is not an entirely happy

one: we hear of Baire's chronic depression and eventual suicide, and how Lebesgue and Borel fell out over mathematical and social issues. Developments in descriptive set theory then moved from France to Russia. There is an argument that the Name-Worshipping sympathies of Egorov, Florensky and Luzin helped them to deal with this abstract and demanding area of mathematics, while the French, lacking this religious inspiration, were unable to make progress.

The authors certainly make a plausible case for the importance of mystical belief in inspiring the Russian mathematicians: their provocative claim is that "Two different cultural contexts led to contrasting results: French skepticism and hesitation, Russian creativity and advancement ... a religious heresy was instrumental in helping the birth of a new field of modern mathematics".

Perhaps the most moving section of the book is that dealing with the famous Moscow School of Mathematics in Soviet times. Its origins are traced to the Lusitania seminar established by Egorov and Luzin (the source of the name "Lusitania" is obscure). The enthusiasm that these teachers inspired in their students is clearly conveyed, as is the atmosphere of intellectual excitement, despite the freezing lecture rooms (the rule that lectures could not take place if the room temperature fell below -5°C was ignored).

The excitement was not just mathematical: the charismatic Luzin attracted female students, and there seems to have been a strong homosexual community at the heart of Lusitania, too. It is good to have these factors acknowledged: mathematics is placed in its human context.

The cold and the food shortages were not the only problems facing mathematics in Stalin's Moscow, and those with known religious beliefs were in an especially precarious position. Egorov, perhaps naively, argued that universities should tolerate diverse beliefs: he was imprisoned in the city of Kazan, where he died in tragic circumstances in 1931.

Florensky, who habitually wore his priest's robes at scientific congresses, was sent to a

prison camp and, despite his significant scientific contributions to the Soviet Union, was shot in 1937. Luzin, much more discreet about his religious beliefs, nevertheless fell foul of the authorities and was tried as an enemy of the state. The book's description of Luzin's trial is riveting: he was saved by the secret intervention of Peter Kapitsa, the high-profile physicist, who interceded with Stalin.

Luzin's trial heard evidence from many junior members of the Moscow School of Mathematics, and this graphically illustrates the shattering dilemmas facing scientists at the time.

The brilliant young Lev Schnirel'man, who made a significant breakthrough in Goldbach's conjecture (still unproven today), committed suicide after being interrogated by the secret police and coerced to incriminate colleagues. Many others criticised Luzin at the time of his trial: they had little choice.

The book has its heroes, most notably Nikolai Chebotaryov, who sacrificed his career by resigning his post in Moscow when he discovered that his predecessor, Egorov, had been unfairly dismissed. In a remarkable coincidence, Chebotaryov and his wife cared for Egorov before his death in Kazan.

The book has one prominent villain, the careerist Marxist mathematician Ernst Kol'man, who led the campaigns against Egorov and Luzin. But all the characters are drawn with human virtues and demerits, as they did what was necessary to survive in impossible conditions, and also pursued more mundane objectives such as career progression and priority claims. In Graham and Kantor's telling, mathematics appears as a thoroughly human activity.

Two truly great figures in 20th-century mathematics, Pavel Alexandrov and Andrei Kolmogorov, who as homosexuals were particularly vulnerable, were forced publicly to support the Soviet biologist Trofim Lysenko and to criticise Alexander Solzhenitsyn. Kolmogorov spoke at the end of his life of his perpetual fear of the secret police. More happily, we hear of the importance of swimming to Alexandrov and Kolmogorov, and its connection with mathematical inspiration.

We are given sympathetic accounts of other

members of the Moscow School of Mathematics, including the tragic figures of Pavel Uryson, who drowned in an accident in France at the age of 26, and Nina Bari, who committed suicide by throwing herself under a train after editing her lover Luzin's mathematical papers for publication after his death. Even Kol'man is perhaps partially redeemed by his later confession that he was "sincerely deluded, nourished by illusions which later deceived me".

