

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 424 April 2013

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NEWSLETTER ONLINE: newsletter.lms.ac.uk

WOMEN IN MATHEMATICS: SETTING THE BENCHMARK

The LMS has published a report based on the first ever survey focusing on women in mathematical science departments. Advancing Women in Mathematics: Good Practice in UK University Departments was launched at the House of Commons on the 27 February 2013. The report examines existing areas of good practice and enables benchmarking against the national picture. More importantly it is hoped that the examples of good practice will provide inspiration to other departments.

The report was launched in Parliament at an event hosted by Andrew Miller MP, Dr Julian Huppert MP and Stephen Metcalfe MP, and the guest speaker was Professor Margaret Wright of the Courant Institute of Mathematical Sciences, New York University, who chaired the International Review of Mathematical Sciences 2010.

The LMS is committed to addressing the issues faced by women in mathematics. It is concerned about the loss of women from mathematics, particularly at the higher levels of research and teaching, and at the missed opportunities that this represents. Through its Women in Mathematics Committee, the LMS has established a Good Practice Scheme to support university departments seeking to address these issues.



Graeme Segal, Andrew Miller MP, Margaret Wright, Shabana Mahmood MP, Stephen Metcalfe MP, Stephen Benn

A large number of departments from a wide range of backgrounds have signed up as supporters of the scheme with many participating in a comprehensive benchmarking survey, which led to this report.

Although similar surveys have been done for other disciplines, this is the first such survey that has been carried out for mathematical sciences departments. The report provides valuable data on the proportions of women at different career stages and an insight into areas of good practice As previously highlighted on a number of ocin which mathematics departments are particularly strong, as well as areas which require further development. It also provides many examples of practical actions that some departments have already taken. The report will enable departments to benchmark themselves against the national picture and will assist both departments and the LMS to target actions appropriately.

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Professor Gwyneth Stallard, Chair of the LMS Women in Mathematics Committee, commented, 'We are delighted that the UK mathematical community is beginning to engage seriously with the issues surrounding the careers of women mathematicians. We hope that this report will help departments to identify practical steps that they can take to enable more women to

achieve their full potential as mathematicians'.

The report is available at www.blitzadv.co.uk/ LMS-BTL-17Report.pdf. If you would like a printed copy of the report please contact Dr John Johnston, LMS Communications Officer (john. johnston@lms.ac.uk).

GOOD PRACTICE SCHEME WORKSHOP

casions, although nearly 40% of mathematical sciences graduates are women, only about 4% of UK mathematics professors are female. Relative to men, women are much less likely to go on to become academic mathematicians. Of course, this trend is not unique to mathematics, but the drop-off rate for women in mathematics is particularly high and this should be a concern to mathematics departments. The recent International Review of Mathematics highlighted concern about the low numbers of female mathematicians in the UK.

The LMS Women in Mathematics Committee. in collaboration with the Committee of Heads of Departments of Mathematical Sciences, have set up a Good Practice Scheme specifically for math-

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

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

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ematics departments, to help the community to recognise and celebrate good employment practice for women working in mathematics. The scheme compliments initiatives such as Athena SWAN.

A Good Practice Scheme workshop will be held in Edinburgh on Monday 22 April 2013 to provide departments with knowledge and tools they can use to improve recruitment and retention of women in mathematics. This may include making an application for Athena SWAN status. The workshop is aimed at departments who did not send representatives to a previous GPS Workshop, eg the one held in November in London, although those who have previously attended are welcome if they think it would be useful to them. Participants will:

- hear about how the LMS Good Practice Scheme can support departments working towards recruiting and retaining more women in mathematics;
- hear from Athena SWAN about the process of applying for Bronze, Silver and Gold Award Department status;
- hear from departments already engaged in the process of applying for Athena SWAN status:
- · make useful contacts with other departments active in promoting the careers of women in mathematics.

The workshop will be held at the ICMS, 15 South College Street, Edinburgh EH8 9AA. Registration will be from 10.30 and the workshop will begin at 11.00 - running on until no later than 16.00. Registration is through the ICMS website at www.icms.org.uk/workshop.php?id=277.

This event is supported by the London Mathematical Society and the Edinburgh Mathematical Society.

MATHEMATICS **POLICY ROUND-UP** March 2013

RESEARCH

Triennial Review of the Research Councils The Department for Business, Innovation and Skills (BIS) is reviewing the Research Councils in accordance with the government's commitment to review public bodies. These reviews aim to increase the accountability for actions carried out on behalf of the state.

This review looks at the structures for delivering funding for the research base. It is not a review of the government's underlying policy on funding the research base.

The Royal Society was invited to submit a contribution to the consultation process being conducted by the BIS review team. As well as overarching questions of governance across the Councils, the consultation also covers the relationship between the Research Councils and other funding bodies, including governmental, private and third sector funders, and the relationship between the Research Councils, those they fund, the 'customers' of research and the wider public. More information can be found at http://tinvurl.com/ dvcr7pz.

The CMS provided input for inclusion in the Royal Society's response and in addition submitted its own response direct to the BIS review. The responses will be available in due course.

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SCHOOLS AND COLLEGES

Consultation on reform of the National Curriculum in England

The Government launched a review of the National Curriculum in January 2011 with the aim of ensuring that the aspirations we set for our children match those in the highestperforming education jurisdictions, and giving teachers greater freedom over how to teach. The closing date for responses is 16 April 2013. More information is available at http://tinyurl. com/cyhrw7r.

Research on youngsters' mathematics ability

According to research by the Institute of Education, England's brightest students are two years behind the best in countries such as Hong Kong and Taiwan by the time they take their mathematics GCSE.

The study looked at the children's mathematics achievement in two international studies, the Programme for International Student Assessment (Pisa) and the Trends in Mathematics and Science Study (Timss).

The researchers concluded that 'England should focus on helping all youngsters with their mathematics skills at an early age'. The findings showed that students are already some distance behind those in East Asia in their mathematics achievement by age 10. However, the gap does not widen between the ages of 10 and 16.

OTHER

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Mathematics Good Practice Report launched at the House of Commons

The LMS has published a report based on the first ever survey of working practices in UK mathematics departments to focus on women's roles. Advancing Women in Mathematics: Good Practice in UK University Departments was launched at the House of Commons on the 27th of February. The report includes a set of best practice guidelines for departments, which aims to provide a benchmark and 'provide inspiration'.

The launch event in Parliament was hosted by Andrew Miller MP, Dr Julian Huppert MP and Stephen Metcalfe MP, and the guest speaker was Professor Margaret Wright of the Courant Institute, New York University, who chaired the International Review of Mathematical Sciences 2010. The report is available at www.blitzadv.co.uk/LMS-BTL-17Report.pdf.

There is a longer article about the report and the launch on page 1.

Open Access: House of Lords report

The House of Lords Science and Technology Select Committee has published its report into Open Access. The report highlighted Research Councils UK's (RCUK) failures in the communication of its open access policy. The report says the previous lack of clarity about RCUK's policy and guidance was 'unacceptable'

The report welcomes RCUK's recent clarification that it will gradually phase in its open access policy over a five year implementation phase, and recommends that RCUK update its policy guidance and all its communications to reflect the anticipated "journey to compli-

ance" and its flexibility over embargo periods. The Committee calls for monitoring of the

impact of open access, both at fixed review points and throughout the implementation period.

The Committee recommends that, given the widespread confusion over the policy, the Department for Business Innovation and Skills must review the effectiveness of RCUK's communication about open access to ensure that lessons are learnt. The full report is available at http://tinyurl.com/at4zxeq.

The LMS response to the call for evidence is available at http://tinvurl.com/a4wexve.

Revised Guidance for the RCUK Policy on Open Access

Following discussions with researchers, research organisations, learned societies and publishers, the revised guidance to accompany the RCUK Policy on Open Access has been published on the RCUK website www.rcuk.ac.uk.

Call for advice on open access

HEFCE has invited advice on developing the four UK funding bodies' joint policy on open access in the post-2014 Research Excellence Framework (REF).

This advice will contribute to the development of consultation proposals on implementing an open access requirement in the next REF exercise. The consultation will run later in 2013.The deadline for responses to the HEFCE letter was 25 March 2013.

The letter on open access and submissions to the REF post-2014 is available at http://tiny-url.com/bnnlly3.

Engineering for Growth campaign launched

The Royal Academy of Engineering has launched its *Engineering for Growth* campaign with a collection of activities to stimulate entrepreneurship and a report highlighting the £481bn contribution engineering makes to the UK economy. More information is available at http://engineeringforgrowth.org.uk.

> Dr John Johnston Mathematics Promotion Unit

ANNUAL ELECTIONS TO LMS COUNCIL

The Nominating Committee proposes slates of candidates for vacancies on Council and vacancies on its own membership. Anyone who wishes to suggest someone for a position as an Officer of the Society or as a Member-at-Large of Council (now or in the future) is invited to send their suggestions to Dr Penny Davies, the current Chair of Nominating Committee (nominations@Ims.ac.uk). Please provide the name and institution of the suggested nominee, his/ her mathematical specialism(s), and a brief statement to explain what s/he could bring to Council/Nominating Committee. The Nominating Committee actively welcomes suggestions from the membership.

The Nominating Committee seeks to maintain a balance in gender, subject area and geographical location when drawing up its list of prospective nominees, and LMS members should bear in mind that it is to the benefit of the Society that Council is balanced and represents the full breadth of the mathematical community. Further details about the work of the Nominating Committee can be found on the LMS website at www.lms.ac.uk/ about/nominating-committee.

Nominations should be received by Friday 24 May 2013 in order to be considered by the Nominating Committee.

In addition to the above there exists the option for members to make direct nominations for election to Council or to the Nominating Committee. Direct nominations must be sent to the Executive Secretary's office (nominations@lms.ac.uk) to arrive before noon on 1 September 2013. Such nominations must bear the signatures of the nominator and three seconders and of the nominee. A letter with the relevant names and signatures is sufficient; alternatively a form on which to make such nominations is available from the LMS website (http://tinyurl.com/ccuhkcx). Nominations and statements from seconders may also be sent by email from individual verifiable email addresses also to nominations@lms.ac.uk. Members considering making a direct nomination

are asked to bear in mind the desirability of Council being balanced so it represents the full range of mathematical specialisms, UK regions and gender-balance.

The slate proposed by Nominating Committee, together with other direct nominations received up to that time will be posted on the LMS website in early August for members to see before deciding whether they wish to make any further direct nominations. Further nominations will be posted onto the website as they are received.

