

NEWSLETTER

No. 387 December 2009

Society Meetings and Events

2009

4–6 December

Joint meeting with the Belgian Mathematical Society, Leuven



2010

Friday 26 February Mary Cartwright Lecture, Durham [page 3]

Monday 21 June

SW & South Wales Regional Meeting Cardiff

Friday 2 July

Hardy Lecture London

Monday 13 September Midlands Regional Meeting, Nottingham

Friday 19 November

Annual General Meeting and Naylor Lecture, London

COUNCIL MEETING

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The Council meeting started with a review of recent events and the current situation of the Society and its Council by the President John Ball. It is fair to say that the last few months have been turbulent in the life of the Council and the Society, with resignations of several Officers of the Society and more recently of the Executive Secretary, and the President and other Officers of the Society have been working hard to return things to an even keel. John reflected that his time as President this second time around had not been a pleasant experience and urged a period of calm and stability in the LMS over the coming months. He emphasised that the turbulence of recent events have been difficult and stressful for staff at De Morgan House, and that we need to communicate clearly and urgently how much Council appreciates their work and their input to developing the policy and activities of the Society. I hope that we made some progress in the directions the President indicated in the remainder of the meeting.

Immediate actions of the meeting were to propose and agree that Professor Garth Dales and Professor Alex Wilkie take on the roles of General Secretary and Vice-President, respectively, until the November elections, when the newly elected people will take over. A significant part of the meeting was then devoted to staffing issues, reinforcing the importance of the staff of the Society and the key role they play. One key decision was to appoint a new permanent full-time member of staff, replacing two half-time vacancies that had arisen during the year within the Society & Grants Group and the Council & Committees Group within the staffing at De Morgan House. The President also reported on the excellent progress made by the Working Group set up with the agreement of Council to commence the process of finding a new Executive Secretary. It was agreed to move rapidly to advertising for a replacement, and there was discussion of the most effective recruitment routes and of the requirements for the role.

The President-Designate spoke briefly about plans for a Council retreat in January, running from Friday to Sunday. This will, in my view, and judging by the previous Council retreat I've attended, be a welcome extended opportunity to plan the future development of the Society, and to build strong working relationships.

In a larger piece of business, the Treasurer presented the draft annual accounts, and draft text for the Trustees' report, and updated us on the performance of our investments (which reduced in value by 16% over the 13 months ending 31 August) and on a forthcoming meeting of the Investment



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Subcommittee. The Treasurer's recommendation was that, despite difficult times in the financial markets over the last year, there was no financial basis for any freeze in spending, given that our Yale model for drawing on investment income is designed for fluctuations and that our publishing activities had performed very well financially this year.

In the afternoon we briefly discussed the draft proposals for the Research Excellence Framework. There was general approval of the proposal to combine the mathematical sciences into a single panel, but concern at how the proposed assessment of "impact" could work for mathematics. Views expressed included that, for much of mathematics, the timescales for impact are far longer than indicated in the consultation document and that the suggested 25% weighting for impact is too high. The Society will feed a detailed response back to this consultation through the Council for the Mathematical Sciences, and we agreed that Professors Ken Brown and David Larman should be the LMS representatives leading this process.

The afternoon also featured a presentation from Professor Kenneth Falconer (see pages 7–8) reviewing the publishing work of the Society and of the Publications Committee (following earlier discussion in the morning of current plans for development). This is a large-scale and very effective part of the LMS, where the staff, Officers and members of the Society are very active, and where there are many challenges, associated with new projects, with changes to the publishing landscape and with external financial pressures, which the large publishing team are negotiating very effectively. Recent new projects have included the Journal of Topology, launched in January 2008, which is developing very successfully, and the journal Mathematika, which the LMS will publish from 2010 on behalf of its owner University College London. Council expressed its great appreciation to Kenneth for his presentation and work as Publications Secretary, noting that this was his last Council meeting in that role.

Simon Chandler-Wilde

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LONDON MATHEMATICAL SOCIETY MARY CARTWRIGHT MEETING

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Friday 26 February 2010

Arthur Holmes Lecture Theatre, University of Durham

3.30 Opening of the Meeting Ana Achúcarro (Leiden)

Title TBC

- 4.30 Tea
- 5.00 Mary Cartwright Lecture Ruth Gregory (Durham) Fun with extra dimensions

A dinner will be held after the meeting. Contact Isabelle Robinson (isabelle.robinson@lms.ac.uk) for further information.

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

APPOINTMENT OF EXECUTIVE SECRETARY

Council is pleased to announce that Mr Ivor Goddard, formerly Director-General of the Royal Statistical Society, has been appointed as interim Executive Secretary from 1 January 2010. Ivor, who headed the administration of the RSS from 1992 to 2008, will take up his post following an overlap period with Peter Cooper.

A group appointed by Council is leading the search for a permanent replacement and an advertisement will be placed shortly.

WOMEN IN MATHEMATICS COMMITTEE

It is well known that there is a steep decline in the number of women in mathematics with increasing levels of seniority. Whilst this trend is not exclusive to mathematics, the London Mathematical Society is concerned about the loss of women from mathematics, particularly at the higher levels of research and teaching. At worst, this loss actively holds back the advancement of mathematics.

The Women in Mathematics Committee at the LMS has identified several reasons for the

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drop-off in mathematics:

- Women are more likely to have had broken career patterns or worked part time on account of child-rearing and family responsibilities.
- The fact that there are fewer women in the mathematics community means that they are often overlooked when names are sought, for speakers or for prizes, for instance.
- Those few women who reach the higher levels are disproportionately called on to sit on committees etc., to the detriment of their own careers.
- Women are often called on to take part in 'people-based' activities rather than 'research-based' activities, to the detriment of their own careers.
- Compared with men, women tend not to press their case but to understate their skills.

Whilst this list is indicative and not comprehensive, it provides an idea of the issues that need to be addressed. To this end, the Council of the LMS adopted, in March 2008, a statement on Women in Mathematics that recognised the issues and explicitly sought to tackle the barriers identified.

The Statement commits the LMS to:

(a) be aware of and seek to ensure an appropriate gender balance on its committees and working groups, and encourage the Nominating Committee to give similar attention in its proposals for election;

(b) keep under review the regulations governing its membership, prizes, awards and grants to ensure that they do not inadvertently deter or fail to recognize people with non-standard career patterns;

(c) actively encourage and facilitate the nomination of women for its prizes and awards, and ensure that it considers women when it is proposing nominees for external prizes and positions;

(d) actively seek to include women speakers in its meetings and workshops;

(e) expect that the organisers of conferences and activities who are seeking grants from the Society will: invite both male and female speakers, or explain why this is not appropriate or possible; and give consideration to the provision of mechanisms to enable participation by people with children or family responsibilities;

(f) collect data and thereby monitor trends in the above.

