

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 421 January 2013

Society Meetings and Events

2013

Friday 1 March

Mary Cartwright Lecture, London page 13

Monday 18 March

Northern Regional Meeting, Newcastle page 23

Tuesday 26 March

LMS Meeting at BMC, Sheffield

18-19 April

Women in Maths Day Cambridge

10-14 June LMS Invited Lectures, Edinburgh

Friday 5 July LMS Meeting, London

Friday 15 November LMS AGM, London

NEWSLETTER ONLINE:

Go to newsletter.lms.ac.uk

LMS COUNCIL DIARY

16 November 2012

A personal view

Although the November Council meeting was shorter than usual Council meetings, due to the AGM taking place immediately afterwards, its reduced length did nothing to diminish members' enthusiasm for discussion. On this occasion it was a paper presented by Council Webmaster, Robert Wilson, and Vice-President. Ken Brown summarising the current situation of the 'De Morgan Journal' (DMJ) - the Blog for matters relating to mathematics education and education policy, editorial control of which rests with the Education Committee - and the developments and discussions on it to date. that stimulated the most debate. The main point at issue was the actual name of the Blog, in particular, whether it is appropriate to use the term 'iournal'. Some members of Council were concerned that there could be damage to the reputation of the Society's publications if the DMJ were to be viewed as an official publication, although others held that misunderstandings on this point had not arisen. Even though it was acknowledged that the name DMJ had become known in mathematics education circles, Council agreed that, in order to avoid any possible confusion in the future, it was better to amend the name to 'De Morgan Forum'. In addition, it was agreed

that the section of the Blog dedicated to publishing articles should be renamed without using the term 'journal', with responsibility for proposing a new name being delegated to Education Committee.

The Education Secretary, Tony Gardiner, asked Council to consider the possibility of awarding a second Cecil King Travel Scholarship in 2013. Council was supportive of the idea and it was suggested that consideration should be given to making this award specifically for a pre-doctoral candidate with the Society itself funding the second award. The Education Secretary was asked to prepare a full proposal for consideration at the February 2013 Council meeting.

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Over recent months it has become increasingly apparent that the Society's Charter, Statutes and By-Laws by which the Society manages its governance are no longer fully fit for purpose. A number are now redundant, while others are somewhat out-of-date not reflecting, for example, modern methods of communication. To date amendments to Bv-Laws have been proposed as and when issues have arisen but it is clear that such a piecemeal approach is not really satisfactory. In recognition of this, the General Secretary, Martin Hyland, proposed that the Society should undertake a full review of its Charter, Statutes and By-Laws. Council agreed and a small Working Group is going to be set up to oversee the process.

The President closed the meeting

by expressing very warm thanks on behalf of the Council for the work of those Officers and members-at-large who would be leaving Council: Martin Hyland, Alexandre Borovik, Dorothy Buck, Wilfred Kendall and Burt Totaro. He wished good luck to all those standing for re-election and thanked them for all the work they had done thus far.

June Barrow-Green

RETIRING OFFICERS

PROFESSOR MARTIN HYLAND (General Secretary)

After three years in office, Professor Martin Hyland stood down as General Secretary at the November 2012 AGM. He has been a great asset to the work and development of the Society during his tenure. In 2009, having not previously held an office of Council, he agreed to take on the position at a particularly difficult time. A natural diplomat and politician, his skills in steering some of Council's more contentious discussions have proved invaluable. He has brought to the Society most particularly his extensive knowledge and experience of the governance of organisations and committees, as well as a sensitive understanding of the relationship between staff and voluntary trustees. His commitment and dedication to ensuring that

Council and its committees have consistently acted in the best interests of the Society and the mathematics community has underpinned the stability of the LMS during the past three years. We thank him for his tireless service and wish him well in his future endeavours.

DR TONY GARDINER

(Education Secretary)

During his year as Education Secretary Dr Tony Gardiner's efforts have ensured that education has remained a significant focus of the LMS. He brought to the role his substantial background in mathematical education and his huge enthusiasm for it. and he has been particularly active in developing the Society's position statements on education, directed towards influencing government policy. The LMS hopes to build on the developments he has initiated over the past year, and would like to thank him for his contribution to the Society and wish him well in the future.

Committee members

In addition to the foregoing the Society thanks all those who have served as members of Council and of its various committees and who are now standing down. Without such dedicated volunteers we should be unable to support and represent mathematics and the mathematical community as we do.

LMS Newsletter

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http://newsletter.lms.ac.uk

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Events calendar: please send updates and corrections to calendar@lms.ac.uk

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

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2012-13 COUNCIL

As a result of the annual election, membership of the Council is the following: President Vice-Presidents

Treasurer **General Secretary Programme Secretary** Publications Secretary **Education Secretary** Members-at-Large

Dr G.B Segal. FRS (University of Oxford) Professor KA. Brown, FRSE (University of Glasgow) Professor J.P.C. Greenlees. (University of Sheffield) Professor R.T. Curtis (University of Birmingham) Professor S.A Huggett (University of Plymouth) Professor R.A. Wilson (Queen Mary, University of London) Professor J.D.S Jones (University of Warwick) Professor F.A. Rogers (King's College London) Dr J.E. Barrow-Green (Open University) – current LMS Librarian Dr F.W. Clarke (University of Swansea) – elected to a one year term * Professor Sir S.K. Donaldson, FRS (Imperial College, London) Dr C.A. Hobbs (University of the West of England) * Professor J.R. Hunton (University of Leicester) * Professor A. Laptev (Imperial College, London) * Professor E.L. Mansfield (University of Kent) Professor B. Pelloni (University of Reading) Dr C.M. Roney-Dougal (University of St Andrews) Professor M.A. Singer (University of Edinburgh) * Professor U.L. Tillmann, FRS (University of Oxford) Professor A.P. Veselov (Loughborough University)

* Members continuing the second year of their two-year election in 2011 Nominating Committee

Also at the AGM, Keith Ball (University of Warwick) and David Tranah (CUP) were elected to the Nominating Committee for three year terms of office. Gavin Brown (University of Loughborough) was elected for a one year term.

Continuing members of the Nominating Committee are Penny Davies (Chair), Frances Kirwan, FRS, Michael Prest and Andrew M. Stuart. Council will also appoint a representative.

LMS GRANT SCHEMES

Next Closing Date for Research Grant Applications: 31 January 2013

Applications are invited for the following grants:

- Conferences and postgraduate research con-
- ferences held in the UK (Schemes 1 and 8)
- Celebrating new appointments (Scheme 1)
- Visits to the UK (Scheme 2)
- Research in Pairs (Scheme 4)
- · International short visits with the main focus on Africa (Scheme 5)

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

Applications received by 31 January 2013 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.
- Normally grants are not made for events which have already happened or where insufficient time has been allowed for processing of the application.

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

 Grants Administrators: Svlvia Daly, Elizabeth Fisher and Barbara Graczyk (tel: 020 7291 9971/3. and 0207 927 0808.

email: grants@lms.ac.uk).

• Programme Secretary: Rob Wilson (email: r.a.wilson@gmul.ac.uk).

OTHER LMS GRANTS AND FUNDING

Computer Science Small Grants (Scheme 7)

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. The next deadline for applications is 31 January 2013 - please see the website for further details: www.lms.ac.uk/content/ computer-science-small-grants-scheme-7.

Childcare Supplementary Grants

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

Small Grants for Education

Funding for grants up to £800 is available to stimulate interest and enable involvement in mathematics from Key Stage 1 (age 5+) to Postgraduate level and beyond. Anyone working/ based in the UK is eligible to apply for a grant. If the applicant is not a member then the application must be countersigned by an LMS member or another suitable person such as a Head teacher or senior colleague. The next deadline for applications is **31 January 2013**. Please see the website for further details: www.lms.ac.uk/ content/small-grants-education.

LMS-EPSRC Short Courses

The Society and EPSRC offer funding of up to

£12,200 (including honoria for organisers) towards the cost of running a one-week Short Course which provides high quality training for postgraduate students in core areas of mathematics. For further information on Short Courses and how to submit a proposal, please visit: www. Ims.ac.uk/content/short-course-organisers.

Research Workshop Grants

The Society offers grants to support for 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. For further information and application forms, visit: www.lms.ac.uk/ content/research-workshops-grants.

Spitalfields Days

Grants of up to £500 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. Further details can be found on the LMS website: www.lms.ac.uk/content/ spitalfields-days#applications.

Young British and Russian Mathematicians Scheme

Visits to Russia

Applications are invited from young British postdoctoral mathematicians who wish to spend a few weeks in Russia giving a series of survey lectures on the work of their school.

The LMS is offering grants of up to £500 to meet the travel costs, while the host should apply to the Russian Academy of Sciences for funding towards local expenses for accommodation and subsistence. Contact Sylvia Daly (grants@lms. ac.uk) for information before contacting the Russian Academy of Sciences for funding. Applications to the LMS should include the following:

- 1. A brief academic case for the visit, including a description of your current research interests, and an outline of your planned work during the visit (no more than one side of A4).
- 2. A brief CV (no more than one side of A4).
- 3. A brief budget.
- 4. A letter of invitation from the head of the host department in Russia, which must state explicitly that your accommodation and subsistence expenses will be met by them. 2. A brief description of the course of lectures. This should include provisional dates for the 3. A letter or email of agreement from the visit.

Financial and academic reports will be reguired after the visit. In exceptional circumstances, applications may be considered from strong research students who are close to finishing their doctorates. Applications should include a strong case and the student should obtain a letter of recommendation from his/ her supervisor.

Visits to Britain

Under this Scheme, applications may also be Ims.ac.uk).

