THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 403 May 2011

Society Meetings and Events

2011

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NEWSLETTER ONLINE:

Go to www.lms.ac.uk/newsletter

LMS COUNCIL DIARY

25 March 2011

Despite the relatively short lapse of time since the last meeting, when Council met on 25 March we had a substantial agenda, not all of which I will be able to report on here. After the usual introductory items, most of the morning was spent (no pun intended) on financial matters. We considered the half-year financial review, and noted a large number of small changes to the original budget, but nothing of any great significance. We received a detailed report on investments, and re-affirmed an earlier decision to investigate possibilities for new investment managers. We were presented with a list of the various activities of the Society, together with suggested changes, to inform the budgeting process for next year. But there was no suggestion for any major new expenditure, so we were happy to let the procedures continue without hindrance. Finally we acknowledged an Activities Review document, designed to inform us about what actually goes on in De Morgan House. Some Trustees are concerned that there is a tendency for spending on bureaucracy to increase without limit, while some staff in De Morgan House are concerned that they do not always have the time to do what is asked of them within their contracted hours of work. If we can identify areas where work can be streamlined, then perhaps we can even square this circle. However, it needs detailed consideration off-line.

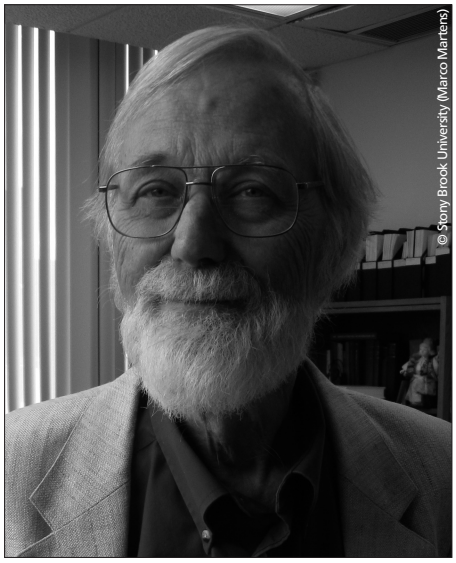
After lunch we agreed to recommendations from the Publications Committee to changes in the wording of the publications pricing policy, to allow more flexibility while continuing to ensure fair prices. We also agreed to the proposal to dissolve the dormant company LMS Publications Ltd, as it costs more to keep it going than it would to start up a new company should we ever need it.

We turned next to the work of the Education Committee. First, Chris Budd, the Education Secretary, informed us that he would be standing down at the end of his current term, in order to take up a position as Vice-President, Communications and Outreach, at the IMA. The President spoke warmly of Chris's contributions to the LMS, and to the Education Committee in particular, over many years. We agreed to the suggestions from the Education Committee for three topics for developing new policy statements. These were 'The value of a mathematics education', 'HE involvement in A-level mathematics issues', and 'Lecturer training'. We formally approved the final version of the LMS response to the White Paper *The importance*

of teaching. We considered a draft statement on the use (and mis-use) of Information Communications Technology (ICT) in the teaching of mathematics in HE institutions, and were invited to send comments to Sasha Borovik. However, when it came to the statement on grammar drafted by the British Logic Colloquium, we agreed to disagree. While some Council members supported the statement, others felt we would be going outside our legitimate sphere of interest. In view of the contention, Martin Hyland, who had already declared a conflict of loyalty as President of the BLC, urged us not to consider the matter further.

While some more routine matters were summarily despatched, others were postponed to future meetings where we hope they can be given a little more time. These included a proposal to set up a Committee to make plans for our 150th birthday in 2015.

Robert Wilson



Abel Prize winner: John Willard Milnor

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ABEL PRIZE 2011

On 23 March 2011, the Norwegian Academy of Science and Letters announced that Professor John Milnor of the Institute for Mathematical Sciences, Stony Brook University, New York had been awarded the Abel Prize for 2011 "for pioneering discoveries in topology, geometry and algebra". Professor Milnor will receive the Abel Prize from His Majesty King Harald at an award ceremony in Oslo on 24 May.

In announcing this year's prize, the Abel Committee noted that "John Milnor's profound ideas and fundamental discoveries have largely shaped the mathematical landscape of the second half of the 20th century. All of Milnor's work displays features of great research: profound insights, vivid imagination, striking surprises and supreme beauty. Milnor has also written tremendously influential books, which are widely considered to be models of fine mathematical writing."

The Abel Prize recognizes contributions of extraordinary depth and influence to the mathematical sciences and has been awarded annually since 2003. It carries a cash award of NOK 6,000,000 (close to €750,000 or US$1 million). For more information about the Abel prize visit the website at www.abelprisen.no/en.

LMS GRANT SCHEMES

Next Closing Date for Applications: 15 May 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 LMS website (www.lms.ac.uk/content/research-grants).

- Applications received by **15 May 2011** will be considered at a meeting in June.
- 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).

Other Grants News

We would like to draw your attention to the following.

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.

(continued on the next page)

Scheme 7 – Computer Science Small Grants
Funding for grants up to £500 is available from the LMS Computer Science Committee 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 **15 May 2011** – please see the website for further details: www.lms.ac.uk/content/computer-science-small-grants-scheme-7.

Small Grants for Education
Funding for grants up to £600 is available from the LMS Education Committee 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 August 2011**. Please see the website for further details: www.lms.ac.uk/content/small-grants-education.

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/content/childcare-supplementary-grants.

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. The Women in Mathematics Day provides a valuable opportunity to meet and talk with women who are active and successful in mathematics. Participants from previous meetings have found this opportunity useful and beneficial.

While women are especially encouraged to attend this day, men are certainly not excluded.

Any postgraduates, postdocs or research assistants wishing to give a talk during the afternoon session or present 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 best Women in Mathematics Day Poster 2011.

Programme

10.30–11.00 Registration and coffee

11.00–13.00 Morning Session

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

2008 Poster Competition Winner: Helena Mihaljevic-Brandt, Liverpool

Participants are invited to join us for dinner at a local restaurant after the event. If you would like to attend, please email Elizabeth Fisher (womeninmaths@lms.ac.uk). Please note that the dinner will **not** be paid for by the Society.

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.

MATHEMATICS POLICY ROUND UP

Peer Review
The LMS has responded to the Science and Technology Committee inquiry into Peer Review. The response is available on the LMS website via http://tinyurl.com/5rmho6n. More information about the inquiry is available at http://tinyurl.com/6hfg7kb.

Higher Education White Paper
The government has delayed the publication of its White Paper on plans to reform higher education in England, so that it can take into account what fees universities are likely to charge. The White Paper was due to be published by March 2011.

HEFCE funding for universities and colleges
HEFCE will distribute £6.5 billion to 130 universities and higher-education colleges, and to 124 directly funded further-education colleges, for the academic year 2011–12 (see www.hefce.ac.uk/news/hefce/2011/grant1112) The main elements of the grant are:

- £4,339 million for teaching
- £1,558 million for research
- £150 million for knowledge exchange
- £30 million as moderation funding to smooth significant year-on-year reductions
- £223 million for earmarked capital grants
- £207 million for special funding

HEFCE announced funding of £662 million for capital investment to support teaching and research in 128 higher-education institutions and 124 further-education colleges. This covers allocations for teaching for 2011–12 and 2012–13, and for research from 2011–12 to 2014-15 (see www.hefce.ac.uk/news/hefce/2011/grant1112/capital.htm).

Financial health of the HE sector
Universities are facing a significant period of transition in the next few years, with reductions in public funding, and a move to a new student finance and funding regime from 2012. A report *Financial health of the higher education sector: 2009–10 financial results and 2010–11 forecasts* shows that the financial results in 2009–10 on a number of key indicators are the best on record. A copy of the report is available at www.hefce.ac.uk/pubs/hefce/2011/11_06/11_06.pdf.

Research Excellence Framework (REF) 2014
The four UK higher-education funding bodies announced how they will recognise and reward excellent research that has led to wider social and economic benefits. The publication, *Decisions on assessing research impact* confirms how much weighting the assessment of research impacts will have in the 2014 REF.

The relative weightings of research outputs, impact and the research environment affect how much each element will contribute to the overall quality profile that will be awarded to each submission made by higher-education institutions (HEIs) to the REF: research outputs (65%); impact (20%) (which is likely to increase in subsequent REFs) and environment (15%). The publication can be accessed at www.hefce.ac.uk/research/ref/pubs/2011/01_11/.

The LMS will launch an on-line consultation to broaden the discussion on all aspects of *impact* as it affects the mathematical sciences.

New guidance from OFFA
The Office for Fair Access (OFFA) has published new guidance setting out its expectations of what English universities will need to do if they wish to charge tuition fees of more than £6000 for full-time entrants in 2012–13.

