THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 399 January 2011

Society Meetings and Events

2011

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LMS Short Course, Oxford [*page* 21]

Friday 6 May
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Tuesday 17 May
LMS–Gresham Lecture, London

Friday 1 July
London

Tuesday 19 July
Northern Regional Meeting, Leeds

Friday 18 November
LMS AGM, London

NEWSLETTER ONLINE:

Go to www.lms.ac.uk/newsletter

MEMBERSHIP SURVEY – TELL US YOUR VIEWS

The LMS is seeking a wide variety of views on various issues, including membership. You are invited to complete a short online survey to inform Council of your opinions on these matters.

Members, former members and non-members are all encouraged to complete the survey, which can be found at www.surveymonkey.com/s/66NW3VW and will be open until **21 January 2011**.

LMS COUNCIL DIARY

19 November 2010

The Council meeting on 19 November began as usual with President's Business, but in contrast to the usual tales of wining and dining on the LMS's behalf, we were treated instead to a 'chronicle of disasters', to quote the President's words. First, the announcement of the withdrawal of funding for the Erwin Schrödinger Institute in Vienna, an institution of comparable importance to the Isaac Newton Institute in Cambridge. Then the news that Adrian Smith's position in the Department for Business, Innovation and Skills is to be abolished. Then we heard that funding for the New Zealand Institute of Mathematics and its Applications is to be pulled. Even as we reeled under the impact, and commended the President's efforts to protest against these measures, we reflected that this is likely to be only the beginning of a long saga.

After this, it was something of a relief to get stuck into Society business. We first discussed some recommendations from the Personnel Committee, and then, after lunch, some publications issues. One of the latter was the draft contract with Mathematical Sciences Publishers (MSP) for the new database system for dealing with papers submitted to the LMS journals. We agreed to delegate the final negotiations to the working group, with a view to going live with the new system in January. Another issue concerned the *Journal of Group Theory*, currently published by de Gruyter. It is by now public knowledge that the entire editorial board has resigned, and Susan Hezlet, the LMS Publisher, invited Council to consider whether the LMS should get involved in some way. For reasons of commercial confidentiality, however, our conclusions must for the moment remain under wraps.

Most of the rest of the meeting was taken up with routine and/or technical business which will be of little interest to readers of this Diary. One possible exception was the design of a survey on membership of the LMS, intended to capture some information on (for example) the reasons why people do or do not join the LMS, to help focus our thoughts on these matters in the new year. Personally I am sceptical of the value of such surveys, as when filling them in I invariably find that they ask the wrong questions. However, we shall see.

Another item which may be of more general interest was an update from Stephen Huggett on the new website. This is now publically available in a 'beta test' version (or 'alpha', as one member of Council quipped) at www.lms.ac.uk/beta, and feedback from LMS members (and others) is actively encouraged. Copying of content from the current website is proceeding apace, with the intention of completing the switch before Christmas. The development of new content, in particular interactive content, will be our focus thereafter.

It is becoming increasingly clear to Council that in the 21st century an effective web presence is not only vital to our existence, but also poses significant risks (for example to our reputation). Therefore we have to think urgently and carefully about a system of devolved editorial control which allows people who have the time and the enthusiasm to develop parts of the site, while ensuring that Council has effective control over what is published in the name of the LMS. As the General Secretary, Martin Hyland, eloquently put it, we want a website which is alive, not one which (like so many) is dead.

Robert Wilson

LMS Newsletter www.lms.ac.uk/newsletter

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LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT MEETING

Friday 25 February 2011

Oxford University Museum of Natural History

Programme:

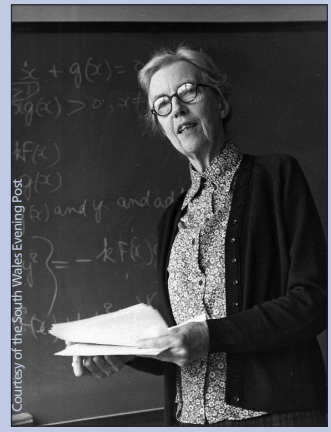
3.30 Opening of the meeting

Peter Donnelly (Oxford)
Modelling Genes

4.30 Tea

5.00 **Mary Cartwright Lecture**

Alison Etheridge (Oxford)
Evolution in a Spatial Continuum



Mary Cartwright

A reception will be held after the meeting at the Mathematics Institute followed by a dinner at the Ashmolean Museum at a cost of £30 per person, inclusive of wine. Contact Isabelle Robinson (isabelle.robinson@lms.ac.uk) by **Friday 18 February 2011** if you would like to attend.

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

LMS INVITED LECTURER 2011

Professor Emmanuel Candès (Stanford)

Compressed Sensing

21–25 March 2011
Centre for Mathematical Sciences, Cambridge

Emmanuel Candès will give an eight-lecture minicourse, at a level suitable for graduate students, on *Compressed Sensing*. This is a subject very much at the interface of pure and applied mathematics and the lectures should interest a wide audience.

There will also be one-hour lectures by:

- Anders Hansen (Cambridge)
- Vincent Rivoirard (Paris-Dauphine)
- Carola Schönlieb (Cambridge)
- Jared Tanner (Edinburgh)

College accommodation will be available. Funding is available for research students from UK universities and a limited amount of funding is available for others. Please email lms2011@maths.cam.ac.uk for more details.

For further details see: www.dpmms.cam.ac.uk/~bjg23/candeslectures.html.

LMS INVITED LECTURES SERIES 2012

Proposals for the 2012 Lectures are sought from any member who, in addition to suggesting a topic and lecturer, would be prepared to organise the meeting at their own institution or a suitable conference centre.

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

Enquiries about the Invited Lectures should be directed to the Programme Secretary at the Society (grants@lms.ac.uk). The deadline for the submission of proposals is **Tuesday 15 February 2011**.

Cecil King Travel Scholarship

The London Mathematical Society

The London Mathematical Society annually awards a £5000 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.

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 interview.

Applicants should normally be nationals of the UK or Republic of Ireland, either registered for or having recently completed a doctoral degree at a UK University.

Applications should be made using the form available on the Society's website (www.lms.ac.uk/activities/cecil_king/index.html) or by contacting education@lms.ac.uk. The closing date for applications is **Friday 25 February 2011**. It is expected that interviews will take place in London in late April or early May.

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

Recent Invited Lecturers are:

2010 M. Bramson (University of Minnesota) *Stability of queuing networks*
2009 A.D. Ionescu (University of Wisconsin, Madison) *Black holes in vacuum: examples and uniqueness properties*
2008 A. Okounkov (Princeton) *Random surfaces*
2007 D. Ben-Zvi (University of Texas, Austin) *The geometric Langlands correspondence*
2006 M.F. Singer (North Carolina State Univ.) *Introduction to the Galois theory of differential and difference equations*

SOCIETY PRIZES DEADLINE

Readers are reminded that the deadline for receipt of nominations for the 2011 Society Prizes is **Friday 14 January 2011**. Prizes available in 2011 include the *Pólya Prize*, *Senior Whitehead Prize*, *Naylor Prize and Lectureship in Applied Mathematics*, *Berwick Prize* and up to four *Whitehead Prizes*. A nomination form can be downloaded from www.lms.ac.uk. For full details of all these prizes please see the Society's December *Newsletter* (No. 398) or email prizes@lms.ac.uk.

LMS GRANT SCHEMES FOR CONFERENCES AND VISITS

Next Closing Date for Applications: 31 January 2011

Applications are invited for the following grants:

- Conferences and postgraduate research conferences held in the UK (Schemes 1 and 8)
- Visitors 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 Society's website (www.lms.ac.uk/grants).

Applications received by **31 January 2011** 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: Sylvia Daly and Elizabeth Fisher (tel: 020 7291 9971/3, email: grants@lms.ac.uk) who both work Wednesday–Friday.
- Programme Secretary: Stephen Huggett (tel: 01752 586869, email: s.huggett@plymouth.ac.uk)

Information on other grant schemes operated by the Society, for education, the mathematics–computer science interface, and childcare, is also available at www.lms.ac.uk/grants.

Other Grants News

We would like to draw your attention to the following.

Childcare Grants
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/activities/women_maths_com/childcare.html.