BRITISH APPLIED MATHEMATICS COLLOOUIUM 2013 University of Leeds - 9-12 April 2013

Plenary speakers:

- Douglas Arnold (University of Minnesota) The fundamental theorem of numerical analysis
- John Bush (MIT) Hydrodynamic guantum analogues: Droplets walking on the impossible pilot wave
- Marie Farge (Ecole Normale Supérieure, Paris) D'Alembert's paradox and the resistance of fluid flows in the fully-developed turbulent regime: still an open problem
- Angela McLean (University of Oxford) How fast does HIV evolve?
- Alan Newell (University of Arizona) Phyllotaxis as a pattern forming front
- Nick Trefethen (University of Oxford) The exponentially convergent trapezoid rule

Public Lecture

Eric Priest (University of St Andrews) Applying mathematics to our sun

For further information, including registration visit www.maths.leeds.ac.uk/BAMC2013. The colloquium is supported by an LMS Conference grant.

made by any mathematician in Britain wishing to host a visit by a young Russian postdoctoral mathematician who wishes to spend a few weeks in Britain giving a series of survey lectures on the work of their Russian seminar.

The LMS is offering grants to the host institution to meet the visitor's actual travel and accommodation costs of up to £1,500. Applications should include the following:

- 1. Name and brief CV of the visitor.
- head of the host department, including the proposed dates of the visit.

Financialandacademicreportswillberequired after the visit. Further details of the Scheme can be found at www.lms.ac.uk/content/international-grants#YBR. Applications received by 31 January 2013 will be considered at a meeting in February. Enquiries should be made to the Grants Administrators: Sylvia Daly, Elizabeth Fisher and Barbara Graczyk (tel: 020 7291 9971 / 3, and 0207 927 0808, email: grants@

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LONG-STANDING MEMBERS

The following is a list of mathematicians who have completed fifty years or more of membership of the London Mathematical Society, with their date of election.

17 Mar 1943	Dyson, F.J.	19 Jan 1956	Bowers, J.F.
15 Jun 1944	Williams, A.E.	15 Mar 1956	Edmunds, D.E.
25 Jan 1945	Ollerenshaw, K.	19 Apr 1956	Penrose, R.
23 May 1946	Huppert, E.L.	14 Jun 1956	Collins, W.D.
16 Jan 1947	Macbeath, A.M.	14 Jun 1956	Noble, M.E.
20 Mar 1947	Hayman, W.K.	14 Jun 1956	Perry, R.L.
22 May 1947	Ghaffari, A.	15 Nov 1956	Edwards, D.A.
19 Jun 1947	Cassels, J.W.S.	14 Mar 1957	Brown, R.
18 Mar 1948	Isaacs, G.L.	14 Mar 1957	Dunnage, J.E.A.
18 Mar 1948	Reade, M.O.	13 Jun 1957	Brown, A.L.
17 Jun 1948	Bateman, P.T.	18 Jun 1957	Russell, D.C.
18 Nov 1948	Mullender, P.	21 Nov 1957	Wallington, J.E.
13 Dec 1948	Fishel, B.	19 Dec 1957	Longdon, L.W.
20 Jan 1949	Borwein, D.	19 Dec 1957	Mohamed, I.J.
19 Jan 1950	Shepherdson, J.C.	19 Dec 1957	Monk, D.
16 Feb 1950	Lehner, J.	19 Dec 1957	Moran, S.
23 Mar 1950	Ponting, F.W.	19 Dec 1957	Newman, M.F.
14 Dec 1950	Patterson, E.M.	19 Dec 1957	Schneider, H.
17 May1951	Roth, K.F.	16 Jan 1958	Flanders, H.
20 Dec 1951	Dowker, Y.N.	20 Feb 1958	Clunie, J.G.
20 Dec 1951	Herszberg, J.	20 Mar 1958	Keedwell, A.D.
17 Jan 1952	Wilson, D.H.	20 Mar 1958	Wallace, D.A.R.
15 Feb 1952	Shephard, G.C.	17 Apr 1958	Macdonald, I.G.
20 Mar 1952	Swinnerton-Dyer, H.P.F.	15 May 1958	Foster, D.M.E.
20 Nov 1952	Knight, A.J.	19 Jun 1958	Green, J.A.
18 Dec 1952	Reeve, J.E.	20 Nov 1958	Rigby, J.F.
18 Jun 1953	Marstrand, J.M.	17 Dec 1958	De Barra, G.
18 Jun 1953	Rayner, M.E.	18 Dec 1958	Birch, B.J.
17 Dec 1953	Ringrose, J.R.	18 Dec 1958	Hallett, J.T.
17 Dec 1953	Samet, P.A.	18 Dec 1958	Higgins, P.J.
21 Jan 1954	Zeeman, E.C.	18 Dec 1958	McLeod, J.B.
18 Feb 1954	Cohen, D.E.	15 Jan 1959	Blackburn, N.
18 Feb 1954	James, I.M.	16 Apr 1959	Burgess, D.A.
17 Jun 1954	Taylor, S.J.	16 Apr 1959	Manogue, J.F.
25 Nov 1954	Amson, J.C.	21 May 1959	Ingram, G.
25 Nov 1954	Halberstam, H.	18 Jun 1959	Carter, R.W.
27 Jan 1955	Atiyah, M.F.	17 Dec 1959	Eames, W.P.
24 Feb 1955	Rayner, F.J.	17 Dec 1959	Hoskins, R.F.
24 Mar 1955	Farahat, H.K.	17 Dec 1959	West, A.
12 May 1955	Harrop, R.	17 Mar 1960	Guy, R.K.
12 May 1955	Murdoch, B.H.	17 Mar 1960	Harris, D.J.
12 May 1955	Wall, G.E.	18 Mar 1960	Scourfield, E.J.
15 Dec 1955	Armitage, J.V.	18 Mar 1960	Strauss, D.
15 Dec 1955	Butler, M.C.R.	19 May 1960	Hoare, A.H.M.

17 Nov 1960 15 Dec 1960 16 Mar 1961 18 May 1961 18 May 1961 15 Jun 1961 15 Jun 1961 15 Jun 1961 15 Jun 1961 16 Nov 1961 21 Dec 1961 21 Dec 1961 21 Dec 1961 21 Dec 1961 21 Dec 1961 21 Dec 1961	Morris, A.O. Turner-Smith, R.F. Rhodes, F. Cuninghame-Green, R.A. Sklar, A. Button, L.G. Dey, I.M.S. Dlab, V. Robertson, S.A. Croft, H.T. Baker, J.W. Barry, P.D. Linden, C.N. Davies, R.O. Rutter, J.W. Sands, A.D. Wall, C.T.C. Eraele, L.O.C
15 Jun 1961	Dey, I.IVI.S.
15 Jun 1961	Diab, V.
15 JUN 1961	Robertson, S.A.
16 NOV 1961	
21 Dec 1961	Baker, J.W.
21 Dec 1961	Barry, P.D.
21 Dec 1961	Linden, C.N.
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.
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.
17 May 1962	Lue, A.S.T.
17 May 1962	Mullin, A.A.
Quarter	

CAMBRIDGE



17 May 1962	Thompson, A.(
21 Jun 1962	Peters, J.E.
15 Nov 1962	Gaffney, M.P.
15 Nov 1962	Riles, J.B.
20 Dec 1962	Douglas, A.J.
20 Dec 1962	Pears, A.R.
20 Dec 1962	Roberts, J.B.
20 Dec 1962	Wallace, E.W.

SOCIETY PRIZES DEADLINE

Readers are reminded that the deadline for receipt of nominations for the 2013 Society Prizes is Friday 18 January 2013. Prizes available in 2013 include the De Morgan Medal, Senior Whitehead Prize, Naylor Prize and Lectureship, Berwick Prize and up to four Whitehead Prizes. A nomination form can be downloaded from www. lms.ac.uk/content/nominations-lms-prizes. For full details of all these prizes please see the Society's November and December Newsletter or email prizes@lms.ac.uk.

LMS NEWSLETTER

http://newsletter.lms.ac.uk

No. 421 January 2013

LMS REPRESENTATIVES

Further to article in the October Newsletter (No. 418), the Society is pleased to announce that there are now 49 LMS representatives at institutions across the UK. An updated list of the current representatives and their institutions is given below.

If there is no representative listed for your institution please contact membership@lms. ac.uk. It is our aim to have representatives at every higher educational institution in the UK. It is essential that your representatives on Council are kept aware of the challenges and opportunities facing mathematics in the UK so that they can reflect your views accurately.

Although the majority of LMS members are pure mathematicians, the Society exists to serve all branches of mathematics – pure, applied and applicable - and our current representatives have a similar wide range of research interests.

