



LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 408 November 2011

Society Meetings and Events

2011

Friday 18 November
Annual General
Meeting, London
[pages 1, 3]

Friday 18 November
Graduate Student
Meeting, London
[page 2]

2012

Friday 24 February
Mary Cartwright
Lecture, London
[page 21]

26–30 March
LMS Invited Lectures,
Glasgow [page 19]

6 June
Northern Regional
Meeting, Newcastle

29 June
Meeting and Hardy
Lecture, London

NEWSLETTER ONLINE:

Go to www.lms.ac.uk/newsletter

ANNUAL GENERAL MEETING

The Annual General Meeting of the Society will be held at 3.00 pm on Friday 18 November 2011 in the Jeffrey Hall at the Institute of Education, 20 Bedford Way, London WC1H 0AL.

The business shall be:

1. elections to Council and Nominating Committee
2. the report of the President on annual activity
3. the report of the Treasurer
4. the adoption of the Trustees Report for 2010/11
5. appointment of Auditors
6. presentation of certificates to LMS prizewinners.

It is hoped that as many members as possible will be able to attend.

Fiona Nixon
Executive Secretary

2011 ELECTIONS TO COUNCIL AND NOMINATING COMMITTEE

The ballot papers for the November elections to Council and Nominating Committee were circulated with the October *Newsletter*. Nominating Committee put forward names for each Officer post; in addition members proposed a further

candidate for the Education Secretary post. There are six vacancies for Members-at-Large of Council, for which a total of ten candidates have been proposed (nine by Nominating Committee, one by members).

Four names have been proposed (all by Nominating Committee) for two vacancies in the membership of the Nominating Committee.

Please note that completed ballot papers must be returned by **Thursday 10 November 2011**.

Members should have received the following:

- a pink (folded A4) ballot paper for the elections to Council
- a blue A5 ballot paper for elections to Nominating Committee
- a white A5 booklet of biographical details of candidates
- a white return envelope

If you are missing any of these items please contact Duncan Turton at DMH (nominations@lms.ac.uk).

A separate form for suggesting names to the Nominating Committee for potential candidates for the 2012 elections was also included with the October *Newsletter*. Members will still be able to make direct nominations for which details will be given in the April and May *Newsletters* next year.

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LONDON MATHEMATICAL SOCIETY GRADUATE STUDENT MEETING

Friday 18 November 2011

Birkbeck College, Malet Street, London WC1E

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

9.30 Coffee and Registration

10.00 **Gareth Jones** (Manchester) *An introduction to o-minimality*

11.00 Coffee/Tea

11.15 Graduate student talks

12.45 Lunch

13.30 Award of prizes

13.35 **Susan Hezlet** (LMS Publisher) *How to get your papers published*

13.45 **Vincenzo Mantova** (Pisa/Oxford) *Title TBC*

14.15 **Adam Harris** (Oxford) *Title TBC*

14.45 Move to Jeffrey Hall, IoE, for LMS meeting (see below and opposite)

The lectures will be held in Room Mal G16, Birkbeck College, Malet Street, London WC1E and a sandwich lunch will be provided. For directions see: www.bbk.ac.uk/images/centrallondon.pdf.

Students are invited to give short talks (15 minutes) aimed at a general mathematical audience. Prizes will be awarded for the best two talks. If you would like to give a talk, please email Elizabeth Fisher (meetings@lms.ac.uk).

To register, please email Elizabeth Fisher (meetings@lms.ac.uk) by **Friday 11 November**.

Limited funds are available to help with students' travel costs, if they are also attending the afternoon meeting (see below).

The graduate event will be followed by an LMS Society Meeting starting at 15.00, which is open to all. Angus Macintyre will give the Presidential address on *The logic of the real, complex and perfect exponentials*, and Alex Wilkie (Manchester) will speak on *Polynomials, quasipolynomials and o-minimality*.

For further details see: www.lms.ac.uk/content/society-meetings.

LONDON MATHEMATICAL SOCIETY

ANNUAL GENERAL MEETING

Friday 18 November 2011

Jeffrey Hall, Institute of Education 20 Bedford Way, London WC1H 0AL
(Nearest tube: Russell Square)

Programme:

- | | |
|------------------|---|
| 3.00–3.30 | Annual General Meeting |
| 3.30–4.30 | Alex Wilkie (Manchester)
<i>Polynomials, quasipolynomials and o-minimality</i> |
| 4.30–4.55 | Tea |
| 4.55–5.00 | Announcement of Election Results |
| 5.00–6.00 | Angus Macintyre (LMS President)
Presidential Address:
<i>The logic of the real, complex and perfect exponentials</i> |

The meeting will include the presentation of certificates to the 2011 LMS prize winners.

The meeting will be followed by a reception at De Morgan House.

Funds are available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Requests for support and any other queries about the AGM should be sent to Elizabeth Fisher (meetings@lms.ac.uk).

ANNUAL DINNER

The 2011 Annual Dinner will be held after the Annual General Meeting at 7.30 pm on Friday 18 November 2011 at The Russell Hotel, London WC1. The cost for members and their guests is £45 per person, which is for a three-course meal and wine. Members wishing to attend should make cheques payable to

'London Mathematical Society' and also indicate if they have any dietary requirements and send to: Leanne Marshall, London Mathematical Society, De Morgan House, 57–58 Russell Square, London WC1B 4HS. Payment should arrive by **Monday 7 November**. Any queries should be sent to leanne.marshall@lms.ac.uk.

LONDON MATHEMATICAL SOCIETY

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www.lms.ac.uk/newsletter

LMS PRIZES 2012

Call for Nominations

The London Mathematical Society welcomes nominations for the 2012 prizes to recognise and celebrate the achievements in and contributions to all aspects of mathematics, including applied mathematics, mathematical physics and mathematical aspects of computer science.

In 2012 the LMS Council expects to award:

- The **Pólya Prize** in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to, mathematics within the United Kingdom
- The **Senior Berwick Prize** in recognition of a piece of mathematical research of the highest quality actually published by the Society during the last eight years (i.e. between 1 January 2004 and 31 December 2011 for the 2012 award)

- The **Fröhlich Prize** for original and extremely innovative work in any branch of mathematics
- The **Whitehead Prizes** for work in and influence on mathematics

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.

For further information and nomination forms, please visit the LMS website (www.lms.ac.uk/content/nominations-lms-prizes) or contact Elizabeth Fisher, Secretary to the Prizes Committee at the Society (tel: 020 7291 9973, email: prizes@lms.ac.uk).

The closing date for nominations is **Friday 13 January 2012**.

LMS Newsletter

www.lms.ac.uk/newsletter

Editorial office: newsletter@lms.ac.uk; London Mathematical Society, De Morgan House, 57–58 Russell Square, London WC1B 4HS (t: 020 7637 3686; f: 020 7323 3655)

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Advertising: for rates and guidelines, see www.lms.ac.uk/newsletter/ratecard.html

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Charity registration number: 252660.

LMS BERWICK PRIZE AND SENIOR BERWICK PRIZES

Changes to Regulations

Since the 1940s, the Society has offered Berwick Prizes in recognition of a piece of research actually published by the LMS. The prize itself was named after Professor W.E.H. Berwick, who donated money to the LMS for the purpose. The Berwick Prize is specifically for younger mathematician(s), whilst the Senior Berwick Prize has no restrictions on age and is intended for established mathematicians.

Following the terms of the bequest, the prize has previously been open only to members of the Society and has usually been interpreted as being open only to a single mathematician. Whilst the terms of the prize were not unusual many years ago, Prizes Committee has found that changes in publishing have had the effect of substantially reducing the field of eligible nominees, particularly for the prize aimed at younger researchers. In 2011, the pool was so narrow that Prizes Committee was not able to make any award.

Council has been concerned to ensure that the LMS prizes are open to a strong field and, having taken advice from the Charity Commission, has agreed to new regulations for the Berwick Prizes, effective from 2012. These seek to retain the spirit of the original Berwick bequest, whilst recognising changing conditions. The most significant changes are:

1. There is now no requirement that the winner(s) of the prize be a member of the LMS.
2. The prize may now be explicitly awarded to multiple winners. This reflects the trend towards multi-authored papers.
3. The restriction on winners of the Berwick Prizes subsequently being unable to win certain other LMS prizes has been removed.

Council understands the need for its prizes to be open to wide pools in order to recognise

research of the highest standard, and hopes that members will use these changes to the fullest and nominate author(s) who have produced articles in LMS publications.

The first prize to be awarded under the new regulations will be the 2012 Senior Berwick Prize. Full regulations and nomination forms are on the Society website, www.lms.ac.uk/content/lms-prizes.

SET AWARDS 2011

The winners of the 2011 Science, Engineering & Technology Student of the Year Awards were announced at a ceremony in The Millennium Hotel, London, on 23 September. Record numbers of entries were received from every major university in the United Kingdom and Ireland and judges paid tribute to the exceptional quality of this year's work. In all 45 students were shortlisted in fifteen different categories.