Universities and colleges will use the guidance to draw up access agreements for 2012–13.

Access agreements detail the fees that institutions intend to charge and the measures (such as outreach and financial support) they will put in place to improve access and student retention at their institution. From 2012–13, all institutions that want to charge more than the new basic fee of £6,000 must have an access agreement approved by OFFA on an annual basis. Details of the guidance are available at http://tinyurl.com/5trzct4.

Student visas

Major changes to the student visa system were announced in Parliament on 22 March 2011. The main changes to the system are:

- From April 2012 all institutions wanting to sponsor students will have to be classed as 'highly trusted sponsors' and become accredited by statutory education inspection bodies by the end of 2012. The current system does not require this and allowed too many poor-quality colleges into the system.
- Those coming to study at degree level will have to speak a higher level of English than now. UK Border Agency staff will be able to refuse entry to students who cannot speak English without an interpreter and who therefore do not meet the required standards.

For more information visit http://tinyurl.com/69ruu8u.

Prior to the announcement, the Home Affairs Committee published a report on student visas. A copy of the report is available at http://tinyurl.com/6gx93j7.

Women in SET: Statistics

The UKRC has published *The UK Statistics Guide on Women in Science, Engineering, Technology and the Built Environment* (*SET*). The guide provides detailed data analysis for gender segregation in SET. The Guide aims to aid future benchmarking and monitoring of progress against a number of indicators from secondary and higher education, vocational training, employment and gender pay, leadership and public engagement. The guide is available at http://tinyurl.com/6ht4cm2.

International comparative study in mathematics teacher training

The CfBT Education Trust has produced a research report aiming to 'seek an understanding of good practice in the training of (primary and secondary) teachers of mathematics, based on evidence from a variety of mathematically high performing countries around the world, and using a longitudinal study to provide recommendations for effective training. A copy of the study is available at www.cfbt.com/evidenceforeducation/pdf/15029_Maths_v10(W).pdf

Review of vocational education: The Wolf Report

The review considers how vocational education for 14–19-year-olds can be improved to promote successful progression into the labour market and into higher-level education and training routes. A copy of the report is available at http://tinyurl.com/4c9ky6w.

Recent speeches by government ministers

David Willetts gave a speech to the Guardian HE Summit discussing the state of the graduate labour market and ways to equip students with the technical skills that employers need. A copy of the speech is available at http://tinyurl.com/68os6qq.

Big Bang Fair 2011

This event took place in early March in London and attracted over 30,000 visitors from schools and colleges, and the general public. The Maths Zone, which provided hands-on exhibits, demonstrations, workshops and seminars, was very popular, including *Learning Maths through Robots* – supported by the LMS.

Dr John Johnston
Mathematics Promotion Unit

The London Mathematical Society

LMS EDUCATION DAY

(in association with HoDoMS)

Tuesday 31 May 2011 at 10.30 am

De Morgan House, 57–58 Russell Square, London WC1B 4HS

The LMS/HoDoMS Education Day is an opportunity for mathematics lecturers from across the Higher Education sector to meet to discuss aspects of education directly related to HE.

The day will be divided into two working sessions with a one-hour lunch break and the opportunity for informal discussion. The first session will be on the transition from school to university, the second will focus on lecturer training.

Each session will start with short presentations by two 'experts' leading to a short general discussion. There will then be break-out sessions followed by a further general discussion session.

Speakers:

- **Professor Chris Budd** (University of Bath)
- **Professor Alexandre Borovik** (University of Manchester)
- **Professor Jeremy Levesley** (University of Leicester)
- **Dr Tony Gardiner** (University of Birmingham)
- **Professor Duncan Lawson** (Coventry University)

Formal LMS business will take place in the morning.

The full time table for the day is available on the London Mathematical Society website at www.lms.ac.uk/content/education-day. Please contact Duncan Turton (education@lms.ac.uk) to register.

The day is intended to attract a wide variety of HE mathematicians, and we would welcome attendees from the full spectrum of HE institutions.

ACME IS LOOKING FOR TWO NEW MEMBERS

The Advisory Committee on Mathematics Education (ACME) is currently seeking two new members. We welcome applications from across the full range of interests, but for one of the vacancies we are particularly seeking someone with experience of teaching and research within a higher-education mathematics department. If you are interested, please view the advert (http://tinyurl.com/6b6nscs) which contains all the relevant information. Applications must be received by **Friday 27 May 2011**.

For further information about ACME and its work, please see the website at www.acme-uk.org. Should you wish to discuss the process or the work of ACME in more detail, or speak with a member of the Committee, please contact Martin Smith (martin.smith@royalsociety.org).

We would be grateful if you could circulate this information to colleagues who might be interested.

Martin Smith
ACME Manager

LMS *NEWSLETTER* ONLINE

Readers are reminded that they may choose to read the LMS *Newsletter* on screen. A file of the current *Newsletter* can be accessed at www.lms.ac.uk/newsletter/current_issue.pdf at any time. Remember to add it to your favourites. The current *Newsletter* is also available in HTML (web-browser) format via www.lms.ac.uk/newsletter/. The HTML version is conveniently structured according to news categories, with indexes listing the individual articles, making it very easy to navigate to items of particular interest.

Anyone who wishes to stop receiving a paper copy can choose to receive instead an email alert at the beginning of each publication month, containing precise links to the current PDF and HTML versions. To do so, please write to membership@lms.ac.uk.

FRANK BONSALL

Professor Frank Bonsall, who was elected a member of the London Mathematical Society in 1952, died on 22 February 2011, aged 90.

Alastair Gillespie writes: Frank went up to Oxford in 1938 but his university career was interrupted by war service from 1940 to 1946. He then returned to Oxford to complete his final year. Rather than staying on as a graduate student, he accepted a one-year temporary lectureship at the University of Edinburgh. The following year, he moved to a lectureship at Newcastle where, encouraged by W.W. Rogosinski, he made a start in research, being attracted to functional analysis from the outset. He was appointed to the Chair at Newcastle in 1959 when Rogosinski retired, but moved back to the University of Edinburgh in 1965 to the newly created McLaurin Chair. He built up active groups in functional analysis at both Newcastle and Edinburgh, supervising numerous graduate students and doing much to strengthen the position of the subject across the UK. He also played a key role in founding the North British Functional Analysis Seminar.

Frank was elected to the Royal Society of Edinburgh in 1966 and to the Royal Society in 1970. He served twice both on the Council of the London Mathematical Society and on its Editorial Board, and was awarded the Senior Berwick Prize in 1966. He was also President of the Edinburgh Mathematical Society 1976–77.

Beyond mathematics, Frank had a great interest in mountain climbing, ascending his 280th Munro in 1977. The Munros are the Scottish mountains of height at least 3,000 feet and Frank contributed to the debate as to which mountains qualify as Munros (when do two close tops count as separate Munros?) in two articles in the *Scottish Mountaineering Club Journal*.

He retired in 1984 and moved to Harrogate but maintained an active interest in mathematics. His last paper appeared in 2000, just two years before he and his wife Jill moved into a retirement home. He is survived by his wife.

IMU NEWS

A Permanent Secretariat for IMU

According to the decision of the 16th IMU General Assembly, Bangalore, India on 16 August 2010, the IMU now has a permanent Secretariat. This is the first time in the IMU's history – so far, the Secretariat has always moved to the home of the IMU Secretary. The permanent Secretariat is hosted by the Weierstrass Institute, Berlin, Germany and commenced operation in January 2011. The official inauguration took place on 1 February when the IMU President, Ingrid Daubechies, together with the State Secretary of the German Federal Ministry of Education and Research, G. Schütte, and the State Secretary for Science and Research at the Berlin Senate, K. Nevermann, did the ribbon cutting on the premises of the IMU Secretariat in the presence of national and international guests, and under the eyes of 'the Prince of Mathematicians' C.F. Gauss (from his portrait, of course, that adorned the place). See www.wias-berlin.de/imu.

The secretarial staff is composed of five people: S. Markwardt (Manager), L. Koch (CDC/ICMI Administrator), H. Kalweit (IT Administrator), A. Orlowsky (Accountant) and B. Seeliger (Archivist). Alexander Mielke from the Weierstrass Institute is the Head of the IMU Secretariat and responsible for coordinating issues on the part of the IMU Secretariat as well as the Weierstrass Institute. The administrative work of the IMU Secretariat includes supporting the activities of the IMU Executive Committee and IMU's subcommissions, maintaining the IMU web page, administrating the IMU finances, and establishing and maintaining the IMU archive.