The Role of the LMS Representative

Membership

- Encourage membership
- Act as proposer/seconder and assist in finding a proposer/seconder
- Encourage local members to vote in the

List of LMS Representatives

Regional Representatives

Region	Representative	Institution	Email
Midlands	Chris Parker	Birmingham	c.w.oarjer@bham.ac.uk
Northern	Mike Prest	Manchester	mprest@manchester.ac.uk
South West & South Wales	Tomasz Brzezinski	Swansea	T.Brzezinski@Swansea.ac.uk

Representatives

Institution	Representative	E-mail
Ab <mark>erystwy</mark> th	John Gough	jug@aber.ac.uk
Bath	Jonathan Dawes	j.h.p.dawes@bath.ac.uk
Birkbeck	Ben Fairbairn	b.fairbairn@bbk.ac.uk
Birmingham	Natalia Petrovskaya	n.b.petrovskaya@bham.ac.uk
Brighton	Paul Harris	P.J.Harris@brighton.ac.uk
Bristol	Andy Barwell	a.barwell@bristol.ac.uk
Cardiff	Federica Dragoni	DragoniF@cardiff.ac.uk

- annual LMS Elections
- Act as a local contact for the LMS

Grants

Promote LMS grants to colleagues

Events and Activities

- Encourage attendance at Regional Meetings
- Promote LMS events and activities e.g. displaying posters, emails to colleagues

Students

- Liaise with student societies
- Encourage membership amongst students

Working with the LMS and other LMS representatives

- Liaise with LMS Regional Representatives and the LMS Treasurer
- Work with other LMS departmental representatives
- Attend an annual LMS Representatives Meeting at De Morgan House
- Regular liaison with De Morgan House, requesting support where needed
- Produce an annual report for the LMS

Chester	Jason Roberts	j.roberts@chester.ac.uk
City	Radha Kessar	Radha.Kessar.1@city.ac.uk
Coventry	Robert Low	mtx014@coventry.ac.uk
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Edinburgh	Sue Sierra	s.sierra@ed.ac.uk
Essex	Gerald Williams	gwill@essex.ac.uk
Exeter	Nigel Byott	N.P.Byott@exeter.ac.uk
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Warwick	John Cremona	J.E.Cremona@warwick.ac.uk
York	Stephen Donkin	sd510@york.ac.uk

STEPHEN BOOK

Professor Stephen A. Book, who was elected a member of the London Mathematical Society on 16 November 1972, died on 10 January 2012 at the age of 70.

Charlie Hopkins writes: Steve earned his PhD in mathematics, with a concentration in probability and statistics, at the University of Oregon. He was a professor of Mathematics at California State University. Dominguez Hills for 10 years during which he published numerous articles, among them the popularly referenced article on the formulation of sample standard deviation, before joining The Aerospace Corporation in 1980. There he worked on a wide variety of Air Force programs and directed a vigorous program of research analysis into methods of conducting cost and schedule risk analyses and deriving cost June 2012 at the age of 86. estimating relationships (CERs). He went on to serve as Director, Cost and Require-

ments Analysis from 1989-95. He then held one of the most eminent titles that The Aerospace Corporation could bestow. the title of 'Distinguished Engineer', from 1996 to 2000. Steve joined Management Consulting and Research in January 2001 and served as its Chief Technical Officer from 2001-09.

Dr Book was the last editor of the Journal of Parametrics, a publication of the International Society of Parametric Analysts (ISPA) and he was the co-editor of its successor, the Journal of Cost Analysis and Parametrics. In 2005 he was the recipient of ISPA's Freiman Award for Lifetime Achievement and in 2010 he was the recipient of the SCEA Lifetime Achievement Award. He is one of only four individuals to receive both lifetime achievement (Linear Algebra, 1975); and pioneered awards.

Steve was one of the most sought after experts in world of cost analysis. Whether supporting the European Space Agency. the National Reconnaissance Office, or NASA, Steve had the deep respect and high regard from all in the cost commu-

nity. He served on numerous blue ribbon panels and supported such national studies as National Research Council's committee on Space Shuttle upgrades, the Chabrow Committee for the International Space Station and Stafford Committee for the Space Exploration Initiative. He also testified to Congress on issues of cost estimating and analysis in the space industry.

With his many contributions to the professional community he balanced a busy professional life with a busy and happy family life. He is survived by his wife, Ruth, and five children.

NATHAN DIVINSKY

Professor Nathan Divinsky, who was elected a member of the London Mathematical Society on 19 December 1957, died on 17

Pamela Divinsky and Judy Kornfeld write: He was born in 1925 in Winnipeg and received his BSc from the University of Manitoba in 1946, then to the University of Chicago where he received his MSc, and then PhD in 1949. He taught at Ripon College, Wisconsin, University of Manitoba, and then from 1959-91 at the University of British Columbia. He held the position of Associate Dean of Science. UBC, was recognized for his teaching excellence with several Master Teaching Awards, and in 1991 was honoured with Professor Emeritus. He spent his numerous sabbaticals teaching at Queen Mary, University of London. He was also a Canadian television personality and hosted a series of mathematics guizzes on the Discovery Channel.

His area of research was linear algebra the area of rings and radical (Rings and Radicals, 1965). Throughout his career he worked with world-class algebraists in Canada, England and Europe. He loved mathematics and teaching, and earned a noteworthy status as an entertaining professor whose classes were worth attending

even if one was not taking mathematics.

In addition to being a mathematician, Divinsky was also a master at both bridge and chess. He became a Bridge Life Master in 1972. He played for the Canadian Chess Team in 1954 in Amsterdam and in 1966 in Havana. He also served as captain for two Chess Olympiads. He founded and edited the Canadian Chess Chat magazine and authored many books on the game. He also played a major role in Canada's chess world. He was Canada's representative to FIDE from 1987-1994 and was inducted into the Chess Hall of Fame in 2001. You can view his games at www.chessgames. com/perl/chessplayer?pid=80128.

He is survived by his wife, two daughters and two granddaughters. He lived his life with passionate curiosity and conviction and was a true linearly independent vector.

TREVOR WEST

Professor Trevor West, emeritus Fellow of Trinity College Dublin, who had been a member of the London Mathematical Society from 1964 to 2004, died on 30 October 2012, aged 74.

Richard Timoney writes: Trevor got his PhD in 1964 at Cambridge under the direction of Frank Smithies with a thesis entitled Riesz operators in Banach spaces, in which he established the 'West decomposition' for the Hilbert space case, and he worked throughout his career on related topics including spectral theory on Banach algebras.

He had a rather extensive research collaboration with Rien Kaashoek of Amsterdam on topics related to semi-algebras and semigroups, leading to a monograph published in 1974. He also collaborated with Alastair Gillespie a number of times, with the late Gerard Murphy, with his student Roger Smyth and with Tom Laffev. amongst others. A second monograph with Bruce Barnes, Murphy and Smyth (entitled Riesz and Fredholm Theory in Banach Algebras) appeared in 1982.

Overall, Trevor was very active in Irish mathematical life and availed of his wide network of mathematical correspondents (some from his days at Cambridge, Glasgow and UCLA) to organise a number of conferences, including a joint meeting of the Irish Mathematical Society and the LMS in 1986 where the speakers were E.C. Lance (Leeds), R.G. Douglas (Stonybrook), W.B. Arveson (Berkeley) and A. Connes (Paris). As a member of the Royal Irish Academy, he took a leading rôle in its mathematical publications, changing the format to be that of a journal, and he also organised some of his major conferences under its auspices.

He was a Senator (a member of the upper house in the Irish parliamentary system) almost continuously from 1970 to 1983. However, his talents and interests extended beyond mathematics and politics to other areas also. He was very active in College life, serving in a number of rôles within the College but especially as chairman of DUCAC, the Dublin University Central Athletic Committee, for 30 years. Trevor was deeply interested in sport since his school days at Midleton College, Cork, where his father was Headmaster for several decades, and Trevor himself became Chairman of the Board of that school.

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He is survived by his wife Maura Lee and will be remembered for his very positive attitude to all that he did: mathematics, politics, sport and writing.

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.

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GRESHAM COLLEGE - Founded 1597 (

THE LONDON MATHEMATICAL SOCIETY JOINTLY WITH GRESHAM COLLEGE

Tuesday 14th May 2013

6:00 pm at The Museum of London

Mathematics: The Next Generation

Professor Peter Cameron

Queen Mary, University of London

Mathematics is important to us all. So it is important to enable young mathematicians, clear-thinking and passionate about their subject, to contribute at the highest level. Professor Cameron will talk about his experience designing and presenting a course for firstsemester university students aiming to produce mathematicians.

ADMISSION FREE

NO RESERVATIONS REQUIRED - FIRST COME, FIRST SERVED

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

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

LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT LECTURE AND SOCIETY MEETING

Friday 1 March 2013

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

Programme:

3.30 Opening of the meeting Jeff Lagarias (University of Michigan) From ABC to XYZ

4.30 Tea

5.00 Mary Cartwright Lecture Margaret Wright (Courant Institute, New York University) A Mathematical Journey in Non-Derivative Optimization

Margaret Wright Mary Cartwright Lecturer 2013

To register, please contact Elizabeth Fisher/Katy Henderson (womeninmaths@lms.ac.uk) by Friday 22 February. Late registrations for places may be still be accepted, subject to availability.

The reception will be followed by a dinner at the DoubleTree by Hilton London West End, at a cost of £35 per person, inclusive of wine. If you would like to attend the dinner, please contact Elizabeth Fisher/Katy Henderson (womeninmaths@lms.ac.uk) by Friday 22 February.

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



LMS NEWSLETTER

http://newsletter.lms.ac.uk

RAMANUJAN PRIZE

Nominations for the 2013 award of the Ramanujan Prize for Young Mathematicians from Developing Countries are now sought. The prize winner must be less than 45 years of age on 31 December of the year of the award, and have conducted outstanding research in a developing country. Researchers working in any branch of the mathematical sciences are eligible. The 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 carries a \$15,000 cash award.

The deadline for receipt of nominations is **1 February 2013.** Send nominations to math@ ictp.it describing the work of the nominee in adequate detail. Nominations should include a cv and a list of publications, as well as a letter of recommendation. Additional supporting letters are encouraged. Self-nominations are strongly discouraged. For further information visit the website at www.ictp.it/about-ictp/prizes-awards/the-ramanujan-prize.aspx.