ABEL PRIZE 2013

I am delighted to learn of the award of this year's Abel Prize to Pierre Deligne, and to congratulate him on behalf of the London Mathematical Society. For half a century he has been one the world's leading mathematicians, and one of its most distinctive voices. He became an honorary member of the LMS in 2003. He sprang to fame as a disciple of Alexander Grothendieck, successfully completing Grothendieck's programme for proving the Weil conjectures relating the number of points of algebraic varieties over finite fields to the topology of the corresponding variety over the complex numbers, and he went on to give us a new picture of how algebraic structure manifests itself in topology. Since then he has done transformative work in many fields, especially group representation theory and number theory, but even beyond that; he was one of the leading contributors to the programme bringing guantum field theory to mathematicians at the Institute for Advanced Study in 1996-7. An enormous number of people have been the beneficiaries of his widely-circulated inimitable handwritten letters to a panoply of mathematical colleagues in which he provides a wonderful new perspective or an elucidation of some mathematical topic that has attracted his attention. He has always been one of my personal heroes.

Graeme Segal President, LMS 5

LMS-CMI RESEARCH SCHOOLS

New partnership announced

The LMS-EPSRC Short Instructional Courses have been a very welcome feature of the UK's mathematical landscape for many years, and they have had a hugely positive impact on generations of graduate students. Next year, they will take on a new identity and a new international focus. With the ending of the EPSRC funding, the LMS has entered into a partnership with the Clay Mathematics Institute (CMI) to continue the courses, for the year 2013-14 in the first instance.

present, but enhanced funding will make it possible to increase the number of participants and to open the courses more fully than at present to international participation, and to overseas lecturers.

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The CMI was founded with a very generous endowment by Landon T. Clay in 1998, in Cambridge, MA, USA. Its academic programme is now run from offices in the Oxford Mathematical Institute.

value of mathematical knowledge and its centrality to human progress, culture, and intellectual life. It is perhaps best known for the establishment of the Clay Millennium Prizes --- one million dollar prizes offered for the solution of each of seven deep unsolved problems in mathematics. These have had a very significant impact: first, in raising awareness of mathematics amongst young students and in encouraging them to enter the discipline; and, second, in conveying a message to professional mathematicians about the importance of working on really hard long-standing problems. The prizes have also entered the general consciousness and drawn attention to the seven problems in a way that is unusual in our sometimes invisible discipline. So far only one prize has been awarded, to Gregoriv Perelman for the proof of the Poin-

caré conjecture. (Perelman declined the prize, as he had earlier declined the Fields Medal).

The CMI supports mathematics in many other ways. It supports individuals through Research Awards and Research Fellowships, and other shorter-term funding: the high standard set is perhaps indicated by the fact that three of the four Fields Medals awarded at the last International Congress of Mathematicians went to former recipients of research support from CMI. It also supports programmes for high school students in the USA, notably the highly successful PROMYS programme at Boston University. Its status as a private foundation gives it a flexibility that na-The format will remain the same as at tional funding bodies sometimes lack.

The new partnership will complement CMI's existing summer schools for graduate students and young researchers, which are run in alternate years. These have a different format from the LMS courses: they are longer, and the recruitment is fully international. They have attracted some very distinguished lecturers and led to excellent volumes of lecture notes, published in collaboration with the AMS. But It grew out of Landon Clay's belief in the their benefit has necessarily been narrowly focused.

The LMS has been running Short Courses in partnership with the EPSRC for the last 14 years with over £665,000 provided in support of postgraduate students. In that time 60 courses have been organised with more than 1,750 participants. The courses have been well received by the students and the wider mathematical community.

It is hoped that the new partnership will build on the success and experience of both ventures and that it will attract proposals that will allow future generations of graduate students to benefit from lectures by the world's leading mathematicians.

Professor Nick Woodhouse, President, CMI Professor Ulrike Tillmann, LMS Trustee and Chair of LMS Research Meetings Committee

LONDON CLAY MATHEMATICAL MATHEMATICS SOCIETY INSTITUTE

NEW LMS-CMI RESEARCH SCHOOLS

CALL FOR PROPOSALS

The London Mathematical Society and Clay Mathematics Institute invite proposals for Research Schools in 2014.

Up to £31,000 is available per Research School, which provides training for young researchers in a core area of mathematics. The new series builds on the short courses previously supported by the Society and EPSRC, and aims to deliver instruction at the highest international standing by enabling support for distinguished international lecturers and encouraging attendance by more overseas participants.

The LMS and the CMI intend to support four Research Schools in 2014.

Prospective organisers should send an outline proposal to Elizabeth Fisher (shortcourses@lms.ac.uk) normally not less than 12 months before the proposed course date

Outline proposals should discuss:

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

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

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

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

http://newsletter.lms.ac.uk

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TRANSACTIONS OF THE LONDON MATHEMATICAL SOCIETY

An LMS open access journal



As part of its ongoing strategy for its publications, the LMS is launching an open access journal, the *Transactions of the London Mathematical Society*. The policy of the Society is to provide as wide and varied a service as possible to the whole mathematics community and we believe that open access is here to stay and we must work with it in all its forms.

The journal will be on an exact par with the *Bulletin, Journal and Proceedings of the LMS*, and the process of peer review will be exactly the same for all four journals. In the past we have used the acronym *BJPLMS* for the three journals and we will extend this to *BJPTLMS* to emphasise the close connections and the fact that all the journals will share the same Editorial Advisory Board.

By launching this journal, the LMS is not promoting any particular cause and we do not advocate one publishing payment model over another. The aim in setting up the *Transactions of the LMS* is to complete a comprehensive range of options to all mathematicians: in particular to provide a service to those whose funders are requiring them to publish in open access journals.

BACKGROUND

The Society provides the following access options beyond the traditional subscriber model: a) Free universal online access to the Society-

- owned journals for the first six months of the publication of content, thereafter moving behind the subscription wall. This is known as a 'reverse moving wall'.
- b) Through our publishing distributors, we agree to provide free access or access at a greatly reduced fee to low income countries. Currently, the offer is available to not-for-profit educational institutions from qualifying countries, and over 900 institutions now have free access.
- c) Since 2008 we have offered a paid open access option for all our journals, where an author can opt to have the Article Processing Charge (APC) paid by his or her funder in return for free universal online access to their paper.
- d) Since the launch of the Math ArXiv¹, we have permitted authors to upload one or more versions of their paper up to the version accepted for publication by the Society. This is not a condition imposed on our authors, it is their choice.
- e) The new, purely open access journal will provide a place for authors whose funders, such as those institutions who have signed the 'Compact for Open Access Equity', insist that the papers they fund may only be published in purely open access journals, which would exclude being published in our hybrid journals.

During 2012, the Finch Group reported on open access to the UK government and RCUK (Research Councils UK) was asked to implement their major findings and develop a policy² on open access. Although the government policy development was coincidental to the timing of our project (fewer than 18% of our authors are based in the UK), it focused the minds of those developing the journal and it has became apparent that, as a British Society, we should ensure that the launch fits in with the timing and policies of RCUK and UK universities. Our statement on complying with their policy is made here: www.lms.ac.uk/sites/lms.ac.uk/files/ Publications/NoteToAuthors-RCUK.pdf.

At the heart of RCUK's policy is the 'decision tree' recommended by the Finch report and endorsed by the Department of Business, Innovation and Skills:



EPSRC-funded authors will be required to follow the RCUK decision tree towards the gold route if possible.

Although we are a British Society, the UK is not the only government that we need to consider when thinking about providing the widest possible range of alternatives for our authors and readers. Another open access act has recently been introduced to the US Houses of Congress and the White House Office of Science and Technology Policy has released a Memorandum³ on open access. There are many other initiatives around the world. For further information on these, and news on a recent AMS proposal regarding open access, see www.ams. org/notices/201303/rnoti-p347.pdf. It is notable that the AMS also recognizes the changes to government policy and the need to broaden the range of options available for authors.

JOURNAL DESCRIPTION

The Transactions of the LMS will be fully open access and funded by Article Processing Charges 'APCs', payable by the authors with money from their institution or funder. It is not expected that authors will pay the fees themselves and LMS policy is that anyone without funds is asked to submit instead to the other three journals. All authors to all our journals will still be able

³ www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf

to place preprint versions of their papers on the arXiv. The aim of this journal is to provide a new service to authors whose funders are promoting the move to paid open access through their policies. By offering a range of open access options, we hope to cover all possible policies with which the majority of our authors will have to deal.

The journal will be purely electronic although we will use a 'virtual' front cover and colour for branding and advertising the journal as indicated above.

Editorial:

The Editorial Advisory Board will now act for all four journals: the *Bulletin, Journal, Proceedings and Transactions of the LMS* and they will apply the same standards. The decision-making structure for the Advisory Board to handle the refereeing process and Main Editors to decide on acceptance of papers to an individual journal will be identical for all four journals. A key feature of the new journal is that we will be able to establish its standard through comparison with papers already published in the other journals as examples.

There will be a Main Editor of TLMS: Keith Ball, University of Warwick and Director of ICMS, who has agreed to take on the role of supporting the launch of the open access journal.

We are fortunate to have an excellent, world class Advisory Board who will treat all papers equally, regardless of the journal chosen by the author. We will use the same article management system that is used for the other journals so that advisers will find it straightforward to handle all their papers on an equal footing. Similarly, authors and referees who have submitted to the other LMS journals in the past will be familiar with the mechanics of using the system.

It is important to note that the Main Editor(s) of a journal that handles a paper will always have final say in whether to accept the paper for their journal, based solely on the quality of the paper and regardless of whether a paper has previously been submitted to another journal in the group. A paper rejected by one journal will not be considered by another of the *BJPTLMS* journals unless there are very exceptional circumstances. For example, an author

¹ http://arxiv.org/new/math.html

² www.rcuk.ac.uk/documents/documents/RCUKOpenAccessPolicyandRevisedguidance.pdf

may submit a paper to TLMS, and then find that their university will not pay the APC. If the author chooses to submit the paper to another LMS journal, it is up to the Adviser whether to upload existing referee reports and pass on the history of the paper to the Main Editors of the new journal.

Production:

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The new journal will have the same virtual design and the four BJPTLMS journals will all be typeset and copy-edited to the same high standard. They will be hosted by OUP on the same platform.

Although we recognise that most online mathematics journals are published in traditional formats and look remarkably similar to their print counterparts, we are investigating whether further functionality can be added to the journal content, and we encourage authors to provide additional material and links. For example, it should be possible to provide additional links to online video (perhaps with the author giving some background to the paper). This iournal will be our first journal to be available in MathJax as well as the standard PDF format.

On matters of payment and the Article Processing Charges (APC):

The only difference between the Transactions and the Bulletin, Journal and Proceedings, which already offer a hybrid open access option at £1,925 per article, is that the new journal will be purely open access. To encourage authors to submit their open access papers to the new journal, the initial fee will be £500 per article as a special introductory offer, well below the costs of administration and production and it is therefore expected that the journal will lose money during the first few years. These costs include the long-term storage and archiving of the papers, ensuring perpetual access.

Of course, mathematicians who do not have access to funds to cover the APC are not obliged to publish in open access journals and they still have the other three journals, offering an identical peer review service. Authors will still be able to post pre-acceptance versions of their paper on the math arXiv.