Conference Grants to Celebrate New Appointments
To be eligible for a grant, the inaugural meeting must take place within two years of the start date of the new appointment. Please note that this policy may be subject to change and will be reviewed later in the current academic year. Any changes will be published on the website. Please note that applications are made via Scheme 1.

Joint Research Groups Supported by the LMS
Details of forthcoming meetings to be held by these groups are normally included in the Calendar of Events section of the LMS website.

Membership Information Packs
As part of a new initiative, the Society will be asking the organisers of LMS-sponsored conferences and joint Research Groups to encourage participants at their meetings to join the Society. Membership packs, which include information about the LMS, and application forms, will be sent to the organisers.

Conferences

Application deadline	Decision date	Start date of visit/conference
15 September	October	May to October (following year)
31 January	February	September (current year) to February (following year)
15 May	June	January to June (following year)

Visits

Application deadline	Decision date	Start date of visit/conference
15 September	October	February to May (following year)
31 January	February	June to September (current year)
15 May	June	October (current year) to January (following year)

New Website
The Society is in the process of upgrading its website and as part of the up-grade the grants section has been amended. In particular, please note the following changes:

Guidelines
These have been kept to a minimum on the Introductory pages. Further guidance notes can be found on the application forms. We have added an Application Checklist which we hope you will find useful. We will be changing to an on-line application and reporting system under phase 2 of the upgrade of the website, which will commence in 2011.

Deadlines
From 1 February 2011, the deadlines for applying will be set according to the *date of the event*. See the table above.

- Applications should be submitted well in advance of the date of the conference or visit.
- Please note that applications will not be considered between mid-June and mid-October.
- Grants will not be made retrospectively.

VISIT OF PROFESSOR M. ELOUMI

Professor Mourad Eloumi will be visiting the UK from 31 January to 8 March 2011. He is an expert in Algorithms, Computational Molecular Biology, Knowledge Discovery and Data Mining. He is currently a Professor in Computer Science at the University of Tunis-El Manar, and a member of the research Unit of Technologies of Information and Communication (UTIC), Higher School of Sciences and Technologies of Tunis, Tunisia. Professor Eloumi will give the following lectures:

- 1 February, Stringmasters 2011, contact Laurent Mouchard (laurent.mouchard@gmail.com)
- 7–8 February, LSD&LAW (London Stringology Days/London Algorithmic Workshop); contact German Tischler (german.tischler@kcl.ac.uk)
- Leicester University, to be arranged; contact Rajeev Raman (rr29@mcs.le.ac.uk)
- Guy's Hospital, to be arranged, contact Kimon Frousios (kimon.frousios@kcl.ac.uk)

The talks will be on topics in Computational Biology. For more details contact Costas Iliopoulos (csi@dcs.kcl.ac.uk). This visit is supported by an LMS Scheme 5 grant.

2010–11 COUNCIL

As a result of the annual election, membership of the Council is the following:

President	Professor A.J. Macintyre, FRS, FRSE (Queen Mary, University of London)
Vice-Presidents	Professor K.A. Brown, FRSE (Glasgow)
	Professor J.P.C. Greenlees (Sheffield)
Treasurer	Dr W.B. Stewart (Oxford)
General Secretary	Professor J.M.E. Hyland (Cambridge)
Programme Secretary	Dr S.A. Huggett (Plymouth)
Publications Secretary	Professor J.D.S. Jones (Warwick)
Education Secretary	Professor C.J. Budd (Bath)
Members-at-Large	* Dr J.E. Barrow-Green (Open University) (Librarian)
	Professor A.V. Borovik (Manchester)
	Dr D.E. Buck (Imperial College London)
	* Professor S.K. Donaldson, FRS (Imperial College London)
	Professor W.S. Kendall (Warwick)
	* Professor A. Laptev (Imperial College London)
	Dr M. Marletta (Cardiff)
	Dr C.M. Roney-Dougal (St Andrews)
	* Professor G.B. Segal, FRS (Oxford)
	Professor U.L. Tillmann, FRS (Oxford)
	* Professor B.J. Totaro, FRS (Cambridge)
	* Professor R.A. Wilson (Queen Mary, University of London)

* Members continuing the second year of their two-year election in 2009

WORKSHOP ON MATHEMATICS JOURNALS

A workshop on mathematics journals will be held from 14 to 16 February 2011 at MSRI, Berkeley, USA.

Mathematics relies on its journal literature as the main conduit for peer review and dissemination of research, and it does so more heavily and differently to other scientific fields. The conflict between universal access and the traditional subscription model that funds the journals has been debated for the past decade. The workshop will discuss what is important and unique to the publishing of mathematical research articles and how we can best ensure that publishing practices support peer reviewed research in the long term.

The invited speakers are

- Sir John Ball (Oxford)
- Jean-Pierre Bourguignon (IHÉS, France)
- David Clark (Elsevier)
- Jim Crowley (SIAM)
- David Gabai (Princeton)
- Robert Guralnick (USC)
- Susan Hezlet (LMS)
- Carol Hutchins (Courant Institute, NY)
- Rob Kirby (UC Berkeley and MSP)
- Hans Koelsch (Springer)
- Matthias Kreck (Bonn, Germany)
- Angus Macintyre (QMUL, UK)
- Paulo Mangiafico (Duke University)
- Don McClure (AMS)
- Sam Rankin (AMS)
- Bernard Teissier (Jussieu Inst. Math., France)
- John Vaughn (Association of American Universities)
- Mira Waller (Duke University Press)
- Tom Ward (University of East Anglia, UK)

For further information regarding participation, see http://tinyurl.com/msri-mathjournals.

CHRISTOPHER ZEEMAN MEDAL

Deadline

Readers are reminded that the deadline for receipt of nominations for the 2011 IMA–LMS Christopher Zeeman Medal is **Friday 11 February 2011**. To put someone forward for the medal, please contact the IMA for a nomination form by writing to:

The Secretary to the Christopher Zeeman Medal
The Institute of Mathematics and its Applications
Catherine Richards House
16 Nelson Street
Southend-on-Sea
Essex SS1 1EF

or by email to lynn.webster@ima.org.uk

For full details of Zeeman Medal see the Society's December *Newsletter* (No. 398) or email prizes@lms.ac.uk.

KAVLI MEDAL

Presentation and Lecture

The President of the Royal Society, Sir Paul Nurse, will present the inaugural Kavli Education Medal to Professor Celia Hoyles, for her outstanding contribution to research in mathematics education. The medal will be presented to Professor Hoyles at the Association for Science Education's (ASE) Annual Conference, University of Reading, on Thursday 6 January 2011.

The presentation will be followed at 11.30–12.30 by Professor Hoyles' lecture *Tackling the mathematics: potential and challenges*. Professor Hoyles will look at some of the major findings of her research in mathematics education, including using ICT to support learning and the skills needed in modern workplaces. She will draw out the implications of her research as starting points to discuss the effective teaching of mathematics – and of science.

The ASE Annual Conference will be held at the University of Reading from Wednesday 5 to Saturday 8 January 2011. For more information visit the ASE website at www.ase.org.uk.

NATIONAL MEDAL OF SCIENCE AWARDED TO MATHEMATICIAN

The LMS would like to congratulate honorary member Professor David Mumford of Brown University, USA on receiving the National Medal of Science. Professor Mumford received his medal from President Obama in a ceremony at the White House in November 2010. The medal is 'the highest honour for achievement in science bestowed by the President of the US'. Mumford is also a Fields Medal winner and former President of the International Mathematical Union (IMU).

Professor Mumford was awarded a Fields Medal in 1974 for his work in algebraic geometry – on moduli spaces and geometric invariant theory. Later he made an astonishing change of direction and since then has concentrated on applied mathematics – mainly in computer and biological vision. Mumford has made a seminal contribution to the relatively young field of Artificial Intelligence, by bringing mathematical concepts, especially variational analysis and probabilistic modelling, to bear on hard problems in the analysis of images. Although almost all pure mathematicians are aware of his fundamental work in algebraic geometry they may be less aware of the enormous impact of his formulation of the segmentation and boundary-detection problems in terms of the variational calculus. This formulation constructs a bridge between computer vision and differential equations and numerical analysis, with stunning results. Applications such as image de-noising, image sharpening, and image segmentation are now routinely done within the Mumford formulation.