The Leadership Forum award for the best mathematics student of the year was given to Claire McIlroy of Leeds University for her project on *Break up of polymeric fluids*. Claire's project demonstrated an interesting integration of mathematics and polymer science. The LMS and IMA provided judges for the award, commenting that Claire is an engaging speaker, and in her project she has integrated ideas in physics, chemistry and engineering into a sophisticated model of complex behaviour of polymers.

LMS CONFERENCE FACILITIES

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

Call us now on 020 7927 0800 or email roombookings@demorganhouse.co.uk to check availability, receive a quote or arrange a viewing of the venue.

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

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OPEN HOUSE SUCCESS FOR LMS

The LMS opened its doors to the public on Saturday 17 September 2011 as part of the London Open House weekend. It is the first time the LMS has participated and the event was a huge success, with over 300 people visiting De Morgan House. The visitors enjoyed a tour of the building and a presentation on mathematics through the years.

The first surprise of the day was arriving at De Morgan House to find that a number of Open House visitors had arrived an hour in advance of the doors opening and that the queue was growing fast.

As an Open House volunteer I had offered to help at the LMS as a guide, and ten days earlier had had a very friendly welcome, a tour of the building and a clear briefing on the plans for the day. So with this background and with notes in hand, I set off with the first group of visitors at 11.00 am and with a constant flow of new arrivals didn't stop until the doors shut at 4.00 pm.

Open House visitors are enthusiastic and curious to learn about both the buildings and the Society. They enjoyed moving through the two houses to appreciate the scale and

layout of the rooms and welcomed the information about the LMS particularly that on display in the Verblunsky Room and, of course, the superb collection of photographs of the past Presidents. But they are also a very knowledgeable group and a further pleasure was to learn from them on a surprisingly wide range of topics pertinent to the tour.

The age range of visitors encompassed students and pensioners; there were Londoners and out-of-towners and quite a number of foreign tourists and the feedback we got from them was overwhelmingly positive. It was an extremely enjoyable day for me and it seems for your visitors too.

Annie Edge

Open House Volunteer

BSHM UNDERGRADUATE ESSAY PRIZE

The British Society for the History of Mathematics (BSHM) is pleased to invite submissions for its 2011–12 undergraduate essay prize. The essay, which may be on any topic within the history of mathematics, should be between 2,000 and 2,500 words. The prize is open to any person who is enrolled as an undergraduate in a UK or Irish university during the academic year 2011–12.

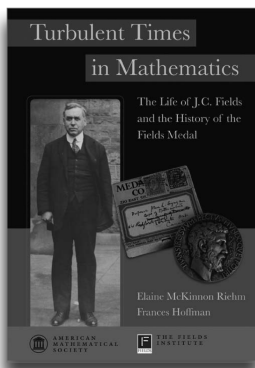
The value of the prize will be £100, plus one year free membership of the BSHM. Essays in submission for the prize should be sent via email attachment to Dr Mark McCartney (m.mccartney@ulster.ac.uk). Applicants should also give details of their place and year of study and the title of the degree programme on which they are enrolled. The deadline for receipt of submissions is **1 May 2012**.

A poster is available at www.bshਮ.ac.uk. Please print and display this if you are in a position to advertise this prize to undergraduates.



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AMERICAN MATHEMATICAL SOCIETY

**TURBULENT TIMES IN MATHEMATICS****The Life of J.C. Fields and the History of the Fields Medal**

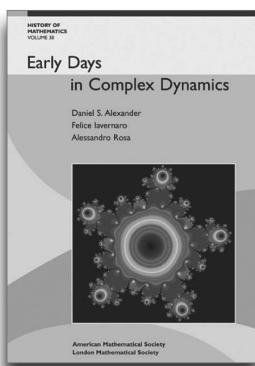
Elaine McKinnon Riehm & Frances Hoffman

"Drawing on a wide array of archival sources, Riehm and Hoffman provide a vivid account of Fields' life and his part in the founding of the highest award in mathematics. Filled with intriguing detail – from a childhood on the shores of Lake Ontario, through the mathematics seminars of late 19th century Berlin, to the post-WWI years of the fragmented international mathematical community – it is a richly textured story engagingly and sympathetically told. Read this book and you will understand why Fields never wanted the medal to bear his name and yet why, quite rightly, it does".

– June Barrow-Green, *Open University, Milton Keynes, U.K.*

Dec 2011 255pp Paperback 978-0-8218-6914-7 £36.50

A co-publication of the AMS and Fields Institute

**EARLY DAYS IN COMPLEX DYNAMICS****A history of complex dynamics in one variable during 1906-1942**

Daniel S. Alexander, *Drake University*,
Felice Iavernaro, *Università di Bari* & Alessandro Rosa

The theory of complex dynamics, whose roots lie in 19th-century studies of the iteration of complex function conducted by Koenigs, Schröder, and others, flourished remarkably during the first half of the 20th century, when many of the central ideas and techniques of the subject developed. This book by Alexander, Iavernaro, and Rosa paints a robust picture of the field of complex dynamics between 1906 and 1942 through detailed discussions of the work of Fatou, Julia, Siegel, and several others.

History of Mathematics, Vol. 38

Dec 2011 448pp 978-0-8218-4464-9 Hardback £79.50

Co-published with the London Mathematical Society beginning with Volume 4. Members of the LMS may order at the AMS member price. The LMS is registered with the Charity Commissioners.

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SOCIETY CONFERENCE GRANTS

The Society is pleased to report that in 2010–11 awards totalling £134,948 were made in the support of mathematics conferences. Funds are granted to the organisers of conferences to be held in the United Kingdom, and may be used to cover the expenses of principal speakers, and to provide support for research students and for participants from Scheme 5 or former Soviet Union countries. For Postgraduate Research Conferences funds are granted to support participants. Applicants wishing to apply for funding for a conference will find further details on the Society's website at www.lms.ac.uk/content/research-grants.

Conference grants awarded during 2010–11

Conference	Dates, Place	Applicant	Grant
Combinatorics One-Day Meeting	16 Mar 2011, Oxford	A. Scott	£1,800
Analysis Workshop	16–18 Mar 2011, Imperial College	B. Zegarlinski	£1,125
The Symmetric Group: Representations and Combinatorics	29 Mar 2011, RHUL	M. Wildon	£590
British Applied Mathematics Colloquium 2011	11–13 Apr 2011, Birmingham	D. Leppinen	£4,050
Numerical and Computational Aspects of Spectral Geometry	14–15 Apr 2011, Loughborough	A. Strohmaier	£1,500
ICFT11: 15th UK Meeting on Integrable Models, Conformal Field Theory and Related Topics	15–16 Apr 2011, City University	A. Fring	£2,220
The Birch and Swinnerton-Dyer Conjecture (additional grant)	2–4 May 2011, Cambridge	T. Dokchitser	£500
Two linked one-day colloquia in Combinatorics	18–19 May 2011, QMUL, LSE	G. Brightwell	£1,500
Complex Analysis and Geometry Meeting	24 May 2011, Open University	D. Nicks	£990
Spectral Theory & PDEs	24 May 2011, Kent	I. Wood	£600
Wales Mathematics Colloquium	23–25 May 2011, Gregynog Hall, Tregynon	E.J. Beggs	£1,716
Variational Multiscale Methods (VMS 2011)	26–27 May 2011, Strathclyde	G. Barrenechea	£3,200
UKMHD 2011	16–17 Jun 2011, City University	L. Silvers	£1,000
Symbolic Computation Analysis 2011 (SCA'11)	17 Jun 2011, Kent	M. Rosenkranz	£370
First British Conference on Mathematics of Filtering and Its Applications	22–24 Jun 2011, Brunel	P. Date	£2,650

Conference	Dates, Place	Applicant	Grant
Gauge Theory and Complex Geometry	4–8 Jul 2011, Leeds	R. Bielawski	£5,000
Tropical Geometry and Integrable Systems	3–8 Jul 2011, Islay	M. England	£1,000
Quantum Cohomology, Symplectic Resolutions and Representation Theory	9–11 Jul 2011, Oxford	K. McGerty	£3,660
Toric Methods in Homotopy Theory and Related Subjects	18–20 Jul 2011, Queen's University Belfast	T. Huettelman	£5,820
Twistors in Geometry and Physics	21–22 Jul 2011, Oxford	L. Mason	£4,000
Stochastic Analysis: A UK–China Workshop	25–29 Jul 2011, Loughborough	H. Zhao	£5,000
14th Galway Topology Colloquium	15–17 Aug 2011, Queen's University Belfast	A. Wickstead	£6,000
The Mathematics of Turbulent Diffusion: A Celebration of the Career of Philip Chatwin	30–31 Aug 2011, Sheffield	N. Mole	£4,000
International Conference on Algebra and Coalgebra in Computer Science (CALCO)	29 Aug – 2 Sep 2011, Winchester	C. Cristea	£2,550
26th British Topology Meeting	1–3 Sep 2011, Edinburgh	J. Howie, A. Ranicki	£5,000
British Logic Colloquium	1–3 Sep 2011, Edinburgh	A. Smaill	£4,255
One Day Function Meeting	5 Sep 2011, London	I. Short	£1,397
Domains X	5–7 Sep 2011, Swansea	J. Blanck	£3,805
Partial Differential Equations and Spectral Theory	5–8 Sep 2011, King's College London	Y. Safarov	£6,000
Mathematical and Theoretical Ecology 2011: Linking Mathematical Models with Ecological Processes	19–21 Sep 2011, Essex	E. Codling	£5,000
Geometry Day	11 Nov 2011, King's College London	G. Tinaglia	£600
Representation Theory and Number Theory	23 Nov 2011, UEA, London Campus	A. Ghosh	£1,800
Free Boundary Problems in Fluid Mechanics	8–11 Jan 2012, Nottingham	D.S. Riley, J.R. King	£5,600