Thanks to the generous provision of resources and to the commitment of all staff, the IMU Secretariat will be able to contribute efficiently to fostering the international cooperation of the mathematical community.

Sylwia Markwardt
IMU Secretariat Manager

ICM 2014

Programme structure

The next International Congress of Mathematicians (ICM) will take place in Seoul, Republic of Korea from 13 to 21 August 2014. The IMU President Ingrid Daubechies has appointed Carlos Kenig (Chicago, USA) as Chair of the Program Committee (PC), and the IMU Executive Committee has chosen all other members of the PC. The Program Committee will meet in October 2011 in order to define the programme structure of ICM 2014. According to the PC/OC Guidelines (www.mathunion.org/ICM/PC/PC-OC-Guidelines-070521.pdf) the PC is responsible for the ICM structure but is advised to use the programmes of previous ICMs as rough guidelines. Innovations, of course, are not ruled out, and some Adhering Organizations and individuals may have good ideas for changes to the programme structure.

If you have suggestions on the programme structure for the Program Committee please contact Carlos Kenig by email (PC-chair-ICM2014@mathunion.org) before **1 September 2011** so that your suggestions can be considered by the ICM 2014 Program Committee.

Pre-registration now available

ICM 2014 will be held at the COEX Convention & Exhibition Center, Seoul, Korea, from 13 to 21 August 2014. We stand ready to provide all possible support for a successful Congress and hope you can come and enjoy this event.

It is our pleasure to announce that the ICM 2014 homepage has officially opened where you are welcome to pre-register for the Congress. Please visit our website (www.icm2014.org) where you will find simple instructions on how to pre-register. Once you have pre-registered, you will be included in the ICM 2014 mailing list and will receive periodic ICM E-news for the next three years. Once you pre-register, you will be able to log into MyPage and modify your personal information or cancel your pre-registration.

For any questions about ICM 2014, please send an email to icm@icm2014.org. If electronic communication is not available, you may also write to SEOUL ICM 2014 Secretariat, The Korea Science and Technology Center 204, 635-4 Yeoksam-dong, Gangnam-gu, Seoul, 135-703, Korea (fax: +82-2-563-2022).

Hoping to see you in Seoul.

Hyungju Park, Chairman
ICM 2014 Organizing Committee

The above items are taken from the 46th issue of the IMU electronic newsletter *IMU Net* (see www.mathunion.org/IMU-Net).

VISIT OF PROFESSOR N. JOSHI

Professor Nalini Joshi (University of Sydney, Australia) is visiting the UK from 1 to 29 May 2011. Professor Joshi's work is dedicated to analysis applied to nonlinear differential and difference equations and integrable systems. She is especially known for her work on the Painlevé equations, but has also contributed to the theory of cellular automata and applications in mathematical biology (see http://tinyurl.com/6xs95td). She will give seminars at:

- University of Leeds, 10 May; contact Frank Nijhoff (nijhoff@maths.leeds.ac.uk) or Anand Pillay (pillay@maths.leeds.ac.uk)
- Loughborough University, 25 May; contact Alexander Veselov (a.p.veselov@lboro.ac.uk)
- University College London (joint with Imperial College), 26 May; contact Rod Halburd (r.halburd@ucl.ac.uk) or Darryl Holm (d.holm@imperial.ac.uk)
- University of Kent at Canterbury, 27 May; contact Peter Clarkson (P.A.Clarkson@kent.ac.uk)

Professor Joshi will be based at the University of Leeds during her stay, hosted by Frank Nijhoff (nijhoff@maths.leeds.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR D. YAFAEV

Professor Dmitri Yafaev (University of Rennes 1) is visiting the UK from 8 to 20 May 2011. Professor Yafaev is an expert in mathematical scattering theory and spectral theory of Schrödinger operators. He will collaborate with Dr Alexander Pushnitski at King's College London and also give the following lectures:

- Thursday 12 May at 3 pm, London Analysis Seminar, King's College London, *Trace formula for differential operators of an arbitrary order*
- Friday 13 May at 3.40 pm, Cardiff University, *Exponential decay of eigenfunctions of differential equations*
- Wednesday 18 May at 4 pm, Lancaster University, *A commutator method for the diagonalization of Hankel operators*

For details contact Alexander Pushnitski (alexander.pushnitski@kcl.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR S. SARGSYAN

Professor Samuel Sargsyan will be visiting the UK from 21 May to 4 June 2011. Professor Sargsyan is chair of Mathematical Analysis and Differential Equations, Gyumri State Pedagogical Institute in Armenia; he works in a number of areas, including micro-polar elasticity and structural mechanics. Professor Sargysan will give seminars at:

- Keele, 24 May; contact Graham Rogerson (g.a.rogerson@keele.ac.uk)
- Brunel, 2 June; contact Julius Kaplunov (julius.kaplunov@brunel.ac.uk)
- Imperial, 3 June; contact Richard Craster (r.craster@imperial.ac.uk)

He will be based at Keele during the rest of his stay, hosted by Professor Graham Rogerson. The visit is supported by an LMS Scheme 2 grant.

VISIT OF PROFESSOR M. DEMERS

Professor Mark Demers (Fairfield University, CT, USA) will be visiting the UK from 23 May to 4 June 2011. His work is at the forefront of open dynamical systems, in which trajectories remain in a system until escaping through a 'hole', and associated invariant and conditionally invariant measures. Following a survey article with L.S. Young in 2006 that provided significant impetus to the field, he has considered open hyperbolic systems with singularities such as mathematical billiards. Professor Demers will visit and give lectures at:

- Loughborough University, Wednesday 25 May; contact Wael Bahsoun (W.Bahsoun@lboro.ac.uk)
- University of Surrey, Friday 27 May; contact Ian Melbourne (I.Melbourne@surrey.ac.uk)
- University of Bristol, Thursday 2 June; contact Carl Dettmann (Carl.Dettmann@bris.ac.uk)

Further information about this visit can be obtained from Carl Dettmann. The visit is supported by an LMS Scheme 2 grant.

UK MHD MEETING

This year the annual *UK Magnetohydrodynamics Meeting* (UKMHD) will be held at City University London from 16 to 17 June 2011. The organisers welcome applications at this time from those wishing to present material. Information about UKMHD can be obtained from the website at www.staff.city.ac.uk/lara.silvers.1/UKMHD2011.html or from Dr Lara Silvers (lara.silvers.1@city.ac.uk). Registration for this meeting will close on **24 May 2011**.

Some funding is available to support postgraduate students who wish to attend the meeting. There are also some funds available from the London Mathematical Society for help with childcare costs; further details can be found on the LMS website (www.lms.ac.uk/content/childcare-supplementary-grants). The meeting is supported by an LMS Conference grant.

THE ARITHMETIC OF FUNCTION FIELDS

A workshop on the *Arithmetic of Function Fields* will take place at Imperial College London from 13 to 17 June 2011. The aim of the workshop is to bring together those who are working on various aspects of the arithmetic of function fields, including abelian varieties and motives over function fields, the Langlands program, Drinfeld modular varieties, t-motifs, characteristic *p* *L*-functions and transcendence theory, and the UK number theory community.

For more information visit the website at http://www2.imperial.ac.uk/~apal4/workshop.htm or contact Ambrus Pal (a.pal@imperial.ac.uk). There are limited funds to reimburse travel and accommodation costs with priority for unfunded graduate students. The workshop is supported by the ESPRC.

MATHEMATICAL MODELS IN ECOLOGY AND EVOLUTION

The third biennial conference on *Mathematical Models in Ecology and Evolution* will take place at the University of Groningen, The Netherlands from 17 to 19 August 2011. Keynote speakers are:

- Paulien Hogeweg (Utrecht University)
- Chris Klausmeier (Michigan State University)
- Simon Levin (Princeton University)
- Hans Metz (University of Leiden)
- Sally Otto (University of British Columbia)
- Corina Tarniță (Harvard University)
- Andreas Wagner (University of Zürich)

Registration and call for abstracts are now open. For further information visit the website at www.mmee2011.evobio.eu. The deadline for registration is **31 May 2011**.

LONDON MATHEMATICAL SOCIETY

MIDLANDS REGIONAL MEETING

Tuesday 14 June 2011

Poynting Large Lecture Theatre, University of Birmingham

Programme:

2.00 Opening of the meeting

Miles Reid (Warwick)
Rings and varieties

3.15 **Shaun Stevens** (University of East Anglia)
Representations of p-adic groups and the local Langlands conjectures

4.15 Tea/Coffee

4.45 **Catharina Stroppel** (Bonn)
TBA

6.30 Dinner at University Staff House

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

For further details, to register or to reserve a place at the dinner, email the organisers (goodwin@maths.bham.ac.uk). The cost of the dinner will be approximately £25, including drinks.