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

MATHEMATICS GENEALOGY PROJECT

The Mathematics Genealogy Project seeks to record part of the history of mathematics through the PhD supervisory relationship. It maintains a database that contains as much of the following information as it can about mathematicians:

- Full name
- Year of degree
- Degree type (PhD, DPhil, etc.)
- Degree-granting institution[1]
- Thesis title
- Thesis primary mathematics subject classification
- Supervisor(s) name(s)

The database contains over 146,000 records, allowing many mathematicians to trace their academic ancestry back to the 14th century. The Project seeks to record doctoral degrees, but recognizes that the British academic system adopted this degree at a later stage than some countries. In cases where a mathematician does not hold a doctorate but did supervise students, recording the individual's highest degree and primary mathematical influence(s) is appropriate.

Mathematicians are encouraged to visit the Project's website at www.genealogy.math.ndsu.nodak.edu to verify their information. A data submission form is available there to make additions and corrections. Since data submissions are reviewed manually, updates may take up to three weeks to appear online. Mathematics departments are encouraged to verify that the list of their graduates is correct.

The Mathematics Genealogy Project is a service of North Dakota State University (Fargo, ND, USA) and the American Mathematical Society. Mitchel T. Keller is the Project's second Managing Director. Dr Keller is spending the 2010/11 and 2011/12 academic years visiting the Department of Mathematics at the London School of Economics and Political Science. He can be reached by email at project@genealogy.math.ndsu.nodak.edu.

The Project is funded through some support from NDSU and the AMS and donations. Another source of support is the sale of personalised posters showing all of a mathematician's academic ancestors and descendants. Posters showing a department's collective ancestry are also often feasible. More information about posters (including samples) can be found on the Project's website.

[1] Degrees awarded through the University of London can be recorded either under 'University of London' or the constituent college at which the degree recipient studied.

ALLAN MUIR

Dr Allan Muir, who was elected a member of the London Mathematical Society on 16 May 1986, died on 17 October 2010, aged 74.

Martin Zarrop writes: Allan's slightly late choice of mathematics as his main preoccupation in life took him from the National Physics Laboratory to University College London at the age of 19 and then to a mathematics lectureship at Leicester University. In 1963 he moved to a lecturing post in newly liberated Ghana, later returning to lecture in the Department of Mathematics at City University London where he spent the remainder of his career.

Allan's mathematical interests were always wide ranging and included logic, lattice-valued relations, automata, non-commutative algebra, quantum electrodynamics, economic game theory and systems biology. In his research he worked for many years with his departmental colleague Mary Wynne Warner as well as Denis Glycopantis, Head of Economics at City University, and Olaf Wolkenhauer, Professor of Systems Biology at Rostock University in Germany. These collaborations resulted in many pleasurable hours of mathematical and philosophical discussion as well as a number of joint research papers and articles.

His enthusiasm for mathematics and philosophy never waned and in the last decade of

his life he also invested much time and energy in the British Humanist Association, particularly in the Chester group close to his home in North Wales.

Allan is survived by his sons, Andrew and David, and his partner Anantamani.

NIGEL KALTON

Professor Nigel Kalton died on 5 September 2010 , aged 64.

Nigel graduated from Cambridge University and completed his doctorate in 1970 under the supervision of Ben Garling. After a year in Warwick, he moved to University College of Swansea before leaving in 1979 for the University of Missouri in Columbia, USA.

Nigel was an outstanding and highly influential mathematician. He wrote over 270 papers and six books on diverse topics both within Functional Analysis and in related areas of analysis. He was a renowned problem solver and was even known to have solved one problem of some twenty years standing during a lecture where it was being discussed!

In 2005, he was awarded the prestigious Banach Medal from the Polish Academy of Sciences for the most significant contributions to Banach space theory. In Missouri, Nigel won the Chancellor's Award for Outstanding Research in 1984 and the Weldon Spring Presidential Award for outstanding research in 1987.

Nigel loved to travel and was a much sought-after speaker at conferences. He visited many mathematics departments throughout the world for extended stays when on study leave, his influence and enthusiasm inspiring countless mathematicians. He was also a popular teacher with his students, both undergraduate and graduate, being approachable and generous with his time.

Beyond mathematics, Nigel had many interests. He was a talented chess player, winning the Major Open at the British Championship in 1970, though giving up competitive play in 1976. He was also a racquetball enthusiast. Above all, he was a family man, never happier than when playing with his children and grandchildren. He is survived by his wife Jennifer, children Neil and Helen, and four grandchildren.

Geoff Wood, University of Swansea
Alastair Gillespie, University of Edinburgh

VISIT OF PROFESSOR D.G. KONSTANTINIDES

Professor Dimitrios G. Konstantinides (University of the Aegean, Samos, Greece) is visiting the UK from 16 to 30 January 2011. Professor Konstantinides's work addresses a wide range of topics in stochastic modelling in economic environments. He will give seminars at:

- Heriot-Watt University, 21 January; contact Sergey Foss (s.foss@hw.ac.uk)
- University of Edinburgh, 26 January; contact Burak Buke (B.Buke@ed.ac.uk)
- University of Strathclyde, 28 January; contact Xuerong Mao (x.mao@strath.ac.uk)

Professor Konstantinides will be based at Heriot-Watt University during his stay, hosted by Sergey Foss (s.foss@hw.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF DR O. DERZHO

Dr Oleg Derzho (Physics and Physical Oceanography, Memorial University, Canada) is visiting the UK from 24 January to 11 February 2011. Dr Derzho works on nonlinear waves in geophysical fluid dynamics. He will give seminars at:

- St Andrews University, 28 January; contact Magda Carr (magda@mcs.st-andrews.ac.uk)
- University College London, 31 January; contact Ted Johnson (e.johnson@ucl.ac.uk)
- Loughborough University, 1 February; contact Roger Grimshaw (R.H.J.Grimshaw@lboro.ac.uk)
- University of Keele, 2 February; contact Victor Shrira (v.i.shrira@keele.ac.uk)

Dr Derzho will be based at Loughborough University during his stay, hosted by Roger Grimshaw (R.H.J.Grimshaw@lboro.ac.uk). The visit is supported by an LMS Scheme 2 grant.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

DESIGNED EXPERIMENTS: RECENT ADVANCES IN METHODS AND APPLICATIONS

30 August – 2 September 2011

in association with the Newton Institute programme entitled
Design and Analysis of Experiments
(18 July – 21 December 2011)

Organisers: S. Biedermann (Southampton), S. Gilmour (QMUL), H. Grossmann (QMUL), B. Torsney (Glasgow), D. Woods (Southampton).

Theme of conference: Design of Experiments is a fundamental part of the knowledge discovery process in science and engineering, and has impact in a wide variety of fields. Long-standing principles of experimentation, such as ramdomization, replication and blocking have become standards of best practice in many areas. In return, stimulus for novel research in the Design of Experiments comes from advances in technology and techniques in application fields important to science and society. These advances often result in complex experiments, for example with large numbers of factors, many levels of randomization, or with the aim of estimating or discriminating between nonlinear models. When these experiments cannot be designed using established methods, they motivate methodological and theoretical advances in the design of experiments. Many recent advances in the subject have come from just this synergy between application and methodology.

DEMA 2011 will bring together researchers and practitioners for the interchange of new ideas on the design and analysis of experiments. The workshop will emphasise both methodology and application areas and should be of interest to scientists and engineers who use experiments, as well as to statisticians. The workshop will consist of a number of invited presentations from international speakers. Applications are also encouraged for contributed talks and posters. Funding may be available to support the attendance of early-career researchers and PhD students.

Further information and application forms are available from the website at: www.newton.ac.uk/programmes/DAE/daew04.html. Closing date for the receipt of applications is **31 March 2011**.