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

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Conference	Dates, Place	Applicant	Grant
The Fourth Sheffield Homotopy Mini Conference: Homotopy and Geometry of Loop Spaces	20–22 Jan 2012, Sheffield	P. Cheung	£5,000
BAMC 2012	27–29 Mar 2012, UCL	J-M. Vanden-Broeck	£5,000
BMC 2012	16–19 Apr 2012, Kent	P. Fleischmann, R. J. Shank	£12,000
Algebra, Combinatorics, Dynamics and Applications	27–30 Aug 2012, Queen's University Belfast	N. Iyudu	£5,200

Postgraduate Research Conference grants awarded during 2010–11

Conference	Dates, Place	Applicant/Organiser	Grant
British Postgraduate Model Theory Conference	19–21 Jan 2011, Leeds	Applicant: A. Pillay Organiser: C. Kestner	£2,300
Young Functional Analysts' Workshop	6–8 Apr 2011, York	Applicant: S. Eveson Organiser: T. Potts	£3,150
Young Researchers in Mathematics 2011	14–16 Apr 2011, Warwick	Applicant: S. Siksek Organiser: D. Holmes	£4,000
13th Postgraduate Theory Conference	23–25 Jun 2011, Aberdeen	Applicant: R. Kessar Organiser: J. Taylor	£4,000

CAMBRIDGE

Localization in Periodic Potentials

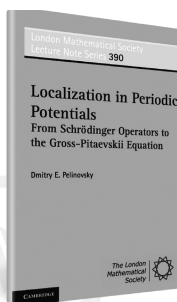
From Schrödinger Operators to the Gross-Pitaevskii Equation

Dmitry E. Pelinovsky

- Suitable text for graduate students in applied mathematics studying nonlinear waves
- Provides a solid mathematical foundation for students and young researchers specializing in the theory of Bose-Einstein condensation

London Mathematical Society Lecture Note Series (No. 390)
October 2011 | Paperback | 9781107621541 | 350 pages | £50.00

Find out more: www.cambridge.org/pelinovsky



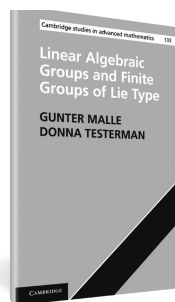
Linear Algebraic Groups and Finite Groups of Lie Type

Gunter Malle and Donna Testerman

- The first textbook to present the modern results on maximal subgroups of both the semisimple algebraic groups and the finite groups of Lie type
- Covers many topics that are central to the subject, but missing from existing textbooks
- Includes numerous exercises and examples ranging in difficulty

Cambridge Studies in Advanced Mathematics (No. 133)
September 2011 | Hardback | 9781107008540 | 324 pages | £45.00

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Participants at the 2011 LMS Editorial Advisory Board meeting

VISIT OF K. KATO

Professor Kiriko Kato (Osaka Prefecture University) will be visiting the UK from 23 November to 7 December 2011. Her research area is homological algebra. During her visit she will give talks at:

- Leeds University, School of Mathematics, Algebra Seminar on 27 November at 4 pm, *Recollement of homotopy categories and Cohen-Macaulay modules*; local contact: Robert Marsh (marsh@maths.leeds.ac.uk)
 - Edinburgh University, School of Mathematics, Algebra Seminar on 28 November at 4 pm, *Symmetric Auslander and Bass categories*; local contact: Michael Wemyss (m.wemyss@ed.ac.uk)
 - Newcastle University, School of Mathematics Algebra Seminar on 1 December at 2.30 pm, *Polygon of recollements*; local contact: Raf Bocklandt (raf.bocklandt@newcastle.ac.uk)
- For further information contact Peter

Jørgensen (peter.jorgensen@newcastle.ac.uk). The visit is supported by an LMS Scheme 2 grant.

EDITORIAL ADVISERS' MEETING

A biennial meeting of the Editorial Advisory Board for the *LMS Bulletin*, *Journal* and *Proceedings* took place at De Morgan House on Friday 9 September 2011. The meeting was well attended and some participants had travelled a great distance.

A large part of the meeting was spent discussing the new online submission and paper management system, *EditFlow*, which is in use for all LMS journals. The system is still undergoing fine-tuning, but there are early signs that the new system will speed up the editorial process, as it allows everyone involved to see at any time what is happening to papers.

Ola Törnkvist
Managing Editor, LMS

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

www.lms.ac.uk/newsletter

MATHEMATICS POLICY ROUND-UP

October 2011

RESEARCH

Mathematics community expresses funding concerns to the Prime Minister

A group of senior mathematicians has written to David Cameron to protest about cuts in research funding for the mathematical sciences. They claim the EPSRC did not adequately consult the mathematics community before making its decisions. The letter can be viewed at <http://tinyurl.com/6y8wzus>.

Joint letter to EPSRC

The Council for the Mathematical Sciences (CMS) has joined a group of STEM organisations – including the Institute of Physics, Royal Society of Chemistry, Institution of Engineering and Technology, Royal Academy of Engineering and the Royal Society – that has sent a letter to EPSRC with a call to pause its 'shaping capability' strategy. The letter can be viewed at <http://tinyurl.com/63yopsw>.

Concerns over EPSRC continue

Professor Michael Singer of the University of Edinburgh has written to David Willetts, MP "to express [his] grave concerns about recent developments at the EPSRC". This follows the recent correspondence from other distinguished mathematicians to the Prime Minister. The letter is available on the LMS website at <http://tinyurl.com/6k7e9sj>.

Select Committee evidence

The Science and Technology Select Committee took evidence on the 2010 Comprehensive Spending Review. Those called to give evidence included EPSRC Chief Executive Professor David Delpy and Minister of State for Universities and Science David Willetts. A transcript of the evidence is available at <http://tinyurl.com/43fv87n>.

1994 Group of universities report on research

A report by the 1994 Group of universities, *Mapping Research Excellence: exploring the links between research excellence and research funding policy*, compares the UK's research output with that of the US, Australia, Germany, China and Japan. The full report is available at <http://tinyurl.com/63c4m9f>.

New EPSRC policy on access to research outputs

EPSRC has introduced a new policy on access to research outputs. More information is available at <http://tinyurl.com/6gdmg6o>.

Public funding for UK science and engineering

The Campaign for Science and Engineering (CaSE) has produced a paper entitled *Public Funding of UK Science and Engineering: Putting Government Rhetoric to the Test* that analyses recent changes in the amount and organisation of public spending on science and engineering and tests whether actual spending plans live up to government rhetoric. The full paper is available at <http://tinyurl.com/6c6bo5n>.

HIGHER EDUCATION

LMS responds to HE White Paper consultation

The LMS has responded to the consultation on the government's Higher Education White Paper, *Students at the Heart of the System*, which closed on 20 September. The response can be viewed at <http://tinyurl.com/5shpm8e>.

UUK warns that HE proposals may not deliver

Universities UK has said that the government's white paper on higher education in England may not deliver all of the government's aims and that the proposals, as they now stand, could lead to unintended consequences for students and universities. The response is available at <http://tinyurl.com/6x95rss>.

ACME responds to HE White Paper consultation

A copy of the full response is available at <http://tinyurl.com/667azeq>.

SCHOOLS AND COLLEGES**Consultation on GCSE Reform**

The consultation covers the changes being made to current GCSE specifications in England and asks specific questions on how these changes will be implemented. The closing date for submissions is **Friday 4 November 2011**. More information is available at <http://tinyurl.com/6xl66oo>.

A* grades at A-level

The Education Secretary, Michael Gove, has proposed that A* grades at A-level could be awarded to a fixed percentage of candidates each year. Gove, speaking at a recent Ofqual conference, said he wanted to 'open up the debate' about changing the A-level system. A transcript of the full speech is available at <http://tinyurl.com/6hlld7q>.

At the same conference, Professor Robert Coe of Durham University said "data showed grade inflation was continuing. In A-level mathematics, the level of ability worth a D or an E twenty years ago would now secure an A or a B".

Enquiry into examinations

The Education Select Committee has announced an inquiry into the administration of examinations for 15–19 year olds in England. The inquiry will consider the benefits and drawbacks of having several awarding bodies for qualifications and the extent to which the current system delivers the best and fairest educational outcomes for young people. For more information visit <http://tinyurl.com/62u2vaq>.

New plans for A-levels

Under plans being drawn up by UCAS, from 2016 A-level exams would take place immediately after Easter and students would apply to university after receiving their grades in July. For further details visit <http://tinyurl.com/3svw742>.

Transition from A-level

A report, *Mind the Gap: Mathematics and the transition from A-levels to physics and engineering degrees*, published by the Institute of Physics (IOP), suggests that exams and specifications have weakened the crucial relationship between mathematics and the physical sciences. The full report is available at <http://tinyurl.com/6h2fhux>.