Impact on the other journals:

Why not just advertise and encourage people to use the hybrid option on the other journals? Because we are not doing this to encourage the existing journals to move from a 'reader pays' model to an 'author pays' model. We believe the LMS journals provide a very useful and valuable service to the community, particularly those who do not have the opportunity to apply for open access funds. If the journals move too far in the direction of open access via the hybrid model, there will be pressure to cancel the subscription model, reducing the options for all mathematicians. It should be noted we already provide free access to several hundred institutions through the developing countries initiative.

Uptake of the open access hybrid option in the journals will be slow to grow and the small amount of evidence at present suggests that some demand will come from authors in transition, i.e. those authors whose funders have just announced a change of policy and who are taking up the hybrid option on papers in the pipeline. We want to maintain a price difference between the APC for the other journals and the Transactions in order to balance providing a service of open access wherever possible with encouraging people to take the less expensive option and submit to TLMS. It is less expensive because, in the first years, the author takes some risk in submitting to a new journal; however our intention is to establish the reputation of TLMS on an equal footing with the other journals as soon as possible.

In the very long run, the divisions may become blurred and we do not want to wed ourselves to one particular model forever; we are confident that we will need to adapt further in the future. However, we make a commitment that any paper that is published under an open access licence will remain open access permanently. The pressures on space in all other LMS journals are enough in themselves to warrant launching another journal of some form so the long term intention is that BJPTLMS will form one continuous spectrum of mathematics and working mathematicians who already have library or free developing country access should

not notice the difference between the journals.⁴

NEXT STEPS

We plan to put a lot of effort into the early explanation of what the journal is for and why we are doing this; we are therefore looking to make a 'soft launch' rather than grand announcements.

We will place the new journal in the context of the many things we already do to support widening access and providing authors with a diverse range of healthy journals. This project is all about opening up choice to both authors and readers.

The journal's home page is www.lms.ac.uk/ content/tlms. Authors seeking advice can email LMS staff at Imsjournals@Ims.ac.uk, which is the new email for the four core journals, or contact the main Editor, Keith Ball, at tlms@lms.ac.uk.

The web page for submitting a paper to the journal is www.lms.ac.uk/content/tlms-submit.

I MS Publications Committee

LMS GRANT SCHEMES

Next Closing Date for Research Grant Applications: 15 May 2013

Applications are invited for the following grants:

Conferences (Scheme 1)

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

- Celebrating new appointments (Scheme 1) Grants of up to £600 are available to provide partial support for meetings held in the United Kingdom to celebrate the new appointment of a lecturer at a UK university.
- Postgraduate Research Conferences (Scheme 8)

Grants of up to £4.000 are available to provide partial support for conferences held in the United Kingdom, which are organised by

and are for postgraduate research students. Visits to the UK (Scheme 2)

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

• Research in Pairs (Scheme 4)

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

International Short Visits (Scheme 5)

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Grants of up to £3,000 are available to support a visit for collaborative research by a named mathematician from a country in Africa (or countries where mathematics is in a similar position) to the home base of the grant holder. Grants of up to £2000 are available to support a visit for collaborative research by the grant holder to a country in Africa (or countries where mathematics is in a similar position).

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 2013 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.

⁴ We will be using the creative commons licence, CC-BY or CC-BY-NC according to the choice of the author, informed by their funder's requirements.

- Grants Administrators: Sylvia Daly and Elizabeth Fisher and (tel: 020 7291 9971/3. email: grants@lms.ac.uk).
- Programme Secretary: Rob Wilson (r.a.wilson@gmul.ac.uk).

OTHER LMS GRANTS AND FUNDING

Computer Science Small Grants (Scheme 7)

Funding for grants up to £500 is available to support a visit for collaborative research at the interface of Mathematics and Computer Science either by the grant holder to another institution within the UK or abroad, or by a named mathematician from within the UK or abroad to the home base of the grant holder. The next deadline for applications is 15 May 2013. Please see the website for further details: www.lms.ac.uk/content/ computer-science-small-grants-scheme-7.

Childcare Supplementary Grants

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

Small Grants for Education

Funding for grants up to £800 is available to stimulate interest and enable involvement in mathematics from Key Stage 1 (age 5+) to Postgraduate level and beyond. Anyone working/ based in the UK is eligible to apply for a grant. If the applicant is not a member then the application must be countersigned by an LMS member or another suitable person such as a Head teacher or senior colleague. The next deadline for applications is **30 April 2013**. Please see the website for further details: www.lms.ac.uk/ content/small-grants-education.

Research Workshop Grants

The Society offers grants to support Research Workshops held in the UK. Requests for support (for travel and subsistence of participants, and reasonable associated costs) in the range £1,000-£10,000 will be considered. For further information and application forms, visit: www. lms.ac.uk/content/research-workshops-grants.

Spitalfields Days

Grants of up to £500 are available to support an LMS Spitalfields Day, which have been run since 1987 and are in honour of the Society's predecessor, the Spitalfields Mathematical Society (1717-1845). A Spitalfields Day is a oneday meeting, which is usually associated with a long-term symposium on a specialist topic at a UK university. Selected participants, often distinguished experts from overseas, give survey lectures (or other types of lecture accessible to a general mathematical audience) on topics in the field of the symposium. Please see the website for further details: www.lms.ac.uk/content/ spitalfields-days#applications.

Young British and Russian Mathematicians Scheme

Visits to Russia

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

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

Applications to the LMS should include the followina:

- 1. A brief academic case for the visit, including a description of your current research interests, and an outline of your planned work during the visit (no more than one side of A4).
- 2. A brief CV (no more than one side of A4). 3. A brief budget.

host department in Russia, which must state explicitly that your accommodation and subsistence expenses will be met by them. This should include provisional dates for the visit. Financial and academic reports will be reguired after the visit. In exceptional circumstances, applications may be considered from strong research students who are close to finishing their doctorates. Applications should include a strong case and the student should obtain a letter of recommendation from his/her supervisor.

Visits to Britain

Under this Scheme, applications may also be made by any mathematician in Britain wishing to host a visit by a young Russian postdoctoral mathematician who wishes to spend a few weeks in Britain giving a series of survey lectures on the work of their Russian seminar.

The LMS is offering grants to the host institution to meet the visitor's actual travel and accommodation costs of up to £1.500. Applications should include the following:

- 1. Name and brief CV of the visitor.
- 2. A brief budget
- 3. A brief description of the course of lectures.
- 4. A letter or email of agreement from the head of the host department, including the proposed dates of the visit.

Financial and academic reports will be reguired after the visit. Further details of the Scheme can be found on the LMS website: www. lms.ac.uk/content/international-grants#YBR. Applications received by 15 May 2013 will be considered at a meeting in June. Enquiries should be made to the Grants Administrators: Sylvia Daly and Elizabeth Fisher (tel: 020 7291 9971/3, email: grants@lms.ac.uk).

MARY CARTWRIGHT **LECTURE 2013** Report

The Mary Cartwright Lecture is an annual lecture organised by the LMS Women in Mathematics Committee and forms part of the

4. A letter of invitation from the head of the annual programme of Society meetings. The event was established by the LMS in 2000 to recognize outstanding women mathematicians. It is named after Dame Mary Lucy Cartwright, the first female mathematician FRS, the first woman to receive the Sylvester Medal, the first woman to receive the De Morgan prize and the first female President of the LMS. This year's event was held on Friday 1 March 2013 at De Morgan House. About 60 people attended. The meeting began with a brief business meeting of the Society, chaired by the LMS President, Dr Graeme Segal, and then moved on to the invited lectures.

> The 2013 Mary Cartwright Lecturer was Margaret Wright, the Silver Professor of Computer Science at the Courant Institute of Mathematical Sciences, New York University. Her research interests include optimization, linear algebra, and scientific computing. Professor Wright's distinguished accolades include being a member of the National Academy of Science, the American Academy of Arts and Sciences, and the National Academy of Engineering. In 2010, she chaired the International Review of Mathematical Sciences in the UK. The companion lecturer, chosen by Professor Wright, was Jeffrey Lagarias, Professor of Mathematics at the University of Michigan. Professors Wright and Lagarias were colleagues at Bell Laboratories in the 1990s and have published a number of joint research papers, including two that Professor Wright cited during her talk.

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The first lecture was given by Professor



Margaret Wright and Jeff Lagarias

Lagarias and had the intriguing title From ABC to XYZ or Addition versus Multiplication. The 1 February 2013 basic question addressed was 'Do addition and multiplication get along?' In a wide-ranging A personal view overview talk, Professor Lagarias described the interaction of addition and multiplication

across several different fields, including logic and complexity theory, measure theory and ergodic theory, and finally Diophantine equations. Definitely a talk with something for everyone. The broad conclusion was that addition and multiplication do not guite get along and in some remarkable way, addition forces irregular behaviour in multiplication.

Professor Wright's lecture was entitled A Mathematical Journey in Non-Derivative Optimization. It focused on solving an unconstrained continuous optimization problem using the nonlinear simplex optimization method proposed by Nelder and Mead in 1965. Professor Wright used practical examples to motivate why derivative-free optimization, which was mostly ignored or disparaged in mainstream optimization during the 1970s and 1980s, remains important and, in many situations, is the only plausible option. She went on to explain why, although the Nelder-Mead approach has received significant attention for more than two decades, many challenging guestions about its basic nature remain. In particular, there is a lack of theoretical results and yet, despite being known to be unreliable, sometimes in mysterious ways, it continues to be very popular today (if not always so with some optimization researchers). Professor Wright spoke about her own recent

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work on Nelder-Mead (including work with Professor Lagarias), providing some insights into the difficulties faced in trying to develop convergence results. She concluded her lively and enthusiastic talk with the open question 'What are the mathematical properties that make real-world problems difficult?"

The lectures were followed by a wine reception at De Morgan House and then a dinner at the DoubleTree by Hilton Hotel in Southampton Row.

> Jennifer Scott Rutherford Appleton Laboratory

LMS COUNCIL DIARY

In a rare departure from normal practice, the Council meeting was held not at De Morgan House but at Woodland Grange Conference Centre, Leamington Spa, due to the fact that it was being held immediately before the Council Strategic Retreat (see next item for a report). While scheduling the two events consecutively had a time and a cost-saving benefit with respect to journeys for Council members, it also meant that the Council meeting was considerably shorter than usual. Unfortunately, despite some items being deferred, it has to be admitted that there was a somewhat rushed feel to the meeting which was not ideal, especially for new members of Council.

Under President's business, Graeme raised the issue of the Society making nominations for external prizes. He had received a number of such requests and was concerned that the Society had no procedure in place to support its ability to make such recommendations. It was recognised that it could be detrimental to mathematics if the Society abstained from making such recommendations, as for example in the cases of prizes that are open to mathematicians and scientists alike, but that a clear procedure was needed to ensure that recommendations were appropriate. It was agreed that such a procedure should be developed.