To this end, the committees of the LMS are implementing the principles of the Statement and are embedding them into their work. For example, gender balance has, for some time, been one of the factors that Nominating Committee has taken into account when making its recommendations and, unlike many other scientific learned societies, the LMS currently has a Council that includes a good proportion of women amongst its members.

More recently, the application forms for grants for conferences and meetings have been changed to include a question about whether both male and female speakers will be invited. The number of women speakers that have been invited in the past is much lower than would be expected; indeed a large proportion of meetings had no invited women speakers. It is hoped that the inclusion of this question will prompt organisers to consider whether there are suitable women that they have inadvertently overlooked. Including women speakers not only helps those particular women to progress in their careers, it also inspires other women in the audience.

The Statement has also been fed into external organisations such as the Athena Forum which has strongly recommended this as a model for other societies to follow.

It is hoped that the Council Statement will provide a spur to improve practice and so secure greater female participation in mathematics. Recently, a significant step in this direction has been taken with the introduction of a Good Practice Award for university mathematics departments – this was the subject of a separate article in the November edition of the *Newsletter*.

Gwyneth Stallard Chair, Women in Mathematics Committee

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CAMBRIDGE

JOURNALS

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New to the London Mathematical Society in 2010... Mathematika

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Publish in Mathematika

Traditional emphasis has been on pure mathematics but papers in applied mathematics and those addressing both aspects are equally welcome.

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LMS PUBLISHING

An Overview

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Many mathematicians I talk to about LMS publications seem only to be aware of the three 'core' journals, that is the Bulletin, Journal and Proceedings, and perhaps the Lecture Notes Series. However, the LMS publications portfolio is much more extensive. It includes the Journal of Topology and our free electronic Journal of Computation and Mathematics, as well as Nonlinearity, which is joint with the Institute of Physics. Since 2004 we have published Compositio Mathematica on behalf of the Dutch Compositio Foundation, and from next year we will be publishing Mathematika on behalf of UCL. The Society publishes the English translations of four Russian journals, three jointly with the Russian Academy of Sciences and Turpion, and one with the AMS. Then there are four book series: the Lecture Notes and Student Texts, both of which run to around 10 new books each year, the Monographs, and the History of Mathematics Series (joint with the AMS).

Many people are involved in supporting the publishing operation. Central, of course, are the four publishing staff who work at De Morgan House, often beyond the call of duty. Then, taking all publications together, there are around 16 editors, 80 editorial advisers and 6 translation editors, to say nothing of 800 or so referees each year and, of course, numerous authors from all over the world. Coordination and communication between such a large number of people is inevitably a complex task.

The Publications Secretary, in consultation with the Publications Committee, is responsible to Council for publications matters and we have addressed a wide range of issues and challenges during my period of office. Our publications surplus has risen steadily, and last year was £804k (after taking off publishing staff salaries and overheads). However, there is a tension here that I am keenly aware of. As a practising mathematician I want mathematical

knowledge to be disseminated as widely and freely as possible. On the other hand, the LMS wants to make enough money from publishing to fund its many worthwhile activities such as promoting mathematics and providing research grants. Two years ago Council agreed a pricing policy, that "... the Society will continue to seek to expand its activities in publishing but intends that the prices of its journals should not rise in real terms (against inflation) except in as far as there is added content or value." This has turned out to be a very useful guideline for Publications Committee when setting journal prices, although recent variations in exchange rates make this a delicate balancing act given that sterling, euro and dollar prices all have to be agreed.

Of course, we need to ensure that institutions buy our journals and that we receive payment, and this is harder to monitor now that many subscriptions are through consortia and bundling agreements. We have not yet suffered much from the effects of the recession, but we are aware that library cuts are an easy option for institutions that have to save money.

Of course it is crucial that we maintain the academic standard and reputation of our publications, which depends on their ability to attract excellent contributions and on their perception in the international community. A major task of Publications Committee is to find suitable editors and advisers, who must be highly regarded academically but also reliable, and who in turn must be able to find appropriate referees; it is certainly harder to find volunteers than in the past given that they and their institutions get little formal credit for taking on these essential tasks. The important question of ensuring that journal acceptance policy is as consistent as possible is being reviewed at the moment, as is the possibility of introducing a journal that would be ranked within the top ten world wide. We also keep an eye on the 'impact factor' of the journals; whilst this is not regarded as a very suitable measure in mathematics, it is a metric that is increasingly used across the world

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to compare journals, and indeed, subjects.

In an age of electronic communication, one might question the need for journals, but it is the 'value added' that they provide for papers that matters, crucially by providing peer review. Journals also increase paper visibility and provide long-term archiving, and increasingly include other 'bells and whistles' such as active links to citations or sophisticated search facilities.

The academic publishing environment is changing faster than ever and we need to keep abreast of developments, not only in electronic publishing and communication, but also on questions of copyright, the use of repositories and the arXiv (which seems generally beneficial to our journals); for example some organisations now require papers to be made available on open access.

It is important we handle papers efficiently, with reasonable acceptance, rejection and publication times, and staff, editors, advisers and referees all have a role to play here. Our paperhandling database has served us well since its introduction some ten years ago, but this now needs upgrading, and we are currently investigating the best way forward. Once papers have been accepted we have to see them through to publication, and monitoring typesetting, copyediting and production is an important task.

It was clear from the survey of authors and referees a couple of years ago that most were very satisfied with our service. However, part of my job as Publications Secretary has been to deal with the more awkward situations: complaints from authors, dilatory advisers and occasionally plagiarism and simultaneous submission of papers to several journals, and this can be time consuming.

LMS Publications cannot stand still, and as well as continually improving our existing undertakings, we are continually seeking new publishing projects and typically investigate one or two ventures each year. Those that get beyond the stage of informal discussion require careful analysis of risk, both financial and academic, and contracts have to be negotiated, which are scrutinised in detail by us and by lawyers. It takes several years before a new journal will break even and for sales to reach a viable level.

Looking to the future, there are several directions in which LMS publishing might go. One possibility might be to set up an independent publishing house rather than to publish through a major publisher such as CUP or OUP. Whilst this would enable some savings and perhaps allow more flexibility in the projects that we undertake, marketing would be harder without the advantage of the contacts and consortia arrangements of the publishers.

Finally, let me say that I have enjoyed my three years as Publications Secretary – it has certainly opened my eyes to the size and complexity of LMS publishing. It could not operate without the support of many individuals, above all the LMS staff, and I am extremely grateful to them all.

Kenneth Falconer

ISRAEL MOISEEVICH GELFAND

Professor Israel Moiseevich Gelfand, who was elected an Honorary Member of the London Mathematical Society on 18 May 1967, died on 5 October 2009, aged 96.