MATHEMATICS POLICY ROUND-UP

December 2012 RESEARCH

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Economic impact report

Working in partnership with the Council for the Mathematical Sciences (CMS), EPSRC commissioned an independent study into the economic impact of mathematical sciences research on the UK economy. The report – *Mathematical sciences research: Leading the way to UK economic growth* – was produced by Deloitte and is the first of its kind. It reflects the excellence of the UK mathematics research base that has generated a range of impressive and far-reaching impacts. The report is available at http://tinyurl.com/cab6ex8.

Chancellor's support for science

George Osborne, Chancellor of the Exchequer, spoke at the Royal Society recently of 'both his

belief in the value of science as a driver of the UK economy and his commitment to science funding into the future'. A transcript of the speech is available at www.hm-treasury.gov. uk/speech_chx_091112.htm.

HIGHER EDUCATION

Lords not satisfied with government response to STEM subjects report

In July the House of Lords Science and Technology Sub-Committee I published its report on Higher Education in Science, Technology, Engineering and Mathematics (STEM) subjects (http://tinyurl.com/cbunh9n). As part of the consultation process the Council for the Mathematical Sciences (CMS) submitted evidence, which is available at http://tinyurl.com/ cqvnvac.

The government has now responded to the report and the Lords Committee is not satisfied with the government's response http://tinyurl. com/cvhtkzu.

Mathematics is mentioned specifically in the following context: Government has not proposed sufficient action to ensure that those entering STEM higher education have an adequate level of mathematical understanding to meet their needs. Given the importance of mathematics to those studying STEM at university, the poor performance of the UK in international mathematics education league tables, and the concerns from universities about the lack of maths skills of new students. it is disappointing that Government is not doing more to lead and facilitate the process in collaboration with Higher Education Institutions (HEIs) and others. Instead they seem to be relinguishing responsibilities completely.

SCHOOLS AND COLLEGES

CBI calls for overhaul of the school system

The CBI is calling for a radical shake up of schools from nursery to sixth form to ensure all young people achieve their potential. In a new report, the CBI warns the education system fosters a cult of the average; too often failing to stretch the most able or support those that

need most help.

First steps: a new approach for our schools outlines possible measures to address this. They include: giving more freedom to teachers; moving the focus from league tables to delivering a more rounded education; a shift from GCSEs to make 18 the focus of secondary education; and introducing vocational A-levels with the same standing as traditional A-levels. The full report is available at www.cbi.org.uk/campaigns/ education-campaign-ambition-for-all/

Ofqual announces changes to A-levels

Ofqual has announced that A-level changes will come into force from September 2013. There will be no January exams for students whether they are in their first or second year of A-level studies. Therefore, students who started a two-year course in September 2012 will not have the option of January exams in their second year.

From September 2013 students in England will no longer be able to sit A-level exams in January, after the proposal received strong support following a three month consultation into A-level reform. The change will also address recent concerns over how many times students can sit their exams by reducing resit opportunities. More information is available at www.ofqual.gov.uk/news/ ofqual-announces-changes-to-a-levels/

Education Committee - Second Special Report In July 2012 the Education Select Committee published its First Report on *The administration of examinations for 15-19 year olds in England.* Responses have now been received from the government and Ofqual and these are published in a Second Special Report. The full report is available at http://tinyurl. com/9lycouc.

OTHER

The Importance of Physics to the UK Economy This report, published by the Institute of Physics, analyses the contributions of businesses that depend on physics. The full report is available at www.iop.org/publications/iop/2012/ file_58713.pdf.

UK Education at a Glance: OECD Indicators 2012

The Organisation for Economic Cooperation and Development (OECD) has published its annual audit of education systems across 34 of its Member countries, two non-OECD countries and a number of other G20 countries that do not participate in the OECD Indicators of Education Systems Programme (such as Argentina, South Africa, China, India).

The main finding across OECD countries is that many countries have increased spending on education at all levels in recent years, as governments recognise the economic and social benefits generated by a highly educated population. The full report is available at http:// tinyurl.com/cw6aobu.

The Learning Curve report

According to the report, which includes tertiary graduation rates in its methodology, the UK sits 6th in the list - ranked by cognitive skills and educational attainment - of the most effective education systems, behind Finland, South Korea, Hong Kong, Japan and Singapore. The US is ranked 17th.

The global study (which included 50 countries) was carried out by the Economist Intelligence Unit (EIU) and published by Pearson, and draws on existing data from international organisations, as well as figures on literacy rates, school attendance, and university graduation rates. The full report is available at http://thelearningcurve.pearson.com/the-report.

Dr John Johnston Mathematics Promotion Unit

VISIT OF IBRAHIM IDRIS

Dr Ibrahim Idris (Bayero University, Kano, Nigeria) will be visiting University of Exeter from 1 February to 31 March 2013, to perform joint work with Professor Biktashev on the problem of initiation of exciation waves. For further information, contact Professor Vadim Biktashev, University of Exeter (v.n.biktashev@exeter.ac.uk). The visit is supported by an LMS Scheme 5 grant.

VISIT OF SERGEY DOBROKHOTOV

Professor Sergey Dobrokhotov (A. Ishlinskii The Department of Mathematics at Univer-Institute for Problems in Mechanics of Russian Academy of Sciences) will be visiting the UK during February 2013. His main research interests are asymptotic methods and adiabatic approximations in various problems of mathematics and mathematical physics. He will deliver the following lectures:

- Loughborough University, Department of Mathematical Sciences, Friday 15 February: Focal points in linear and nonlinear wave equation with degenerating velocity; contact Anatoly Neishtadt (A.Neishtadt@lboro.ac.uk)
- Imperial College, London, Department of Mathematics, Tuesday 19 February: Asymptotics for waves and vortices with small amplitudes on the shallow water

- created by localised sources; contact Dimitry Turaev (d.turaev@imperial.ac.uk)
- University of Bristol, Department of Physics, Wednesday 20 February: Beams dynamics and Lagrangian manifolds: contact Olga Sikora (Olga.Sikora@bristol. ac.uk)
- University of Bristol, Department of Mathematics, Friday 22 February: Explicit asymptotics for waves and vortices on the shallow water created by spatially localised sources with small amplitudes; contact Nina Snaith (n.c.snaith@bristol. ac.uk)
- Warwick University, Mathematics Institute, Tuesday 26 February: Librations, normal forms and tunnelling in guantum double well with magnetic field; contact Vassili Gelfreich (V.Gelfreykh@warwick.ac.uk)
- Loughborough University, Department of Mathematical Sciences, Wednesday 27 February: Pseudodifferential operators in homogenisation problems; contact Alexander Veselov (A.P.Veselov@lboro.ac.uk) For further information contact Anatoly Neishtadt, Loughborough University (A.Neishtadt@lboro.ac.uk). The visit is supported by an LMS Scheme 2 grant.

UCL GEOMETRY AND TOPOLOGY DAYS

sity College London (UCL) has recently made new appointments in geometry and topology, which have resulted in the creation of a new research group. To help celebrate this development, UCL will host two half-day events: the theme of the first meeting on 20 February 2013 will be differential geometry and the second meeting on 20 March 2013 will focus on symplectic and contact topology. The speakers will be:

20 February

- Olivier Biguard (ENS Paris)
- Jason Lotay (UCL)
- Michael Singer (UCL)

20 March

- Johnny Evans (UCL)
- Hansjörg Geiges (Universität Köln)
- Chris Wendl (UCL)

The meetings are open to everyone and each event will be followed by a reception and a dinner to which all are welcome.

Updated information will be provided on the website www.homepages.ucl.ac.uk/~ucahjde/ geometry/geom-topol-days.htm. To register your interest in attending the events or for any enquiries email Jason Lotay (j.lotay@ucl.ac.uk). The meetings are supported by an LMS Conference grant.



A 3D model of the Clifford torus





EXPERIENCES OF LEARNING PROGRAMMING WITHIN A MATHEMATICS COURSE

Monday 4 February 2013, University of Bath

At the University of Bath, first year students in Mathematical Sciences learn both discrete mathematics and computer programming in Matlab, within a single, teamtaught course. This workshop will provide the opportunity to hear from lecturers and tutors about the approach adopted and to gain further insight from students who will be available to talk about their learning experiences of the course. During the workshop attendees will be invited to participate in a discussion session and share their own experiences of including computer programming in Mathematics courses.

This workshop is funded by the Mathematics. Statistics and Operational Research discipline (www.heacademy.ac.uk/disciplines/maths-stats-or) at the Higher Education Academy (HEA), through the HEA Workshop and Seminar Series. As such there is no charge for attending this event.

For further information and to book a place please go to www.heacademy.ac.uk/ events/detail/2013/4 Feb MSOR Bath. Oueries about this event should be emailed to Catherine Redfern (Catherine.Redfern@heacademv.ac.uk).

GEOMETRIC AND TOPOLOGICAL GRAPH THEORY

This five-day workshop focuses on geometric and topological problems related to graph theory. Expected topics will include topological graph theory, topological design theory, rigidity theory and other geometric structures. The workshop will feature both invited speakers and contributed talks from participants. It will take place from 15 to 19 April 2013 at the School of Mathematics, University of Bristol. The provisionally confirmed invited speakers are:

- Dan Archdeacon (Vermont)
- Robert Connelly (Cornell)
- Mark Ellingham (Vanderbilt)
- Mike Grannell (Open University)
- Terry Griggs (Open University)
- Bill Jackson (Queen Mary)
- Tibor Jordán (Eötvös Lorand)
- Boian Mohar (Simon Fraser)

- Mathew Penrose (Bath)
- Stephen Power (Lancaster)
- Konrad Swanepoel (LSE)
- Walter Whiteley (York)

There will be a £50 registration fee for participants (waived for postgraduate students). Funding is available for postgraduate students.