Graeme also reported that he had received an invitation to participate in the 8th Pan African Congress of Mathematicians (www. pacomabuja2013.org) to be held this summer in Abuja, Nigeria, under the theme 'Contemporary Developments in the Mathematical Sciences as Tools for Scientific and Technological Transformation of Africa'. It was keenly felt that the Society should support the Congress and it was agreed that two people should attend as the Society's representatives.

Moving on to financial matters, the Treasurer, Rob Curtis, having presented the first quarter financial review, reported on the activities of the Investment Sub-Committee, in particular their work concerning the Society's investment

management contract. For some time there has been concern about the performance of the Society's investment managers, Morgan Stanley, and the Investment Sub-Committee had been asked to investigate alternatives. They invited seven firms to submit bids and subsequently held formal interviews, after which they agreed to recommend to Council that Schroders be appointed as the Society's new investment managers Council was very appreciative of the Sub-Committee's work on this matter and readily agreed to the Sub-Committee's recommendation.

Also under financial matters, the President reported that the Isaac Newton Institute (INI) had contacted the Society, following a reduction in their grant from the EPSRC, to ask if the Society would consider increasing its funding to the Institute. It was agreed that the Society would increase its grant to the INI by 40%, i.e. up from £25,000 to £35,000, with effect from 2014.

We now came to the most important discussion item of the meeting: the proposal submitted by Publications Committee for the Society to launch a new online-only gold open access journal. This provoked a wide-ranging debate, with concerns being raised about the damage that might be caused to the Society's reputation by launching such a journal at a time when there were significant misgivings in the mathematical community about open access. It was also questioned whether it was necessary to make a decision now. The Publisher, Susan Hezlet, explained that a high proportion of authors were quoting EPSRC funding and looking for places to publish, and that launching the journal now would be beneficial with regard to the timing of the changes in RCUK policy. After considerable debate, it was agreed to accept the Publications Committee proposal. The new journal, which is to be called the Transactions of the London Mathematical Society, will be ready to accept manuscripts later this year (see page 8 of this *Newsletter*). Meanwhile, it is perhaps worth reminding members that all other LMS journals offer a hybrid open access option in compliance with the RCUK policy (for details. see the note on the LMS website www.lms. ac.uk/sites/lms.ac.uk/files/Publications/NoteTo-Authors-RCUK.pdf).

The final main item for discussion was the Scrutineers' Report and the review of the 2012 Council Elections, in particular the introduction and implementation of electronic voting. We were very pleased to learn that in terms of votes cast, there had been a 121.7% increase on the 2011 elections. Of the 855 votes (up from 386), 578 had been electronic and 277 paper, the figures representing a turn-out of 39.8%. In the light of these figures, we discussed whether it would be appropriate to move to electronic only voting for this year. However, the consensus was that it was still too soon and we should wait at least another year. But we did agree to recommend to the membership that the facility for members to cast a vote at the AGM should be removed and that this should be included in the scope for the upcoming review of the Charter, Statutes and By-Laws.

June Barrow-Green

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LMS STRATEGIC RETREAT 1-2 February 2013

Following the Council meeting on the morning of Friday 1 February, Council members continued to meet, now informally, for the remainder of that day and the following one, to consider long term matters of policy and strategy. The more relaxed and informal atmosphere allowed a greater degree of open-ended discussion of the Society's goals and challenges for the coming years than is usually possible at the formal sessions of Council.

It had been two years since the last retreat, and the aims this time were to think about a range of matters: the most useful areas for the Society to put its energy and resources into; various membership issues: briefings from the individuals most directly involved with topics such as the Society's finances, publications and core activities: and the development of a strategy for sustaining its activities in the future.

On the Friday afternoon we began with a session on financial modelling. Rob Curtis, as Treasurer, gave an overview of the current situation and forecasts for 5 and 10 year periods. While the assets and income streams currently seem healthy, we split into small working groups to consider both new potential sources of income, and new or improved ways for the Society to spend money to support mathematics, both in the UK and abroad. As with the later sessions, many ideas and suggestions were pooled at the end, which will need to be assessed and developed in the months to come.

After a break for a cup of tea we resumed with a lively session considering issues around the Society's publication work, led by the Publications Secretary, John Jones and Vice-President John Greenlees, and with expert input from the Society's Publisher, Susan Hezlet. Our focus concerned the rise of Open Access publication. For the foreseeable future the world of academic publishing will be a mixed environment ranging from traditional journal models to completely OA publications. The Society, both in its work to support mathematicians, and as a publisher itself, needs to consider the optimal, and indeed possible, strategies. The situation is complicated further by the way it continues to be fluid, and it was felt to be marked by much fog, misunderstanding and lack of clarity, including, for example, the various current and recent RCUK statements on OA. Again splitting into small groups, we considered these issues both from the point of view as a publisher and as a Society whose objectives include the support of research mathematicians in the environment we all have to live in. There was consensus that the Society should be actively monitoring the situation in institutions, keeping mathematicians as well informed of the ongoing situation as possible, considering schemes – where possible – to mitigate potential serious threats (among others, to academic freedom or the difficulties of early career researchers), and publishing clear policy statements. Being the last session of the day, we were free to drown our sorrows in the bar at the end of it.

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Saturday began with a morning mostly devoted to thinking about the Society's activities. Rob Wilson, Programme Secretary, took us through the current grant schemes and current spending aims. Alice Rogers, Education Secretary discussed the work and aims of the Education Committee and the activities it supports, while Ken Brown, Vice-President, detailed the work of the Research Policy Committee, covering its main activities and its links with and contributions to outside organisations such as government, EPSRC and CMS. Break-out groups this time were asked to think about the various issues raised, including what we thought were the most important opportunities and most serious threats to UK mathematics, and what the LMS could do about them. Again, many and varied were the ideas generated, and time will be needed for them to be worked through and the most promising developed.

The last themed session straddled the lunchbreak. Rob Curtis took us through a review of the Membership, with discussion of the new system of LMS representatives in departments. the general increase in membership over the last year or so, and the greater use of technology to enhance communications. He circulated an interesting analysis comparing the costs and benefits of being an LMS member with membership of other learned societies. Discussions were led on how membership might be further increased, the best ways of enhancing the benefits of being a member, and whether there were particular categories of mathematician with whom the LMS could better engage. There was general agreement that the Society's objectives were best served by continuing to spread funding widely, but it was also felt that a general discussion throughout the mathematics community as to the types of grant schemes the Society runs would be helpful.

The afternoon finished with an open session for general discussion; topics raised included the ambition of the Society, issues related to communications with other bodies and policy influence, and a review of meetings, activities and the relation of the Society to the BMC.

The President ended the Retreat at about 4 pm, thanking the five staff members who had done much to assist with the Retreat, and everyone for what was generally agreed as a very constructive process.

John Hunton



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WOMEN IN MATHEMATICS DAY 2013

The Women in Mathematics Day is an annual event organised by the London Mathematical Society. This year there will be a two day event on 18-19 April to be held at the Isaac Newton Institute in Cambridge. As usual, sessions will include talks by women mathematicians at different career stages and a poster session. There will also be a number of practical sessions to help women get the most out of their careers in mathematics. Sessions will include advice on how to get funding for your first postdoc and beyond and discussion groups on topics such as combining family and career, working overseas and making the next step in your career. The event provides an opportunity to meet and talk with women who are active and successful in mathematics. The event is open to all but would be of particular interest to women mathematicians, especially PhD students and those at an early stage of their career.

Any postgraduates, postdocs or research assistants interested in giving a talk or presenting a poster at the meeting should contact Beatrice Pelloni (b.pelloni@reading.ac.uk) by 15 March 2013.

To encourage high quality posters, a £50 book token will be awarded for the poster that is judged to be the WiM Day Best Poster 2013.

Programme

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DAY 1 (18 April)

10.30-11.00	Registration and Coffee	DAY 2 (19 A	April)
11.00-12.30	Morning Session	09.00-13.00	Morning Session
	Gwyneth Stallard (Open University)		Nalini Joshi (University of Sydney)
	Sarah Dance (University of Reading)		Junior Talks
12.30-13.30	Lunch and Poster Session		Corinna Ulcigrai (University of
13.30-18.30	Afternoon Session		Bristol)
	Junior Talks	13.00-14.00	Lunch and Poster Session
	Athena SWAN and good practice	14.00-16.30	Afternoon Session
	in university mathematics departments		Discussion groups
	Funding Talk and discussion groups		Colva Roney-Dougal (University of
18.30-19.30	Reception		St Andrews)
19.30	Dinner	16.30	Meeting closes

There will be a dinner on the evening of 18 April at Murray Edwards College, funded by the Cambridge Mathematics Departments and lunch on both days will be funded by the LMS. Bed and breakfast accommodation will be available at Murray Edwards College at a cost of £69.75 per night (or a reduced rate for those willing to share). The INI will book accommodation if requested on the registration form.

The event is free for students and speakers and £5 for all others, payable on the day.

Limited funds are available to help with the travel costs of students attending the event; please email womeninmaths@lms.ac.uk for further details.

Register by 1 April 2013 at www.newton.ac.uk/women/WIM/wimw02.html. (Late registrations for places may be accepted, subject to availability.)

The Women in Maths Day 2013 event has received additional funding support from the Clay Mathematics Institute, Isaac Newton Institute and Cambridge University.

HIGH-DIMENSIONAL INFERENCE WITH APPLICATIONS

A two-day workshop on High-Dimensional Inference with Applications will take place at the University of Kent Canterbury, from 25 to 25 June 2013 hosted SMSAS.

The workshop will explore theory and practice for high-dimensional statistical inference by bringing together applied mathematicians, statisticians and bioinformaticians from the UK and internationally, with a focus on the future direction of the topics. A number of distinguished invited speakers ALGEBRA AND will contribute talks on subjects including Bayesian nonparametric statistics, wavelet based functional data analysis, regression and calibration with many covariates. Bayesian experimental design, classification and discrimination in high dimensions, and work which connects with innovative non-Bayesian and classical approaches.

The areas of research and researchers are those with whom Professor Phil Brown has had close contact and the workshop is in his honour. There will be a dinner on the Monday evening at which Sir Adrian Smith will give the after dinner speech.

The aim of the workshop is to provide a state-of-the-art review and a presentation of the open problems in the aforementioned topics related to high-dimensional inference. This will therefore be a highly visible two-day international gathering of world renowned statisticians. Confirmed invited speakers are:

- Deborah Ashby (Imperial College London)
- Philip Dawid (University of Cambridge)
- Tom Fearn (University College London)
- Jim Griffin (University of Kent)
- Chris Holmes (University of Oxford)
- Jeffrev S. Morris (University of Texas)
- Clive Payne (Nuffield College, Oxford)
- Irene Poli (University Ca'Foscari, Venice)
- Rolf Sundberg (University of Stockholm)
- Marina Vannucci (Rice University, Houston)
- Stephen Walker (University of Kent)
- Henry P. Wynn (London School of

Economics)

• James V. Zidek (University of British Columbia)

Graduate students and all those interested

in the research area to the workshop are encouraged to attend. For further information visit the website at www.kent.ac.uk/smsas/ events/HDIA2013.html or contact Professor Jian Zhang (email: jz79@kent.ac.uk; tel: +44 1227 823648). The workshop is supported by an LMS Conference grant.