More students study core subjects

According to Department for Education figures the new English Baccalaureate is having an immediate impact – hugely increasing the proportion of students taking the core academic subjects most valued by universities and employers.

The English Baccalaureate (Ebacc) was introduced by the Department for Education as an additional measure in the performance tables published in January 2011. Students who achieve a GCSE grade C or better in English, mathematics, a language, history or geography, and two sciences achieve the Ebacc.

- 33 per cent of students taking GCSEs next year will be doing a combination of subjects that could lead to an Ebacc.
 - 47 per cent of students taking GCSEs in 2013 will be doing a combination of subjects that could lead to an Ebacc.
- This compares with 22 per cent of GCSE-stage students entered for the Ebacc in 2010

Dr John Johnston
Mathematics Promotion Unit

NEW AT DE GRUYTER

Hans-Otto Georgii

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- ▶ Informs about the state of the art in several directions
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„This book [...] is a work of outstanding scholarship. It is in fact one of the author's stated aims that this comprehensive monograph should serve both as an introductory text and as a reference for the expert.“

Fredos Papangelou, Zentralblatt MATH

Dieter Röss

LEARNING AND TEACHING MATHEMATICS USING SIMULATIONS

Plus 2000 Examples from Physics

2011. xvii, 239 pages. 117 fig.

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NEWS FROM IMU

60th anniversary of IMU after rebirth in 1951

On 10 September 2011 the International Mathematical Union (IMU) celebrated its 60th anniversary after it was reborn in 1951. In his book *Mathematics without borders: A history of the International Mathematical Union*, Olli Lehto recalls that Børge Jessen (1907–1993), the Danish Secretary of the Interim Committee of the IMU 1950–1952, declared on 10 September 1951 the official founding of the Union with its first domicile in Copenhagen. For further information see www.mathunion.org/general/history.

Facebook Social Network

IMU is now alive and active on Facebook under the name 'IMU Secretariat (Mathunion)' as well as under 'International Mathematical Union'. If you want to know the latest IMU updates (and have a Facebook page or profile), become friends of the IMU on Facebook. You just have to search for www.facebook.com/mathunion, and then click the button LIKE at the institutional webpage (see <http://tinyurl.com/5rlho2n>).

CDC launches the IMU Mathematics Library Assistance Scheme for Developing Countries

IMU's Commission for Developing Countries (CDC) has launched a new support scheme where the shipment of textbooks to universities in less economically developed countries is supported. CDC offers limited financial support for shipment costs for individual scientists or institutions wishing to donate books in the mathematical sciences to libraries in developing countries. Libraries in universities/research institutions in developing countries can apply for receiving donated books. For more information see <http://imuweb.mathunion.org/cdc/further-cdc-activities/library-assistance-scheme> or contact the CDC Administrator in the IMU Secretariat in Berlin (icmi.cdc.administrator@mathunion.org).

The Simons Foundation announces the Africa Mathematics Project

The programme is designed to enhance the mathematical capacity and productivity of recipient research groups. The project will focus on mathematicians and their graduate students at institutions of higher learning in sub-Saharan Africa. The Foundation will make competitive awards that, taken together, will total approximately US\$400,000 per year for each of the next 10 years. For more information see <https://simonsfoundation.org/mps-africa-mathematics-project>

John Ball elected to the Executive Board of ICSU

The General Assembly has elected the officers for the next three-year period and John Ball, former President of IMU, was elected to the Executive Board of the International Council of Scientific Unions (ICSU) for a three-year period starting January 2012.

Death of Albrecht Dold

Albrecht Dold, known for fundamental contributions to algebraic topology, who was born in Germany on 5 August 1928, died on 26 September 2011. He held positions in Heidelberg, Zürich, Princeton and Columbia and was Vice-President of the IMU 1995–98.

Subscribing to IMU-Net

There are two ways of subscribing to IMU-Net:

1. Click on www.mathunion.org/IMU-Net with a web browser and go to the 'Subscribe' button to subscribe to IMU-Net online.
2. Send an email to imu-net-request@mathunion.org with the subject-line: Subject: subscribe

The above items are taken from the 49th issue of the IMU electronic newsletter *IMU Net* (see www.mathunion.org/IMU-Net).

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

www.lms.ac.uk/newsletter

MAKING EVERYTHING AND NOTHING

Otley Science Festival, 17 November 2011
and London, December 2011 (date TBA)

Everything and Nothing is a mixed-media theatre piece based on the recently-solved Poincaré conjecture and is a collaboration between myself – a composer and writer – and sculptor Kate Allen, funded by EPSRC's Partnerships for Public Engagement scheme, through Sheffield, Reading and Oxford Universities. With the impetus of public engagement as our objective, the work has come about through our own engagement as artists with the mathematics of the Poincaré conjecture. In this we have been guided by expert mathematicians Marcus du Sautoy and Katie Steckles, while Henri Poincaré's own writings around mathematics in *The Value of Science* have provided invaluable endorsement of our instinct to explore this very abstract mathematics through tactile, visual and sonic means.

Now that Poincaré's conjecture has been proved for the 3-sphere it gives us a means for exploring the possible shapes of our universe. This idea of 'possible shapes' resonates across disciplines: as artists we are continually exploring and rendering our own topologies and landscapes. Stimulated by the concepts encapsulated by the Poincaré conjecture, *Everything and Nothing* explores what the fourth dimension could be, what a manifold is, what the three-sphere might look like and how one might navigate the universe. The diverse sources of Jorge Luis Borges's *Library of Babel* and Amelia Earhart's story of circumnavigation have become powerful partners for developing the concept of a shape or surface we are on but cannot see. Three characters (one a surreal virtual Librarian), each attempting to navigate the universe from a different mathematical perspective, encounter one another in the library, through the

airwaves and along the dateline, with outcomes that are at times absurd, at others poetic and sublime. *Everything and Nothing* is a tangible encounter with the Poincaré conjecture at the horizon of our capacity to imagine space, that in itself facilitates a theatre in which mathematics, sound, image and text can be equal partners.

Dorothy Ker

As a mathematician who has become increasingly involved in outreach activities as I completed my PhD, I jumped at the chance of a PDRA post in maths outreach for *Everything and Nothing*. My responsibility on the project is to



Circumnavigating the globe – Amelia Aleph (Lucy Stevens)

© Roswitha Chesher



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explain the mathematics behind the Poincaré conjecture, both to those working on the production, and in an accompanying workshop to the audience of the show. As well as discussing the historical story of the proof – the conjecture could well be the statement

ful, and it incorporates ideas from Jorge Luis Borges, the Argentine author whose short stories touched on concepts like infinity and the universe, as well as combinatorics, scale and perspective. These ideas are woven around the story of a mathematician who is excited about the recent proof, and the lost aviator Amelia Earhart, who presents a non-mathematician's viewpoint and whose charts and navigational tools echo the mathematical charts of topological manifolds.

It has been very instructive working with a team of non-mathematicians – it is wonderful being advised on ways to present things and to take advantage of my skills and enthusiasm in order to communicate effectively. On top of this, I have the opportunity to ask someone without a mathematics background 'does this make sense?'; sometimes their insights and perspectives give me a new angle on something I thought I knew well. It forces me to be creative in finding ways to explain and demonstrate things, as well as justifying the usefulness of the (very pure) mathematics involved, which is not always easy.

mathematics involved, which is not always easy.

The motivation for much of pure mathematics is often unclear until years later, and my hope is that in this project I have managed to convey the importance and beauty of mathematical proof, and of such results as the Poincaré conjecture.

Katie Steckles

Following on from premieres this summer at the Green Man and British Science Festivals, the next performance of Everything and Nothing will be at the Otley Science Festival on 17 November. A London performance is planned for early December and will be advertised through the LMS. Further information is available from the website www.everythingandnothingproject.com. Follow the twitter feed: @everythingnothing.



Investigating the possible shapes of the Universe
– Everyman Explorer (Chris Brannick)

with the most false proof attempts ever – I communicate the ideas behind the conjecture in simple terms.

Some quite serious maths terminology is used in the statement of the conjecture, and my task is to find a way to explain such concepts in a way that is intuitive and understandable. I have had a lot of fun playing with plasticine to explain homeomorphism, large inflatables and maps and charts to demonstrate the idea of a manifold, animating loops moving around on surfaces to illustrate the fundamental group, and making tiny model ants to convey the idea of determining properties of a surface from local information, as seen from an ant's perspective.

I find the performance itself very beauti-

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

www.lms.ac.uk/newsletter

SARAH SHEPHERD

It is with enormous regret that we report the death of Sarah Shepherd, aged 26, on 14 September 2011.