The meeting precedes a workshop on *Representation Theory* from 15 to 18 June. For further details visit
http://web.mat.bham.ac.uk/S.M.Goodwin/lms2011/
or contact the organisers.

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

The London Mathematical Society

GRESHAM COLLEGE
Founded 1597

THE LONDON MATHEMATICAL SOCIETY
JOINTLY WITH GRESHAM COLLEGE

Tuesday 17 May 2011

6:00 pm at Barnard's Inn Hall

Undecidable and Decidable Problems in Mathematics

Professor Angus Macintyre, FRS

Queen Mary, University of London

Professor Macintyre, the current President of the London Mathematical Society, presents a survey and some reflections to mark the centenary of Turing's birth.

ADMISSION FREE

NO RESERVATIONS REQUIRED – FIRST COME, FIRST SERVED

Gresham College, Barnard's Inn Hall, Holborn, London EC1N 2HH
Nearest underground: Chancery Lane
020 7831 0575 enquiries@gresham.ac.uk www.gresham.ac.uk

SYMBOLIC COMPUTATION FOR ANALYSIS

This is a one-day inaugural meeting to mark the appointment of new lecturer Markus Rosenkranz at Kent. It will take place on Friday 17 June 2011 at the University of Kent. The invited speakers are:

- James H. Davenport (Bath)
- Eckhard Pfluegel (Kingston)
- John Shackell (Kent, Emeritus)
- Jing Ping Wang (Kent)

Everybody is welcome to attend the meeting as well as the dinner scheduled to take place afterwards. There will be a nominal registration fee of £5 per person, which will be waived for graduate students; dinner is not included in the registration fee. For updated information visit the website at www.kent.ac.uk/ims/personal/mgr/sca11 or contact the organiser Markus Rosenkranz (M.Rosenkranz@kent.ac.uk) for any enquiries. The meeting is supported by an LMS Conference grant.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

PERSPECTIVES IN ALGEBRAIC LIE THEORY

12–16 September 2011

in association with the Newton Institute programme entitled
Algebraic Lie Theory

Organisers: M. Geck (Aberdeen), A. Kleshchev (Oregon), G. Röhrle (Bochum).

Theme of workshop: This is a follow-up workshop of the six-month programme *Algebraic Lie Theory* held in 2009. That programme generated a great deal of interest and served as a stimulus in the research community.

The aim of this workshop is to bring together some of researchers who made major contributions during the 2009 programme to report on the current state of the developments, to see to what extent the theory has evolved since then. Moreover, the workshop should serve as a means to present new results in the field, specifically those which have been initiated or founded by participants of the 2009 programme during their stay at the INI. Highlights of the workshop will involve further developments in the categorification and geometrisation in Lie theory and representation theory. It is expected that new developments in algebraic Lie theory, e.g. categorification and geometric methods, and the latest developments in the representation theory of affine and finite W-algebras, each will play a major role.

The workshop gratefully acknowledges financial support from the EPSRC-funded programme network 'Representation Theory across the Channel' as well as the DFG-funded priority programme in 'Representation Theory'.

Further information and application forms are available from the website at: www.newton.ac.uk/programmes/ALT/altw07.html. Closing date for the receipt of applications is **31 May 2011**.

LONDON MATHEMATICAL SOCIETY

NORTHERN REGIONAL MEETING

Tuesday 19 July 2011

MALL Seminar Room, Mathematics Building, University of Leeds

Programme:

2.30 Opening of the meeting

Gregory Cherlin (Rutgers)
The classification of homogeneous combinatorial structures

3.45 Tea/Coffee

4.15 **Alexander Kechris** (California Institute of Technology)
The dynamics of automorphism groups of homogeneous structures

6.00 Dinner at University House

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

For further details, to register or to reserve a place at the dinner, email the organisers (J.K.Truss@leeds.ac.uk). The cost of the dinner will be approximately £30, including drinks.

The meeting forms part of a workshop on *Homogeneous Structures* from 19 to 22 July. For further details visit the website at www.maths.leeds.ac.uk/events/lmsnorth2011 or contact the organisers.

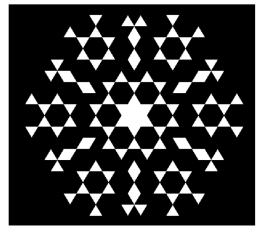
There are funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting and workshop. Requests for support, including an estimate of expenses, may be addressed to the organisers.

LONDON MATHEMATICAL SOCIETY

POPULAR LECTURES 2011

Institute of Education, London – Wednesday 29 June

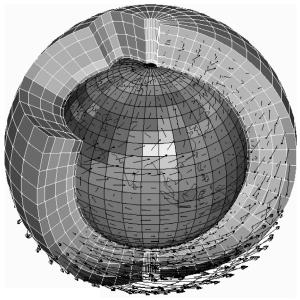
University of Birmingham – Thursday 29 September



Dr Colva Roney-Dougal
St Andrew's University

Symmetry, Chance & Determinism

By playing some games with symmetries, we'll discover the surprising fact that choosing randomly can give the same answer (almost) every time!



L. Fairhead (LMD-CNRS)

Dr Hilary Weller
University of Reading

How Climate Models Work and Could They Be Better?

Hilary Weller will describe some of the physics behind how the real climate works, some of the mathematics involved in creating a computer model of the climate to make climate predictions and how climate data is gathered in order to test the models.

We will see that, although climate models are far from perfect, some predictions can be made with confidence.

LONDON: Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. **Register by Friday 24 June.**

BIRMINGHAM: Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm. Admission is free, with ticket. **Register by Friday 23 September.**

To register for tickets, please email Lee-Anne Parker (leeanne.parker@lms.ac.uk) or visit the LMS website for a registration form (www.lms.ac.uk).

The lectures are intended to be suitable for a general audience and no specific mathematical knowledge will be assumed. Although the talks are not primarily intended for professional mathematicians, everyone is welcome and some members may wish to apply for tickets for friends and relatives.

ONE-DAY COLLOQUIA IN COMBINATORICS

Two linked one-day colloquia in combinatorics will be taking place in London. The first day will be held at Queen Mary, University of London, on Wednesday 18 May 2011, and the second will take place at the London School of Economics and Political Science on Thursday 19 May 2011. It is hoped that the talks will be of wide interest to all those working in combinatorics or related fields. The schedule is as follows:

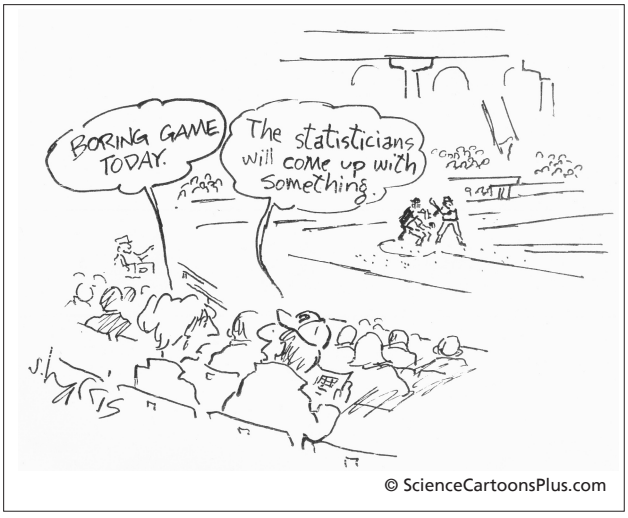
Queen Mary, University of London (18 May)

- Tim Austin (Brown University) *Exchangeability and limit objects of combinatorial data*
- Jan Hladký (University of Warwick) *Hamilton cycles in dense vertex-transitive graphs*
- Christian Reiher (University of Rostock) *A solution to the clique density problem*
- József Solymosi (University of British Columbia) *Sumsets and convexity*
- Balázs Szegedy (University of Toronto) *At the boundary of finite and infinite*
- Tibor Szabó (Freie Universität, Berlin) *Games, SAT, and the local lemma*

London School of Economics (19 May)

- Zoltán Füredi (UIUC and Rényi Institute) *Linear paths and trees in uniform hypergraphs*
- Tom Sanders (University of Cambridge) *Why do the primes contain arithmetic progressions?*
- Simon Blackburn (Royal Holloway) *K-radius sequences*
- Amin Coja-Oghlan (University of Warwick) *Belief propagation guided decimation for random k-SAT*
- Mary Cryan (University of Edinburgh) *Counting Euler tours*
- Robert Johnson (Queen Mary) *Intersection graphs of discrete subcubes*

Anyone interested is welcome to attend. Some funds are available to contribute to the expenses of research students who wish to attend the meetings. Further details can be obtained from the webpage (www2.lse.ac.uk/maths/Seminars/Colloquia_2011.aspx) or from Graham Brightwell (g.r.brightwell@lse.ac.uk) and Peter Keevash (p.keevash@qmul.ac.uk). There are also some funds available from the London Mathematical Society for help with childcare costs; further details can be found on the LMS website (www.lms.ac.uk/content/childcare-supplementary-grants). Support for this event by the London Mathematical Society and the British Combinatorial Committee is gratefully acknowledged by the organisers.