BIFURCATION THEORY. NUMERICAL LINEAR **APPLICATIONS 2013**

A conference on Bifurcation Theory, Numerical Linear Algebra and its Applications to celebrate the 65th birthday of Professor Alastair Spence will take place from 1 to 2 July 2013 at the University of Bath. Confirmed speakers are:

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- Howard Elman (University of Maryland)
- Andrew Stuart (University of Warwick)
- Françoise Tisseur (Manchester University)
- Fengshan Bai (Tsinghua University)
- Ian Sloan (University of New South Wales)
- Des Higham (University of Strathclyde)
- Karl Meerbergen (Katholieke Universiteit Leuven)
- Andrew Cliffe (University of Nottingham)
- Simon Tavener (Colorado State University)
- Alan Champneys (University of Bristol)
- Gerald Moore (Imperial College London)
- Bodo Werner (Universität Hamburg)

All are welcome and there will be no registration fee. For further information and to book accommodation visit the website at http://people.bath.ac.uk/mamamf/BTNAA13. html. To register and reserve a place at the dinner contact the organiser Dr Melina Freitag (m.a.freitag@bath.ac.uk). This conference is supported by an LMS Conference grant.

The meeting will take place the week after the 25th Biennial Conference on Numerical Analysis in Strathclyde which is preceded by the Preconditioning Conference in Oxford.



Frontiers

Flatland, a Great Place to do Algebra

Sir Vaughan Jones KNZM FRS FRSNZ Vanderbilt University

In his book *Flatland, a romance of many dimensions*, Edwin Abbott imagines a two-dimensional world inhabited by two-dimensional creatures. The lack of a third dimension might appear to reduce possibilities all round but we will explain how a system of algebra based on two dimensional configurations is in fact very rich. It has even been proposed as the basis for building a quantum computer. The talk, intended for those without too much mathematics background, will be enhanced by a certain number of more or less relevant anecdotes and images and trace the speaker's own mathematical voyage in dimensions.

Tuesday 16th April 2013 Time: 17.15 Wallace Lecture Theatre, Main Building, Cardiff University

The distinguished lecture is aimed at a broad spectrum of scientists interested in the frontiers of mathematical research with applications and roots in theoretical physics and the other sciences. The Founding President of the Society, Professor Sir John Cadogan CBE FRSE PLSW FRS will take the chair. The event is open to anyone. For further information contact Professor David Evans, EvansDE@cf.ac.uk, Cardiff School of Mathematics. Registration is through the web page http://tinyurl.com/JonesVFR. The closing date for registration is Friday, 12th April 2013.

Sir Vaughan Jones is Distinguished Professor and Stevenson Professor at Vanderbilt University, Director of the New Zealand Mathematics Research Institute, Co-director of the New Zealand Institute for Mathematics and its Applications. He was awarded the Fields medal, New Zealand Government Science Medal (now Rutherford Medal) and the Onsager Medal. Sir Vaughan is a Fellow of the Royal Society and of the Royal Society of New Zealand, Member of the Australian Academy of Sciences, American Academy of Arts & Sciences, US National Academy of Sciences and Foreign Member to the Norwegian Royal Society of Letters and Sciences.

Frontiers is a lecture series in which distinguished academics are invited to speak about the frontiers of research and to place their own contributions in context. This lecture is funded by the Wales Institute of Mathematical and Computational Sciences at Cardiff University.



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VISIT OF CONSUELO MARTÍNEZ LÓPEZ

Professor Consuelo Martínez López (Universidad de Oviedo, Spain) will visit the UK and Ireland from 28 April to 8 May 2013. She will be lecturing on various aspects of non-associative algebras and representation theory at

- University College Dublin, 29 April Conformal modules and irreducible representations of the exceptional Cheng-Kac superalgebra
- Queen's University Belfast, 3 May Around the Cheng-Kac superalgebra
- Queen's Mary University London, 7 May Representation theory of Jordan superalgebras

For further details of her visit contact Dr Martin Mathieu (m.m@qub.ac.uk). The visit is supported by an LMS Scheme 2 grant.

WALES MATHEMATICS COLLOQUIUM 2013

The Wales Mathematics Colloquium 2013 will be held at Gregynog Hall, near Newtown, Powys, from 20 to 22 May 2013. In addition to a range of contributed talks, there will be guest lectures on two themes: (i) spectral theory, and (ii) uncertainty in mathematical modelling. The guest speakers are:

- Brian Davies (Kings College London)
- Sofia Olhede (University College London)

Fuller information on the programme and details of how to apply can be found at www.wimcs.ac.uk/gregynog.html. The colloquium is supported by an LMS Conference grant and the Gregynog Fund.

ACME OPEN CALL FOR MEMBERS 2013

The Advisory Committee on Mathematics Education (ACME) has issued an open call for three new members. Candidates for the positions are expected to have current or recent experience of mathematics education research, teacher education and development, teaching within schools and/ or colleges, Higher Education or working with mathematics education practitioners.

The ACME provides advice to the Government and its agencies, and other policy makers on mathematics education issues in English schools and colleges between the ages of 5 to 19.

Further details about the roles and the application process are on the ACME website at www.a cme-uk.org/news/news-items-repository/2013/2/ acme-open-call-for-members-2013.

Applications must be received by Friday 12 April 2013.

ww.demorganhouse.org.uk

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O-Minimality and Diophantine Geometry

LMS-EPSRC Short Course

Manchester University 8-12 July 2013

Organisers: Gareth Jones and Alex Wilkie

Course outline

The last five years have seen a surprising and fruitful interaction between o-minimality, a branch of model theory, and diophantine geometry. The most spectacular outcome of this interaction is Pila's proof of the André-Oort conjecture for products of modular curves (Annals of Math., 2011). There have been further important developments by several mathematicians including Masser, Zannier, Ullmo, Yafaev, Habegger, and Pila.

The aim of the LMS-EPSRC Short Course is to introduce students in both model theory and number theory to these recent developments. The strategy underlying the diophantine applications will be introduced through a simple example accessible to first-year graduate students, and the key ingredients will each be discussed.

The three main lecture course topics are:

- Rational points on definable sets (Alex Wilkie, Manchester)
- Functional transcendence via o-minimality (Jonathan Pila, Oxford)
- Diophantine applications (Philipp Habegger, Frankfurt)

There will be guest lectures given by **David Masser** (Basel), **Andrei Yafaev** (UCL) and **Gareth Jones** (Manchester).

These lecture courses will be supplemented by tutorial sessions.

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

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

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

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

Fees

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

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£150) **£400** 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 (£300) **£550** in total.

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). <u>Fees are not payable until a place on the course is offered but will be due by Friday 28 June.</u>

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

LMS INVITED LECTURES 2013



Professor Fedor Bogolomov (Courant Institute, NYU)

Birational Geometry and Galois Groups

10-14 June 2013 University of Edinburgh

The lectures will discuss the relation between the structure of the Galois group of algebraic closure of a field of rational functions and the structure of the field itself. More precisely, they will cover how to extract effectively birational invariants (i.e. geometric invariants of projective models of the field from the Galois group).

There will also be supplementary lectures by:

G. Brown (Loughborough) Fano 4-fold hypersurfaces

- I. Cheltsov (Edinburgh) Finite subgroups of Cremona group
- T. Logvinenko (Warwick) Derived categories and birationality

University and local Guesthouse accommodation will be available.

Limited financial support is available with preference given to UK research students. Please contact the organisers for further details (i.cheltsov@ed.ac.uk, J.Martinez-Garcia@sms.ed.ac.uk).

Deadline for funding: 1 May 2013.

For further details on the 2013 Invited Lectures visit www.maths.ed.ac.uk/ cheltsov/fedya/



- *All applicants will be contacted within two weeks after the deadline; information about individual applications will not be available before then*
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Topology in Low Dimensions

Durham University 26 – 30 August 2013

Organiser: Andrew Lobb

Course outline

Low-dimensional topology has seen a proliferation of new invariants and techniques over the last decade or so which are intimately interrelated. The ideas behind them are approachable from a number of points of view: for example from algebraic geometry, differential geometry, algebraic topology, or from representation theory. The invariants include Khovanov homology and its offspring, Floer homologies, and various gauge theories.

It is important that the new generation of topologists and geometers becomes familiar with these techniques in which many disparate areas of mathematics are united. A problem in getting to grips with this area is that there are no good comprehensive written sources for students to study independently that give a sensible balance of the theory and the applications.

The course aims to present a broad selection of these ideas, covering the construction, the properties, and what can be done with them.

The three main lecture course topics are:

- Heegaard-Floer homology (Matthew Hedden, Michigan State University)
- Khovanov homology and its offspring. (Jacob Rasmussen, Cambridge)
- Contact 3-manifolds and holomorphic curves. (Chris Wendl, UCL)

These lecture courses will be supplemented by tutorial sessions.

For further information visit:www.maths.dur.ac.uk/~ddmb48/LMS_Durham_Short_Course.html

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

The closing date for applications is ${\bf 15}$ July 2013. Numbers will be limited and those interested are advised to make an early application.

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

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

Fees

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

UK-based postdocs will be charged a registration fee of £250, plus half the subsistence costs (£125) **£400** in total.

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

All participants must pay their own travel costs (for EPSRC funded students, this should be covered by their DTA). <u>Fees are not payable until a place on the course is offered but will be due by **Friday 16 August 2013**.</u>

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

INTERNATIONAL **MATHEMATICS COMPETITION** FOR UNIVERSITY **STUDENTS**



Preliminary Announcement

The 20th International Mathematics Competition for University Students coorganized by University College London and hosted by the American University in Fax. Bulgaria, Blagoevgrad, Bulgaria, will take place at Blagoevgrad, Bulgaria from 6 to 12 August 2013.

Every participating university is invited to send several students and one teacher. Individual students are welcome. The competition is planned for students completing their first, second, third or fourth year of university education and will consist of

two sessions of five hours each. Problems will be from the fields of Algebra, Analysis (Real and Complex), Geometry and Combinatorics. The working language will be English. Over the previous nineteen competitions we have had participants from over two hundred institutions in fifty countries.

the Universities traditionally divide their participants into groups of four each. The number of students in the teams is. however, not fixed. The professor who accompanies the students is expected to be The LMS Joint Research Group in Tropical a member of the Jury.

The problems will be chosen at the meeting of the Jury on 7 August from those received in advance by the President of the Jury, Professor John Jayne. The problems proposed should be precisely formulated and accompanied by a detailed solution. The problems should be in fields of Algebra, Analysis (Real and Complex), Geometry and Combinatorics. The problems given at the last nineteen competitions can give a general idea of the level expected (see the IMC website www.imc-math.org.uk).