Jacek Brodzki writes: Gelfand was one of the most influential mathematicians of the twentieth century and one of the most prolific. Essentially self-taught, he began his doctoral studies (without formal qualifications) at the Moscow State University at the age of 19, gaining his doctorate in 1935 and DSc in 1938. His early work brought algebraic methods to analysis which laid foundations for modern analysis and which gave rise to the theory of Banach algebras. Among his many results in this area is the Gelfand–Naimark theorem, which is now stated as the equivalence between the category of commutative C*-algebras and the category of locally compact Hausdorff spaces. This insight,

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combined with ideas from quantum mechanics, is regarded as one of founding ideas of noncommutative geometry developed by Alain Connes from 1980s. Among other foundational results is the Gelfand–Naimark–Segal construction, which is an indispensable tool in operator algebras.

In 1959 Gelfand remarked that the index of an elliptic differential operator is homotopy invariant and posed the index problem for such operators: find a general formula for the index in terms of topological invariants. This problem was solved by Atiyah and Singer in a series of highly influential papers which shaped a large part of modern analysis and led to even stronger interactions between operator algebras, topology and geometry. Various generalisations of the index problem are essential in Kasparov's approach to the Novikov conjecture, and in the formulation of the Baum-Connes conjecture. Among Gelfand's other mathematical achievements one can list his contributions to the representation theory of complex classical Lie

groups, the theory of Verma modules, foliations (the Gelfand–Fuks cohomology), topology, and many others.

His scientific interests reached far bevond mathematics, and included mathematical biology, where his results in integral geometry found applications in tomography, one of the key diagnostic tools in medicine today. At Moscow University Gelfand held a weekly seminar, which started in 1943, and which was attended by about a hundred mathematicians, and which attained a near legendary status for its improvised talks and robust interruptions from the audience. In 2003 an interview with the New York Times quoted him saying that he did not want his students to blindly follow him and his ideas, so as soon as a topic became popular, he shifted his attention to something new. In his approach to mathematics he was a theory-builder, driven by deep intellectual curiosity to develop ideas that would have a lasting influence on modern mathematics.



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MATHEMATICS POLICY ROUND-UP

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National HE STEM Programme

The National Higher Education STEM Programme has appointed Michael Grove, currently Network Manager of the HEA Maths, Stats and OR Network, as Programme Director. The three-year programme takes over from the Higher Education Funding Council for England's four projects to promote 'vulnerable and important subjects' (More Maths Grads, Chemistry for our Future, Stimulating Physics and the London Engineering Project). See the website at www.stemprogramme.com and the more detailed article on page 13.

ACME report on mathematics post-16

The Advisory Committee on Mathematics Education (ACME) has published a discussion paper suggesting that all post-16 learners should study mathematics. Dame Julia Higgins, chair of ACME, wrote, "From many quarters, there is criticism of the mathematical capabilities of the population. Employers consistently rate the shortage of mathematical skills as one of their major challenges. Universities are faced with intakes of undergraduate students who often fall short in the mathematics required to adequately cope with many courses. And there is a fear that the population at large is not equipped with even the basic toolkit of mathematics necessary for basic day-to-day survival. Therefore, to help address these needs, ACME is floating a model in which there will be an expectation that mathematics will be studied up to the age of 18." The model suggests three pathways: first, for those who are unlikely to follow a mathematical career, opportunities to keep their mathematics alive and develop mathematically as citizens: second, for those who will use mathematics and value its applications in courses such as Use of Mathematics A-level; and third, for those intending to study for mathematically-rich subjects and are already studying for Mathematics or Further Mathematics A-levels. To see the paper and

send back comments visit www.acme-uk.org/ downloaddoc.asp?id=175.

Boost for university mathematics places

The Scottish Government has pledged £8.6 million to create 3,000 new university places in Scotland. The announcement comes in response to increased demand due to the recession and will predominantly be in STEM (science, technology, engineering and mathematics) subjects. Also in November, the Government laid out its vision for the future for universities in its higher education blueprint, Higher Ambitions. Business Secretary Lord Mandelson said that extra places on degree courses should emphasise the STEM subjects as these "underwrite the country's competitive advantages". The report also went on to say, "There will be a greater element of competition between universities for funding, with the winners being those universities who can best respond to these evolving economic challenges." To read the full report visit www.bis.gov.uk/policies/higher-ambitions.



Mathscareers.org.uk update

At the beginning of December, the new Maths Careers website was unveiled. The site was originally launched in 2004 by the Council for the Mathematical Sciences. Updated and re-branded, the site continues to offer school students, their teachers, parents and careers advisers information about careers from mathematical sciences at all levels. The new site has seven new themes: *I Love Maths, Environment, Health & Society, Business & Money, Entertainment, Science & Technology* and *Sport* as well as a new logo (see above).

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site unted ffer and ers The ths, 5 & ogy Redevelopment of the site is still progressing, but it will contain a full range of exciting and engaging articles showing the application of mathematics in many careers and contexts. The work was funded by the Department for Children Schools and Families and the Higher Education Funding Councils for England and Wales. The site remains at www.mathscareers. org.uk

CMathTeach launch

The IMA launched the new Chartered Mathematics Teacher designation with the National Centre for Excellence in the Teaching of Mathematics (NCETM) at its National Conference *Engaging with Mathematics* on 1 December 2009 at the University of Nottingham. The first batch of designated teachers was announced in November. CMathTeach for the first time recognises the professional

training and experience of mathematics teachers, acknowledging their gualifications both in mathematics and in teaching practice. It follows the Chartered Science Teacher (CSciTeach) designation successfully launched by the Science Council and the Association for Science Education in 2006. It is hoped that the designation will have significant impact on the chronic shortage problems in school mathematics teaching, making this a valued and respected career, recognised at the level of other chartered professions such as engineers, accountants and surveyors. Gaining the designation will enable teachers to meet the TDA's Post-Threshold Professional Standards for Teachers which will entitle them to higher pay levels.

MEI report on maths A-level uptake

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Roger Porkess and Stephen Lee of Mathematics in Education and Industry published a report in October investigating the continuing rise in numbers of candidates sitting Mathematics and Further Mathematics A-levels. This year, Mathematics A-level saw an increase of over 12% on 2008 numbers, which means that, compared with 2003, over 43% more candidates sat the examination. The report looks at four possible explanations: establishing a favourable environment, the mathematics curriculum, in-house reputation and career progression. Although it ultimately draws no specific conclusions, the report looks at how each of these explanations may have fed into the increase. To read the report visit www. mei.org.uk/files/pdf/A_Level_uptake.pdf.

Caroline Davis Mathematics Policy and Promotion Officer



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Southampton

School of Mathematics

Two Professorships in Pure Mathematics

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We are seeking to appoint two outstanding mathematicians with excellent track records of research and research leadership in areas which will enhance and extend the current interests of the Pure Mathematics Group. For at least one of the positions preference may be given to experts with an international reputation for excellent research in Algebra, though outstanding candidates in any area will be seriously considered.