BRITISH COMBINATORIAL CONFERENCE

The 23rd British Combinatorial Conference will take place from 3 to 8 July 2011 at the University of Exeter. The conference is held every two years and attracts around 200 delegates, these being a mixture of established academics, young researchers, and postgraduates. It provides excellent opportunities for the exchange of ideas and for networking between research groups and individuals. The areas covered are extensive and range from the highly theoretical to very practical issues in aspects such as coding and cryptography. Invited talks will be given by:

- Mireille Bousquet-Mélou (Université Bordeaux 1) *Counting planar maps, coloured or uncoloured*
- Paul Goldberg (University of Liverpool) *A survey of PPAD-completeness for computing Nash equilibria*
- Peter Keevash (Queen Mary, University of London) *Hypergraph Turán problems*
- Vlado Nikiforov (University of Memphis) *Some new results in extremal graph theory*
- Bruce Sagan (Michigan State University) *The cyclic sieving phenomenon: a survey*
- Koen Thas (Ghent University) *Order in building theory*
- Andrew Thomason (University of Cambridge) *Graphs, colours, weights and hereditary properties*
- Mark Walters (Queen Mary, University of London) *Random geometric graphs*
- Ian Wanless (Monash University) *Transversals in latin squares: a survey*

These talks are intended to be accessible to postgraduate students, postdoctoral fellows, and researchers in all areas of combinatorics. In addition, participants are invited to give a talk of 20 minutes on any combinatorial topic. Further details can be obtained from the website at http://empslocal.ex.ac.uk/people/staff/rjchapma/bcc23.

QUANTUM COHOMOLOGY

A meeting on *Quantum Cohomology, Symplectic Resolutions and Representation Theory* will take place from 9 to 11 July 2011 at the Mathematical Institute, Oxford.

Many of the varieties studied in Lie theory carry a natural symplectic or Poisson structure. In particular one finds many examples of symplectic resolutions, such as Springer's resolution of the nilpotent cone. More recently, the Etingof–Ginzburg symplectic reflection algebras have given important examples of noncommutative resolutions of symplectic singularities.

A picture is beginning to emerge which connects the structures predicted by mirror symmetry for these symplectic resolutions to phenomena familiar in geometric representation theory, for example in the study of Hecke algebras. This workshop will bring together experts in the different areas to discuss these new connections. The invited participants are:

- Alexander Braverman (Brown)
- Philip Boalch (ENS)
- Tom Coates (Imperial)
- Iain Gordon (Edinburgh)
- Ian Grojnowski (Cambridge)
- Davesh Maulik (MIT)
- Tom Nevins (UIUC)
- Alexei Oblomkov (UMass)
- Konstanze Rietsch (Kings)
- Toby Stafford (Manchester)
- Valerio Toledano-Laredo (Northeastern)

Some funding is available to support postgraduate students who wish to attend the meeting. Further details can be obtained from Kevin McGerty (mcgerty@maths.ox.ac.uk) or from the website at http://people.maths.ox.ac.uk/mcgerty/Conference.html. The organizers are Kevin McGerty and Balázs Szendrői. The meeting is supported by an LMS Conference grant.

HEILBRONN INSTITUTE FOR MATHEMATICAL RESEARCH, BRISTOL, UK

HEILBRONN ONE-DAY BACKGROUND WORKSHOP ON MULTIPLE ZETA VALUES, MODULAR FORMS AND ELLIPTIC MOTIVES

Monday 2 May 2011

Unsure what a modular form is? Never heard of a multiple zeta value? Not to worry!

In conjunction with the Heilbronn Institute workshop on *Multiple Zeta Values, Modular Forms and Elliptic Motives* (3–6 May), the Heilbronn Institute is also offering a one-day background workshop on Monday 2 May. This workshop is geared toward the graduate student and researchers not already expert in the specifics of the conference. The day will consist of survey talks and basic expositions of prior results, with time for questions and more in-depth discussion. It is hoped that after attending the Heilbronn Day workshop, attendees will feel comfortable attending the week-long conference. Speakers include:

- H. Nakamura (Okayama) *The fundamental group of a punctured elliptic curve*
- L. Schneps (Jussieu) *Grothendieck–Teichmüller groups, multiple zeta values*
- H. Gangl (Durham) *Modular forms, period polynomials and double zeta*
- R. Hain (Duke) *Hodge extensions, Galois extensions and unipotent completions*
- A. Scholl (Cambridge) *Elliptic motives and modular forms*

The one-day workshop is to be held at Howard House, University of Bristol. Registration for the one-day workshop is £15, but space is limited, and will be allocated on a first-come, first-served basis.

For more information and to sign up for the workshop visit the website at www.maths.bris.ac.uk/events/meetings/meeting/index.php?meeting_id=67.

There may be limited funds to offset costs for graduate students and beginning researchers. Interested attendees should indicate interest on their application form.

COMPLEX ANALYSIS AND GEOMETRY MEETING

The Open University *One-Day Complex Analysis and Geometry Meeting* will be held on Tuesday 24 May 2011. This is an inaugural meeting to mark the appointment of new lecturers Dan Nicks and Ian Short. The speakers are:

- Alan Beardon (Cambridge)
- Alastair Fletcher (Warwick)
- Jim Langley (Nottingham)
- Dan Nicks (Open University)
- John Parker (Durham)
- Ian Short (Open University)

There are limited funds to assist with travel expenses for UK research students. Visit the website http://complex-meeting.open.ac.uk for more information about the event. The meeting is supported by an LMS Conference grant.

FIELDS INSTITUTE

The Fields Institute, situated on the University of Toronto campus, is a center for mathematical research activity – a place where mathematicians from Canada and abroad, from business, industry and financial institutions, can come together to carry out research and formulate problems of mutual interest. The Institute's mission is to provide a supportive and stimulating environment for mathematics innovation and education. The following thematic programmes are scheduled:

- *Mathematics of Constraint Satisfaction* (2011 Summer)
- *Discrete Geometry and Applications* (2011 Autumn)
- *Galois Representations* (2012 Winter/Spring)
- *Inverse Problems and Imaging* (2012 Winter/Spring/Summer)
- *Forcing and its Applications* (2012 Autumn)

Visit the website at www.fields.utoronto.ca/programs/scientific for links to these and the many other upcoming workshops, conferences, etc. To be informed of upcoming scientific activities, subscribe to the mailing list at www.fields.utoronto.ca/maillist.

GEOMETRIC GROUP THEORY

A workshop on *Recent Advances in Geometric Group Theory* will be held in the University of Southampton from 29 June to 1 July 2011. The workshop will focus on various topics in geometric group theory, setting aside sufficient time for individual discussion and research activity. The confirmed speakers are:

- Noel Brady (University of Oklahoma)
- François Dahmani (University of Grenoble)
- Cornelia Druțu (Oxford University)
- Martin Dunwoody (University of Southampton)
- Daniel Groves (University of Illinois at Chicago)
- Ilya Kapovich (University of Illinois at Urbana-Champaign)
- Ian Leary (Ohio State University)
- Martin Lustig (Université Aix-Marseille III)
- Alexander Ol'shanskii (Vanderbilt University)
- Saul Schleimer (University of Warwick)
- Henry Wilton (Caltech)

Due to funding from EPSRC and the School of Mathematics, University of Southampton, there will be no registration fee for this workshop. The organisers are also able to offer limited funds to support, in terms of travel and accommodation, researchers early in their career. Prospective participants will be asked to register via the website at www.personal.soton.ac.uk/am1t07/ggt. Registration will be open until **10 June 2011**; the closing date for applications for financial support is **13 May 2011**. The organisers are Armando Martino and Ashot Minasyan.

POSTGRADUATE GROUP THEORY CONFERENCE

The *Postgraduate Group Theory Conference* is an annual conference that is organised by PhD students for PhD students. The idea of the conference is to provide a friendly environment for PhD students working in group theory (and related areas), to meet each other and discuss their work.