VISIT OF PROFESSOR A. KARLSSON

Professor Anders Karlsson (University of Geneva) will be visiting the UK from 23 January to 5 February. Professor Karlsson's research covers areas ranging from spectral graph theory and ergodic theory to metric geometry and random walks on groups. He will give seminars at:

- Durham University,
  24 January;
  contact Norbert Peyerimhoff
  (norbert.peyerimhoff@durham.ac.uk)
- University of Warwick, 1 Feburary;
  contact Mark Pollicott
  (mpollic@maths.warwick.ac.uk)
- University of Bristol, 3 February;
  contact Alexander Gorodnik
  (a.gorodnik@bristol.ac.uk) or
  Jens Marklof (J.Marklof@bristol.ac.uk)

Further information about the visit can be obtained from Norbert Peyerimhoff (norbert.peyerimhoff@durham.ac.uk). The visit is supported by an LMS Scheme 2 grant.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

OPTIMUM DESIGN FOR MIXED EFFECTS NON-LINEAR AND GENERALISED LINEAR MODELS

9–12 August 2011

in association with the Newton Institute programme entitled
Design and Analysis of Experiments
(18 July – 21 December 2011)

Organisers: D.B. Bogacka (Queen Mary), S. Leonov (GlaxoSmithKline).

Theme of conference: Mixed effects non-linear and generalised linear models have recently received considerable interest with respect to modelling issues and statistical analysis. However, the theory of optimum design for such models has got somewhat less attention in the statistical literature. In 2006 a small meeting *Population Optimum Design of Experiments* (PODE) started a series of annual workshops dedicated to the theory and applications of design of experiments for PK/PD mixed models, see www.maths.qmul.ac.uk/~bb/ PODE/PODE. However, the theory of design for mixed-effects models has been developed independently of any applications as well as for other specific problems, for example choice experiments. Hence, we would like to get together a wider group of those interested in the area of design of experiments for mixed-effects generalised linear models and non-linear models, to share their experience and to further the theory.

Optimum design theory cannot develop without good knowledge of statistical issues in modelling, estimation and hypothesis testing. Hence, we plan to have talks in these topics together with talks on experimental design. We plan to include PODE in the workshop and have talks in the area of optimum design for population PK/PD models. On Friday 12 August, the last day of the workshop, we will have dedicated one-hour lectures, invited and contributed talks, poster sessions as well as a lot of time for informal discussions.

Further information and application forms are available from the website at: www.newton.ac.uk/programmes/DAE/daew02.html. Closing date for the receipt of applications is **30 April 2011**.

VISIT OF PROFESSOR J. BURILLO

Professor José Burillo (Universitat Politècnica de Barcelona) will visit the UK from 23 January to 6 February 2011. Professor Burillo's research area is geometric group theory. He is an expert on the properties of the family of Thompson's groups, in particular the metric properties of their Cayley graphs, and has also studied questions of amenability of groups, primitive elements of free groups and growth of groups. Professor Burillo will give seminars at:

- Newcastle, Geometry and Algebra Seminar, 27 January; contact Sarah Rees (Sarah.Rees@ncl.ac.uk)
- Southampton, Algebra Seminar, 28 January; contact Armando Martino (a.martino@soton.ac.uk)
- St Andrews, Pure Mathematics Colloquium, 1 February; contact Collin Bleak (collin@mcs.st-and.ac.uk)

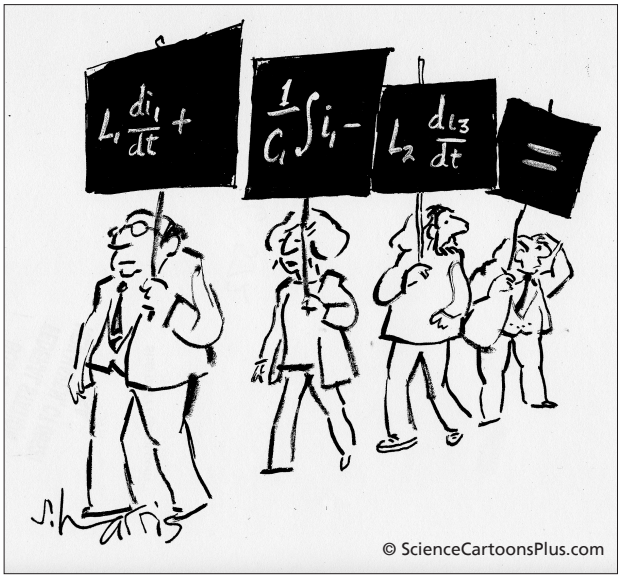
For further details consult seminar web pages. Professor Burillo will spend a few days in each of the three institutions. The visit will be coordinated by Sarah Rees and is supported by an LMS Scheme 2 grant.

MATHEMATICS POLICY ROUND UP

International Review of Mathematics
The LMS submitted three papers to the International Review Panel in November 2010; two position statements: *Doctoral Training in Mathematics in the UK* and *UK Mathematical Sciences – Research and Teaching in Symbiosis,* and one briefing paper: *UK government funding for mathematical sciences research*. These are available on the LMS website www.lms.ac.uk.

Research Excellence Framework (REF) updates
The full list of main and sub-panel chairs is now available on the HEFCE website at www.hefce.ac.uk/research/ref.

During 2010 the REF team ran a pilot exercise aimed at testing the feasibility of assessing research impact, and to develop the method of assessment for use in the REF. The findings from the impact pilot exercise have now been published. Reports, recommendations, and example case studies are available on the HEFCE website at www.hefce.ac.uk/ research/ref/impact.



Tuition fees
The government has set a basic threshold of £6000 per annum for tuition fees in England. In exceptional circumstances there would be an absolute limit of £9000. No publicly-funded university will be able to charge more than this for its undergraduate courses.

The government also proposed a more progressive repayment structure. At present graduates start repaying when their income reaches £15,000. The repayment threshold will be increased to £21,000, and will thereafter increase periodically to reflect earnings. The repayment will be 9% of income above £21,000, and all outstanding repayments will be written off after 30 years. Raising the threshold reduces the monthly repayments for every graduate.

A real interest rate will be introduced on a progressive taper. For graduates earning below £21,000, the real rate of interest will remain at zero. For graduates earning between £21,000 and around £41,000, a real rate of interest will be tapered in to reach a maximum of inflation plus 3%. When graduates are earning above £41,000 they will be making a full contribution to the costs of the system but still incurring interest well below normal commercial rates. For more information visit http://tinyurl.com/39hfxvo.

Education White Paper
The Secretary of State for Education, Michael Gove published the long-awaited Education White Paper *The Importance of Teaching* in November. The key points affecting mathematics and science are listed on the next page.

Raising standards. In the last 10 years we have slipped behind other nations, going from 4th in the world for science to 14th and 8th in the world for mathematics to 24th.

Key points:
- reform the National Curriculum so it is a benchmark we can use to measure ourselves against the world's best school systems
- slim down the curriculum by stripping out unnecessary clutter and simply specifying the core knowledge in strategic subjects which every child should know at each key stage

Support the drive to raise standards for all by reforming exams:
- make GCSEs more rigorous by stripping out modules
- make GCSE performance tables more aspirational by judging schools on how well all students do not just in English and mathematics but also in science, modern languages and the humanities like history and geography

Teaching:
- invest in doubling the number of top graduates who enter teaching through the *Teach First* programme
- create a new programme, *Teach Next*, to attract high performers from other professions into teaching
- subsidise graduates in strategic subjects such as science and mathematics to enter teaching

A copy of the White Paper is available at http://tinyurl.com/2ukoqgd.

Cambridge Assessment publishes international curriculum analysis

Tim Oates, the Director of Research at Cambridge Assessment, has said repeated changes to the National Curriculum have promoted a 'tick list' approach to teaching. In his recent report *Could do better: Using international comparisons to refine the National Curriculum in England*, Oates – who will help lead a Coalition review of the curriculum – called for it to be simplified. The report is available at http://tinyurl.com/2bs9xhq

Immigration cap

In November 2010 the government announced new measures that will strictly control the numbers that can come to the UK and work from outside Europe.

As well as limiting the number of skilled non-EU workers businesses can bring into the country, the Home Office is tightening the intra-company transfer route which will sit outside the annual limit, and restricting 'tier one' of the Points-Based System (PBS) to all but entrepreneurs, investors and people of exceptional talent.

Annual limit. To control the number coming here, the government has committed to:
- introducing an annual limit of 21,700 for those coming into the UK under the skilled and highly-skilled routes – 20,700 under the skilled route and 1000 under the new 'exceptional talent' route
- raising to £40,000 the minimum salary for those coming for more than 12 months through the intra-company transfer route
- requiring occupations in 'tier two' to be at graduate level

The government became determined to make changes to tier one – the 'highly-skilled' tier – when it was revealed that approximately a third of those coming through this route were actually doing low-skilled jobs once they were in the UK. Businesses have made it clear that their priority is to fill their specific vacancies through tier two.