Duties, as determined by the Head of School, will include: conducting research of international status in pure mathematics, applying for externally funded research grants and enhancing the international profile of the research group, teaching undergraduate and postgraduate mathematics and supervision of research students. As part of the role you will also be expected to support effective management and administration of the School.

Both positions are available from 1 October 2010, or as soon as possible thereafter.

It is intended that applicants short-listed for interview will be invited to give a lecture in the School. The provisional date for interviews is Tuesday 16 March 2010.

Informal enquiries can be made at any time to Professor G.A.Niblo, email: G.A.Niblo@soton.ac.uk tel: +44 (0)23 8059 3674, fax: +44 (0)23 8059 5147.

To apply online visit www.jobs.soton.ac.uk Alternatively telephone +44 (0)23 8059 2750. As part of your completed application you will be required to include addresses of three referees and your full CV.

Please quote the reference number 3957-09-E in all correspondence. The closing date for applications is 13 January 2010 at 12 noon.

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MATHEMATICAL SCIENCES IN THE NATIONAL HE STEM PROGRAMME

In 2006 a group of mathematical organisations bid for and received a £3.3M grant from Hefce to look at ways of increasing uptake to mathematical sciences in higher education (HE). The project was one of four initiated by Hefce to increase uptake into strategically important and vulnerable subjects, the others being in physics, chemistry and engineering. The mathematical sciences project – the More Maths Grads Project (MMG) – has been working in areas of England and Wales, as well as looking at the implications for HE. Details of the Project and its outcomes are available at www.moremathsgrads.org.uk and its resources have been incorporated into www. mathscareers.org.uk.

The four projects will now be integrated into a National HE STEM Programme, a three-year initiative aiming to generate interest in STEM subjects (mathematics, physics, chemistry and engineering) among young people, enhance higher-level skills in the workplace and increase accessibility of higher education courses in these subjects. Though focused around STEM, it will primarily support chemistry, engineering, mathematical sciences and physics, aimed at stimulating HE to attract more and wider entry and seek to build greater employer engagement and careers focus. The new Programme, coordinated by the University of Birmingham, engages both with subject groups through the professional organisations, and with universities through a group of 'spokes' based in Bath, Birmingham, Bradford, Manchester Metropolitan, Southampton and Swansea universities (see www.stemprogramme.com).

Building on the experience of the MMG project a group of societies and others in the mathematical sciences have collaborated to oversee and direct the mathematical sciences input to the National HE STEM Programme. The bodies comprise: the Institute of Mathematics and its Applications (IMA), the London Mathematical Society (LMS), the Royal Statistical Society (RSS), the Heads of Departments of Mathematical Sciences (HoDoMS), SIGMA and the HEA MSOR Network. The IMA will lead the consortium of mathematical bodies, chairing the Mathematical Sciences HE STEM Programme Board. The National Programme will involve the Royal Society of Chemistry, the Institute of Physics and the Royal Academy of Engineering in those organisations' subject areas.

The mathematical sciences programme will address the following main themes:

(a) Integration and diversity – drawing on and extending the work of MMG and others to widen and enlarge entry to mathematical sciences undergraduate courses, and embed these into universities;

(b) *Employer engagement* – looking at employer needs in basic and high-level mathematics and statistics and in the application of scientific and mathematical knowledge in order to meet the Government's wish to improve work-force skills, and exploring implications for the HE curriculum;

(c) *HE curriculum innovation* – exploring current learning, teaching and assessment practices within mathematical sciences departments, and disseminating good practice;

(d) Mathematical sciences support – establishing and extending a network for mathematical sciences support in universities, building on SIGMA's regional hub model, working together to share resources and experience.

The Mathematical Sciences Programme will be coordinated from a new unit, based in De Morgan House, which will contain staff employed on the above activities, as well as a further staff member based at the MSOR in Birmingham. The three societies – the IMA, LMS and RSS – are considering how the unit might further be beneficial in working collaboratively on other activities in outreach and careers awareness, including some societies' activities being run out of, or linking, to the work of the Unit.

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SOCIETY PRIZES DEADLINES

Readers are reminded that the deadline for receipt of nominations for the 2010 Society Prizes is **Friday 22 January 2010**. Prizes available in 2010 include the *De Morgan Medal*, *Senior Berwick Prize*, *Fröhlich Prize* and up to four *Whitehead Prizes*. A nomination form can be downloaded from www.lms.ac.uk. For full details of all these prizes please see the Society's November *Newsletter* (No. 386, pp. 4–5) or email prizes@lms.ac.uk.

A BRIEF HISTORY OF THE DE MORGAN MEDAL

Most mathematicians would recognise the name Augustus De Morgan, if only through an acquaintance with 'De Morgan's Laws' in logic and set theory. But to LMS members, the name has an extra significance because of the key role he played in the Society's foundation. When the LMS held its inaugural meeting on 16 January 1865, he was its first President, and was to remain an enthusiastic member during

its formative years. Not long after his death in 1871, a meeting was held to discuss an appropriate testimonial in his memory. One of the resolutions of the resulting 'De Morgan Memorial Committee' was the proposal "to establish a De Morgan medal, to be awarded annually by the [London] Mathematical Society to the writer of the most original mathematical treatise".

Although the decision to com-

memorate De Morgan with the award of an LMS medal had not been initiated by the Society itself, its members quickly endorsed the idea. But the inauguration of the commemorative medal was to take far longer than anticipated, for a variety of reasons. For example, it took several years to agree on a precise design. Eventually it was decided that one side of the medal should feature De Morgan's 'Zodiac of Syllogism'. This was a drawing of which De Morgan had been especially proud, incorporating notation used in his work on symbolic logic with the initials ADM to form a symmetrical pattern, which he had used as his personal motif. For the medal's reverse, it was agreed that a profile of De Morgan would be appropriate, and this was taken from a posthumous bust sculpted by the artist Thomas Woolner, which is housed today in the University of London Library. tha

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By 1882, subscriptions from LMS members had raised sufficient funds to enable the Society to endow the award of a medal, worth £10, at intervals of three years. (In 1942, this initial endowment was augmented by a bequest of £250 to the Society by the applied mathematician Sir Joseph Larmor.) The medal was to be made of 22-carat gold, but it would appear from the Society's records that this was not the only metal used. Minutes from June 1920 reveal that the Council agreed that

> "the De Morgan Medallist in future be given the choice either to receive the medal in bronze only, or in gold only, or in both as hitherto usual." Actual evidence of this practice came to light in the summer of 2002, when the Society obtained William Burnside's 1899 De Morgan Medal cast in bronze.