The conference is now in its 13th year and will take place from 9 am on Thursday 23 June to 12 pm on Saturday 25 June 2011 at the University of Aberdeen. This is the second occasion when this conference will be held in Scotland. Participants are encouraged to give a 20-minute talk on a

topic of their choice. These talks will form the main component of the conference. For most this will involve discussion of work from their PhD project. These will be supplemented by talks from two keynote speakers:

- Stephen Donkin (University of York) *Schur algebras*
- Rebecca Waldecker (Martin-Luther-Universität Halle-Wittenberg) *Local arguments for the Z*-theorem*

Accommodation will be offered for the nights of 22, 23 and 24 June as standard. For more information visit the conference website at www.abdn.ac.uk/~r01jmt8/PGTC/Welcome.html or email pgtc2011@gmail.com. The conference is supported by an LMS Scheme 8 Postgraduate Conference grant.

GALWAY TOPOLOGY COLLOQUIUM

The 14th *Galway Topology Colloquium* will, in spite of its name, take place in Queen's University Belfast from 15 to 17 August 2011. Apart from the mathematical business, the conference dinner on the evening of Monday 15 August will also be Brian McMaster's retirement dinner. Invited talks will be by:

- Alexander Arhangel'skii (Ohio University, USA) *Remainders of various kinds of spaces in compactifications*
- Paul Bankston (Marquette University, USA) *A framework for characterising topological spaces*
- Paul Gartside (University of Pittsburgh, USA) tba
- Jan van Mill (Free University, Netherlands) *Topological homogeneity*
- Ivan Reilly (University of Auckland, New Zealand) *A topological anti-hero*
- Dona Strauss (University of Leeds, UK) *The algebra of βN and polynomial returns*

Further details and a link to register (for any or all of the conference, accommodation and the dinner) may be found at www.qub.ac.uk/puremaths/Conferences/Galway14/Galway14.html. The conference is supported by an LMS Conference grant and the Irish Mathematical Society.

TROPICAL GEOMETRY AND INTEGRABLE SYSTEMS

A conference on *Tropical Geometry and Integrable Systems* will take place from 3 to 8 July 2011 in Glasgow. This conference will develop common understanding and language between pure mathematicians working on tropical geometry and applied mathematicians working on integrable systems. Confirmed speakers so far include:

- Florian Block (University of Michigan, USA, and Warwick, UK)
- Jan Draisma (Technical University Eindhoven, The Netherlands)
- Rei Inoue (Suzuka University of Medical Science, Japan)
- Diane Maclagan (University of Warwick, UK)
- Toshiaki Maeno (Kyoto University, Japan)
- Marta Mazzocco (Loughborough University, UK)
- Tomoki Nakanishi (Nagoya University, Japan)
- Junkichi Satsuma (Aoyama Gakuin University, Japan)
- Michael Shapiro (Michigan State University, USA)
- Testuji Tokihiro (The University of Tokyo, Japan)
- Alexander Veselov (Loughborough University, UK)
- Lauren Williams (University of California, Berkeley, USA)

Limited financial assistance is available for PhD students. For further information visit the website at www.maths.gla.ac.uk/island/island4. The workshop is supported by the EPSRC and an LMS Conference grant.

EPSRC
Pioneering research and skills

The London Mathematical Society

THEORETICAL FLUID DYNAMICS

LMS–EPSRC Short Course

Heriot-Watt University, 29 August – 2 September 2011
Organiser: Dr Simon Malham

Course outline and prerequisites

As observers of Nature, experimentalists and mathematicians, we marvel at the beauty and intricacies of real physical fluid flows: from cloud patterns to the turbulent intertwined tumbling mass of swirling vortices alongside a riverbank. Nearly eighty years ago Leray suggested that Navier–Stokes singularities may signify the onset of turbulence in a real fluid flow. During this five-day residential school, world authorities on these topics will provide intensive courses on contemporary theoretical fluid dynamics, juxtaposing the latest exciting developments in Navier–Stokes regularity against the leading models of turbulent fluid flow. The courses will be accessible to first-year PhD students in mathematics with some knowledge of partial differential equations, but a background in fluid mechanics is not required.

The three main lecture course topics are:

- *Fundamental mechanisms of fluid flow* (Simon Malham, Heriot-Watt; three lectures)
- *Navier–Stokes equations: regularity and singularity* (Charlie Doering, Michigan, and James Robinson, Warwick; three lectures each)
- *The physical nature of turbulence* (Emmanuel Leveque, ENS Lyon; five lectures)

These will be supplemented by tutorial sessions. There will also be guest lectures by John Gibbon (Imperial College London) and Sergei Kuksin (École Polytechnique). For further information, see: www.ma.hw.ac.uk/~simonm/lms-epsrc_short_course_2011.

Application

Applications should be made using the registration form available via the Society's website at: www.lms.ac.uk/content/short-instructional-courses.

The closing date for applications is **Friday 1 July 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 (£160), £260 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 (£320), £570 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.

EPSRC
Pioneering research and skills

Oxford-Man Institute of Quantitative Finance

The London Mathematical Society

DUALITY, BSDEs AND MALLIAVIN CALCULUS IN MATHEMATICAL FINANCE

LMS–EPSRC Short Course

Oxford-Man Institute of Quantitative Finance, University of Oxford
18–22 July 2011
Organiser: Dr Michael Monoyios

Course outline

Mathematical finance now routinely uses advanced methods from functional and stochastic analysis to solve control problems associated with optimal trading in financial markets. Duality methods have been at the forefront of these advances. Dynamic versions of such control problems lead naturally to solutions of Backward Stochastic Differential Equations (BSDEs). The control parameter in such equations can be interpreted as the Malliavin derivative of a process which matches a given terminal objective. The Malliavin calculus is a stochastic calculus of variations that is increasingly finding applications in financial models. The course will consist of three lecture courses, each of five to six lectures in these topics, aimed at first-year graduate research students in Financial Mathematics:

- *Duality methods* (Dmitry Kramkov, Carnegie Mellon University)
- *Malliavin calculus* (Josef Teichmann, ETH)
- *BSDEs* (Nizar Touzi, École Polytechnique)

For further information see: www.oxford-man.ox.ac.uk/events/conferences.html.

Application

Applications should be made using the registration form available via the Society's website at: www.lms.ac.uk/content/short-instructional-courses.

The closing date for applications is **Friday 27 May 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. If demand is high, it may be possible to make additional places available, though financial support will not be available beyond a limited number of participants.

Fees

- **UK university research students** will be charged a registration fee of £100. There are a limited number of places available on a first-come, first-served basis where ALL subsistence costs will be covered; otherwise applicants will be responsible for covering ALL subsistence costs.
- **UK-based postdocs** will be charged a registration fee of £100. There are a limited number of places available on a first-come, first-served basis where 50% subsistence costs will be covered; otherwise applicants will be responsible for covering ALL subsistence costs: approximately £270
- For **overseas students, postdocs and industry professionals** registration will be £250. Accommodation and food costs will NOT be covered: approximately £350.

All participants must pay travel costs (EPSRC-funded students should be covered by their DTA). Subsistence costs are not covered unless participants fit into the categories above. 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 LMS MEETINGS

ORDINARY MEETING

held on *Friday 25 February 2011* at the Oxford University Museum of Natural History. About 55 members and visitors were present for all or part of the meeting.

The meeting began at 3.30 pm, with the Vice-President, Professor J.P.C. GREENLEES, in the Chair.

Fourteen people were elected to Ordinary Membership: R.L.F. Brignall, E. Deadman, T. Dokchitser, C. Garetto, J.C. Hansen, S. Hubbert, K.T. Huber, R. Klages, B. Lemmens, C. Luebbe, B. Mitchell, M.G. Rosenkranz, M. Wemyss, F. Yu; two people were elected to Associate Membership: P.J. Keen, O. Randal-Williams; and two people were elected under a Reciprocity Agreement: M.T. Keller, G.A. Willis.

The Records of Proceedings of the Society Meetings held on 25 August, 6 September, 19 November and 6 December 2010 were signed as a correct record.

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

Professor G.M. STALLARD, Chair of the Women in Mathematics Committee, gave an introduction to the lectures with a brief description of Mary Cartwright and her achievements.

Professor F.C. KIRWAN, FRS, introduced the first lecture given by Professor Peter Donnelly on *Modelling genes*.

After tea, Professor Kirwan introduced Professor Alison Etheridge, who gave the Mary Cartwright Lecture, on *Evolution in a spatial continuum*.

The Vice-President thanked the organisers of the Meeting for arranging an excellent and well-attended event, and declared the Meeting closed.

After the meeting, a reception was held at the Mathematical Institute, Oxford, followed by a dinner at the Ashmolean Museum Restaurant.