Consultation. A consultation was launched at the end of the year focusing on tier four of the PBS – the student route – which currently accounts for two thirds of migrants entering the UK each year. By introducing a system that is more selective and more robust, the government is aiming to stamp out abuse

while continuing to attract the top students to our top universities.

The consultation covers areas including:

- for adult students, focusing tier 4 on higher-level courses and those offered by Highly Trusted Sponsors
- introducing tougher entry criteria such as English language competence
- ensuring students wishing to extend their studies show evidence of academic progression
- limiting students' entitlements to work and sponsor dependants
- improving the accreditation process for education providers, alongside more rigorous inspections

More information about the immigration cap and the consultation is available at www.homeoffice.gov.uk.

Select committees

There were two important Select Committee sessions in late November. The Public Accounts Committee took oral evidence from David Bell, Permanent Secretary, and Jon Coles, Director General, Education Standards Directorate, Department for Education on *Educating the next generation of scientists*. The Science and Technology Committee took oral evidence from Rt Hon David Willetts MP, Minister of State for Universities and Science, and Professor Adrian Smith, Director General, Science and Research, Department of Business, Innovation and Skills, on the *Spending Review 2010*.

Session transcripts are available at http://tinyurl.com/2fadjgo and http://tinyurl.com/257bhpx.

Dr John Johnston
Mathematics Promotion Unit

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

DESIGN OF EXPERIMENTS IN HEALTHCARE

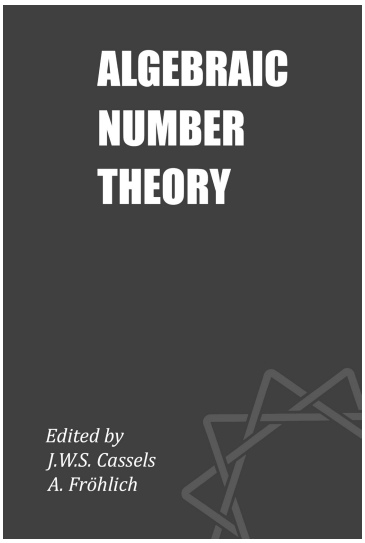
15–19 August 2011

in association with the Newton Institute programme entitled
Design and Analysis of Experiments
(18 July – 21 December 2011)

Organisers: S. Biedermann (Southampton), V. Dragalin (Quintiles, USA), S. Eldridge (QMUL), H. Grossman (QMUL), M. Krams (Johnson & Johnson), P. Müller (University of Texas MD Anderson Cancer Center).

Theme of conference: The purpose of this workshop is to gather together people working in various aspects of design experiments in health-care, in the widest understanding of that word, from drug development in pre-clinical and clinical trials, treatment individualisation, studies on primary care, and gathering of evidence for public policy, to choice experiments in health economics. Participants and speakers include experts from industry and academia. Several talks will specifically focus on challenges and problems arising with the practical implementation of proposed strategies. Presentations describing both the current attempts to use DoE to overcome the recognised inefficiencies of the traditional drug development as well as the new challenges in implementing the DoE in clinical trials will be a basis for exchange of information among the researchers from the pharmaceutical companies, regulatory authorities, and from academia.

Further information and application forms are available from the website at: www.newton.ac.uk/programmes/DAN/danw023.html. Closing date for the receipt of applications is **30 April 2011**.



The London Mathematical Society

Algebraic Number Theory

edited by

J.W.S. Cassels
A. Fröhlich

ISBN 978-0-9502734-2-6
Paperback, £35, US$55

First printed in 1967, this book has been essential reading for aspiring algebraic number theorists for more than forty years. It contains the lecture notes from an instructional conference held in Brighton in 1965, which was a milestone event that introduced class field theory as a standard tool of mathematics. There are landmark contributions from Serre and Tate. The book is a standard text for taught courses in algebraic number theory.

This second edition includes a valuable list of errata compiled by mathematicians who have read and used the text over the years.

Contributors:

J.V. Armitage
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Ordering information:

The book may be ordered via the major online bookstores (e.g. Amazon UK, Amazon USA). A small number are also available directly from the LMS using the order form found at http://www.lms.ac.uk/CasselsFrohlich.pdf.

EPSRC

The London Mathematical Society

TOPICS IN PROBABILITY

LMS–EPSRC Short Course

Mathematical Institute, University of Oxford, 3–8 April 2011
Organiser: Professor Alison Etheridge

Course outline and prerequisites
In the last fifty years, probability theory has emerged both as a core mathematical discipline, sitting alongside geometry, algebra and analysis, and as a fundamental way of thinking about the world. This five-day residential school will provide intensive courses on some of the most exciting developments in modern probability theory. They will be accessible to first-year PhD students in mathematics. There will be three lecture courses of 5 lectures each:

- *Random networks: the preferential attachment paradigm* (Peter Mörters, University of Bath)
- *Aggregation and coalescence* (James Norris, University of Cambridge)
- *Bayesian approach to inverse problems* (Andrew Stuart, University of Warwick)

These will be supplemented by tutorial sessions and guest lectures. For further information see: www.stats.ox.ac.uk/people/academic_staff/alison_etheridge/lms-epsrc_short_course_2011.

Participants might like to note that the meeting *Random structures and dynamics*, with minicourses by Alain Sznitman, Louigi Addario-Berry and Martin Barlow and a range of invited talks from across probability theory will take place in Oxford during the following week.

For further information see:
www.maths.ox.ac.uk/events/conferences/random-structures-and-dynamics

Application
Applications should be made using the registration form available via the Society's website at: www.lms.ac.uk/activities/rmc/sc/55.html.

The closing date for applications is **Friday 25 February 2011**. Numbers will be limited and those interested are advised to make an early application. All applicants will be contacted approximately two weeks after this deadline; we will not be able to give information about individual applications before then.

Fees
- All research students registered at a UK university will be charged a registration fee of £100. **They will not be charged for subsistence costs.**
- UK-based postdocs will be charged a registration fee of £100, plus half the subsistence costs (£212), £312 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 (£424), £674 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.

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

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.

RECORDS OF PROCEEDINGS AT MEETINGS

ANNUAL GENERAL MEETING

held on *Friday 19 November 2010* at University College London. About 60 members and visitors were present for all or part of the meeting.

The meeting began at 3.15 pm, with the President, Professor A.J. MACINTYRE, FRS, in the Chair. Members who had not yet voted were invited to hand their ballot papers to the Scrutineers, Professor P.T. Saunders and Dr D.J. Collins.

Copies of the *Trustees' Report* for 2009/10 were made available and the President invited questions.

The Treasurer, Professor W.B. STEWART, presented his report on the Society's finances during the 2009/10 financial year.

Messrs Kingston Smith were re-appointed as auditors for 2010/11.

14 people were elected to Ordinary Membership: M. Batchelor, N. Bez, A.D. Brooke-Taylor, I. Cheltsov, F. Diamond, J. Einbeck, B.J. Green, M.A. Hallnäs, C. Pin Arias, R.M.G. Reis, J. Sieber, D.J. Smith, E. Varvaruca, J. Voss; seven were elected to Associate Membership: L.A.K. Blackburn, J.M. Fraser, J.T. Hyde, A.K. Nixon, B.T-L Pham-Dang, H. Plotka, J. Stolte and eight were elected as Ordinary Members through reciprocal membership of an overseas mathematical society: K.S. Adegbie, M.H.A. Alrashed, V. Ambat, I.K. Dontwi, Z. Hu, G.B. Khosorovshahi, A. Madanshekaf, M.W. Schmitt. One member signed the book and was admitted to the Society.

The President announced that the next meeting of the Society would be in Edinburgh on 6 December 2010, and that the *Records of Proceedings* of the meetings in Hyderabad and Nottingham would be brought to the Mary Cartwright Lecture in Oxford on 25 February 2011.

The Programme Secretary and Chair of the Web Working Group, Dr S.A. HUGGETT, presented his report on the new website.

The President, on Council's behalf, presented certificates to the 2010 Society Prizewinners – De Morgan Medal: Professor Keith William (Bill) Morton; Fröhlich Prize: Professor Jonathan Keating, FRS; Whitehead Prizes: Dr Harald Helfgott, Professor Jens Marklof, Dr Lasse Rempe and Dr Françoise Tisseur. The winner of the Senior Berwick Prize, Professor Dusa McDuff, FRS, was unable to attend.