> The first medal was awarded at the Society's annual general meeting on 13 November 1884. After much discussion, it had

been agreed "that there should not be any special competition for the medal but that it should be granted by the Council of the L. Math. Society for distinguished services in the advancement of Math. Science." Given this criterion, it is perhaps not surprising

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that the inaugural medal went to the man who was arguably Britain's finest pure mathematician of the time, Arthur Cayley. Subsequent medallists included the algebraist James Joseph Sylvester, the analyst G.H. Hardy, and the philosopher Bertrand Russell.

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Although it was originally intended "that the Medal be open to Mathematicians of any country," the majority of its 42 recipients have in fact been British. Despite the award of the fourth medal to the German Felix Klein, in the medal's early days it was more common for foreign nominees (who included Weierstrass, Hermite, Poincaré and Veblen) to be unsuccessful. More recently, those recipients such as Mordell, Besicovitch, Mahler and Roth, who were born overseas, all spent the majority, if not all, of their careers in the United Kingdom. But irrespective of nationality (at birth or otherwise), it is the calibre of De Morgan medallists over the past 125 years that has resulted in its becoming arguably the highest honour available to mathematicians in Britain, whether they be British or not.

The current regulations can be found at www.lms.ac.uk/activities/prizes_com/prizes. html.

Adrian Rice 15

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Randolph-Macon College, Virginia, USA

De Morgan Medallists 1884–2007

- 1884 Arthur Cayley 1887 James Joseph Sylvester 1890 Lord Rayleigh 1893 Felix Klein 1896 Samuel Roberts 1899 William Burnside 1902 Alfred George Greenhill 1905 Henry Frederick Baker James Whitbread Lee Glaisher 1908 1911 Horace Lamb 1914 Joseph Larmor 1917 William Henry Young Ernest William Hobson 1920 Percy Alexander MacMahon 1923 1926 Augustus Edward Hough Love 1929 Godfrev Harold Hardv 1932 Bertrand Russell 1935 Edmund Taylor Whittaker 1938 John Edensor Littlewood 1941 Louis Joel Mordell
- 1944 Sidney Chapman

- 1947 George Neville Watson
- 1950 Abram Samoilovitch Besicovitch
- 1953 Edward Charles Titchmarsh
- 1956 Geoffrey Ingram Taylor
- 1959 William Vallance Douglas Hodge
- 1962 Maxwell Herman Alexander Newman
- 1965 Philip Hall
- 1968 Mary Cartwright
- 1971 Kurt Mahler

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- 1974 Graham Higman
- 1977 Claude Ambrose Rogers
- 1980 Michael Francis Atiyah
- 1983 Klaus Friedrich Roth
- 1986 John William Scott Cassels
- 1989 David George Kendall
- 1992 Albert Fröhlich
- 1995 Walter Hayman
- 1998 Robert Rankin
- 2001 J. A. (Sandy) Green
- 2004 Roger Penrose
- 2007 Bryan Birch

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NEWSLETTER

Maths2010

British Mathematical Colloquium & British Applied Mathematics Colloquium www.maths2010.org.uk

Edinburgh 6–9 April 2010

Plenary Talks

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Emmanuel Candes, Stanford University (Stewartson lecture) Rich Kerswell, University of Bristol (Lighthill lecture) Robert MacKay, University of Warwick L Mahadevan, Harvard University Maciej Zworski, University of California at Berkeley

Main BMC Speakers

Christopher Hacon, University of Utah Jeffrey Lagarias, University of Michigan Gigliola Staffilani, Massachusetts Institute of Technology

Main BAMC Speakers

Philip Maini, University of Oxford Eric Vanden-Eijnden, New York University

Public Lecture on Financial Mathematics Paul Embrechts, *ETH Zurich*

Registration Opens 01 December 2009 Closes 12 February 2010

Enquiries enquiries@maths2010.org.uk

Maths2010

s organised by the Maxwell Institute for Mathematical Sciences, Edinburgh and the nternational Centre for Mathematical Sciences.

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Cecil King Travel Scholarship

The London Mathematical Society



The London Mathematical Society annually awards a \pm 5000 Cecil King Travel Scholarship in Mathematics to a young mathematician of outstanding promise. The Scholarship is awarded to support a period of study or research abroad, typically for a period of three months.

The award is competitive and based on a written proposal describing the intended programme of study or research abroad and the benefits to be gained from such a visit. A shortlist of applicants will be selected for interview.

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

Applications should be made using the form available on the Society's website (www.lms.ac.uk/activities/cecil_king/index.html) or by contacting education@lms.ac.uk. The closing date for applications is **Friday 19 February 2010**. It is expected that interviews will take place in London in late April or early May.

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

18TH LUCASIAN PROFESSOR

Michael Green has been elected 18th Lucasian Professor at the University of Cambridge, succeeding Stephen Hawking, who stepped down as Lucasian Professor on 30 September. Michael and Stephen are both prize winners of the LMS Naylor Prize and Lectureship in Applied Mathematics.

CECIL KING TRAVEL SCHOLARSHIP

Report

During my PhD I have worked on a variety of topics related to two-dimensional arithmetic geometry, including the theories of integration and zeta integrals on two-dimensional local fields and related

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NEWSLETTER

representation theory and model theory. The Cecil King Travel Scholarship allowed me to explore further the relationship between and to gain new perspectives on these areas, by giving me the opportunity for both quiet research and talking to interested eminent mathematicians.

I began my travelling with a one-month visit to the IHÉS in November, which provided the ideal environment in which to complete an article I had been writing, entitled Euler characteristics, Fubini's theorem, and the Riemann-Hurwitz formula. I took the RER in Paris once or twice a week to the Pierre and Marie Curie University, where the mathematical logic group was holding a series of meetings on E. Hrushovski's and D. Kazhdan's 115-page monumental work Integration on valued fields, which I had been struggling to understand since the beginning of my PhD. As I realised that even the Paris logicians found this work difficult. I regained the confidence to begin seriously thinking about this area of my work again. I presented a seminar on this research and found the audience both interested in my work and forgiving of my French.

Secondly, I spent two weeks during early January at the Hebrew University of Jerusalem, with the single purpose of talking to Professors Hrushovski and Kazhdan. Over two weeks, they kindly guided me through their paper, explaining the main ideas and the right direction from which to approach it. I began to understand how powerful their results truly were, and how only slight modification was required for applications to two-dimensional integration.

Finally, I spent six weeks during the Spring at Harvard University where I enjoyed conversations with Professor Gaitsgory on the many faces of the Langlands programmes. I was warmly welcomed by my fellow PhD students, who were impressively well-versed in many areas and allowed me to give a couple of talks at their informal seminar. Encouraged by a presentation on a related topic by one of these students, I wrote the bulk of my most recent paper, on explicit Grothendieck duality for arithmetic surfaces.