Deadlines: student funding requests: 18 January; abstract submission: 15 February; registration deadline: 15 March.

This workshop is funded by the Heilbronn Institute for Mathematical Research and postgraduate student support is provided by the London Mathematical Society. The organisers are: Tom McCourt and Tony Nixon. Further information and registration forms are available at www.maths.bris. ac.uk/~maakn/GTGT2013.

CONTEMPORARY CHALLENGES FOR THE DELIVERY OF UNDERGRADUATE MATHEMATIC COURSES



Tuesday 26 March 2013, University of Sheffield

This workshop will consider two questions which provide challenges for the delivery of undergraduate mathematics courses. The first is how to provide undergraduate students in mathematics with a research experience. The second is how best to combine the strengths of traditional teaching delivery methods in mathematics with the opportunities provided by new and emerging technologies.

This workshop is funded by the Mathematics, Statistics and Operational Research discipline (www.heacademy.ac.uk/disciplines/maths-stats-or) at the Higher Education Academy (HEA), through the HEA Workshop and Seminar Series. As such there is no charge for attending this event. The workshop is being held in conjunction with the 2013 British Mathematical Colloquium. Queries about this event should be emailed to Catherine Redfern (Catherine.Redfern@heacademy.ac.uk).

For further information and to book a place go to www.heacademy.ac.uk/events/ detail/2013/26_March_MSOR_Sheffield .

18 HYPERBOLIC EQUATIONS

YFAW 2013 AND NBFAS

A one-day workshop on *Hyperbolic equations: solvability and asymptotic properties* will take place at the Department of Mathematical Sciences at Loughborough University on Wednesday 13 February 2013. The main objectives of the meeting are to:

- provide an overview on the recent research on hyperbolic equations
- stimulate discussions and inspire future collaborations within the department
- suggest open problems and future lines of research for potential PhD students

Three lectures on different aspects of hyperbolic PDEs (solvability for equations and systems in case of multiple characteristics, qualitative analysis of the solutions, asymptotic properties and behavior at infinity) will be given by:

- Claudia Garetto (Loughborough)
- Michael Ruzhansky (Imperial College London)
- Todor Gramchev (Cagliari, Italy)

The meeting will be followed by a reception. For further information contact Claudia Garetto (c.garetto@lboro.ac.uk) or visit the website http://homepages.lboro.ac.uk/~macg4/. The meeting is supported by an LMS Conference grant. The next Young Functional Analysts' Workshop (YFAW) will be held at the University of Sheffield from 20 to 22 March 2013. The event is aimed at postgraduate and postdoctoral researchers in functional analysis and related areas, but anybody interested in participating is welcome. The programme on each of the three days will consist of talks given by participants as well as three invited speakers:

- Paul Mitchener (Sheffield)
- Stuart White (Glasgow)
- Michael Ruzhansky (Imperial College, London) - tbc

There will be a registration fee of £25. For further information, and in order to register, visit the YFAW website at https://sites.google.com/site/yfawuk. The event is supported by an LMS Postgraduate Research Conference Scheme 8 grant.

The workshop will be followed by a meeting of the North British Functional Analysis Seminar (NBFAS) in Sheffield from 22 to 23 March 2013. For further details see the NBFAS website at www1.maths.leeds.ac.uk/ nbfas/.

LARGE EVOLVING NETWORKS

This one day workshop will introduce the audience to a broad spectrum of work on modelling and inference for large evolving networks. It will take place on 19 March 2013 at Engineers House, The Promenade, Bristol BS8 3NB. The invited speakers include:

- Charles Bordenave (Toulouse)
- Colin Cooper (King's College, London)
- Moez Draief (Imperial College, London)
- Nick Heard (Imperial College, London)
- Des Higham (Strathclyde)
- Gesine Reinert (Oxford)

There is no registration fee but to enable estimation of numbers, intending participants are requested to inform Alice Adams (Heilbronncoordinator@bristol.ac.uk).

The organisers are Niall Adams, James Cruise, Dan Lawson, David Leslie and Andrew Wade. This meeting is funded by the Heilbronn Institute and organised in conjunction with the Applied Probability section of the Royal Statistical Society.

Further information and registration forms are available at: www.maths.bris.ac.uk/events/ meetings/meeting/index.php?meeting_id=95.

ADVANCES IN NUMBER THEORY AND DYNAMICAL SYSTEMS

This conference will focus on connections between diophantine approximation, dynamical systems and number theory. It will take place from 8 to 12 April 2013 at the School of Chemistry, University of Bristol. The invited speakers include:

- Jon Aaronson (Tel Aviv)
- Yann Bugeaud (Strasbourg)
- Michael Drmota (TU Wien)
- Manfred Einsiedler (ETH)
- Dmitry Kleinbock (Brandeis)
- Sanju Velani (York)
- Barak Weiss (Ben Gurion)

In addition to the plenary talks there will be opportunities for a number of contributed talks.

Graduate students and recent postdocs whose interests are concurrent with the theme of the conference are encouraged to attend. There is funding available to support travel and accommodation expenses for graduate students and postdoctoral researchers who do not have other sources of funds.

There will be a conference dinner on the Thursday evening at 7 pm at a cost of £20. Indicate if you would like to attend the dinner, along with any dietary requirement, when registering. There is no registration fee but to enable estimation of numbers, registration is mandatory. Email one of the organizers (alan.haynes@ bristol.ac.uk) or (Dave.Platt@bristol.ac.uk) to confirm.

The conference is supported by the Heilbronn Institute for Mathematical Research. Further information is available at: www.maths. bris.ac.uk/events/meetings/meeting/index. php?meeting_id=94.

QUANTUM ALGORITHMS DAY

Following on from the success of the previous two events, the aim of this colloquium is to showcase recent research in quantum algorithms. It will take place on 25 April 2013 at Engineers House, The Promenade, Bristol BS8 3NB. The invited speakers are:

- Andrew Childs (University of Waterloo)
- Maarten van den Nest (MPI für Quantenoptik)
- Ben Reichardt (University of Southern California)
- Jérémie Roland (Université Libre de Bruxelles)

 Pawel Wocjan (University of Central Florida) There is no conference fee but registration is mandatory. There may be limited travel support to UK PhD students who are unable to find funding from their home institutions.
 The organisers are Steve Brierley, Oliver Gray and Noah Linden. The conference is supported by the Heilbronn Institute for Mathematical Research (HIMR). Further information and registration forms can be found at: www.maths.bris. ac.uk/~maowo/q-alq-2013/q-alq-2013.html.

newsletter@lms.ac.uk

DATA ANALYSIS FOR CYBER SECURITY

The need to defend computers and networks against attack is becoming increasingly topical. While much research in this area is formal computer science, some aspects explicitly involve data analysis, including anomaly detection, dynamic graph analysis, and malware classification. It is intended to gather active academic researchers, from areas such as statistics and data mining, to describe and develop the current state-ofthe-art in data-analytic aspects of network cyber security.

This workshop will take place form 25 to 26 March 2013 at Engineers House, The Promenade, Bristol BS8 3NB. Registration

fees for the full workshop are: PhD students - £40, Academics - £80, Industrial - £180. Some support is available for PhD students presenting a poster.

Dinner on the Monday evening at 7 pm will be held at Bordeaux Quay. Delegates intending to attend the workshop dinner are asked to pay £25 towards its cost.

The organisers are Niall Adams and Nicholas Heard. The workshop is supported by the Heilbronn Institute for Mathematical Research (HIMR), University of Bristol. Further information and registration forms are available at: www2.imperial.ac.uk/~nadams/CC/HIMRCyberWorkshop2013.html.

CECIL KING TRAVEL SCHOLARSHIP

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

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

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

Applications should be made using the form available on the Society's website (www.lms.ac.uk/content/cecil-king-travel-scholarship) or by contacting education@lms.ac.uk. The closing date for applications is Friday 8 March 2013. It is expected that interviews will take place in London in late April or early May.



ENHANCEMENT AND PARTNERSHIP PROGRAM

The Clay Mathematics Institute invites proposals under its new program, "Enhancement and Partnership". The aim is to enhance activities that are already planned, particularly by funding international participation. The program is broadly defined, but subject to general principles:

- CMI funding will be used in accordance with the Institute's mission and its status as an operating foundation to enhance mathematical activities organised by or planned in partnership with other organisations.
- It will not be used to meet expenses that could be readily covered from local or national sources.
- All proposals will be judged by the CMI's Scientific Advisory Board.

Examples include:

- Funding a distinguished international speaker at a local or regional meeting.
- Partnership in the organisation of conferences and workshops.
- Funding a short visit by a distinguished mathematician to participate in a focused topical research program at an institute or university.
- Funding international participation in summer schools (lecturers and students) or repeating a successful

summer school in another country.

- Funding a special lecture at a summer school or during a research institute program.
- Funding an extension of stay in the host country or neighbouring countries of a conference speaker.

Applications will only be received from institutions or from organisers of conferences, workshops, and summer schools. In particular the CMI will not consider applications under this program from individuals for funding to attend conferences or to visit other institutions or to support their personal research in other ways.

Enquiries about eligibility should be sent to president@claymath.org. Applicants should set out in a brief letter a description of the planned activity, the way in which this could be enhanced by the CMI, the existing funding, the funds requested and the reason why they cannot be obtained from other local or national sources. Funds requested should not be out of proportion to those obtained from other sources. The CMI may request independent letters of support.