Professor Helen Byrne gave a lecture on *Modelling Matters in Medicine and Biology*.

After tea, Professor Saunders announced the results of the ballot. The following Officers and Members of the Council were elected. President: A.J. Macintyre; Vice-Presidents: K.A. Brown, J.P.C. Greenlees; Treasurer: W.B. Stewart; General Secretary: J.M.E. Hyland; Publications Secretary: J.D.S. Jones; Programme Secretary: S.A. Huggett; Education Secretary: C.J. Budd; Members-at-Large of Council (for 2 year terms): A.V. Borovik, D.E. Buck, W.S. Kendall, M. Marletta, C.M. Roney-Dougal, U.L. Tillmann. Six Members-at-Large who were elected for two years in 2009 have a year left to serve:

J.E. Barrow-Green, S.K. Donaldson, A. Laptev, G.B. Segal, B J. Totaro, R.A. Wilson. The following were elected to the Nominating Committee: M.A. Singer, A.M. Stuart.

Professor Philip Maini, winner of the Naylor Prize for 2009, gave the Naylor Lecture on *Modelling Aspects of Solid Tumour Growth*.

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 70 people.

NOVEL NUMERICAL MODELLING FOR THE ATMOSPHERE AND OCEAN

A Royal Meteorological Society meeting on *Next Generation Modelling Techniques for the Atmosphere and Ocean* will take place on Wednesday 19 January 2011 at the Clore Lecture Theatre, Huxley Building, Imperial College London. The next generation of models for weather and climate prediction may look very different from the current, well optimised generation. Future models may use different grids which avoid the pole problem and use unstructured or adaptive meshes. During this meeting we will hear a history of developments of numerical methods for the atmosphere, some new model developments at the US National Center for Atmospheric Research (NCAR), some new model developments in the UK and an overview of some of the challenges we face in designing models with static or dynamic mesh adaptation. The speakers are:

- David Burridge (ex ECMWF) *A history of the numerical methods used for atmospheric prediction*
- Bill Skamarock (NCAR) *A nonhydrostatic atmospheric model using centroidal Voronoi meshes*
- Matthew Piggott (Imperial College London) *3D unstructured mesh ocean modelling*
- John Thuburn (University of Exeter) *Trouble near the grid scale*
- Colin Cotter (Imperial College London) *Geostrophically optimal finite elements*
- Joanna Szmelter (University of Loughborough) *Unstructured mesh modelling of atmospheric inertia-gravity waves*
- Hilary Weller (University of Reading) *Grids and numerical techniques for the global atmosphere*

The meeting will be followed by a panel discussion chaired by Julia Slingo. For more information visit the website at www.rmets.org/events/detail.php?ID=4500 or contact Dr Hilary Weller (h.weller@reading.ac.uk).

VISIT OF DR P.A. ZEGELING

Dr Paul Zegeling (University of Utrecht, The Netherlands) will be visiting the UK from 22 to 29 January 2011. His research interests are in the numerical solution of differential equations and more generally the analysis of various models in the physical sciences. Dr Zegeling will give the following seminars:

- Monday 24 January, University of Leeds, *Travelling waves in a non-equilibrium Richard's equation*
- Wednesday 26 January, Heriot-Watt University, *The fractional heat equation: history, properties and numerical approximations*
- Friday 28 January, University of Surrey, *Detecting patterns with efficient adaptive moving grids*

For further information contact Jitse Niesen (jitse@maths.leeds.ac.uk). The visit is supported by an LMS Scheme 2 grant.

AGM AND SOCIETY MEETING 2010

Report

The 2010 London Mathematical Society AGM and Society Meeting, including the Naylor Lecture, took place on Friday 19 November 2010 at University College London.

Following LMS business, including the particularly pleasant duty of presenting certificates to the 2010 Prizewinners, the President, Professor Angus Macintyre, FRS, proceeded to the lecture programme, the first lecture being by Professor Helen Byrne, University of Nottingham, on the subject of *Modelling Matters in Medicine and Biology*.

Professor Byrne explained that she would discuss in mathematical terms each of two topics in biomedicine.

The first of these topics concerned that ever-important phenomenon of cancer. Cells which are cancerous grow by extracting nutrients, including oxygen, from their surroundings. However there is then the question of how their growth is affected by the mechanical properties of the surrounding tissue and the mass of tumour cells. Experiments have been performed in which the cancerous cells are surrounded by a hydrogel of known composition, and the effects on the cells' growth of varying the stiffness of the gel then measured. These experiments formed the starting point of Helen Byrne's mathematical modelling. She chose to model the tumour first as an incompressible fluid and then as a morphoelastic solid. She compared mathematical and observational results for the two cases with a certain degree of success. However the experimental data were not accurate enough to be able to resolve qualitative differences between the incompressible fluid and morphoelastic models. Future research can be expected to examine more complex stress/strain laws for the tumour mass and its surrounding material.

Professor Byrne's second topic was of a different nature and focussed on the rod photoreceptors in the retina, and how their length and effectiveness varied in response to different stimuli. Such changes occur during the day with the change of lighting, and are believed to have a profound impact on their metabolism. Two hypotheses [a, b] have been put forward to explain how metabolism may regulate length changes in the photoreceptor. The first mechanism [a] suggested oxygen as growth limiting, whereas the second mechanism [b] involved instead the so-called phosphocreatine shuttle with creatine, creatine phosphate and phosphate taking part. In neither case did the mathematical model agree well with observation. However if both [a] and [b] were involved jointly by linear superposition, agreement between

Angus Macintyre (centre) with (left to right) Prizewinners Jon Keating, Jens Marklof, Lasse Rempe, Bill Morton, Françoise Tisseur, Harald Helfgott

observation and mathematical theory was improved but not perfect. There remained the open question for further mathematical work, namely to check whether there could be a nonlinear interaction between [a] and [b] which would produce still better agreement. This remains for the future.

Professor Byrne was thanked warmly by the President and received much applause for her lecture.

Following a break for tea and chatting, the AGM was re-convened for the President to announce the results of the ballots for the Council and the Nominating Committee. The President then introduced the Naylor Lecturer for 2010, Professor Philip Maini, University of Oxford, who would speak on the important topic of *Modelling Aspects of Solid Tumour Growth*.

Professor Maini started by drawing attention to the fact that cell death and cell proliferation are normally tightly regulated so that normal tissues are in homeostasis, or a steady state. In contrast the 'rogue' cancerous cells do not respond to these regulatory signals and are invasive and in a real sense compete with the normal cells. He then went to an analogy from ecology, namely that of the competing populations of the red, or indigenous (in the UK), squirrel with the grey, or alien and imported, squirrel. They compete in the environment for food, nutrients and the habitat generally. In the South of England the grey squirrel is more successful, while the red squirrel is still resident in Scotland and the North of England. If we wished to reverse this balance in the South of England, how would we attempt it? Would we, could we, change the environment? Is this a lesson for us to apply to cancer?

Philip Maini went on to discuss this concept with reference to the Warburg effect, namely the observation that many tumour cells use anaerobic metabolism. Lactic acid, a by-product of this, changes the environment and indeed favours the growth and propagation of tumours. A mathematical model has been devised in terms of a pair of partial differential equations (PDEs) for the number, N, of normal cells and the number, T, of tumorous cells, but involving also a parametric quantity, L, to represent the amount of lactic acid. This model predicts waves of tumour invasion, which have unusual properties that have been shown to be consistent with experiments. (Slow and fast waves have been shown to exist mathematically but the reason why numerical simulations show only slow waves is an open question). The speaker has used this model (developed by colleagues) to start a research programme which addresses therapeutic aspects. For example, buffering acid using sodium bicarbonate or dichloroacetate may slow down invasion, as might aspirin and ibuprofen, so taking us into the realm of familiar prescriptive treatments. It is natural to enquire how the onset of cancer may be delayed, perhaps by exercise; there is a problem here in that, while lactic acid is produced during exercise, it is likely that exercise can delay the onset of cancer. It was shown that this was consistent with the model which predicted the selection of a less invasive cell phenotype under these circumstances.