Following a 4-year mathematics degree at St Hugh's College, Oxford, Sarah began research for a PhD in mathematical medicine at the University of Nottingham. She once told me that before her degree she would visit her local library and, in the absence of a mathematics magazine aimed at sixth-formers, would look through back copies of *New Scientist* for articles about mathematics. When she began her PhD, realising the 'mathematics magazine' she had been longing for still didn't exist, she decided to set it up. Sarah published twelve issues of *iSquared Magazine* between autumn 2007 and summer 2010.

iSquared contained feature articles, historical biographies, interviews, news, book reviews and puzzles. Dozens of people wrote articles for *iSquared* and Sarah commissioned, wrote, edited, designed and did everything else that gets a magazine into the hands of readers. The philosophy behind *iSquared* was to show mathematics not as a static, abstract body of knowledge but as an active, vibrant subject applied to the real world. The magazine realised Sarah's passion for communicating this to those who are unaware of the nature of mathematics. In her first editorial she wrote,

Many people are unaware that maths is more than just abstract concepts, inaccessible to all but those with a university education in the subject. In fact, mathematics can be appreciated by everyone. The past few decades have seen maths being used in numerous innovative real-world situations; notably in the areas of biology and medicine, where new insights are emerging from the use of mathematical modelling.

Sarah's research with Helen Byrne and Nick Monk, 'Stem cell differentiation in response to cell signalling mechanisms', was developing mathematical models to look at the role of delta-notch signalling in neurogenesis. She wrote about her research area in the final issue of *iSquared*, calling this "a rapidly expanding area that carries great promise for the future of biology."

Sarah was interested in the place of women in mathematics and devoted a special issue of *iSquared* to this topic, writing of the gender imbalance in our subject and saying she hoped the issue would "prove inspirational for young women looking to start their own mathematical careers."

Sarah was an active and well-respected member of the mathematics community who made a substantial contribution to the promotion of mathematics. She will be remembered for her passion and commitment to mathematics and her achievement in communicating this to others through *iSquared Magazine*.

Peter Rowlett

Sarah's family have asked for donations in Sarah's memory to the *Rethink* charity via www.rethink.org/get_involved/donate_now/donate_in_memory/sarahs_fund.html.

DAN QUILLEN MEMORIAL MEETING

Second Announcement

There will be a memorial meeting for Dan Quillen at Magdalen College, Oxford, on the afternoon of Saturday 19 November 2011. He died on 30 April this year and was the Waynflete Professor at the Mathematical Institute from 1984 to 2006 and associated with Magdalen College. The speakers are:

- Sir Michael Atiyah
- Michael Hopkins
- Graeme Segal

In addition to lectures there will also be musical contributions (musical director: Kobi Kremnizer). To register, email tillmann@maths.ox.ac.uk. Further details are available at <http://tinyurl.com/3uouwa4>. To find accommodation, see <http://tinyurl.com/62lrqod>.

To reserve a space at the conference dinner, which will be held at Merton College,

send a cheque of £35 made out to the 'Mathematical Institute' to U. Tillmann, Mathematical Institute, 24–29 St Giles', Oxford OX1 3LB by **4 November 2011**.

The organizers are Martin Bridson, Frances Kirwan, Glenys Luke, Graeme Segal and Ulrike Tillmann.

An obituary was published in the June issue of the LMS Newsletter (No. 404).

LMS INVITED LECTURER 2012

Professor Alexei Borodin (MIT)

Determinantal point processes and representation theory

26–30 March 2012
University of Glasgow

Alexei Borodin will give a ten-lecture minicourse, at a level suitable for graduate students, on *Determinantal point processes and representation theory*. The lectures will explore the interactions between probability theory and algebra, which is a new fast-developing area.

There will also be supplementary lectures by:

- Neil O'Connell (Warwick)
- Patrik Ferrari (Bonn)

Local B&B accommodation will be available.

Limited financial support is available with preference given to UK research students. Please contact the organisers for further details (LMSlectures2012@gmail.com).

For further details on the 2012 Invited Lectures please visit www.maths.gla.ac.uk/~mf/LMSLectures2012/index.htm.

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

www.lms.ac.uk/newsletter

INTEGRABLE DAY

A half-day workshop on *Integrable Systems and Poisson Geometry* will be held at Loughborough University on 25 November 2011. The speakers are:

- Pantelis Damianou (Cyprus)
Transverse Poisson structures and ADE singularities
- Andy Hone (Kent)
Algebraic entropy and tropicalization of birational maps
- Marta Mazzocco (Loughborough)
Poisson structure on block triangular bilinear forms
- Theodore Voronov (Manchester)
Poisson brackets and supergeometry

The meeting is part of a collaborative workshop series on *Classical and Quantum Integrability* involving Edinburgh, Glasgow, Leeds and Loughborough Universities. The meeting is supported by an LMS Scheme 3 grant. Funds may be available to support the attendance of research students. Enquiries should be addressed to the organiser Sasha Veselov (A.P.Veselov@lboro.ac.uk or 01509 222866), or visit the website at <http://www.lboro.ac.uk/departments/ma/events/IDays/index.html>.

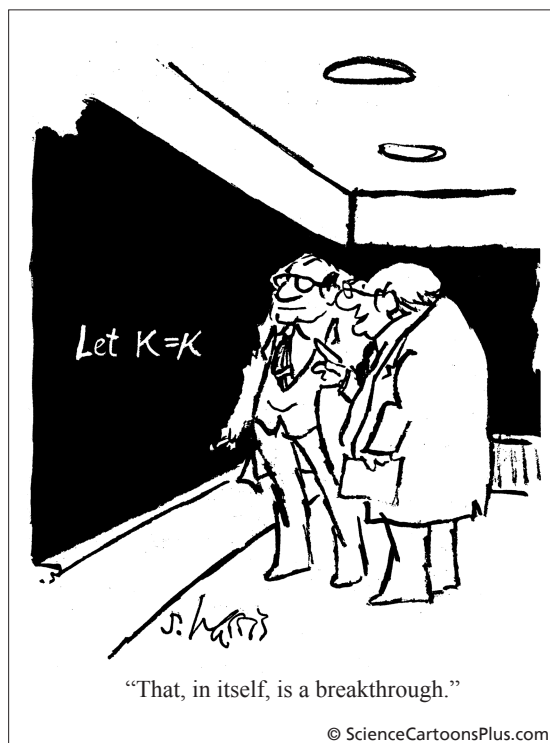
PROFINITE COMPLETIONS OF GROUPS

A one-day meeting on *Profinite Completions of Groups* will be held on Monday 12 December 2011 at Imperial College London. Every residually finite group embeds as a dense subgroup into its profinite completion, and the profinite completion construction is an important tool in studying infinite groups. There are many interesting open questions about the relationship between abstract groups, their profinite completions and profinite groups in general. The natural problem 'Which profinite groups are completions of finitely generated groups?' seems impossibly hard. Prospective speakers are:

- Dan Segal (University of Oxford)
- Menny Aka (Hebrew University of Jerusalem)
- Henry Wilton (University College London)

The meeting is part of the *South England Profinite Groups Meetings* which are supported by an LMS Scheme 3 grant. Limited funds are available to reimburse travel expenses of UK-based students and young mathematicians. For more details see www.ma.rhul.ac.uk/profinite_groups/meetings.html or contact N. Nikolov (n.nikolov@imperial.ac.uk).

20



LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT LECTURE AND SOCIETY MEETING

Friday 24 February 2012

Black Suite, BMA House, Tavistock Square, London WC1H 9JP

Programme:

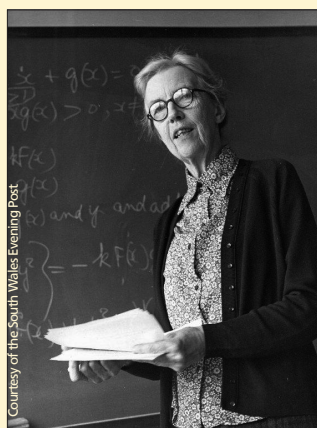
3.30 Opening of the meeting

Tom Lenagan (Edinburgh)
Totally nonnegative matrices

4.30 Tea

5.00 Mary Cartwright Lecture

Agata Smoktunowicz (Edinburgh)
*Old and new questions in
noncommutative algebra*



Mary Cartwright giving a lecture
at Swansea University

A reception will be held after the meeting at BMA House followed by a dinner at the Number Twelve Restaurant, Ambassador Hotel, at a cost of £32 per person, inclusive of wine. If you would like to attend the dinner, please contact Elizabeth Fisher (meetings@lms.ac.uk) by **17 February**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Contact Duncan Turton/Elizabeth Fisher (womeninmaths@lms.ac.uk) for further information.

www.bristol.ac.uk

Heilbronn Research Fellow

£33,734 - £44,016

The Department of Mathematics invites applications for a number of Research Fellowships in Mathematics in association with the Heilbronn Institute for Mathematical Research. Research areas of interest include but are not restricted to number theory and algebraic geometry, algebra, combinatorics, probability, quantum algorithms and statistics (data mining). We expect to appoint a number of Fellows across the full range of these areas, at least one in each area mentioned above.

The Fellowships will be for three years, with a preferred start date in September 2012. You will divide your time equally between your own research and the research programme of the Heilbronn Institute. Due to the nature of the Heilbronn Institute's work, you must satisfy vetting before appointment. UK resident UK nationals will normally be able to meet this condition: other potential applicants should consult the Director about their eligibility before applying. You may become a member of the USS pension scheme. Research expenses of at least £2,000 per annum will also be available.