The travel scholarship allowed me to immerse myself in three world-renowned institutes, which was not only useful mathematically, but also for the sake of deciding where I might wish to settle later in my career. It gave me many ideas, which I intend to pursue over the next year, and I remain in contact with several other young researchers I met. I am deeply grateful to the Cecil King Memorial Foundation and London Mathematical Society for the opportunity I was given, and strongly recommend it to others! Matthew Morrow

University of Nottingham

SET STUDENT OF THE YEAR

The winners of the 2009 Science, Engineering & Technology Student of the Year Awards were announced at a ceremony in London's InterContinental Hotel on 25 September. Record numbers of entries were received from every major university in the United Kingdom and Ireland and judges paid tribute to the exceptional quality of this year's work. In all 45 students were shortlisted in fifteen different categories.

The Laing O'Rourke award for the best mathematics student of the year was given to Melissa Turcotte of Imperial College London for her project on the *Wave Solution to the KdV Equation*. Melissa's project obtained a solution of the KdV equation in which a solitary wave propagates on the back of a periodic wave train. The LMS and IMA provided judges for the award, commenting that Melissa will make an excellent ambassador for mathematics, having demonstrated great commitment in acquiring the necessary mathematical background to undertake her project. V S.

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VISIT OF PROFESSOR S. NABOKO

Professor Sergey Naboko (St Petersburg State University) will be visiting the UK from 1 to 22 December. His interests lie in spectral theory and the application of functional analysis to non-selfadjoint problems from mathematical physics. Professor Naboko will give talks at:

- University College London, Room 706, Thursday 3 December at 3 pm Mobility edges for Hermitian Jacobi operators and the generalized eigenvectors decay
- University of Kent, Canterbury, Cornwallis Building, Friday 4 December at 3 pm Spectral properties of some classes of Jacobi matrices
- Cardiff, School of Mathematics, Senghennydd Road, Room M/2.06, Thursday 17 December at 3.15 pm Unbounded Jacobi matrices with a few gaps in the absolutely continuous spectrum: constructive examples
 For further information contact Ian Wood

(I.Wood@kent.ac.uk). This visit is supported by an LMS Scheme 2 grant.

VISIT OF DR H. LE PHAM

Dr Hung Le Pham (Victoria University, Wellington, New Zealand) will be visiting the UK from December 2009 to February 2010. Dr Le Pham works in abstract functional analysis, with an emphasis on Banach spaces and Banach algebras. He will give seminars at:

- Nottingham, 2 December; contact J. Feinstein (Joel.Feinstein@nottingham.ac.uk)
- Glasgow, 26 January; contact N. Bez (n.bez@maths.gla.ac.uk)
- Lancaster, 29 January; contact N. Laustsen (n.laustsen@lancaster.ac.uk)
- Leeds, 23 February; contact M. Daws (mdaws@maths.leeds.ac.uk)

He will be based at Leeds during the rest of his stay, hosted by Dr M. Daws. This visit is supported by an LMS Scheme 2 grant. -----

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 Starting salary: £24,273, rising annually to £26,524 YOU WILL BE RESPONSIBLE FOR: developing algorithm repairable flow networks and application of the developed soft preparing regular research reports and delivering presentati delivering specialist lectures and software demonstrations as p preparing proposals for research grant submissions and resear YOU SHOULD HAVE: a first-class degree in computing, m numerical programming skills in C/C++ 	as and software in C/C++ for optimising tware to real oil and gas production network ions • preparing teaching materials and part of the curriculum • collaboratively arch papers disseminating results. athematics, engineering or physics • stron perience with algorithms for stochastic
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NEWSLETTER

VISIT OF DR L. CIOBANU

Dr Laura Ciobanu (University of Fribourg, Switzerland) will visit the UK from 25 January to 7 February 2010. Dr Ciobanu's research area is combinatorial, computational and geometric group theory. In particular, she is interested in equations, decision problems, complexity of algorithms and fixed subgroups in free groups, as well as group actions on trees and generalizations of trees.

She will give seminars at:

- Newcastle, 28 January; contact Sarah Rees (Sarah.Rees@ncl.ac.uk)
- Southampton, 29 January; contact Armando Martino (a.martino@soton.ac.uk)
- Warwick, 2 February; contact Derek Holt (dfh@maths.warwick.ac.uk)

Dr Ciobanu will be based at Newcastle during her visit, hosted by Sarah Rees. For further details consult seminar web pages. This visit is supported by an LMS Scheme 2 grant.

ICM 2010

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The International Mathematical Union is currently accepting applications for financial support to attend the *International Congress* of *Mathematicians 2010*, to be held in Hyderabad, India. The eligibility criteria are as follows:

- financial support is for mathematicians from developing countries, except India
- applicants must either have a PhD in mathematics or at least post-doctoral level research experience in mathematics
- the permanent workplace of the mathematician must be one of the developing countries listed in the ICM website

The deadline for applications is **1 January 2010**. For the list of developing countries and further information visit the website at www. icm2010.org.in/financial-support/internationalparticipants.

Rajat Tandon Secretary, Executive Organizing Committee ICM 2010

THE HOLGATE LECTURES

The LMS Holgate Lecture scheme was set up in memory of Philip Holgate. A number of academics agree to make five visits a year to schools to give talks. The scheme is advertised on the websites of LMS and others, such as NCETM.

The importance of the scheme cannot be overstated. If you become a Holgate Lecturer (and the scheme could do with a few more volunteers) you will almost inevitably spend a fair proportion of your time visiting schools where you are not really needed, where the mathematical education provided is way above the national average. You can nonetheless do some good here, of course, and you will certainly enjoy your visit. But you can have a much greater effect if you get an invitation to the sort of school, possibly high in the league tables, whose teachers would be regarded as excellent by OFSTED, but where the mathematical diet is confined strictly to the syllabus for GCSE or A level. Here you will find not a single mathematical textbook other than those provided by the examination board. (The desperately sad raison d'être of such books seems to be that they promise not to waste your time telling you things you won't be asked in the examination. This is what the government means when it says teachers are more professional these days.) Here you have a meagre hour in which to open their eyes to the existence of a mathematical world beyond their syllabus, and I have had teachers thank me for reminding them of something they said they had forgotten, namely, why they decided they wanted to teach mathematics.

I am now in my fifth year as a Holgate Lecturer, habitually ignoring the limit and giving about a dozen talks a year. One does receive some strange requests. One school said they were starting a Maths Club next term, and would I like to visit every Monday? Since they were a five-hour journey aw at ' sch giv tol spe to it v A ab au hic if t tur mi sur ing of an eve len the (I f is r you all

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away, I declined, but settled on two visits, at the start and at the end of term. Another school was very specific: they wanted me to give an interesting talk. (No extra charge, I told them.) One email invitation was so nonspecific that it contained not a single clue as to which school was inviting me, nor where it was.