The speaker presented a suite of modelling approaches, ranging from ordinary differential equations to PDEs, as implied above in the context of wave properties, and, with a different flavour, cellular automata. Professor Maini made it clear that there is a good deal of scope for mathematical research of diverse kinds into the medical problem of cancer.

Professor Philip Maini was thanked most warmly for his fine lecture, which was of the high standard that we expect of Naylor Lecturers; this was followed by the appreciative applause of the audience. The Meeting closed soon after 6 pm, and many members repaired to De Morgan House for the reception.

The writer is very grateful to both speakers for their very valuable comments on his draft.

Trevor Stuart
Imperial College London

WOMEN IN MATHEMATICS DAY 2011

The next Women in Mathematics Day will be held on **Friday 6 May 2011** at De Morgan House, 57–58 Russell Square, London. Sessions will include talks by women mathematicians in a variety of appointments and at different career stages.

The organisers would be very grateful if all members could encourage women mathematicians, particularly students (including final year undergraduates) and those at an early stage in their career, to attend this meeting. It is hoped that an opportunity to see women who are active and successful in mathematics, and to meet them informally, will be beneficial. Feedback from previous meetings has shown that participants find this useful. While this is an occasion particularly for women active in mathematics to get together, men are certainly not excluded.

Any postgraduates, postdocs or research assistants interested in giving a talk during the afternoon session or presenting a poster should contact Peter Clarkson (P.A.Clarkson@kent.ac.uk).

To encourage high-quality posters, a £50 book token will be awarded for the poster that is judged to be the Women in Mathematics Day Best Poster 2011.

Programme (tbc)

10.30–11.00	**Registration and coffee**
11.00–13.00	**Morning Session (times tbc)**
	Claire Gilson (Glasgow) *Box and ball systems in integrable systems*
	Joan Lasenby (Cambridge) *The Mathematics of making movies*
	Rowena Paget (Kent) *Set partitions and symmetric groups*
13.00–14.00	**Lunch and poster session**
14.15–16.00	**Afternoon Session** Postgraduate/Postdoc speakers Discussion groups
16.00–16.30	**Tea**

Limited funds are available to help with the travel costs of students attending the event. Further details are available from Elizabeth Fisher at the Society (contact details below).

To register contact Elizabeth Fisher (womeninmaths@lms.ac.uk).

The day is free for students and £5 for all others – payable on the day.

INTERNATIONAL CONFERENCE OF WOMEN MATHEMATICIANS

Report

The first International Conference of Women Mathematicians (ICWM) was held in Hyderabad, India from 17 to 19 August 2010, before the International Congress of Mathematicians (ICM). The ICWM took place on the beautiful University of Hyderabad campus and was hosted with wonderful grace and kindness by the local organisers. Around 200 mathematicians attended, mostly – but not exclusively – women. The majority of the delegates were Indian but there was representation from around the world. The meeting consisted of eight presentations by exceptional mathematicians, all women, of whom some were also plenary or invited speakers for the ICM. The speakers came from India, France, US, China, UK and Denmark, and the talks covered various mathematical topics, including topology, algebra and numerical analysis.

The first afternoon was dedicated to a panel discussion on *Women mathematicians around the world*. The discussion was organised by Professor Caroline Series, and I chaired the discussion in the absence of Professor Series. The session began with eight short presentations illustrating some of the issues affecting women mathematicians around the world, including Africa, South America, North America, Japan, Korea, India, Pakistan and Europe.

The presentations generally contained statistical data on the percentage of women mathematicians at different stages in academia and research, within the different social and political context in the various regions. The panelists also described the organisations that focus on supporting women mathematicians in their particular region, which motivated most of the lively discussion. Many more views were expressed in writing on a questionnaire distributed at the meeting.

The issue raised most often was the need to establish national, or possibly regional, organisations that can coordinate the flow of information and make sure it reaches all potentially interested women, and offer support and leadership to women mathematicians worldwide. Delegates also asked for advice on how to obtain financial assistance for individuals or meetings, or for establishing peer support groups. This developed into a widespread request that information on all types of support for women mathematicians should be made available on the web. In partial response to this request, a report on the discussion and the electronic versions of all the presentations are available on the European Women in Mathematics (EWM) website at http://tinyurl.com/2vyynut. This website also hosts a blog that could become a useful tool for further discussion of how to create a central information and support platform for women mathematicians: http://womenandmath.wordpress.com. It would be particularly useful if the existing organisations dealing with women in mathematics issues could use this blog to open and maintain a discussion on how best to disseminate information, and on how to help the existing efforts to establish similar organisations elsewhere.

The next ICM will be held in Seoul, South Korea, in 2014. While no final decision has been made on whether a second ICWM will take place at the same time, KWMS has already announced that it will use a donation of $90,000 to support women from developing countries to attend the ICM in 2014.

Dr Beatrice Pelloni
University of Reading

GEOMETRY & ALGEBRA SPITALFIELDS DAY

Report

A Spitalfields Day was held at the Royal Society of Edinburgh (RSE) on 17 September 2010, supported by the International Centre for Mathematical Sciences (ICMS), the London Mathematical Society, (LMS), the Edinburgh Mathematical Society and the RSE. The event celebrated the election in May 2010 of Professor Friedrich Hirzebruch, Emeritus Professor of Mathematics, Max Planck Institute for Mathematics, Bonn, as an Honorary Fellow of the RSE.

A morning lecture was delivered by past President of the RSE, Sir Michael Atiyah, OM, FRS, on *The Hodge signature theorem: past, present and future.*

The Induction Ceremony for Professor Hirzebruch was conducted by Professor Tariq Durrani OBE, Vice-President of the RSE and the citation read by Sir Michael before Professor Hirzebruch was formally welcomed to the Society by Professor Durrani. Following this, Professor Hirzebruch delivered his lecture on *125 years of the Schubert calculus*.

The day concluded with a lecture by Professor Andrew Ranicki, FRSE, who had also organised the event. Professor Ranicki appropriately spoke on *Aspects of quadratic forms in the work of Hirzebruch and Atiyah*.

Jenny Liddell
Communications Officer
The Royal Society
of Edinburgh

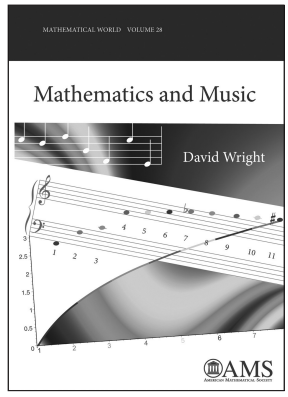
(Left to right) Tariq Durrani, Friedrich Hirzebruch and Sir Michael Atiyah

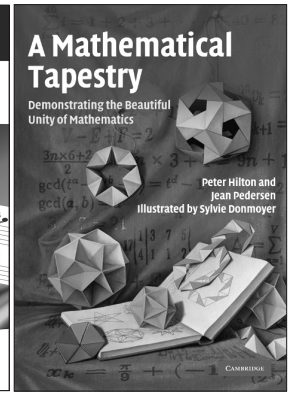
This article and the photograph are reproduced by permission of the Royal Society of Edinburgh from *ReSourcE*, the Royal Society of Edinburgh's newsletter, Issue 29 (Autumn 2010), p.18. Slides of Professor Ranicki's lecture can be found at www.maths.ed.ac.uk/~aar/confer.

REVIEWS

Mathematics and Music, Mathematical World by David Wright, Volume 28, American Mathematical Society, 2009, 161 pp, £26.50 (paperback), ISBN 978-0-8218-4873-9.

The connections between mathematics and music can be traced back 2500 years to the Pythagoreans, who linked musical intervals with ratios of whole numbers. Later, the European universities of the Middle Ages and the Renaissance taught music as one of the four 'mathematical arts' of Ancient Greece (the *quadrivium*), while mathematicians such as Kepler, Mersenne, Newton and Euler investigated various connections between the two subjects. On the musical side many composers, from Josquin, Bach and Haydn to Schönberg, Bartok and Xenakis, have employed a range of mathematical devices in their compositions.





Recently there has been a resurgence of interest in the links between these two disciplines. A journal has been founded, and increasing numbers of conferences feature these cognate arts. Among the books on the subject are technical tomes on the mathematical aspects of music theory [1, 2], collections of accessible articles [3, 4], and mathematical accounts of particular musical topics, such as temperament and twelve-tone scales.