Additional topics may be also included. The students' work will be evaluated by Team Leaders and other Professors and Assistant Professors using criteria provided by the Jury.

Participants are invited to confirm their intention to participate, either by on-line registration or by email, by the end of May 2010, providing the following information: University; City, Country; Leader of the team (name, email address): Students (number); Mailing address; Email address;

The participants from some countries will need a visa to enter Bulgaria. Contact your travel agent or the Bulgarian Consulate in your country for details. If necessary, the organizers will post formal invitations for participation in the competition. You must begin the visa process early as it requires time.

The competition fee, which will include accommodation and meals from dinner on 26 July to breakfast on 1 August, have not vet been finalized.

Send all confirmations of participation and arrival details to John Jayne (j.jayne@ ucl.ac.uk). If you would like a copy of the competition poster email John Jayne with your postal address. For further informa-Although this is an individual event, tion visit the website at www.imc-math. ora.uk.

TROPICAL MATHEMATICS

Mathematics and Its Applications is organising another series of tropical workshops in Manchester, Birmingham and Warwick in 2013. The workshop in Birmingham will take place on Thursday 16 May from 1 pm. Among the speakers are:

- Marianne Akian (Palaiseau)
- Martin Gavalec (Hradec Králové)
- Dima Grigoriev (Lille)
- Bernd Heidergott (Amsterdam)

More information can be found on http:// web.mat.bham.ac.uk/tropical. The workshops are supported by an LMS Scheme 3 grant.

LMS POPULAR LECTURES 2013

Institute of Education, London – Tuesday 25 June

King Edward School, Birmingham – Thursday 26 September

Professor Ray Hill University of Salford

Mathematics in the Courtroom

In this talk, Professor Ray Hill shows how the misuse of mathematics can lead to miscarriages of justice, and how the correct use of mathematics can help to prevent them.





Dr Vicky Neale University of Cambridge

Addictive Number Theory

For hundreds of years, mathematicians have asked intriguing guestions about adding whole numbers, for example concentrating on particularly important sequences such as the prime numbers and the square numbers.

We shall discuss some of these problems (solved and unsolved), and some of the elegant techniques from across mathematics that have been used to tackle these problems.

LONDON: Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. Register by Thursday 20 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 20 September.

To register for tickets, please email popularlectures@lms.ac.uk or visit the LMS website for abstracts and a registration form (www.lms.ac.uk/content/popular-lectures).



Isaac Newton Institute for Mathematical Sciences

HOLOGRAPHY: FROM GRAVITY TO QUANTUM MATTER

16-20 September 2013

in association with the Newton Institute programme Mathematics and Physics of the Holographic Principle (16 September – 11 October 2013)

Workshop Organisers: Antonio García-García (Cambridge), Hong Liu (MIT) and Jan Zaanen (Leiden)

The study of holographic dualities is currently a broad area of research located at the confluence of several traditionally separate communities of physics and mathematics ranging from QCD, condensed matter, statistical physics and string theory, to numerical relativity and non-linear partial differential equations.

This workshop, which is the launching event of the Isaac Newton Institute programme Mathematics and Physics of the holographic principle, brings together leading experts in these diverse fields in order to create the critical mass of knowledge and skills necessary for the opening of new research avenues in this problem.

Although the workshop is open to any major development in the field, research lines that stimulate cross-fertilization and push the remit of holographic dualities will be especially highlighted. A sample of topics of interests is given below:

- Holographic description of quantum matter, such as quark-gluon plasma, strange metals, Fermi-liquid emergence, topological matter, novel quantum phases
- Far from equilibrium dynamics and numerical relativity
- Entanglement, quantum information and holography
- Condensed matter applications: towards the description of real materials
- Novel gravity duals of large N vector and ABJM models

Further information and application forms are available from the website at www.newton.ac.uk/programmes/HOL/holw01.shtml

Closing date of the receipt of applications is 24 May 2013.

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DISCRETE INTEGRABLE SYSTEMS A follow-up workshop: 8-12 July 2013



Isaac Newton Institute for Mathematical Sciences

in association with the Newton Institute programme Discrete Integrable Systems (19 January – 3 July 2009)

Organisers: Rod Halburd (UCL), Frank Nijhoff (Leeds) and Reinout Quispel (La Trobe).

This follow-up workshop will explore the recent advances in discrete integrable systems since the half-year programme in 2009. Discrete equations are more fundamental and richer than their differential counterparts. The theory of discrete integrable systems draws on, and contributes to, methods from many diverse areas of mathematics including algebraic geometry, complex analysis, differential geometry, graph theory, orthogonal polynomials, random matrix theory, Riemann-Hilbert problems, special functions, spectral theory and tropical geometry. Furthermore it has inspired work on discrete versions of complex analysis and discrete 'differential' geometry.

A key aspect of the meeting will be to explore connections between the ever-growing number of approaches to this exciting and expanding area.

> Further information and application forms are available from the website at www.newton.ac.uk/programmes/DIS/disw05.

> > Closing date of the receipt of applications is 30 April 2013.

ADVANCED DECOMPOSITION METHODS FOR PARTIAL DIFFERENTIAL EOUATIONS

A minisymposium on Advanced Decomposition Methods for Partial Differential Equations will take place from 2 to 4 September 2013 at Kingston University. The objective of this minisymposium is to examine advanced decomposition methods with respect to discretisation for evolution equations with applications to transport phenomena, heat transfer models, micro heat transfer models, financial and economic problems and medical applications. The decomposition considered includes three different aspects, which include (1) spatial decomposition in the form of decoupling of the spatial axes, (2) temporal decomposition induced fessor Choi-Hong Lai (C.H.Lai@gre.ac.uk).

by transformation and Lie group, and (3) decomposition within micro-scale computational domain. The agreed plenary speakers include:

- Craig Douglas (University of Wyoming)
- Jurgen Geiser (Humboldt University)
- Dongwoo Sheen (Seoul National University)
- Qing Sheng (Baylor University)

The format will be plenary talks, contributed talks, a poster session, short PhD project presentations throughout the meeting, and a panel session on the third day to discuss the future trend of decomposition techniques and their numerical properties on parallel and distributed computing environment.

For further details and call for papers visit the website at http://cms1.gre.ac.uk/conferences/LMS2013/index.html or contact Pro-



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Isaac Newton Institute for Mathematical Sciences



NON-EQUILIBRIUM STATISTICAL MECHANICS AND THE THEORY OF EXTREME EVENTS IN EARTH SCIENCE

29 October - 1 November 2013

in association with the Newton Institute programme Mathematics for the Fluid Earth (21 October – 20 December 2013)

Organisers: Valerio Lucarini (Hamburg/Reading) and Sandro Vaienti (Centre de Physique Théorique, Marseille).

Contributions to the workshop are encouraged in relevant areas and e.g. in the following topics: large deviation theory, extreme value theory, dynamical systems, bifurcations, chaos, predictability, Lyapunov exponents and vectors, data assimilation, multifractal properties of fluid flows, long-term memory, turbulence, stochastic processes, response theory for nonequilibrium systems.

This event will hopefully give impetus for extending the collaboration between meteorologist, climate scientists, physicists, and mathematicians.

> Further information and application forms are available from the website at www.newton.ac.uk/programmes/MFE/mfew01

Closing date of the receipt of applications is 15 September 2013.

FINITE SIMPLE GROUPS **ALGEBRAIC GROUPS** AND THEIR IMPACT

CONFORMAL GEOMETRY IN MAPPING, IMAGING AND SENSING

A meeting on Finite Simple Groups Algebraic Groups and their Impact will take place on Wednesday 10 April 2013 at Birkbeck, University of London. The speakers are:

- Ben Fairbairn (Birkbeck)
- Martin Liebeck (Imperial)
- Inna Capdeboscg (Warwick)

For further information visit the webwww.ems.bbk.ac.uk/facultv/fairbairn/ site fsg or email the organizer Ben Fairbairn (b.fairbairn@bbk.ac.uk). The meeting is supported by an LMS Conference grant.

A workshop on Conformal Geometry in Mapping, Imaging and Sensing will take place from 20 to 21 June 2013 at Imperial College London, The aim of the workshop is to survey new developments in the theory and applications of conformal geometry ranging from its more traditional roles in pure/ applied mathematics and numerical analysis (such as numerical conformal mapping, mesh generation) through to recent developments (such as circle packing and discrete conformal geometry) and novel applications in medical imaging, shape analysis, computer vision and sensina.

The workshop will comprise invited lectures, contributed talks, posters and discussion sessions. The interdisciplinary nature of the event should appeal to a broad range of mathematicians. The invited speakers are:

- Xianfeng David Gu (SUNY, Stony Brook)
- Monica Hurdal (Florida State)
- Dmitry Khavinson (U. South Florida)
- Sergey Kushnarev (Nat. Univ. Singapore)
- Kenneth Stephenson (U. Tennessee)
- Darryl Holm (Imperial College)

Full details, including instructions on how to apply for partial funding to attend, are available at www3.imperial.ac.uk/ammp/ aboutammp/ammpseminar/ammpworkshopjune2013. The website is updated regularly with new information.

The organizers are D. Crowdy (Imperial), T. DeLillo (Wichita State) and D. Holm (Imperial). The workshop is supported by an LMS Conference grant and an EPSRC Platform Grant at Imperial College.

HYPERBOLIC EQUATIONS: SOLVABILITY AND **ASYMPTOTIC PROPERTIES**

Report

The one-day meeting on Hyperbolic equations: solvability and asymptotic properties took place on 13 February 2013 at the Mathematics Department of Loughborough University. Hyperbolic equations model different physical phenomena from propagation of waves in a medium (for instance during an earthquake) to refractions in crystals and have been and still are objects of great interest in the mathematical community. This meeting aimed

- to provide an overview on the recent research on hyperbolic equations;
- to stimulate discussions and inspire future collaborations within the department:
- to suggest open problems and future lines of research for potential PhD students. The talks of the three invited speakers,



Claudia Garetto (Louahborouah University) On the well-posedness of weakly hyperbolic equations with low regular roots and lower order terms, Michael Ruzhansky (Imperial College London) Largetime asymp-

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Todor Gramchev

totics of solutions to hyperbolic equations, and Todor Gramchev (Università di Cagliari) Cauchy problem for hyperbolic systems in the presence of multiple characteristics and nonregular coefficients, focused on different aspects of the theory of hyperbolic equations and have definitely stimulated the interest of the audience who contributed to the success of the meeting with interesting questions and constructive

remarks.

We can therefore say that the meeting's aims have all been accomplished. In addition to the local participants (mainly from the Loughborough analysis and mathematical physics groups) a good number



Michael Ruzhansky

of participants (PhD students, Postdocs and one of the speakers) came from Imperial College London, encouraging us to plan joint research meetings in the near future.

The meeting was supported by an LMS Conference grant awarded under the 'Celebrating New Appointments' scheme.