MARY CARTWRIGHT MEETING

Report

The 2011 Mary Cartwright Meeting was held on Friday 25 February in Oxford. The meeting began with a brief business meeting of the Society, chaired by Professor John Greenlees, Vice-President, who then handed over to Professor Gwyneth Stallard as current chair of the Women in Mathematics Committee, which is responsible for organising the Mary Cartwright Meeting. Professor Stallard spoke about Mary Cartwright and also about the work of the Women in Mathematics Committee. She then introduced Professor Frances Kirwan, the scientific organiser of this year's lectures.

Peter Donnelly and Alison Etheridge

The Mary Cartwright Lecturer in 2011 was Alison Etheridge, Professor of Probability at the University of Oxford, with companion lecturer Peter Donnelly, Professor of Statistical Science at the University of Oxford and Director of the Wellcome Trust Centre for Human Genetics.

Peter Donnelly spoke first and his talk was entitled *Modelling genes*. He gave an overview of research using statistical methods in the field of genetics of human diseases. He spoke about recent progress in the identification of genetic variants linked to the risk of many human diseases and conditions. A further focus of his talk was on recent approaches to inference for recombination rates from population genetic data, and on how this has led to the identification of many human recombination hotspots.

Alison Etheridge spoke after tea, and her talk was entitled *Evolution in a spatial continuum*. Professor Etheridge reviewed various models and concepts in mathematical genetics, including Kingman's coalescent and the concept of a most recent common ancestor, as background to recent work that extends the Lambda–Fleming–Viot process to include evolution in a spatial continuum. She ended her talk with a mathematical genealogy showing the most recent common ancestor of herself and Mary Cartwright.

The meeting was held in the Oxford University Museum. It was followed by a reception in the Mathematical Institute, and then dinner at the Ashmolean Museum.

Susan Pitts
University of Cambridge

REVIEWS

Mathematics Under the Microscope: Notes on Cognitive Aspects of Mathematical Practice by Sasha Borovik, AMS, 2010, 317 pp, US$59, £43.50, €50.00, ISBN 978-0-8218-4761-9.

Announcing that you are a mathematician in polite company is likely to be met with awe and terror in equal measure, as well as the conviction that the mathematical brain is a curious and unusual beast. So this book is a welcome attempt to try to de-mystify the processes that underly mathematical cognition.

The point of view is that of a mathematician interested in talking to neurophysiologists and psychologists, trying to give insights into the basic structures and mechanisms necessary for higher mathematical thought. The idea being that while there has been a good deal of work done on mathematical cognition insofar as it relates to counting and quantification, there has been much less work on higher-level mathematics.

The book draws on a staggeringly eclectic array of cultural references – from Vermeer's *The Astronomer*, to the sitcom *Father Ted*, to Bulgakov's *The Master and Margarita* – by which the author entertains and amuses while never straying too far from the topic. It also contains a wealth of mathematical examples and puzzles, and the reader should be prepared to be challenged by an array of Olympiad-style problems, as well as Coxeter Theory and a particularly tricky Sudoku.

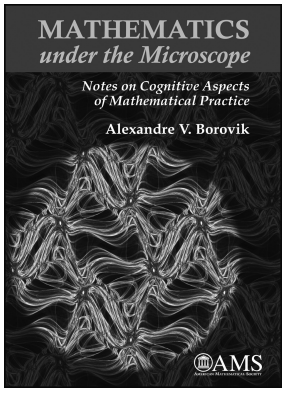
The author's main thesis is that mathematics is 'vertically integrated', and mathematical cognition consists of various simple processes including visual and geometric intuition, parsing (formal manipulation of symbols) and reification (encapsulation of a mathematical technique as an object). However, while all of these points and many more besides are amply illustrated by a variety of mathematical problems, anecdotes and history, I found it hard to come away with a coherent picture of the author's view. This is perhaps unsurprising given the difficulty of the subject and the daunting task facing an experimenter.

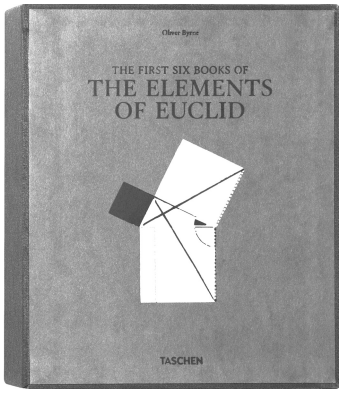
Also, to name a criticism which both the author and a potential reader would anticipate, I was never convinced that what was being communicated was much more than an insight into the author's mental processes whilst doing mathematics. I am not sure, for instance, that Coxeter's proof of Euler's Theorem – a geometric proof that an orientation-preserving isometry of Euclidean 3-space fixing a point is a rotation – is really a slam dunk in demonstrating the prominence of a certain kind of geometric intuition in mathematical thinking. While I myself found it convincing, that is a world away from saying that I'd expect all mathematicians to find it so. And given the fallibility of geometric intuition in certain contexts (all the false proofs of the Poincaré Conjecture, for instance), one needs to be doubly careful.

I am equally skeptical of the stated aim to communicate to neurophysiologists and psychologists using "simple examples". For instance the first, and by no means most difficult, such example is the iteration of the function $||x| - 1|$. Having spoken to some of my reasonably numerate colleagues from the biological sciences, I am reasonably certain that they would not find such examples easy to deal with at all, and certainly not illustrative in the way the author expects.

Despite all these criticisms, this book is nonetheless a joy to read. The fact that it falls short of its own impossibly high ambition is not something I can hold against it, as the delight in mathematics is both present on every page and infectious in the extreme. This book contains some of the most interesting mathematical anecdotes and puzzles I have ever encountered, all decorated with a variety of diagrams, pictures and photos of mathematicians from when they were children, making for an excellent and entertaining read.

Armando Martino
University of Southampton





The First Six Books of the Elements of Euclid, with explanatory booklet, by Oliver Byrne, Taschen, 2010, 268pp + 95 pp, £34.99, ISBN 978-3-83651-775-1.

In the 19th century Euclid's *Elements* were the basis of school mathematics. In 1847 a radically different edition of the first six books was published by Oliver Byrne, a mathematics teacher who went on to become "Surveyor of Her Majesty's Settlements in the Falkland Islands". His edition, "in which coloured diagrams and symbols are used instead of letters for the greater ease of learners", is the best known of his works. Byrne claimed that its use could reduce the time needed to master the material by two thirds.

Byrne's novel idea was to replace the usual symbols for lines, triangles, etc, by coloured shapes. He had four colours at his disposal and so a line became a coloured segment: ——, a triangle a set of (vari-coloured) lines, an angle a solid coloured shape like  , and so on. Then, in the proofs, the various geometric entities were represented by symbols corresponding to parts of the original diagram.

To one accustomed to the usual way of writing out a proof this does not seem like much of an improvement, though one must admit that, for example, in the *pons asinorum* or Pythagoras's Theorem the proof becomes an attractive riot of colour.

Byrne had experimented with this in schools and had evidently decided that the schoolteacher's approach would be better described by his method than in the usual way using *A*, *B*, *C*, ... He says:

> *... the use of coloured symbols, signs, and diagrams in the linear arts and science renders the process of reasoning more precise, and the attainment more expeditious ... the retention by the memory is much more permanent; these facts have been ascertained by numerous experiments by the inventor.*

There were, however, severe implementational difficulties. In the 1840s accurate colour printing was rare, and Byrne was lucky to find a publisher who was prepared to take on the task. He found William Pickering, who produced a masterly version of Byrne's vision. Alas, such a production was bound to be expensive and consequently sales were limited: the production costs of this work contributed to the bankruptcy of Pickering a few years later. This means that only a few copies of Byrne's work found their way into circulation and hence, by the peculiar irony of the second-hand book trade, those that did are now extremely valuable.

Of course this meant that Byrne's dream of seeing his method replace the usual way of presenting Euclid was never realised. Cajori, writing eighty years later, dismissed the work as "a curiosity" and echoed the poor opinion that De Morgan had expressed a couple of years after its publication.

However, Ruari McLean, writing in *Victorian Book Design and Colour Printing* (1972) calls it "one of the oddest and most beautiful books of the whole century". Historians of art have seen the geometric works of Mondrian pre-figured in Byrne's diagrams – though Mondrian admitted to never having seen the work! It is easy to leaf through the volume and appreciate it as a fine work of design rather than as a mathematical text.

The facsimile edition by Taschen is beautifully produced, cloth-bound in its own hard case. It comes with a booklet which actually adds rather little to the book itself. An historian of mathematics rather than of art will probably not covet this sumptuous reprint, but would certainly appreciate the web pages put up by Bill Casselman (www.math.ubc.ca/~cass/Euclid/byrne.html).