On the educational side, several UK universities offer joint honours degrees in mathematics and music, while the subject has taken on a new lease of life in the USA as enrichment material in high schools or as an attractive course for liberal arts students needing to fulfil a 'math requirement'. To meet this need, several textbooks have been published, ranging from those that assume prior knowledge of such topics as Fourier series (such as [5]) to those at a more basic level ([6] and [7]).

One of the best introductory books is the one under review, which was designed for a one-semester course on mathematics and music at Washington University in St Louis and covers the usual subjects of intervals and scales, tuning and temperament, timbre and Fourier series, modular arithmetic in music, and much else besides. All the necessary mathematical and musical theory and notations are introduced as they are needed, and the book is clearly illustrated, easy to read and learn from, and certainly to be recommended.

Indeed, my only quibble is that, having taught such courses in an American liberal arts college where many first-year students still have difficulties with basic arithmetic and algebra, I considered his prerequisites (set theory, functions and relations, etc.) somewhat unrealistic. But apart from this, the author's treatment of the subject is down to earth and realistic, and I certainly plan to use the book in future courses that I teach on the subject.

Robin Wilson
Open University

References

1. D. Lewin, *Generalized Musical Intervals and Transformations*, Yale University Press, 1987.
2. G. Mazzola, *The Topos of Music: Geometric Logic of Concepts, Theory and Performances*, Birkhäuser, 2002.
3. G. Assayag, H. G. Feichtinger and J. F. Rodrigues (eds.), *Mathematics and Music: A Diderot Mathematical Forum*, Springer, 2002.
4. J. Fauvel, R. Flood and R. Wilson (eds.), *Mathematics and Music: From Pythagoras to Fractals* (paperback), Oxford, 2006.
5. D. J. Benson, *Music: A Musical Offering*, Cambridge, 2006.
6. T. H. Garland and C. V. Kahn, *Math and Music: Harmonious Connections*, Dale Seymour, 1995.
7. L. Harkleroad, *The Math behind the Music*, Cambridge / MAA, 2006.

A Mathematical Tapestry, Demonstrating the Beautiful Unity of Mathematics by Peter Hilton and Jean Pedersen, illustrations by Sylvie Donmoyer, Cambridge University Press, 2010, 306 pp, £19.99 pbk, ISBN 978-0-52-112821-6, £60 hbk, ISBN 978-0-52-176410-0.

This book is dedicated to the late Martin Gardner, and the first chapter could have

been written by him as an extension to one of his famous subjects, hexaflexagons. Although it is, in part, marketed as a recreational mathematics book, it is far more and can be read at many levels. The word tapestry in the title arises because it weaves a number of threads which the authors specify as: paper folding, number theory, polyhedra, geometry, algebra, combinatorics, symmetry, group theory, history, so the "beautiful unity of mathematics" in the title is very appropriate. There are also many other loose threads like topology, although this one is not easy to follow through the index which is generally good.

The foundation of the book is folding strips of paper. This might seem trivial mathematics, but it develops into some intriguing number theorems as well as many interesting paper models. For example, what they call the quasi-order theorem enables you to determine for any given odd number $b \geq 3$, using an algorithm that involves only subtraction and division by the number 2, the smallest power k to which 2 must be raised in order that either $2^k - 1$ or $2^k + 1$ is exactly divisible by b. The folding is mostly quite approachable by a teenager but, towards the end, the number theory can get quite heavy; however earlier on when it is directly related to the folding it is very easy to understand. What I particularly liked was that, as a kind of aside, there are many parlour tricks with numbers that emphasise the understanding.

The strongest thread follows Jean Pedersen's discovery that by folding strips of paper some regular polygons could be constructed to any desired degree of accuracy. Working with Peter Hilton, she developed this idea into a systematic algorithm for producing any regular b-gon for $b \geq 3$. This includes the polygons that cannot be constructed by straightedge and compass methods. Gauss's work linking ones that could to certain Fermat numbers appears in the number theory thread, as do Mersenne numbers. The polygons give rise to polyhedra, of course, but for the recreational mathematician there is a wealth of options to explore, since they are created from strips. As well as the Platonics, there are star polyhedra and rotating rings, giving rise to a topology thread and going beyond Euler's formula to the concept of a genus and Euler's characteristic. The simple concepts soon develop into the weightier number theory, but then the next chapter goes back to another simpler one; the practical is interspersed with the theory which makes it easy to assimilate. So symmetries, combinatorics and group theory threads provide light relief. Polyhedra are also constructed by weaving the strips and there are polyhedra which collapse. All of this is hard to review because you need to see the excellent illustrations and follow the threads to appreciate what a well-organised book this is.

The book would be an invaluable tool for teaching, especially as it covers so many areas of mathematics and interweaves them. The development of ideas like approximation and convergence, as well as the threads mentioned above, are dealt with in a concrete way and is a very good way to learn. Too much teaching does not involve the hand and eye as well as abstract thought. The treatment of group theory is excellent in this respect. It also shows how basic mathematics can progress to advanced number theory.

As I finished this review, the news came in that Peter Hilton had passed away at the age of 87. This book is a fitting memorial to his work as a mathematician. One can see, from the way the book produces so much mathematics from a simple start, why his work at Bletchley Park in the war was so successful. He was a member of the LMS, and an obituary of him will appear in a future *Newsletter.*

John Sharp
London Knowledge Lab

CALENDAR OF EVENTS

This calendar lists Society meetings and other mathematical events. Further information may be obtained from the appropriate LMS *Newsletter* whose number is given in brackets. A fuller list of meetings and events is given on the Society's website (www.lms.ac.uk/newsletter/calendar.html).

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

JANUARY 2011

5-8 ASE Annual Conference, Reading (399)
5-14 School on Moduli Spaces, INI, Cambridge (395)
6 Kavli Education Medal Award and Lecture, Reading (399)
10-13 UK–Japan Winter School, King's College London (396)
10-14 Embeddings, INI, Cambridge (395)
10-14 Torsors: Theory and Application ICMS Workshop, Edinburgh (398)
17 *Geometry and Physics: Past, Present and Future*, Cardiff University (398)
19 Next Generation Modelling Techniques for the Atmosphere and Ocean RMS Meeting, Imperial College London (399)
19-21 British Postgraduate Model Theory Conference, Leeds (398)

FEBRUARY 2011

14-16 Workshop on Mathematics Journals, MSRI, Berkeley, USA (399)
25 LMS Mary Cartwright Lecture, Oxford (399)

MARCH 2011

14-18 Representations of Surface Groups and Higgs Bundles Workshop, Oxford (398)
16 One-Day Meeting in Combinatorics, Oxford
21-25 Compressed Sensing LMS Invited Lectures 2011, Cambridge (399)
24 IMA Mathematics 2011 Conference, London
28 - 1 Apr Discrete Harmonic Analysis Workshop, INI, Cambridge (398)
29 The Symmetric Group: Representations and Combinatorics, Royal Holloway, University of London

APRIL 2011

3-8 Topics in Probability, LMS–EPSRC Short Course, Oxford (399)
4-5 Nonlinear Waves and Solitons in Lattices Workshop, ICMS, Edinburgh (399)
4-8 Computational Challenges in Partial Differential Equations Meeting, Swansea (392)
11-13 BAMC 2011, Birmingham (398)
11-15 Derived Categories Workshop, INI, Cambridge (399)
11-16 Groups, Combinatorics, Computing De Brún Workshop, Galway (398)
14-16 Young Researchers in Mathematics 2011 Conference, Warwick (398)
18-21 BMC 2011, Leicester (398)
25-29 The Kervaire Invariant and Stable Homotopy Theory ICMS Workshop, Edinburgh (398)

MAY 2011

6 Women in Mathematics Day, London (399)
17 LMS–Gresham Lecture, London (398)
22-27 Progress on Difference Equations 2011, Dublin (398)
31 - 3 Jun CHAOS 2011, Crete, Greece (398)

JUNE 2011

6-8 Nonlinear Diffusion: Algorithms, Analysis and Applications Workshop, Warwick (395)
6-10 Oscillatory Integrals in Harmonic Analysis ICMS Workshop, Edinburgh (398)
7-10 14th Applied Stochastics Models and Data Analysis International Conference, Rome, Italy

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LMS member 1875–1914

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