At this point the book has wandered some way from the topic of the religious inspiration for descriptive set theory. But this reinforces the book's theme that mathematics is a human activity, influenced decisively by the beliefs and life choices of practitioners.

The book is generously illustrated, with many photographs and, on the cover, an evocative painting of Florensky in his robes. However, it betrays its double authorship in a number of minor ways. Names are not consistently transliterated - for example, is the poet Andrei Bely or Andrey? - and occasionally someone is mentioned before they are introduced by

a later paragraph. Little attempt is made to explain the mathematics, although it could hardly be otherwise in a book such as this: specialists will know the details already, and the mathematics is too difficult for non-specialists.

But, for the reader who is prepared to take on trust the value of the mathematics, the stories told are fascinating. The conclusion draws parallels between the Name-Worshipping beliefs of Egorov, Florensky and perhaps Luzin, and the mystical philosophy of Alexander Grothendieck, one of the most enigmatic mathematicians of the late 20th century.

This is a remarkable book, illuminating the history of 20th-century mathematics and its practitioners. The stories it tells are important and too little known. It is clearly a labour of love and deserves a wide audience: it is an outstanding portrayal of mathematics as a fundamentally human activity and mathematicians as human beings.

Tony Mann
University of Greenwich



Loughborough
University

Sir David Wallace Lecture 2017

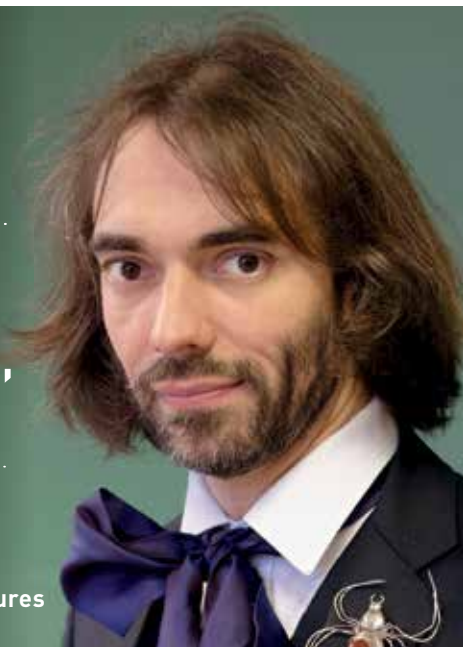
Professor Cédric Villani,
University of Lyon

Of triangles, gases, prices and men

Friday 20 January 2017, 5pm,
West Park Teaching Hub

To book your place visit:

www.lboro.ac.uk/david-wallace-lectures





SUBLIME SYMMETRY

The Mathematics behind De Morgan's Ceramic Designs

You are cordially invited to attend the
**Sublime Symmetry Symposium: Celebrating William De Morgan and
 synergies between mathematics and art.**

**London Mathematical Society, De Morgan House, 57 – 58 Russell Sq,
 London, WC1B 4HS
 13th January 2017, from 09.30 – 17.00**

The event is free to attend, but RSVP through eventbrite:
<https://www.eventbrite.co.uk/e/sublime-symmetry-symposium-tickets-29650930732>

Sublime Symmetry is the De Morgan Foundation's major 2016-17 exhibition which is currently touring the UK. Through innovative research, it presents William De Morgan, one of the most notable and innovative ceramic designers of the Victorian period, as a designer with an incredible mathematical sensitivity.

This symposium supports the exhibition by bringing together academics and speakers from mathematic, arts and education backgrounds who will present the research they have undertaken into De Morgan's use of mathematics.

Confirmed speakers include:

- ❖ Claire Longworth, Curator of the De Morgan Foundation
- ❖ Sarah Hardy, Sublime Symmetry Exhibition Curator
- ❖ Prof. Alexandre Borovik, Professor of Mathematics at the University of Manchester
- ❖ Prof. June Barrow-Green, Professor of History of Mathematics, The Open University
- ❖ Dr. Christopher Jordan, independent historian

Refreshments and lunch will be provided. There will be time for questions to the speakers and an opportunity for networking in our evening reception.