Enquiries about the fellowships may be addressed to Dr Oliver Johnson, School of Mathematics, telephone +44 (0) 117 928 8632, e-mail: assoc-director-himr@bristol.ac.uk and enquiries about the work of the Heilbronn Institute may be addressed to the Director of the Institute, Professor Malcolm MacCallum, telephone +44 (0) 117 980 6303, e-mail: m.a.h.maccallum@bristol.ac.uk

Applications should include a statement of proposed research (not more than one side of A4). Candidates should ask three referees to send references by the closing date to: Ms Chrystal Cherniwchan, School of Mathematics, University of Bristol, BS8 1TW or e-mail: chrystal.cherniwchan@bristol.ac.uk It is the candidates own responsibility to ensure that the reference letters are received by the closing date (these may be sent by e-mail also).

For further details and an application form please visit www.bristol.ac.uk/jobs Alternatively you can e-mail recruitment@bristol.ac.uk or telephone (0117) 954 6947, quoting the reference number 16679.

The closing date for applications is 9.00am, Wednesday 7 December 2011.

EXCELLENCE THROUGH DIVERSITY



ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES PATTERN FORMATION: THE INSPIRATION OF ALAN TURING

(A satellite meeting at St John's College, Oxford)

14–16 March 2012

in association with the Newton Institute programme
Semantics and Syntax: A Legacy of Alan Turing
(9 January – 6 July 2012)

To celebrate the centenary of Alan Turing's birth and his seminal work in the mathematical modelling of biological pattern formation, this workshop will aim to show how mathematical modelling of pattern formation has led to (i) significant advances in the understanding of certain aspects of biology and chemistry; (ii) new mathematical and computational challenges. It will bring together researchers ranging from those who do experiments to demonstrate pattern formation, to those who develop mathematical and computational techniques to analyse proposed models, the common theme being the emergence of pattern and form. The format will consist of a number of keynote lectures, given by experts in the field, and a series of shorter contributed talks.

Further information and application forms are available from the website at www.newton.ac.uk/programmes/SAS/sasw08.html. Closing date for the receipt of applications is **1 December 2011**. The organisers are Bernold Fiedler (Freie Universität Berlin), Benedick Löwe (Amsterdam) and Philip Maini (Oxford).

23

FORMAL AND COMPUTATIONAL CRYPTOGRAPHIC PROOFS

10–13 April 2012, Cambridge

in association with the Newton Institute programme
Semantics and Syntax: A Legacy of Alan Turing
(9 January – 6 July 2012)

Proofs arise in many forms in cryptography and security:

- As mathematical proofs of security in a complexity-theoretic model of a protocol or scheme; such proofs are typical of the area known as 'reductionist proofs of security'.
- As mathematical proofs of security in a logical, or symbolic, model of a protocol or scheme; such proofs are typified by work in the 'formal methods'/'symbolic' tradition, a.k.a. the Dolev–Yao model.
- As objects in their own right which are used in a protocol; for example as in zero-knowledge interactive proofs or probabilistically checkable proofs.

This workshop is timely, given recent work in establishing that some Dolev–Yao style proofs can have the same computational guarantees as provided by reductionist proofs of security. Such meta-proofs show that Dolev–Yao proofs are computationally sound. In addition recent years have shown the development of automated theorem provers, traditionally the reserve of formal methods style proofs, into the arena of provable security. In addition, we have seen the actual deployment of protocols based on zero-knowledge proofs via protocols such as U-Prove (from Microsoft) and Idemix (from IBM). Finally, the last ten years have seen the application of ideas from complexity theory, such as the PCP theorem, to cryptographic protocols, and it is to be hoped that such protocols may soon become practical.

The aim of the workshop is to bring together people working on all such topics, with a view for cross-disciplinary work, to obtain new insights on old problems, and to capitalise on the recent advances alluded to above.

Further information and application forms are available from the website at www.newton.ac.uk/programmes/SAS/sasw02.html. Closing date for the receipt of applications is **30 November 2011**. The organisers are Nigel Smart (Bristol) and Shafi Goldwasser (MIT).

www.bristol.ac.uk

Lecturer/Senior Lecturer/Reader in Number Theory, Arithmetic Geometry, or Arithmetic Combinatorics

£33,734 - £52,556 (to be agreed on appointment)

Bristol, UK

We are seeking an outstanding candidate for a Lectureship, Senior Lectureship or Readership in Number Theory, Arithmetic Geometry, or Arithmetic Combinatorics. You will join the Pure Mathematics Group within the School of Mathematics. For a Lectureship you are expected to demonstrate outstanding research potential in one of the above or closely related research areas. For a Senior Lectureship or Readership you are expected to have an outstanding record of research and academic leadership.

The University of Bristol's School of Mathematics is one of the leading centres for research and teaching in mathematics in the UK. The Pure Mathematics Group is internationally recognised, with interests in number theory, arithmetic geometry, arithmetic combinatorics, ergodic theory, random matrix theory, algebra, analysis and logic. The Bristol Number Theory Group is distinguished by the unusual breadth of interests encompassed both by its members and closely associated affiliates from the groups in Ergodic Theory and Mathematical Physics. Current members of the group are Andrew Booker, Tim Browning, Brian Conrey, Tim Dokchitser, Lynne Walling and Trevor Wooley, with Alex Gorodnik, Jon Keating, Jens Marklof, Misha Rudnev and Nina Snaith having closely allied interests. It has close links with the Heilbronn Institute for Mathematical Research, which focuses on discrete mathematics and funds about 20 postdoctoral fellows in the School of Mathematics. We particularly welcome suitably qualified female applicants, as women are currently under-represented in the School of Mathematics.

You should arrange for three referees to send letters of recommendation directly to Professor Trevor Wooley, FRS, e-mail trevor.wooley@bristol.ac.uk or fax +44 (0) 117 928 7999 by the closing date, 9.00am 12 December 2011. Please note that it is the applicant's responsibility to ensure that the reference letters are received by the closing date.

For informal enquiries please contact Professor TD Wooley on +44 (0) 117 331 5240 or e-mail trevor.wooley@bristol.ac.uk

For further details and an application form please visit www.bristol.ac.uk/jobs Alternatively you can e-mail recruitment@bristol.ac.uk or telephone (0117) 954 6947, quoting the reference number 16654.

The closing date for applications is 9.00am, Monday 12 December 2011.

Interviews will be held during January 2012.

EXCELLENCE THROUGH DIVERSITY





Formal Aspects of Computing
Science Specialist Group

The London
Mathematical
Society



BCS-FACS EVENING SEMINAR
Joint event with the London Mathematical Society
Wednesday 30 November 2011 at 6:00 pm

De Morgan House, 57-58 Russell Square, London WC1B 4HS.
Nearest tube: Russell Square.



Picture courtesy of Andrew Ireland

From l-r: Andrew Ireland, Maria Teresa Llano, Gudmund Grov and Alison Pease (on screen)

Reasoned Modelling: Towards Decision Support for System Designers
Professor Andrew Ireland (Heriot-Watt University)

Formal modelling and reasoning are closely related activities. In particular, modelling decisions are typically informed by the analysis of failed proofs. While such analysis is not intellectually challenging from the perspective of mathematical reasoning, it does represent a major barrier to the uptake of formal design methods by mainstream software engineers - whose intuitions lie in modelling and not proof. This problem is exacerbated by the huge number of proof obligations that arise during industrial scale developments.

Overcoming this barrier would increase the accessibility and productivity of formal design methods, and ultimately the dependability and security of software intensive systems. Andrew Ireland's talk will describe a programme of research called reasoned modelling which aims to reduce this barrier. In essence he and his collaborators are focused on the development of techniques that abstract away from the complexities of low-level proof obligations, in particular proof-failures, and provide designers with high-level modelling guidance. Their approach is based upon a classification of common modelling patterns. Combined with automatic proof-failure analysis, they use these patterns to automatically generate modelling guidance. Complementing this top-down process, they are experimenting with bottom-up AI theory formation techniques. Specifically, they are exploring how the HR automated theory formation system can be used to increase the flexibility of our modelling patterns. He will report on progress within the context of Event-B, a refinement based modelling formalism. Their longer-term vision for reasoned modelling will also be outlined. This talk is based upon joint work with Gudmund Grov, Maria Teresa Llano and Alison Pease.

Refreshments will be available from 5.30 pm.

The seminar is free of charge and open to everyone.

*If you would like to attend, please email computerscience@lms.ac.uk by **25 November**.*

RECORDS OF PROCEEDINGS AT LMS MEETINGS

REGIONAL ORDINARY MEETING

held on *Saturday 8 October 2011* at the University of Exeter. About 35 members and visitors were present for all or part of the meeting.

The meeting began at 9.30 am, with the President, Professor A.J. MACINTYRE FRS, in the Chair.

Seventeen people were elected to Ordinary Membership: D.K. Burgarth, P. Cascini, J. Castillo-Rodriguez, J. Derrick, P.E. Dorey, A. Fronda, T.S. Gee, D.T. Gurr, J.Z. Kolendowicz, E.J.N. Lockhart, S. Mikulas, M.T. Morrow, R.E. Paget, S.J. Sierra, A. Wiese, S. Zharkov, V. Zharkova; one was elected to Reciprocity Membership: M.P. Chaudhary.