Advice to new Holgate Lecturers. Ask about the mathematical capabilities of your audience, well in advance. The ideal talk is highly adaptable, and can still be delivered if the 50 minutes you have been promised turns out to be 35, or if you find at the last minute that they want you to fill 90. Make sure you can survive a laptop crash or a sulking projector. Personally, I don't see the point of talking about mathematics and not doing any, so I always include some proofs, however short, and I always toss in a few problems, including some too hard to answer on the spot – but I give them my email address. (I find it is safe to do this, as the response is regrettably tiny.) Most importantly, make your enthusiasm for mathematics plain for all to see, and enjoy yourself: after all, there is no setting or marking of examinations involved here!

> John Silvester King's College London

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ROYAL SOCIETY 2010 ANNIVERSARY PROFESSORSHIPS

The Royal Society 2010 Anniversary Research Professorships were recently awarded, in celebration of the Society's 350th anniversary. Amongst the six awards were two mathematicians, both LMS members:

Professor Timothy Gowers, FRS, University of Cambridge. Professor Gowers' work focuses on combinatorics – the study of discrete, and usually finite, objects. In 1998 he received

the Fields Medal for research on functional analysis and combinatorics. In addition to scholarly papers on mathematics, he is also the author of *Mathematics: A Very Short Introduction* and other works popularizing mathematics.

Sir Andrew Wiles, KBE, FRS, Princeton University. He is most famous for proving Fermat's Last Theorem. He aims to develop arithmetic techniques that will help to resolve some of the fundamental questions in his field.

ROSALIND FRANKLIN AWARD 2010

Invitation to nominate

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The Royal Society Rosalind Franklin Award is designed to promote women in Science, Technology, Engineering and Mathematics (STEM) and is funded by the Department for Business, Innovation and Skills (BIS).

The award, consisting of a medal and \pounds 30,000, is made annually to an individual for an outstanding contribution to any area of STEM. As part of the nomination process, nominees are asked to put forward a proposal for a project that would raise the profile of women in STEM in their host institution and/or field of expertise in the UK. The recipient of the award will be expected to spend a proportion of the £30,000 award fund on implementing their project. There are no restrictions on the age of nominees, but it is anticipated that the award will be made to someone in their mid-career and actively involved in scientific research. Nominations are welcomed for both women and men.

For full details of the Award and guidelines for nomination, including the online nomination forms, visit the website at royalsociety.org/franklin or email awards@ royalsociety.org. Closing date for nominations is Monday 25 January 2010. 21

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NEWSLETTER

ROYAL COMMISSION FOR THE EXHIBITION OF 1851

Research Fellowships

The scheme of 1851 Research Fellowships is intended to give a few PhD-level scientists or engineers of outstanding promise the opportunity for conducting research for a further period. Awarded for three years, they provide an exceptional opportunity for PhD graduates to pursue further research at the highest level. Approximately eight awards are made each year.

The Fellowships are open to candidates in any of the physical or biological sciences, in mathematics, in applied science, or in any branch of engineering. Candidates in science subjects should normally have recently obtained their PhD degree, or be in the final stages of their PhD studies. Those offering engineering do not have to be in possession of a PhD, but must be of at least PhD standard.

The Research Fellowship stipend payable in 2010 is $\pm 28,500$ for the first year, and $\pm 30,000$ for the second and third years. In addition a London (Overseas) Weighting of $\pm 2,500$ per annum is payable in appropriate cases. Stipends are reviewed annually.

A candidate must be a citizen of the United Kingdom or the Commonwealth, or of the Republics of Ireland or Pakistan. He or she should either have spent at least two out of the past three years at a UK Institution, or be intending to hold the Fellowship at a UK Institution, or both.

Applications are made online via the website www.royalcommission1851.org and must include two references, plus certification from the institution at which the Fellowship is to be held. Applications must be received by **5 pm Thursday 25 February 2010**. Appointments to the Fellowship will be made during June 2010. Fellowships commence at the beginning of October in the year of award.

DIVERSE FACES OF ARITHMETIC

A conference on the Diverse Faces of Arithmetic will be held at the University of East Anglia from 14 to 16 December 2009, on the occasion of Graham Everest's retirement. The conference will cover the remarkable interactions of Number Theory with Logic, Dynamical Systems and Mathematical Physics: for example, novel approaches to Hilbert's Tenth Problem, and connections between elliptic divisibility sequences and integrable systems. One of the purposes of the conference is to bring together researchers in guite diverse fields, the common point being an interaction with Number Theory, particularly concerning the arithmetic of recurrence sequences. The invited speakers are:

- Manfred Einsiedler (ETH Zürich)
- Kirsten Eisenträger (Penn State)
- Graham Everest (UEA)
- Győry Kálmán (Debrecen)
- Andy Hone (Kent)

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- Valéry Mahé (Franche-Comté, Besançon)
- Alexandra Shlapentokh (East Carolina)
- Igor Shparlinski (Macquarie, Sydney)
- Chris Smyth (Edinburgh)
- Nelson Stephens (Bristol)
- Franco Vivaldi (Queen Mary, London)

There will also be an introductory lecture each day, aimed particularly at graduate students.

For further information visit the website at www.uea.ac.uk/mth/mtheventsnews/Conference or contact the organisers: Anish Ghosh (UEA), Shaun Stevens (UEA), Sanju Velani (York) and Tom Ward (UEA) at arithmetic@mth.uea. ac.uk.

The conference is supported by an LMS Conference grant, and by the Number Theory Foundation. In particular, there are funds from the LMS towards the participation of UK-based PhD students – contact the organisers for more information. S A

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STOCHASTICS, CONTROL AND FINANCE

A workshop on *Stochastics, Control and Finance* in honour of Professor Mark H.A. Davis on the occasion of his 65th birthday will take place at Imperial College London from 12 to 14 April 2010. The speakers are:

- Peter Bank (Technical University of Berlin)
- Tomas Björk (Stockholm School of Economics)
- Martin Clark (Imperial College)

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- Mark Davis (Imperial College)
- Michael Dempster (University of Cambridge)
- Paul Embrechts (ETH Zürich)
- Eduardo Epperlein (Citigroup)
- Jim Gatheral (Bank of America Merrill Lynch)
- Vicky Henderson (University of Oxford)
- Andrew Heunis (University of Waterloo)
- David Hobson (University of Warwick)
- Lane Hughston (Imperial College)
- Ioannis Karatzas (Columbia University)
- Ralf Korn (University of Kaiserslautern)
- Alexander Lipton (Bank of America Merrill Lynch)
- Vladimir Lucic (Barclays Capital)
- Terry Lyons (University of Oxford)
- Jan Oblój (University of Oxford)
- Bernt Øksendal (University of Oslo)
- Eckhard Platen (University of Technology Sydney)
- Chris Rogers (University of Cambridge)
- Walter Schachermayer (University of Vienna)
- Martin Schweizer (ETH Zürich)
- Nizar Touzi (École Polytechnique)
- Michel Vellekoop (University of Amsterdam)
- Richard Vinter (Imperial College)
- Thaleia Zariphopoulou (University of Oxford)
- Xunyu Zhou (University of Oxford)

For registration and further information visit the website at www3.imperial.ac.uk/mathfin/ events or contact the Workshop Administrator, Doris Abeysekera, tel: +44 (0)20 7594 8547; fax: +44 (0)20 7594 1191; email: d.abeysekera@imperial.ac.uk.