LMS NEWSLETTER

http://newsletter.lms.ac.uk

OBITUARIES PAUL BATEMAN

Professor Paul T. Bateman, who was elected a member of the London Mathematical Society on 17 June 1948, died on 26 December 2012, aged 93.

Harold Diamond writes: Paul Bateman,

spired much further study.

who was born and raised in Philadelphia, PA, attended the University of Pennsylvania. His studies were interrupted during World War II, when, as a conscientious objector, he worked in a mental hospital. Paul earned his PhD in 1946, supervised by Hans Rademacher. His thesis included a proof of a formula conjectured by G.H. Hardy for the number of representations of a positive integer as the sum of three squares, a result that has in-

After post-doctoral positions at Yale and the Institute for Advanced Study, Paul came to the University of Illinois in 1950 and stayed until retiring in 1989. From 1965 to 1980, Paul served as Department Head; he was active in the department until his last year.

Paul's research centered on analytic number theory. He supervised 20 PhD students and wrote joint articles with 20 mathematicians. Also, he prepared an authoritative appendix for the reprint of Landau's seminal book *Primzahlen*. Paul is perhaps best known for the Bateman-Horn conjecture on the density of prime number values generated by systems of polynomials.

Paul was a long-time member of the American Mathematical Society, where he served as an Associate Secretary and a member of the Board of Trustees and the Mathematical Reviews Committee.

Paul married Felice Davidson in 1948. She died 4 February 2013, just a few weeks after Paul. The Batemans shared interests in classical music and opera and enjoyed exploring



mountains and back roads.

Colleagues and acquaintances will remember Paul for his guidance, support, encouragement, and friendship. A number theory conference in honor of the Batemans will be held in Spring 2014.

AKOS SERESS

Ákos was a great man. He carried all before him in a wave of enthusiasm, hard work, and insight, an insight that comprehended a great range of mathematical issues, an understanding of what needed

to be done and how to do it, and a cheerful empathy with all around him. To meet Ákos was to make a friend and collaborator for life. He collaborated with everyone, whether (as was often the case) he wrote a joint paper with them or not. He was quietly proud of having Erdös number 1; so everyone with Erdös number k has Seress number at most k+ 1.

Ákos worked chiefly in computational group theory; more specifically with permutation groups and matrix groups over finite fields: and also in combinatorics. Computational group theory has, on occasion, shown signs of splitting into two mutually suspicious cliques; the theorists and the practitioners. Any nonsense of this kind was blown away in the presence of Ákos. He bestrode both worlds, and made ridiculous the idea of regarding either as inferior. With Bill Kantor he organised a series of international meetings on computational group theory where these divisions were further, and perhaps permanently, healed. He also brought the two sides together with his lectures. The content of his lectures was of central importance; but Ákos added another ingredient. To hear him lecture was to think: What fun: I should like to work in this area. His pleasure in being invited to give a lecture at the 2006 International Congress of Mathematicians in Madrid was a splendid

example of this infectious enthusiasm.

A central topic in the work of Ákos was the theory of black box groups. A group, which might, in practical cases, have order as big as two to the power of a million, is given in purely abstract terms. A black box algorithm, under certain hypotheses that include, for example, almost all simple groups, will interpret these abstract group elements as permutations or matrices, despite the fact that only a miniscule proportion of the multiplication table can be explored. That it should be possible to produce algorithms to solve such problems seems miraculous: but Ákos and his collaborators showed us how this can be done. His algorithms were fast and practical for simple groups, and some, with far greater generality, were of purely theoretical interest, and he was equally proud of their impracticality.

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Ákos Seress was born on 24 November 1958, and died on 13 February 2013. He leaves a widow Sherry, and a son Laszlo.

> Charles Leedham-Green Queen Mary, University of London

REVIEWS

around vou.

Mathematical Expeditions: Exploring Word Problems across the Ages by Frank J. Swetz, 2012, The Johns Hopkins University Press, 192 pp, hbk £31.00, \$60.00, ISBN: 978-1-4214-0437-0, pbk £15.50, \$30.00, ISBN: 978-1-4214-0438-7.

For many years, the author has 'worked with teachers and students to promote the inclusion of historical material into the teaching of mathematics'. He states that he has found that an 'efficient, fruitful and appealing way' of doing so is

http://newsletter.lms.ac.uk



and solved by our forebears'. His incorporation of such problems in earlier publications has been favourably received.

More than half of the book consists of 13 short chapters, each devoted to a particular period and place in history, commencing with Ancient Babylonia (2002 - 1000 BCE) and finishing with Nineteenth Century Calculus Problems. Chapters in between include predictable topics such as Ancient Egypt, Ancient Greece, Ancient China, India, Islam and Renaissance Europe. More recent, and in some cases less well-known topics, include Japanese Temple Problems, the *Ladies Diary* (1704-1841) and Problems from the *Farmer's Almanac*. Each of these chapters includes a list of problems, generally between about 20 and 40.

Many of the problems can be solved much more easily with the benefit of modern mathematical notation than they could have been at the time they were posed. One chapter solves a few problems in detail by both contemporary and modern methods, and another chapter gives numerical solutions to all the problems in the book.

Many different units of currency, length,

area, etc., have been used over the centuries, so the inclusion of a 'Glossary of Strange and Exotic Terms' is particularly useful. Throughout the book, many contemporary illustrations are reproduced and there is a detailed index which makes it easy to locate where a particular topic or problem occurs.

Each problem reflects the time and culture in which it was posed, but there are some problems which appear in different forms over hundreds of years. One such is the river-crossing problem posed by Alcuin of York in 800 CE. Swetz poses it as follows 'Three friends each with a sister needed to cross a river. Each of them coveted the sister of another. At the river they found a small boat in which only two of them could cross at once. How could they cross the river without any of the women being defiled by the men?' Variations of the problem appear over the centuries with the boat's occupants replaced with animals and their prey, cannibals and missionaries, people of different weights, etc.

The book is well thought-out and is recommended to readers interested in the history of mathematics.

> E. Keith Lloyd University of Southampton (retired)

PRINCIPIA MATHEMATICA the musical - world premier Conway Hall, Red Lion Square, London.

20 February 2013

Now then, people that know me will be aware that I am not much of an algebraist and even less of a philosopher and, so seeing the title of this musical, I challenged myself to recall passages from long forgotten books on the history of mathematics to prepare myself for this performance. But perhaps I shouldn't have bothered. Rather than preaching to the converted (that is only to those people fully conversant with the theory of logic) maybe the idea was to introduce concepts to others or indeed anyone, so not requiring any knowledge of rigourous mathematics. Talking of preaching, it is probably no coincidence that this musical performance is being held at the Conway Hall since the building is the home of an ethical society, which advocates secular humanism. I will need to do some research, but Bertrand Russell, on whose work this musical is based, had similar ideals and, since there is a bust of Russell in the square I guessed that he had some earlier involvement with Conway Hall.



Bust of Bertrand Russell in Red Lion Square (by Alys Gwynne-Jones)

Sure enough, inside Conway Hall, which is really a building, there is a room named after Russell, so my guess was right.

The performance of *Principia Mathemati*ca, the musical is a world premiere of a 'fascinating and unusual' new work by Tyrone Landau which is based on the 3-volume *Principia Mathematica* written by Alfred North Whitehead and Bertrand Russell, the last volume of which was published 100 years ago this year. This should not be confused with (as internet searches often do) Isaac Newton's *Principia, Philosophiæ N a t u r a l i s Principia Mathematica* written some 226 years earlier. If I mainly refer to Russell then I apologise to Whitehead who must have also played a significant role.

Building on Artistotle's reasoning, and Frege's earlier ideas on analytical philosophy, Russell was convinced that arithmetic, and indeed all of mathematics, could be constructed from a series of axioms or logical arguments. Logic was, and still is the cornerstone of mathematics allowing us to move from a hypothesis to a conclusion by incorporating proof, which is a logical sequence of steps that allows us to deduce new concepts from ones that we already know to be true. In their work, Whitehead and Russell used the language of abstraction and wrote their text using the notation of symbolic logic but to many (and I include myself) this made the text almost impenetrable (see www.youtube.com/watch?v=BE657F9sqyQ for how it was portrayed on the television programme QI, although I did not find this overly funny but while you are on the internet you might also look at a clip that I did find funny - the youtube clip of Fry and Laurie which parodies early Open University outputs www. voutube.com/watch?v=2un9rO2ZF4g). It is reported (no, sorry I have not read it) that in Principia Mathematica they took many pages even to get to the conclusion that 1+1=2 (either 200 or 362 pages depending on who you listen to, but whichever it is, it seems drawn out to me). For an applied mathematician like myself, this obsession with moving away from the visual towards rigour, while laudable, was for me at the cost of meaning and understanding (although my pure mathematics colleagues will no doubt tell me that it was understanding that they were after and that I am the one that does not have it). The tragedy is, that despite all their efforts it was not long before Gödel showed that, based on the axioms of the day, there were some results that could neither be proved to be true, nor false. So, although their central idea was to use logic to make mathematics certain, they

failed to make it certain. Interestingly, in the hall where the performance took place there was an inscription above the stage -'To thine own self be true', which I thought was appropriate to Whitehead and Russell's

search for truth.

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The writing of *Principia Mathematica* must have taken its toll on both authors. It has been compared to preparing a vast overture without actually writing the opera - so all the more interesting that this has spawned a musical.

Principia Mathematica the musical is scored for singers, dancers, musicians and philosophers - so I am not sure where I fit in! We were told to prepare to be astonished (better than being admonished). I tried to do my homework and found some clips of an opera based on Nikola Tesla with Tyrone Landau playing Thomas Edison so I was not expecting a Lloyd Webber extravaganza. This was a world premier (surely this an exclamation mark at the end of the title), but as far as I could ascertain, there is no immediate plan to repeat the performance and therefore I offer here a quick run through of the action.

On entering the performance hall I was struck by the intimacy of the cast with the audience. I sat in the front row (there were only two, but they snaked around the side of the room) and next to me were four or five actors sat at a desk. At first I thought it might be a bit like *Bouncers*, the John Godber play, where the audience suddenly become the performers. These actors were a sort of interview panel, or jury in a trial, so it felt a bit like a Hearing (for anyone who has ever run the gauntlet of seeking European Commission funding) or an EPSRC panel to review a proposal. The show starts with introductory piano music leading into opera singing from the 'star', well the writer of the musical at least, dressed all smartly in his tux (was he Russell? Maybe he was Whitehead - I never did find out but I guess so). Like most opera (for me at least), without an intimate knowledge of the script you cannot make out the exact words of the song. Moving, yes but it would have been nicer to know the detail and there was no other movement from the cast to give me a hint (usually in opera there is the archetypal heroine or mother figure feigning injury, love or a mixture of both).