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

Professor J. RITTER introduced a lecture given by Professor John Coates on *L-functions and arithmetic from a p-adic perspective*.

After tea, Professor Ritter introduced a lecture given by Professor David Burns entitled *On the derivatives of p-adic L-functions*.

After lunch, Professor V. SNAITH introduced a lecture given by Professor Jürgen Ritter entitled *On equivariant Iwasawa theory*.

The Programme Secretary Dr S.A. HUGGETT expressed the thanks of the Society to the local organisers for putting on such an interesting meeting.

SOUTH-WEST REGIONAL MEETING 2011

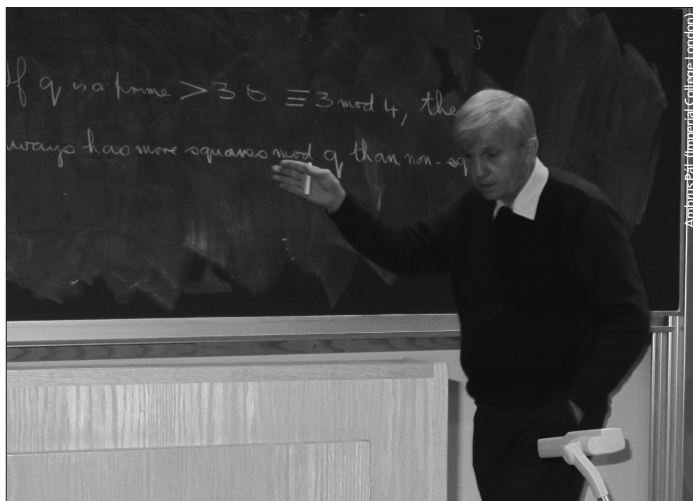
Report

The 2011 South-West Regional Meeting of the LMS was held on Saturday 8 October 2011 at the University of Exeter. The meeting took place on the second day of a two-day workshop on *Iwasawa Theory*, and the speakers were Professor John Coates (Cambridge), Professor David Burns (King's College London) and Professor Jürgen Ritter (University of Augsburg).

The formal business of the meeting, including the approval of reports of several previous meetings, was conducted by Professor Angus Macintyre (LMS President). Professor Macintyre took the opportunity to share with the assembled members his concerns over the very worrying recent developments in EPSRC's policy on mathematics funding, and to encourage those present to act in

any way they could in defence of mathematical research in the UK.

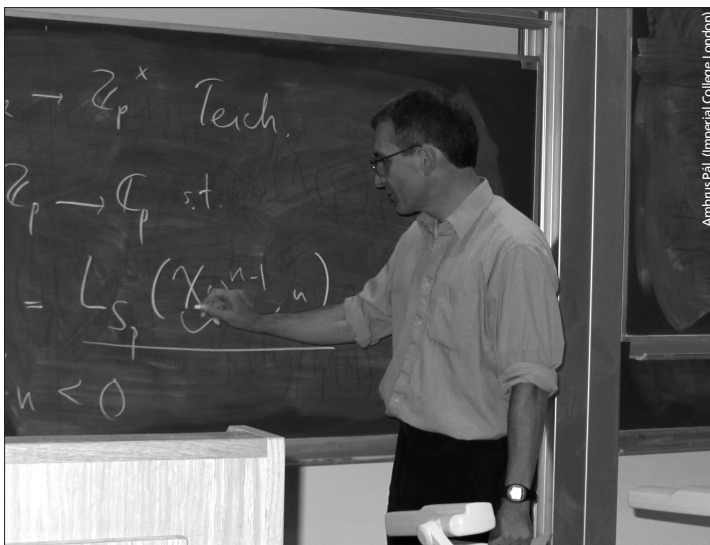
It was left to the first speaker, Professor Coates, to move on to more uplifting topics. His lecture *L-functions and arithmetic from a p-adic perspective* surveyed a number of exciting recent developments in Iwasawa theory. A major theme in Iwasawa theory in recent years has been the study of arithmetical modules (such as class groups of number fields) in the limit over towers of number fields whose Galois groups are non-commutative p -adic Lie groups. Professor Coates explained the algebraic



John Coates

framework that is used to study these objects, and described several striking applications to well-known arithmetical problems.

Professor Burns' talk *On the derivatives of p-adic L-functions* described new progress on an old problem in algebraic number theory, Brumer's conjecture, which asserts that the ideal class groups of certain number fields are annihilated by elements of a group algebra concocted from the values of Artin L -functions. A major problem in this theory is the existence of certain 'trivial zeros' of p -adic L -functions, and Professor Burns described how this



David Burns

LONDON MATHEMATICAL SOCIETY

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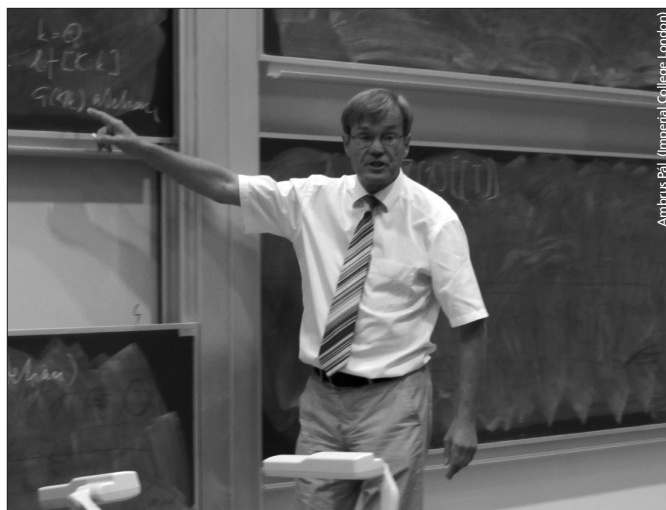
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difficulty can be circumvented by understanding the derivatives of these L -functions.

After lunch, Professor Ritter addressed the audience on *Equivariant Iwasawa theory* explaining a theorem due to him and Alfred Weiss giving an equivariant refinement of the classical Iwasawa main conjecture. This refinement incorporates the action of an auxiliary finite group, which may be non-commutative, and allows problems in non-commutative Iwasawa theory to be reduced to compatibilities between objects in commutative Iwasawa theory over different base fields (so-called 'Möbius-Wall congruences').

Altogether, the meeting and the accompanying workshop were a highly interesting experience. I particularly enjoyed the broad range of topics covered, touching on p -adic, automorphic, and function field aspects of the subject as well as some more classical topics.

David Loeffler
University of Warwick



Jürgen Ritter

FESTIVAL OF SCIENCE 2011

Report

The British Association for the Advancement of Science (now using the name British Science Association) has been holding Festivals of Science since 1831. The objective has always been to bring science, including some of the latest developments, to the attention of the media and the interested public; nowadays the Festival also provides entertaining and inspiring science for families and schools.

Mathematical Sciences, in common with other disciplines, has its own 'Section', a committee which each year proposes events for the Festival. Ideas for events come from the wider community, through Section members, and from the various societies with an interest in promoting mathematics (the IMA, LMS, RSS for example). The Mathematical Sciences Section also hosts events with a flavour of computing, including the very popular *Maths and Computing Magic Show*, the creation of Peter McOwan and Matt (Stand-Up Mathematician) Parker from QMUL.

This year in Bradford, from 10 to 15 September, the RSS organized an event *Vital Statistics*, describing the practical application of statistical analysis in sport and with contributions from Nathan Leamon of the England & Wales Cricket Board and Georgie Hart from Atass Sports Ltd as well as academics John Haigh (Sussex) and Bill Gerrard (Leeds). Chris Budd introduced *Maths Makes Waves*, marking the fiftieth anniversary of the death

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of Schrödinger and explaining waves from radio waves to tsunamis and solitons, with contributions from Alan Champneys (Bristol) and Nick Mitchell (Bath). Katie Chicot ran a multi-media competition *X and Y Factor* for schools, with an awards ceremony in the National Media Museum.

This year's Maths Presidential Lecture was by Caroline Series on *New Patterns – New Perspectives* in which she emphasized, through the history of non-euclidean geometry, the long-term nature of the impact of 'pure mathematics' on the advance of science. This lecture was followed by a wine reception sponsored by the LMS.

Bradford College hosted an event on the *Sight and Sounds of Primes*, and during the Family Weekend at the start of the Festival there was busking in the city, organized by Debra Hurcomb and Sara Santos. The Festival Fringe included a performance of the *Festival of the Spoken Nerd* by Matt Parker, Steve Mould and Helen Arney mixing stand-up comedy with entertaining instruction in mathematics, physics and biology.

The atmosphere at this year's Festival was excellent, with large numbers of local people and schoolchildren taking part in a huge range of activities covering the whole of science. Most visitors were housed in *The Green* student residences which claim to have the highest ever rating for sustainability and eco-friendly living. The mathematics events attracted good and responsive audiences.

The next Festival is from 4 to 9 September 2012 in Aberdeen.