Applications should be sent to admin@ claymath.org. There is no deadline, but the call will be closed when the current year's budget has been committed.

http://newsletter.lms.ac.uk





London Mathematical Society/Nuffield Foundation Undergraduate Research Bursaries in Mathematics 2013

Nature of Awards

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

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

The closing date for receipt of applications is 5 pm Friday 8 February 2013.

Eligibility

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

How to apply

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

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

LONDON MATHEMATICAL SOCIETY NORTHERN REGIONAL MEETING

Monday 18 March 2013

Herschel Building, Newcastle University

Programme:

2.00 pm	Opening of the meeting	
	Volodymyr Mazorchuk (Uppsala)	
3.15 pm	Ivan Smith (Cambridge)	
4.30 pm	Tea/Coffee	
5.15 pm	Bernhard Keller (Paris 7)	
6.30 pm	Reception and Buffet at The Penthouse	

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

To register, please visit www.mas.ncl.ac.uk/triangulations/index.php?p=6. Registration closes on **31 January 2013**.

The Society Meeting forms part of the workshop on *Triangulations and Mutations* from 18-22 March. For further details visit: www.mas.ncl.ac.uk/ triangulations/index.php?p=6.

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

Institute of

nathematics





Modern nonlinear PDE methods in fluid dynamics

LMS-EPSRC Short Course University of Reading 8-12 July 2013 Organisers: Beatrice Pelloni & Eugen Varvaruca

Course outline

The course aims to give the opportunity to a new generation of UK PhD students to attend high quality lectures on the analysis of PDE in fluid dynamics, delivered by leading international experts. The four courses are broadly divided in two strands. The first, containing the courses given by Luigi Ambrosio and Yann Brenier, deals with applications in fluid dynamics of optimal transport methods, more specifically the variational approach to the incompressible Euler equations, and the monotone rearrangement and convection theory for the Navier-Stokes and semi-geostrophic equations. The second, containing the courses of Adrian Constantin and Georg Weiss, deals with methods specific to free-boundary problems in fluid dynamics, addressing respectively the bifurcation theory approach to existence of large-amplitude steady water waves with vorticity, and the use of blow-up techniques in the study of regularity and behaviour at singularities in free boundaries.

The four main lecture course topics are:

- Variational models for incompressible Euler equations (Luigi Ambrosio, Scuola Normale Superiore, Pisa)
- Monotone rearrangement and convection theory (Yann Brenier, University of Nice)
- Bifurcation theory in the context of steady water waves (Adrian Constantin, King's College, London)
- Analysis of singularities in free-boundary problems (Georg Weiss, Heinrich Heine University, Düsseldorf)

Guest lectures will be given by **Mike Cullen** (Met Office) and **Camillo De Lellis** (University of Zürich).

For further information please visit: <u>www.reading.ac.uk/maths-and-stats/news/LMS-EPSRC-Shortcourse-Reading.aspx</u>

Applications: Applications should be made using the registration form available via the Society's website at: <u>www.lms.ac.uk/content/short-instructional-courses</u>. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **Monday 27 May 2013.** Numbers will be limited and those interested are advised to make an early application.

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

In the event of over-subscription preference will be given to UK-based research students

Fees

All research students registered at a UK university will be charged a registration fee of $\pounds 100$. There will be no charge for subsistence costs.

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£140) **£390** in total.

All others (overseas students and postdocs, those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£280) **£530** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). Fees are not payable until a place on the course is offered but will be due by Friday 28 June. **LMS-EPSRC Short Courses** aim to provide training for postgraduate students in core areas of mathematics. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.



The 2013 David Crighton Lectures and Medal Presentation



Thursday 14 March 2013 The Royal Society, Carlton House Terrace, London, SW1Y 5AG

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

Dr Peter Neumann OBE (University of Oxford) Tout ce gâchis: why edit the mathematical manuscripts of Évariste Galois?

Professor Arieh Iserles (University of Cambridge) The future of life, mathematics and everything

To register contact Duncan Turton at the LMS (email <u>duncan.turton@lms.ac.uk</u>) or De Morgan House, 57-58 Russell Square London WC1B 4HS by 1 March 2013

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

EPSRC

Pioneering research

and skills



Computational Group Theory

LMS-EPSRC Short Course

University of St. Andrews 29 July – 2 August 2013

Organisers: Alexander Konovalov, John McDermott, Angela Miguel & Max Neunhöffer

Course outline

The course will introduce students to the four main areas of Computational Group Theory: permutation groups, soluble and p-groups, matrix groups and finitely presented groups. The course will cover typical problems and standard algorithms, along with the analysis of these algorithms and their practical use on a computer. In the practical sessions there will be some emphasis on using the computer algebra system GAP, a world wide open source project established in 1988. After this course the participants will have a good understanding of what computers can and cannot do with groups and will be able to use GAP to answer their own group theoretic questions. The course aims to appeal to a broad spectrum of students from areas such as Algebra, Topology, Combinatorics and Graph Theory.

The four main lecture course topics are:

- Permutation Groups (Alexander Hulpke, Colorado State University)
- Soluble Groups and p-Groups (Bettina Eick, Technische Universität Braunschweig)
- Matrix Groups/Constructive Recognition (Derek Holt, University of Warwick)
- Finitely Presented Groups (Max Neunhöffer, University of St Andrews)
- These lecture courses will be supplemented by tutorial sessions.

For further information please visit: <u>http://www-circa.mcs.st-andrews.ac.uk/cgt2013</u>

Applications: Applications should be made using the registration form available via the Society's website at: <u>www.lms.ac.uk/content/short-instructional-courses</u>. Research students, post-docs and those working in industry are invited to apply.

The closing date for applications is **Monday 17 June 2013.** Numbers will be limited and those interested are advised to make an early application.

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

*In the event of over-subscription preference will be given to UK-based research students $\!$

Fees

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All research students registered at a UK university will be charged a registration fee of **£100**. There will be no charge for subsistence costs.

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£125) **£375** in total.

All others (overseas students and postdocs, those working in industry) will be charged a registration fee of £250 plus the full subsistence costs (£250) **£500** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). <u>Fees are not payable until a place on the course is offered but will be due by Friday 19 July.</u>

LMS-EPSRC Short Courses aim to provide training for postgraduate students in core areas of mathematics. Part of their success is the opportunity for students to meet other students working in related areas as well as the chance to meet a number of leading experts in the topic.



Isaac Newton Institute for Mathematical Sciences

LIQUID CRYSTAL DEFECTS AND THEIR GEOMETRY, ACTIVE AND SOLID LIQUID CRYSTALS, AND RELATED SYSTEMS

24 - 28 June 2013

in association with the Newton Institute programme *The Mathematics of Liquid Crystals* (7 January –5 July 2013)

Workshop organisers: Oleg Lavrentovich (Kent State University), Tom Lubensky (University of Pennsylvania), Antonio de Simone (SISSA) and Mark Warner University of Cambridge.

Typically described by their well-ordered structures, liquid crystal phases were first identified and even named by their topological defects. The rich interplay between geometry, topology, and optics is ubiquitous through all liquid crystals. We will discuss their characterisation, and also their essential appearance in complex systems such as colloidal liquid crystals and in blue phases. Their exploitation in templating complex structures and their special character in non-simple spaces (such as those with Gaussian curvature) will also be examined. In parallel, the workshop is concerned with solid liquid crystals, both elastomers where the director remains mobile, and glasses where the director is pinned to the material frame. The unique mechanics of solid liquid crystals, and its connection with techniques of quasi-convexification first exploited in Martensites, is an active area of research. Mechanics connects with the defects theme since topological defects in LC solids, on illumination or temperature change, cause changes in Gaussian curvature or topology. These consequences, and those when nematics become active will also be explored.

This workshop will bring together experts in all the above fields, to compare and contrast the various them, to discuss topical and future problems and methods of their solution, and to explore possible applications.

Further information and application forms are available from the website at www.newton.ac.uk/programmes/MLC/mlcw04.shtml.

Closing date of the receipt of applications is **28 February 2013**.

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RECORDS OF PROCEEDINGS AT LMS MEETINGS

ANNUAL GENERAL MEETING AND SOCIETY MEETING OF THE LONDON MATHEMATICAL SOCIETY

held on Friday 16 November 2012 at the Institute of Education, London. About 80 members and visitors were present for all or part of the meeting.

The meeting began at 3:00 pm, with the President, Dr Graeme Segal, FRS, in the Chair. Members who had not yet voted were invited to hand their ballot papers to the Scrutineer, Professor Peter Saunders.

The Vice-President Professor Ken Brown 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 2011/12 financial year and the President invited questions.

Copies of the *Trustees Report* for 2011/12 were made available and the President invited members to adopt the *Trustees Report* for 2011/12 by a show of hands. The *Trustees Report* for 2011/12 was adopted.

The President proposed Messrs Kingston Smith be re-appointed as auditors for 2012/13 and invited members to approve the re-appointment by a show of hands. Messrs Kingston Smith were re-appointed as auditors for 2012/13.

Details of the proposed changes to the By-laws with respect to the role of the Librarian (By-laws I.5, XII.3 and III.1 and a new By-law I.6) had been made available to members prior to the Annual General Meeting.

The President invited members to vote to pass these resolutions. Professor Alexandre Borovik objected on the grounds that he considered that the preparation for the meeting had been in violation of Statutes 35, 36 and 37. He also stated that he had three proxy votes. These were duly counted. Members were asked to vote by a show of hands and the count was undertaken by the Scrutineer, Professor Saunders. The resolution was passed by more than a two-thirds majority.

Details of the proposed changes to the By-laws with respect to direct nominations for LMS Elections, (By-laws II.2 and II.7) had been made available to members prior the Annual General Meeting.