So it was a bit like my reading of the book Principia Mathematica - I got the gist but could not follow it exactly. There followed a bit of dialogue about the use of Peano's notation soon accompanied with some discordant piano (I am not sure if either were easy to follow). I later discussed this with Landau and he explained that the atonal score was representing the abstraction of thought and writing in the text of Principia Mathematica. Next, two female performers who had sat quietly on the stage, take to the floor and become dancers who engage in long courtship-like ritual, rather like we have seen on Strictly Come Dancing of late, accompanied by sound from a scratchy 78 record. A fight ensues, which must relate to the angst of writing such complex text in the days before word processing as Russell was himself a pacifist who was put in prison for campaigning against the war effort during the first world war. The fight ends with one of the dancers thrown onto the review panel's table - in some rather good acting I have to say (how they did not spill the drinks I will never know. I meant to look later to see if it was a fake glass but I forgot).

One of the Panelists joins the fray (it is Tim Taylor who I later discover is a dance teacher from Morley College. Coincidentally, some 30+ years ago I did a microscopy course at Morley College and enjoyed many a social hour playing badminton so it was nice to hear later that Morley College is still going strong). Anyway, I digress and so Tim takes to the floor and stands as still as the statue in Red Lion Square arms out ready to take up a waltz while one of the female dancers cavorts (but slowly mind you) around him. The statue pose is clearly an attempt to demonstrate how much thought must have gone into the writing of Principia Mathematica while all around the world was still spinning. There is a later dance similarly with waltz statue man and the second female dancer (slightly more erotic this time, or perhaps that was just me!) where the dancing transported my thoughts back to my days at Goldsmiths staring into the back of

the Laban Centre. I only saw one flex of the foot so popular of the style back then, but nevertheless this was contemporary dancing and not ballroom dancing (although I have to say Strictly Come Dancing itself seems to have moved away from traditional ballroom and closer to contemporary of late from what little I have seen).

What follows is an interesting mix of dance and dialogue to expose the audience to the paradoxes that Whitehead and Russell faced. Circles within circles, was a theme at one point. Landau coils back when later I use the term "interesting", but to be honest it takes the audience time to get into this type of art form. Then up pops Jenny Patrone with a west end type belter called function of a function. No I can't believe it either. There she was, like Roxy from Chicago, singing about single valued functions. Actually it was guite good. The singer has obviously performed before, and on this showing will perform again. I was intrigued when the number finished with Roxy taking the Chair of the panel off into a back room - it never happens to me I can assure you!

Landau created further piano music to link pieces together. Some playing reminded me a bit of the music from Cats, which is not to say that Landau has plagiarised since a lot of Llovd Webber's material itself has its base selected from classical pieces. The same is probably true of Landau's work but I am not a music buff enough to identify it. It was pleasant enough. Then Landau - or was it Russell? - stepped into the limelight and had what looked like a dance version of a 'ménage a trois' with statue man and a female panelist (Jane Turner). There was a lot of tenderness shown and discussions about collections accompanied by the scratchy 78's again (Landau could not dance and play the piano at the same time, you understand). Roxy returned with another tuneful number about Socrates being wise before some narrative on 'if and only if' which I suspect left the unknowing audience as cold as it leaves our fresh intake students. The show ends rather suddenly with the panel's verdict that

'our world is not bound by logic - and nor are we'. I say suddenly because the show was only 45 minutes which is probably good (I have seen too many long, drawn out amdrams lasting hours) and it left me wanting more having just started to get into it.

I asked Landau later how or why he thought of Principia Mathematica as a concept for a show and he said that he had become fascinated by the book when he was a teenager after a father figure had given him the "youth of today" speech saying that "none of them can even be bothered to read anything deep like Principia Mathematica", which spurned him into action - well the first few pages at least. Landau was struck by the structure of the symbolism, rather like the symbolism of the music he was also studying. He was also guite taken with the acknowledgements in Principia Mathematica which noted earlier contributions, a bit like Newton's on the shoulders of giants, perhaps something that writers of music should also take on board.

I also asked Landau how he constructed the physical sequences and here he said that although he had suggested structures to the dancers, some or much of the sequences came from the dancers own choreography, so a full cast involvement that they seemed to enjoy.

So I was right. There were people alongside me (including a very friendly 10 year old, who told me that her Mum was pretty!) who had no detailed knowledge of mathematics and so I did not need to have done my homework to enjoy the performance. A few more background notes might have been useful in a longer program, but if you put this aside and enjoy it for what it was - an interesting mix of song, dance, and drama - then everyone had something to talk about afterwards. In fact, if they are to do it again I think that they should make more of the 'afterwards' because everyone actually did want to talk about it.

> Steven Bishop Mathematics Department, UCL and EPSRC Dream Fellow

LMS NEWSLETTER

CALENDAR OF EVENTS

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

APRIL 2013

2-5 Operads and Deformation Theory INI Conference, Cambridge (418)
2-5 Characteristic *p* methods in Algebraic Geometry, Imperial College, London (423)
3-5 Quantum Fields, Gravity and Information, Nottingham (422)
8-9 Mathematics in Finance IMA Confer-

ence, Heriot-Watt University (416) 8-12 Iwasawa Theory and Galois Representations, Warwick (423)

8-12 Advances in Number Theory and Dynamical Systems Conference, Bristol (421)

9-11 Large Deviations and Asymptotic Methods in Finance Workshop, Imperial College London (422)

9-12 BAMC, Leeds (421)

10 Finite Simple Groups, Algebraic Groups and their Impact, Birkbeck, London (424)
12-13 Integrable Models, Conformal Field Theory and Related Topics, Herts (423)
15-16 Higher Structures in Topology and Number Theory Workshop, Oxford (423)
15-17 Conformal Geometry and Function Theory in Mapping, Imaging and Sensing, Imperial College London

15-19 Common Themes in Financial & Actuarial Mathematics LMS EPSRC Short Course, Liverpool (423)

15-19 Geometric and Topological Graph Theory Workshop, Bristol (421)16 Frontiers Lecture, Sir Vaughan Jones:

Flatland, a Great Place to do Algebra, Cardiff (424)

18-19 Women in Maths Day, Cambridge (424)

22 Good Practice Scheme Workshop, ICMS, Edinburgh (424)

25 Quantum Algorithms Day, Bristol (421) 25-26 Young Topology Meeting, Imperial College, London (422)

26 LMS Meeting at BMC, Sheffield (423)

27 Early Career Mathematicians' IMA Conference, Cardiff

29-30 Operator Spaces and Operators on
Banach Spaces Meeting, Lancaster (423)
29 - 3 May Higher Rank Automorphic Forms and L-functions, Warwick (423)

MAY 2013

1-3 Modelling Biological Evolution 2013
Conference, Leicester (423)
10-11 String Math UK, Surrey

13 Operator Algebra Day, Aberdeen (423)
14 LMS-Gresham Lecture, Peter Cameron, Museum of London (423)

16 Tropical Mathematics and Its Applications Workshop, Birmingham (424)

20-22 Wales Mathematics Colloquium 2013, Powys (424)

JUNE 2013

5 Combinatorics One Day Meeting, Oxford 10-14 LMS Invited Lectures, Fedor Bogolomov, Edinburgh (424) 11 LMS Midlands Regional Meeting, Leicester (423) 11-14 MAFELAP 2013, Brunel

12-14 Advances in Surface Theory Workshop, Leicester (423)

20-21 Conformal Geometry in Mapping, Imaging and Sensing Workshop, Imperial College London (424)

24-25 High-Dimensional Inference with
Applications, University of Kent (424)
24-28 Liquid Crystal Defects and their
Geometry INI Workshop, Cambridge (421)

24-28 Dynamics of Suspensions, Gels, Cells and Tissues INI Workshop, Cambridge (422)
25 LMS Popular Lectures, London (424)
30-5 Jul British Combinatorial Conference, Royal Holloway College, University of London (422)

JULY 2013

1-2 Bifurcation Theory, Numerical Linear Algebra and Applications, Bath (424)
1-4 Dense Granular Flows 2nd IMA Conference, INI, Cambridge (416)
3-13 Polylogarithms as a Bridge between Number Theory and Particle Physics LMS-EPSRC Durham Symposium

5 LMS Meeting, London

8-12 Discrete Integrable Systems INI
Follow-up Workshop, Cambridge (424)
8-12 O-Minimality and Diophantine
Geometry, LMS-EPSRC Short Course, Manchester (424)

8-12 Modern Nonlinear PDE Methods in Fluid Dynamics, LMS-EPSRC Short Course, Reading (423)

8-12 Banach Algebras and C*-algebras
Meeting, IMPAN, Warsaw (423)
15-19 Polynomial Optimisation Summer
School and Workshop, INI, Cambridge (420)
15-25 Graph Theory and Interactions
LMS-EPSRC Durham Symposium
29-2 Aug Computational Group Theory, LMS-EPSRC Short Course, St Andrews (423)

AUGUST 2013

6-12 International Mathematics Competition, Blagoevgrad, Bulgaria (424)
3-11 Groups St Andrews 2013, St Andrews (410)

19-23 Random Graphs, Geometry & Asymptotic Structure LMS-EPSRC Short Course, Birmingham (424) 26-30 Topology in Low Dimensions LMS-

EPSRC Short Course, Durham (424)

SEPTEMBER 2013

2 Heilbronn Day, Groups and Their Representations, Manchester (423)

2-4 Advanced Decomposition Methods for Partial Differential Equations Minisymposium, Kingston (424)

2-6 New Mathematical Directions for Quantum Information INI Workshop, Cambridge (423)

3-6 Brauer's Problems in Representation
Theory – 50 years on, Manchester (423)
9-13 Spectral Geometry, Chaos and Dynamics, Loughborough

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

15-21 Quantum (semi)groups and (co)actions Meeting, Leeds (423)

16–20 Holography: From Gravity to Quantum Matter INI Workshop, Cambridge (424)
22-27 Heidelberg Laureate Forum, Heidelberg (422)

26 LMS Popular Lectures, Birmingham (424)

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OCTOBER 2013

14–18 Quantum Marginals INI Workshop, Cambridge
29 Oct – 1 Nov Non-Equilibrium Statisti-

cal Mechanics and the Theory of Extreme Events in Earth Science INI Workshop, Cambridge (424)

NOVEMBER 2013

15 LMS AGM, London

APRIL 2014

7-10 British Mathematical Colloquium, QMUL

AUGUST 2014 13-21 ICM 2014 Secul F

13-21 ICM 2014, Seoul, Republic of Korea (403)

ADVANCING WOMEN IN MATHEMATICS: GOOD PRACTICE IN UK UNIVERSITY DEPARTMENTS

Report launched at the House of Commons on the 27 February 2013 (article on page 1)



Graeme Segal, Andrew Miller MP, Margaret Wright, Shabana Mahmood MP



Soan Lasenby, Peter Clarkson



Stephen Huggett, Cathy Hobbs



Jennifer Scott, Gwyneth Stallard, Christie Marr



Liz Whitelegg, Chi Onwurah



Emma McCoy, Eva-Maria Graefe