We look forward to seeing you there,
 Sarah Hardy, on behalf of the De Morgan Foundation

We are most grateful to the London Mathematical Society and the Esmée Fairbairn Collection Fund for their generous support of this event.



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CALENDAR OF EVENTS

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

JANUARY 2017

4–6 Twistor Theory and Related Areas, Oxford (463)

4–7 Mathematics on Singularities, Symmetries and Submanifolds UK-Japan Winter School, University College London (463)

9–13 Algebraic, Topological and Complexity Aspects of Graph Covers, Durham (464)

11–12 Young Theorists' Forum, Durham (464)

12 T-time Meeting, Manchester (463)

13 Sublime Symmetry Symposium, London (465)

20 Sir David Wallace Lecture, Cedric Villani, Loughborough (465)

23–27 Structure of Operator Algebras: Subfactors and Fusion Categories INI Workshop, Cambridge (461)

25–27 British Postgraduate Model Theory Conference, Leeds (464)

FEBRUARY 2017

2 Reforms to Mathematics Qualifications Westminster Education Forum Seminar, London

2–3 Mathematical Medicine and Mathematical Pharmacology, Swansea (465)

20–21 Origins of Numerical Abilities Royal Society Scientific Discussion Royal Society London (463)

20–21 Mathematical Imaging with Partially Unknown Models, Cambridge (465)

23–24 COW and Calf in Cardiff (465)

MARCH 2017

20–24 Young Geometric Group Theory Meeting, Oxford (465)

22 Maths, Teamwork and Googlies, Rob

Eastaway, Christopher Zeeman Medal Lecture, London (465)

29–31 Young Functional Analysts' Workshop, Glasgow (465)

30 Spectral Geometry, Leeds (465)

APRIL 2017

3 Society Meeting at BMC, Durham

3–6 BMC, Durham (463)

10 Developing Efficient Methodologies for Modelling Stochastic Dynamical Systems in Biology, Bath (465)

10–12 BAMC, Surrey (463)

18–21 Research Students Conference, Durham (465)

18–22 Function Theory by Hilbert Space Methods, Jim Alger, LMS Invited Lecturer, Newcastle (465)

27–28 Mathematical Ecology Workshop, Swansea (464)

MAY 2017

5 Mary Cartwright Lecture, London

8–12 Approximation, Deformation, Quasification INI Workshop, Cambridge (464)

JUNE 2017

1 LMS Northern Regional Meeting, York

19–23 Group Actions and Cohomology In Non-Positive Curvature, INI Cambridge (465)

19–23 New Trends in Representation Theory

LMS–CMI Research School, Leicester (465)

26–1 Jul Microlocal Analysis and Applications LMS–CMI Research School, Cardiff (465)

26–30 Quantum Topology and Categorified Representation Theory, INI Cambridge (465)

30 LMS Graduate Student Meeting, London

30 LMS Society Meeting, London

JULY 2017

3–7 BSDEs, SPDEs and their Applications Workshop, Edinburgh

3–7 British Combinatorial Conference, Strathclyde (464)

10–12 Mathematical Models in Ecology and Evolution Conference, City, University of London (462)

10–19 Foundations of Computational Mathematics Conference, Barcelona (461)

SEPTEMBER 2017

10–15 Mathematics Education for the Future

Decade, Balatonfüred, Hungary (460)

24–29 Heidelberg Laureate Forum (465)

LMS ANNUAL GENERAL MEETING

Friday 11 November 2016

LMS President, Professor Simon Tavaré presenting prize certificates



Arend Bayer (Edinburgh)
Whitehead Prize



Carola-Bibiane Schönlieb (Cambridge)
Whitehead Prize



Gustav Holzegel (Imperial College)
Whitehead Prize



Jason Miller (Cambridge)
Whitehead Prize



Dominic Joyce (Oxford)
Fröhlich Prize



Julia Wolf (Bristol)
Anne Bennett Prize