Peter Giblin
Recorder (i.e. Chair)
Mathematical Sciences Section

REVIEW

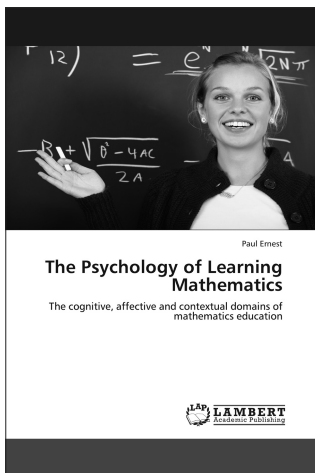
The Psychology of Learning Mathematics: The Cognitive, Affective and Contextual Domains of Mathematics Education by Paul Ernest, Lambert Academic Publishing, 2011, 164 pp, ISBN-13: 978-3-8443-1306-2.

Being interested in the study of how mathematics students think mathematically, I hoped this book might help me understand these thought processes better. I was not disappointed. *The Psychology of Learning Mathematics* is a study of current research into how mathematics is learned and taught. The first half of the book deals with the ways in which children learn

mathematics and demonstrates how teachers can raise attainment by improving their own understanding of the learning process. There is a middle chapter on the theories of constructivism which leads nicely into the remaining section dealing with problem solving set partly in the context of teaching mathematics in Higher Education. It was this final section that I found the most helpful but the book as a whole has helped me increase my understand-

ing of how mathematics is learned and, I hope, has brought fresh inspiration into my teaching this year.

The sub-title of the book is important. This is not just a study of how mathematics is learned cognitively but includes the affective domain; the influence of peoples' feelings, attitudes and learning context on their mathematical learning. The book provides a comparison between the attitudes of 11- and 15-year-olds to mathematics



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NEWSLETTER

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and shows how enjoyment and ability to see the use of the subject diminishes as learners get older. There is some discussion concerning the differences between the genders and the relationship between attitude and achievement.

As someone who likes to do mathematics with some sort of writing implement in my hand. I found the example of the mental maths skills of street vendors in Brazil quite absorbing. Researchers found that these children can perform some quite complex mental arithmetic in the market place but do not perform nearly as well on similar questions on paper. The author goes on to examine the differences between written algorithms and mental methods, understandably concluding that both are important and necessary in the learning of mathematics.

The last few chapters concern problem solving, a skill that we frequently tell our students is their main asset when it comes to future employment. Ernest makes the point that students can only acquire a finite number of examples (despite their insatiable hunger for more) and it is from these that they have to be able to form patterns of heuristics that provide the basis for transferring to real world problems. This section of the book has helped me to realise why my students find this hard and has encouraged me to find new ways to persuade my students to think rather than solve problems routinely. There is much reference to work by Pólya, Burton and Mason in the context of general problem-solving strategies and ideas as to how this can be implemented in Higher Education.

This is a fascinating look at how mathematics is learned and cannot fail to influence the teaching of any reader involved in the teaching or learning of mathematics at any level.

Noel-Ann Bradshaw
University of Greenwich

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 of meetings and events is given on the Society's website (www.lms.ac.uk/newsletter/calendar.html).

Please send updates and corrections to calendar@lms.ac.uk.

NOVEMBER 2011

3 Supporting Postgraduates Who Teach Workshop, Manchester (405)

7-11 Learning and Plasticity Workshop, CIRM, Marseille (406)

8-10 Short Course on Model Order Reduction, Santiago de Compostela, Spain

11 Geometry Day, King's College London (406)

12-13 MathsJam Weekend, Wychwood Park (405)

15 *How Fast Can Usain Bolt Run?* Gresham College Lecture, Museum of London (407)

17 Everything and Nothing, Otley Science Festival (408)

18 LMS Graduate Student Meeting, London (408)

18 LMS AGM, London (408)

19 Dan Quillen Memorial Meeting, Oxford (408)

23 Representation Theory and Number Theory Meeting, London (406)

25 Integrable Day Workshop, Loughborough University (408)

29-3 Dec SAMS-AMS Joint International Congress, Port Elizabeth, South Africa (406)

30 BCS-FACS Evening Seminar, London (408)

DECEMBER 2011

5-9 Mathematical Models of Cognitive Architectures Workshop, CIRM, Marseille (406)

12 Profinite Completions of Groups Meeting, Imperial College London (408)

12-16 Inverse Problems in Science and Engineering INI Workshop, Cambridge (401)
13 *David and Goliath*, Gresham College Lecture, Museum of London (407)
16-17 LMS Prospects in Mathematics Meeting, Bristol

JANUARY 2012

4-6 British Postgraduate Model Theory Conference, Oxford
4-8 String Theory, Geometry, and Mathematical Physics UK–Japan Winter School, Oxford (407)
8-11 Free Boundary Problems in Fluid Mechanics Meeting, Nottingham (406)
17 *Citius, Altius, Fortius*, Gresham College Lecture, Museum of London (407)
31-2 Feb Cryptographic Theory INI Workshop, Cambridge (404)

FEBRUARY 2012

13-17 Symmetries of Discrete Objects Conference, Queenstown, New Zealand (406)
21 *Let's Twist Again*, Gresham College Lecture, Museum of London (407)
24 **LMS Meeting and Mary Cartwright Lecture (408)**

MARCH 2012

14 Combinatorics Meeting, Oxford
14-16 Pattern Formation: The Inspiration of Alan Turing INI Satellite Meeting, Oxford (408)
15-17 The Big Bang Science and Engineering Fair, NEC Birmingham (407)
21 Zeeman Medal 2011 Award Ceremony, The Royal Society, London (406)
21-22 Young Functional Analysts' Workshop, Oxford
26-30 **LMS Invited Lectures, Alexei Borodin, Glasgow (408)**
27 *On the Waterfront*, Gresham College Lecture, Museum of London (407)
27-29 BAMC, London

APRIL 2012

2-3 Biological Flow Conference, Cambridge
2-4 Young Researchers in Mathematics Conference, Bristol
10-13 Formal and Computational Cryptographic Proofs INI Workshop, Cambridge (408)
16-19 BMC 2012, Canterbury
17-19 Frontiers of Nevanlinna Theory 3: Applications of Nevanlinna Theory to Differential and Functional Equations, University College London (401)
24 *Final Score*, Gresham College Lecture, Museum of London (407)

MAY 2012

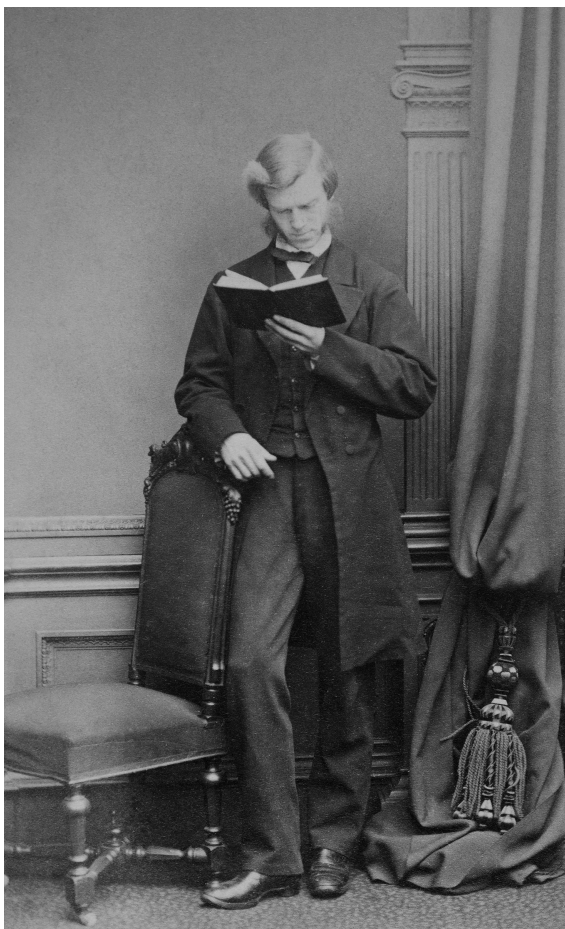
19 Poincare Meeting, London
28-1 Jun Boundary Value Problems for Linear Elliptic and Integrable PDEs: Theory and Computation ICMS Workshop, Edinburgh (405)
28-1 Jun Infinite Ergodic Theory Workshop, Surrey

JUNE 2012

2-3 Numerical Linear Algebra, Control Theory and Data Assimilation Conference, Reading
5-8 Higher Order Problems in Geometric Analysis, Bath
6 **LMS Northern Regional Meeting, Northumbria University, Newcastle**
11-12 Numerical Analysis of Stochastic Partial Differential Equations, Warwick
12-15 The Incomputable Workshop, Chicheley Hall, North Buckinghamshire (407)
12-15 Chaotic Modeling and Simulation International Conference, Athens, Greece
18-20 Frontiers of Nevanlinna Theory 4: Nevanlinna Theory and Number Theory, University College London (401)
18-23 Turing Centenary Conference, Cambridge (407)
29 **LMS Meeting and Hardy Lecture, London**

J.M. WILSON

LMS member 1865–1873



Mayall Photo, London & Brighton

Rev James Maurice Wilson, MA
Fellow, St John's College, Cambridge
Mathematics Master, Rugby School, Rugby
Mathematical Association President 1921