I particularly recommend Book II Propn VI to appreciate just how lively Byrne can make a result as dry as:

> *If a straight line be bisected and produced to any point, the rectangle contained by the whole line so increased, and the part produced, together with the square of half the line, is equal to the square of the line made up of the half, and the produced part.*

John O'Connor
University of St Andrews

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.

MAY 2011

2 Heilbronn One-day Background Workshop on Multiple Zeta Values, Modular Forms and Elliptic Motives, Bristol (403)
2-5 Women in Applied Mathematics Meeting, Heraklion, Greece
3-6 Multiple Zeta Values, Modular Forms and Elliptic Motives Workshop, Bristol (401)
4-6 The Birch and Swinnerton-Dyer Conjecture Conference, Cambridge (402)
5 LMS Spitalfields Day, INI, Cambridge
6 Women in Mathematics Day, London (403)
12 Teaching Students to Write Mathematics Workshop, Leeds (402)
16-18 Algebra and Representation Theory in the North Meeting, Aberdeen (402)
17 LMS–Gresham Lecture, London (403)
18-19 Combinatorics Colloquia, London (403)
19 Good Practice Award Workshop, De Morgan House, London (401)
22-27 Progress on Difference Equations 2011, Dublin, Ireland (398)
23-25 Wales Mathematics Colloquium, Gregynog Hall, Powys (402)
24 Spectral Theory and PDEs Meeting, Canterbury (402)
24 Complex Analysis and Geometry Meeting, Open University (403)
27-28 Panhellenic Geometry Conference, Rion, Greece (401)
30 - 3 Jun MEGA 2011, Stockholm, Sweden (400)
31 LMS Education Day, London (403)
31 - 3 Jun CHAOS 2011, Crete, Greece (400)

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 Stochastic Models and Data Analysis International Conference, Rome, Italy
8-9 Variational Multiscale Methods Workshop, Strathclyde (402)
13-17 Stabilization of Dynamical Systems and Processes ICMS Workshop, Edinburgh (398)
13-17 Arithmetic of Function Fields Workshop, Imperial College London (403)
14 LMS Midlands Regional Meeting, Birmingham (403)
15-18 Representation Theory Workshop, Birmingham (403)
16-17 UK Magnetohydrodynamics Meeting, City University London (403)
17 Symbolic Computation for Analysis Meeting, Canterbury (403)
20-24 Geometric Group Theory Workshop, Heilbronn Institute, Bristol (402)
20-24 Geometric Analysis ICMS Workshop, Edinburgh (398)
23-25 Postgraduate Group Theory Conference, Aberdeen (403)
26 - 1 Jul Spectral Analysis and Its Applications LMS–EPSRC Short Course, University College London (402)
26 - 2 Jul New Developments in Non-Commutative Algebra and Applications ICMS Workshop, Sabhal Mòr Ostaig, Isle of Skye (398)
27-29 Frontiers of Nevanlinna Theory 2: *p*-adic Function Theory and Arithmetic Dynamics, University College London (401)
27 - 1 Jul Moduli Spaces Closing Conference, INI, Cambridge (401)
27 - 1 Jul Signal Pocessing with Adaptive Sparse Structured Representations, ICMS Workshop, Edinburgh (398)
29 LMS Popular Lectures, Institute of Education, London (403)

29 - 1 Jul Recent Advances in Geometric Group Theory Workshop, Southampton (403)
30 Providing a Mathematics and Statisics Support Service Using *Elluminate*, Loughborough (402)

JULY 2011

1 LMS Meeting, London
1 Developing Mathematical Thinking Through Problems, Puzzles and Games Workshop, Greenwich (402)
3-8 British Combinatorial Conference, Exeter (403)
3-8 Tropical Geometry and Integrable Systems Conference, Glasgow (403)
4-8 Theories of Infinity ICMS–ESF Meeting, Edinburgh (398)
4-23 Gauge Theory and Complex Geometry Conference and Workshop, Leeds (402)
9-11 Quantum Cohomology, Symplectic Resolutions and Representation Theory Meeting, Oxford (403)
11-15 Numerical Relativity Beyond Astrophysics ICMS Workshop, Edinburgh (398)
13-15 Mathematics of Filtering and its Applications Workshop, Brunel University (402)
16-24 International Mathematical Olympiad, Amsterdam
18-20 Toric Methods in Homotopy Theory Conference, Belfast (398)
18-22 Experiments for Processes with Time or Space Dynamics INI Workshop, Cambridge (400)
18-22 Duality, BSDEs and Malliavin Calculus in Mathematical Finance LMS–EPSRC Short Course, Oxford (403)
18-22 ICIAM 2011, Vancouver, Canada (400)
19 Olga Taussky-Todd Lecture (B. Pelloni), ICIAM 2011, Vancouver, Canada (402)
19 LMS Northern Regional Meeting, Leeds (403)
19-22 Homogeneous Structures Workshop, Leeds (403)
21-22 Twistors in Geometry and Physics Meeting, Oxford (401)
25-29 Introductory Workshop on Inverse Problems, INI, Cambridge (400)
28 - 3 Aug International Mathematics Competition, Blagoevgrad, Bulgaria (402)
29-31 IPMC 2011, Islamabad, Pakistan (402)

AUGUST 2011

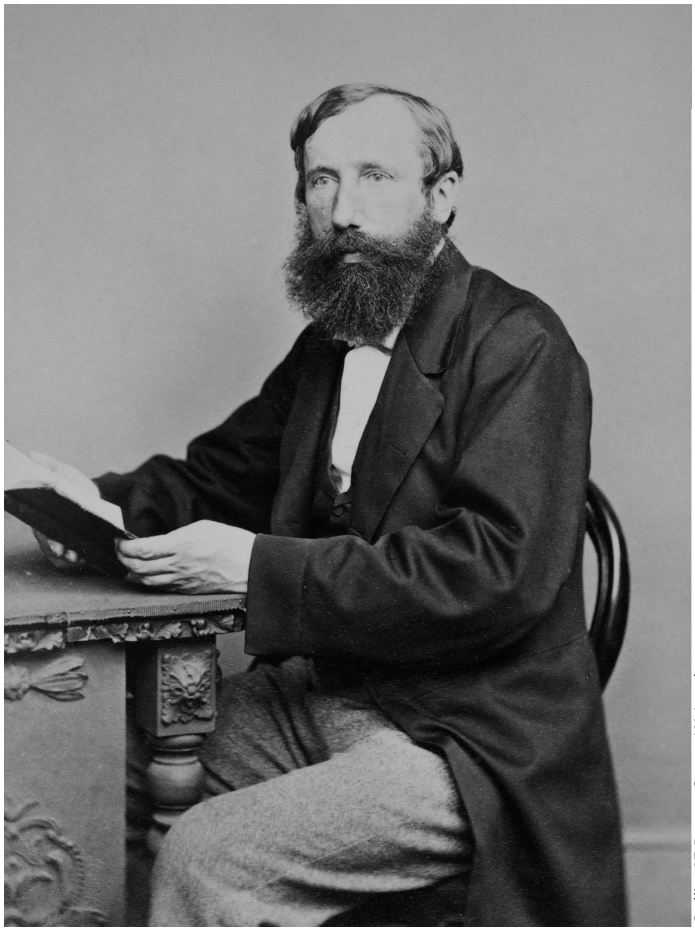
1-5 EQUADIFF 2011, Loughborough (400)
1-5 Inverse Problems in Analysis and Geometry INI Workshop, Cambridge (400)
9-12 Optimum Design for Mixed Effects Non-Linear and Generalised Linear Models INI Workshop, Cambridge (399)
15-17 Galway Topology Colloquium, Belfast (403)
15-19 Design of Experiments in Healthcare INI Workshop, Cambridge (400)
17-19 Mathematical Models in Ecology and Evolution, Groningen, The Netherlands (403)
22-26 Analytic and Geometric Methods in Medical Imaging INI Workshop, Cambridge (400)
29 - 1 Sep Algebra, Combinatorics, Dynamics and Applications, Queen's University, Belfast
29 - 2 Sep Theoretical Fluid Dynamics LMS–EPSRC Short Course, Heriot-Watt University (403)
30 - 2 Sep Designed Experiments: Recent Advances in Methods and Applications INI Workshop, Cambridge (399)

SEPTEMBER 2011

5-9 European Women in Mathematics General Meeting, Barcelona (396)
5-9 Accelerating Industrial Productivity via Deterministic Computer Experiments and Stochastic Simulation Experiments Workshop, INI, Cambridge (402)
5-9 Mathematical Imaging in Interaction with Biomedicine ICMS Workshop, Edinburgh (398)
5-9 ENUMATH Conference 2011, Leicester
11-17 Turning Dreams into Reality ICME, South Africa (388)

I. TODHUNTER

LMS member 1866–1883



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