The President invited members to vote to pass these resolutions. Members were asked to vote by a show of hands and the count was undertaken by the Scrutineer, Professor Saunders. The resolution was passed by more than a two-thirds majority.

One member, Dr A.E.L. Davis, proposed one further item of business with respect to the care of the Special Collections. As 21 days' notice had not been given for this item, it was agreed the matter would be taken under consideration and may be presented to the Council of the Society at its next meeting.

The President, on Council's behalf, presented certificates to the 2012 Society Prize-winners:

Pólya Prize: Professor Dan Segal;

Fröhlich Prize: Professor Trevor Wooley, FRS;

Whitehead Prizes: Dr Eugen Varvaruca, Dr Sarah Waters and Professor Andreas Winter. The winner of the Senior Berwick Prize: Professor Ian Agol; and the winner of the fourth Whitehead Prize, Dr Toby Gee were unable to attend to collect their prizes.

Thirty people were elected to Ordinary Membership: Konstantin Ardakov, David Bevan, Stephen Connor, Rama Cont, Anthony Debling, Sebastian Del Bano Rollin, Michael Duff, Tania Dunning, Qendrim Gashi, Agelos Georgakopoulos, Richard Hepworth, Milena Hering, David Hughes, Naotaka Ikeda, Minhyong Kim, Jorj Kowszun, Sara Lombardo, Deljoo Mahdmina, Iain Moffatt, Aleksey Pichugin, Oleg Pikhurko, Martin Rasmussen, Lucia Scardia, Nadia Sidorova, Michael Smyth, Bogdan Stefanski, Kellogg Stelle, Marco Thiel, Samireh Vahid, Henry Wilton.

Twelve people were elected to Associate Membership: Suhear Saady Alwan, Alex Bailey, Andrew Barwell, Ruth Bauwens, Rosanna Cretney, Alan Logan, Paul Morris, Emilio Pierro, Ralf Rueckriemen, Daniel Rust, David Jonathan Sixsmith, James Walton.

Two people were elected to Reciprocity Membership: Petter Bergh, Enrico Jabara. Three members signed the book and were admitted to the Society.

The President announced that the next meeting of the Society would be in London on 1 March 2013 and would include the Mary Cartwright Lecture. The following Society Meeting would be in Newcastle on 18 March 2013 as part of the Northern Regional Meeting and Workshop on *Triangulations and Mutations*

Professor Charles Stuart gave a lecture on *Bifurcation, Asymptotic Bifurcation and Elliptic Equations on* R^N .

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

President: Graeme Segal;

Vice-Presidents: Ken Brown, John Greenlees;

Treasurer: Robert Curtis;

General Secretary: Stephen Huggett;

Publications Secretary: John Jones;

Programme Secretary: Robert Wilson;

Education Secretary: Alice Rogers;

Members-at-Large of Council (for 2 year terms): Catherine Hobbs, Beatrice Pelloni, Colva Roney-Dougal, Michael Singer, Ulrike Tillmann, Alexander Veselov;

Member-at-Large of Council (for one-year term): Francis Clarke.

Five Members-at-Large who were elected for two years in 2011 have a year left to serve: June Barrow-Green, Simon Donaldson, John Hunton, Ari Laptev, Elizabeth Mansfield. The following were elected to the Nominating Committee: Keith Ball, Gavin Brown, David Tranah.

Professor J. Bryce McLeod, FRS, winner of the 2011 Naylor Prize and Lectureship in Applied Mathematics gave the Naylor Lecture on *The wedge entry problem*.

After the meeting, a reception was held at De Morgan House, followed by the Annual Dinner, which was held at the Russell Hotel and attended by 80 people.

No. 421 January 2013

LMS AGM 16 November 2012



LMS President: Dr Graeme Segal, FRS



Fröhlich Prize: Professor Trevor Wooley, FRS



Whitehead Prize: Dr Sarah Waters



Pólya Prize: Professor Dan Segal



Whitehead Prize: Dr Eugen Varvaruca



Whitehead Prize: Professor Andreas Winter

newsietter@ms.ac.uk

GRADUATE STUDENT MEETING 2012

Report

The LMS Graduate Student Meeting 2012 took place in association with the LMS AGM on 16 November at the Jeffrey Hall, Institute of Education, London. After an initial reception for the 20 students in attendance, the chair of the meeting, Professor Ari Laptev, introduced the first speaker. In his talk, Professor Sebastian van Strien from Imperial College London presented A survey on dynamics in dimension one. He gave an interesting insight into results related to the 'closing lemma' going back to Poincaré and Fatou.

Following this, seven graduate students from various universities around the UK presented their research in a series of short talks. To begin with, Andrea Fanelli (Imperial College London) gave a talk titled *Introduction to Birational algebraic geometry: classification problem and minimal model program* providing an overview of recent results in this field.

Lukas Schimmer (Imperial College London) presented an application of the commutation method in *A simple proof for sharp Lieb-Thirring inequalities* based on work by R. Benguria and M. Loss.

In her talk *Centroid-based initialized JADE* for global optimization, Rashida Adeeb Khanum (University of Essex) showed that the performance of JADE, an adaptive version of nature inspired algorithm DE, can be improved further by changing its random population initialization with centroid based population initialization.

Tomasz Tkocz's (University of Warwick) presentation *My favourite inequality* provided a proof of the remarkable fact that for spheres in high dimensions almost all mass is concentrated around any equator.

Barinder Banwait (University of Warwick) gave an insight into an important aspect of number theory, the so-called local-to-global question, in his talk titled *Local to global phenomena in number theory'*.

Marina Iliopoulou (University of Edinburgh)

presented Algebraic methods for the solution of combinatorial and analytical problems, demonstrating the use of innovative algebraic methods for the solution of the joints problem.

The last student talk was given by Sara Tavares (University of Nottingham), who provided an introduction to background field theory in *What is BF theory anyway?*.

Tomasz Tkocz and Marina Iliopoulou were awarded prizes in recognition of their outstanding presentations.

Afterwards LMS publisher Susan Hezlet presented a concise overview of the process of publishing scientific work in her talk *How to get your papers published*, from the choice of a journal to the submission of the final version of the paper. To close the Graduate Student meeting, Professor Adrian Constantin from King's College London and University of Vienna presented *Particle trajectories beneath irrotational travelling water waves*, in which he considered travelling waves moving at the surface of water and described the pattern of the particles beneath the wave.

Later the LMS Annual General Meeting took place in the same location, and is reported in the 'Records of Proceedings' in this *Newsletter*.

> Lukas Schimmer Imperial College London

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REVIEWS

THE TRAVELLING SALESMAN – P VS NP

It is a refreshing idea to set a thriller in the world of mathematics and mathematicians – to put a theorem at the heart of the conflict in a film. Not surprisingly, in *The Travelling Salesman*, directed by Timothy Lanzone and written by Andrew and Timothy Lanzone, the tension is due not to the intricacies of the proof, but rather to the moral issues arising from the possible uses of the theorem. In this case the theorem is P=NP, which all mathematicians except a handful of lunatics expect to be false. As it happens, I am one of these lunatics: in fact, almost thirty years ago, Charles Read and I even had a dinner to celebrate our

'proof'. (Since then I have been leaning more and more towards the widely accepted view. but haven't guite got there yet.)

At the risk of insulting the readers of this Newsletter, let me remind them that the P vs NP problem is the most famous problem in theoretical computer science, somewhat like the Riemann Hypothesis in pure mathematics: putting it crudely, it asks whether every

check quickly, in polynomial time, can in fact be solved guickly by a computer.

The 'action' of the film takes place in a coldly lit room in an undisclosed location: four mathematicians, of whom three are in their thirties and one is somewhat older, gather around a table to wait for a fifth man, and soon get into a heated discussion of the implications of their recent phenomenal result that P=NP. The protagonist is a man with outstandics in the Department of Pure

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Mathematics and Mathematical Statistics at Cambridge, Fields Medallist Professor Timothy Gowers (oops! Timothy Horton), who was clearly the leader of the project; the other three mathematicians, of whom only one is named, are less important. Timothy Horton's antagonist is the man they are waiting for, a smooth and creepy official of the U.S. Department of Defense. It soon transpires that, two years earlier, the DoD had hired the four mathematicians to work on P vs NP (echoes of Gowers's Polymath Project?), and now the official is there to collect their algorithm and make them sign a nondisclosure agreement. In return each will get 10 million dollars.

A long and heated argument ensues, in which our mathematicians prove themselves to be unusually articulate: they shower glory on mathematics, concluding that mathematics has given the world just about everything.

'the good, the bad, and everything else'. The reason for the argument is expressed by the DoD official, who says that with this proof, 'we can simply conquer, destroy, eradicate without mercy, without any consequences'. The official bullies ('we own you' and 'you'll forfeit your future compensation'), cajoles ('it's your patriotic duty'), and stresses that 'there is a war in cyberspace whether you admit it problem whose solution a computer can or not'. The mathematicians counter that, by

letting the Government take total control of their result, the myriad benefits for mankind, like a cure for cancer, will be endangered. Eventually, Horton's colleagues are hammered into submission. and sign the agreement. As the lone dissenter, Horton demands 'a document drafted stating that the proof of P=NP belongs to the four of us. You can have the design for the processor classified if vou want', he savs, 'but the proof, as originally promised. is ours', and the action pro-Ball Professor of Mathemat- A CEREBRAL THRILLER. COMING SOON Ceeds to an unexpected and unlikely conclusion.

> A rather important question remains: at whom is the movie aimed? Is it for the general public or mathematicians? At the UK Premier of this film at the Centre for Mathematical Sciences in Cambridge, the screening was preceded by a brief lecture to mathematicians about the P vs NP problem. The lecturer mentioned that this problem was one of the seven Millennium Problems, and made the outrageous claim that a proof of P=NP will be rewarded by 6 million dollars, as it will lead to instant proofs of the other remaining open problems, including the Riemann Hypothesis and the Birch and Swinnerton-Dver Conjecture. If this is the view of an expert mathematician, what chance do members of the general public have to make head or tail of the problem and its implications? As one would expect, many things jar in the film, although that may not be important for

people outside academia; here are just three examples. After four years of collaboration, one of the mathematicians addresses another as 'Dr', to which he gets the retort 'Professor'. To give weight to his arguments, one of the characters says 'I also have a Wolf Prize and an Abel Prize'. Congreve's line is turned into 'Hell hath no fury like a mathematician scorned.'

Lanzone has succeeded in making an exciting and enjoyable 'intellectual thriller': we mathematicians must be grateful to him for venturing into our world and for showing us as human beings, and not as misfits, as we appear in most films. Although there are only five characters and a handful of walk-ons, and the camera hardly ever leaves the bare room of the negotiations, the spectators are treated to an enjoyable 80-minute feature film. That Lanzone could shoot his film for under \$10,000, in just ten days, is a miracle. Danny Barclay, in the role of Horton, is excellent: he delivers his difficult lines with conviction, and his portraval of an exceptionally able man is verv believable: Marc Raymond, as the DoD official, is a worthy opponent. Every other character would be acceptable as a mathematician. The film is beautifully shot by the cinematographer Benji Bakshi: the overall tone is gravish blue, and the deftly used shades create a crisp, clinical atmosphere.

The Travelling Salesman is a marvelous effort by a brave and talented filmmaker - we should look forward to his next production.

Béla Bollobás University of Cambridge and University of Memphis

Higgs Force: Cosmic Symmetry Shattered by Nicholas Mee, 2012, Quantum Wave Publishing Ltd, 496 pp, £12.99, US\$19.95, ISBN: 978-0-9572746-1-7.

Higgs Force traces the history of physics. starting from the atomic ideas of the ancient Greeks and finishing with the launch of the Large Hadron Collider, Impressively, the author succeeds in presenting it as a continuous story, tracing the analogies between the earliest ideas of elements and the standard model. The book culminates in the story of the search for the Higgs boson: Higgs Force came out just months before the announcement of its likely discovery.

The standard model states that the world is made out of a just few types of elementary particles. For example, atoms consist of electrons, up-quarks and down-quarks). The job of most other particles is to hold the atom together, mediating the forces of attraction. A few more show up as results of various collisions and transformations. Quite apart from this particle stew stands the final constituent of the standard model: the Higgs boson. It is the only unconfirmed component of a generally very successful theory. This alone would not explain the gigantic international efforts to find the Higgs boson; the extra motivation comes from the structure of the standard model. Should it turn out that the Higgs boson does not exist, the entire theory falls. For example, this particle is essential for understanding why atomic particles have mass.

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The author describes a repeating pattern in the progress of science. Over the course of several investigations, the number of known elementary building blocks has increased. Human nature, however, dictates that the true, beautiful theory of the universe should include only a small number of building blocks. Once there are hundreds of them, we start to feel that these building blocks are not elementary after all, and their abundance is explained by being combinations of a small number of more essential building blocks. This new explanation comes from noticing a pattern or symmetry. For example, when the number of known chemical elements became uncomfortably large, a regular pattern was observed in them (the periodic table), and this eventually led to the discovery that the elements are just combinations of electrons, protons and neutrons. Then history repeated itself. It was discovered that there are in fact many more elementary particles, leading to the idea that the "elementary" particles are not elementary after all: their building blocks

turned out to be guarks. The standard model

now contains a rather large number of par-



ticles: perhaps we are at the beginning of another such cycle, although an announcement of the possible observation of the Higgs boson came from CERN just months after this book was published.

The book is written in a simple and engaging style, and the author chooses the level of complexity well for a general audience. Inexplicable transitions do occur, however. For example, the author consistently refers to interactions as forces (except briefly chapter 5). Most of the time it is a reasonable choice of words. However, how should the reader understand, for example, the words that the weak force 'changes the identity of matter' and is responsible for particle transformations?

These minor shortcomings are greatly outweighed by the overall excellence of the material and presentation. Higgs Force will be of interest to anyone interested in physics, as well as to those physicists whose area of expertise is not particle physics.

Ilia Rushkin

A version of this review was first published in Plus magazine (http://plus.maths.org).



The story of the greatest scientific discovery for 50 years **Nicholas Mee**

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 2013

7 Analysis Day, Bristol (420)

7-11 Nonlinear Analysis UK-Japan Winter School, London (419)

7-11 Symmetry, Bifurcation and Order Parameters INI Workshop, Cambridge (418) 8-11 Statistical Mechanics and Extreme Events in Earth Science Conference, Reading (420)

16-18 British Postgraduate Model Theory Conference, Manchester (419)

22 *The Queen of Mathematics*, Gresham College London

30 Sheffield Probability Day, Sheffield (420)30 Winter Combinatorics Meeting, Open University (420)

FEBRUARY 2013

4 Experiences of Learning Programming within a Mathematics Course, Bath (421) 13 Hyperbolic Equations Workshop, Loughborough (421)

19 Are Averages Typical? Gresham College, London 20 Geometry and Topology Day, University College London (421)

MARCH 2013

1 LMS Mary Cartwright Lecture, London (421)

14 David Crighton Lectures, Royal Society, London (421)

18 LMS Northern Regional Meeting, Newcastle University (421)

18-22 Analytical and Computational Paths from Molecular Foundations to Continuum Descriptions Workshop, INI Cambridge (419) **18-23** Workshop on Triangulations and Mutations, Newcastle (421)

19 Modelling the World, Gresham College

19 Large Evolving Networks Workshop,

Bristol (421) 20 Geometry and Topology Day, University

College London (421) 20-22 Young Functional Analysts' Workshop, Sheffield (421)

22-23 NBFAS, Sheffield (421)

25-26 Data Analysis for Cyber Security Workshop, Bristol (421)
25-27 Quantitative Modelling in the Management of Health and Social Care 7th IMA Conference, Central London (416)

25-28 BMC, Sheffield (420) 26 LMS Meeting at BMC, Sheffield

26 Contemporary Challanges for the Delivery of Undergraduate Mathematics Courses,

Sheffield (421)

APRIL 2013

2-5 Operads and Deformation Theory INI Conference,
Cambridge (418)
2-5 Char p Methods in Algbraic Geometry, Imperial College, London

3-5 Quantum Fields, Gravity and Information, Nottingham

8-9 Mathematics in Finance IMA Conference, Heriot-Watt University (416)

8-12 Advances in Number Theory and Dynamical Systems Conference, Bristol (421)
9-11 Large Deviations and Asymptotic Methods in Finance, Imperial College London
9-12 BAMC, Leeds (421)

10 Finite Simple Groups, Algebraic Groups and their Impact, Birkbeck, London 12-13 Integrable Models, Conformal Field Theory and Related Topics, Hertfordshire 15-17 Conformal Geometry and Function Theory in Mapping, Imaging and Sensing, Imperial College London

15-19 Geometric and Topological Graph Theory Workshop, Bristol (421)

18-19 Women in Maths Day, Cambridge
25 Quantum Algorithms Day, Bristol (421)
25-26 Young Topology Meeting, Imperial
College, London

MAY 2013

1-3 Mathematical Models of Biological Evolution, Leicester 15 LMS-Gresham Lecture, Peter Cameron,

Museum of London (421)

JUNE 2013

5 Combinatorics One Day Meeting, Oxford
10-14 LMS Invited Lecturers, Fedor
Bogolomov, Edingburgh (420)
11-14 MAFELAP 2013, Brunel
17-20 Young Researchers in Mathematics
2013, Edinburgh
20-21 High-Dimensional Inference with
Applications, Kent
24-28 Liquid Crystal Defects and their Geometry INI Workshop, Cambridge (421)
30-5 Jul British Combinatorial Conference, Royal Holloway College, University of London

JULY 2013

1-2 Bifurcation Theory, Numerical Linear Algebra and Applications, Bath
1-4 Dense Granular Flows 2nd IMA Conference, INI, Cambridge (416)
3-13 Polylogarithms as a Bridge between Number Theory and Particle Physics LMS-EPSRC Durham Symposium

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5 LMS Meeting, London

8-12 Modern Nonlinear PDE Methods in Fluid Dynamics, LMS-EPSRC Short Course, Reading (421)

15-19 Polynomial Optimisation Summer
School and Workshop, INI, Cambridge (420)
15-25 Graph Theory and Interactions
LMS-EPSRC Durham Symposium
29-2 Aug Computational Group Theory,
LMS-EPSRC Short Course, St Andrews (241)

AUGUST 2013

3-11 Groups St Andrews 2013, St Andrews (410)

SEPTEMBER 2013

2 Heilbronn Day, Groups and Their Representations, Manchester

3-6 Brauer's Problems in Representation Theory – 50 years on, Manchester

9-13 Spectral Geometry, Chaos and Dynamics, Loughborough

11-13 Mathematics of Surfaces 14th IMA Conference, University of Birmingham (416)

LMS RECEPTION AND ANNUAL DINNER 16 November 2012



Rob Wilson and Shahkar Mossaheb



Caroline Series and Sebastian van Strien



Peter Clarkson and Nick Manton



Srishti Chatterjee and John Toland



LMS President Graeme Segal giving a speech at the Annual Dinner