The workshop is receiving financial support from the European Science Foundation (Advanced

Mathematical Methods in Finance programme), the London Mathematical Society and Imperial College (Department of Electrical and Electronic Engineering and Department of Mathematics).

AERODYNAMIC BOUNDARY LAYERS

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There will be a two-day meeting on *Aerodynamic Boundary Layers* at the University of East Anglia, Norwich from 10 to 11 December 2009 in honour of the 75th birthday of Professor Norman Riley. The purpose of the meeting is to review the current state of the art in the application of boundary-layer theory to aerodynamics, and to present surveys of the subject area. Important issues which are still not fully understood include boundarylayer transition, aerodynamic noise, separation and unsteady phenomena in boundary layers. The invited speakers will cover almost all of these important topics. The invited speakers are:

- J. Ackroyd (Manchester)
- S. J. Cowley (Cambridge)
- P.W. Duck (Manchester)
- P.W. Hammerton (UEA)
- J.J. Healey (Keele)
- I.P. Jones (ANSYS UK)
- I. Poll (Cranfield)
- A.I. Ruban (Manchester)
- N. Sandham (Southampton)
- F.T. Smith (UCL)

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- S.N. Timoshin (UCL)
- A.E.P. Veldman (Groningen)
- X. Wu (Imperial College)

The conference will last for two days, starting at 12 noon on Thursday 10 December, and continuing until late afternoon on Friday 11 December. A conference dinner will be held on the Thursday evening. For updated information visit the website at www.mth.uea.ac.uk.

If you would like to attend, contact the organisers at m.blyth@uea.ac.uk by 20 November 2009. The organisers are Mark Blyth and Alexander Korobkin. The meeting is supported by an LMS Conference grant and the School of Mathematics at UEA. 23

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NEWSLETTER

TOMORROW'S MATHEMATICIANS TODAY

The University of Greenwich Department of Mathematical Sciences, in conjunction with the Institute of Mathematics and its Applications (IMA), is very pleased to announce the inaugural Undergraduate Mathematics Conference in London which will be held on Saturday 6 February 2010. The keynote speaker will be Professor Ian Stewart, who earlier this year was the first recipient of the Christopher Zeeman Medal, awarded jointly by the LMS and the IMA for his work on promoting mathematics.

This will be a fascinating day which will give participants the opportunity to learn about a wide range of mathematics which has excited their peers. The aim of the conference is to enable final-year (and other) undergraduates to give presentations on mathematical topics of their choice. Mathematics students will benefit enormously from this in a number of ways. Those going into research will gain experience of the process of conference submission, while those going into the workplace will gain valuable experience to enhance their CVs and career prospects. All delegates will gain insights into a wide range of mathematics of potential value in their future careers. It should be a wonderfully enjoyable day of inspiring mathematics.

The organisers hope that the conference will also attract employers, presenting a useful opportunity for participants to gain information about career possibilities.

Abstracts of proposed presentations should be submitted to tmt@gre.ac.uk by 18 December 2009. Authors will be informed of the outcome by the beginning of January 2010.

In order to encourage students to attend it is important that this conference be free to students, so we would ask that Universities make a financial contribution of ± 10 /person up to a maximum of ± 100 to help us cover our costs.

For further information visit the website at http://mathsoc.cms.gre.ac.uk/tmt or contact Noel-Ann Bradshaw (N.Bradshaw@ gre.ac.uk), Tony Mann (A.Mann@gre. ac.uk) or Peter Rowlett (Peter.Rowlett@ ima.org.uk).

YORKSHIRE AND DURHAM GEOMETRY DAY

There will be a Yorkshire and Durham Geometry Day on Friday 11 December 2009 from 11.00 am to 5.15 pm in the Department of Mathematical Sciences, Durham University. Tea and coffee will be available from 10.30 am. The programme is as follows:

- Andy Hayden (Durham) Hyperbolic billiards in Teichmüller space
- Ian McIntosh (York) Taking stock of spectral curve methods in surface theory
- Benjamin Thorpe (Durham) Long-time existence for spacelike mean curvature flow
- Neshan Wickramasekera (Cambridge) New developments in regularity theory for stable minimal hypersurfaces
- John C. Wood (Leeds) *Explicit constructions* of harmonic maps in classical Lie groups and symmetric spaces

All interested are welcome to attend, although the organisers would appreciate your letting them know if you plan to come. For further information, please email John Bolton (john.bolton@ durham. ac.uk) or Wilhelm Klingenberg (wilhelm. klingenberg@durham.ac.uk), or visit the website at www.maths.dur.ac.uk/~dma0jb/ ydgd.html.

The organisers of the Yorkshire and Durham Geometry Days are pleased to acknowledge the financial support of the LMS for this series of meetings. Re On hai of and eve tur Ra. Dr tol Mi Mi

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LMS POPULAR LECTURE

Report

On 15 September 2009, the Birmingham University Lecture theatre was full of budding mathematicians, scientists and generally interested parties. The evening's events consisted of two lectures – Hollywood's Hippest Mathematics: Random Matrices and Riemann Zeros by Dr Nina Snaith of the University of Bristol and The Scale of Things by Dr Mark Midownik of King's College London.

Dr Snaith introduced us to the Riemann zeta-function and its importance in describing prime numbers. This was used to outline the Riemann hypothesis and through graphical representation of the complex zeros of the Riemann-zeta function she illustrated the 'organised randomness' of prime numbers. She demonstrated the mathematical awareness of the creators of the American TV series Numb3rs in which the Riemann hypothesis is mentioned, before giving us an overview of the work she was involved in regarding the hypothesis. By plotting every thirty Riemann zeros on the circumference of a circle and by direct comparison with randomly generated patterns it was clear that there was some underlying order to the Riemann zeros. However, it wasn't until a freak meeting at the Institute for Advanced Study at Princeton University, that a researcher in Random Matrix Theory recognised the pattern as that produced by the eigenvalues of random matrices. Further work followed and resulted in the team being able to calculate a sequence of numbers describing how fast the Riemann zeta function grows.

Dr Midownik introduced the scale of things with examples of objects of increasingly small size from both natural and man-made sources, enabling the audience to better grasp the scale at which

engineering and science is now capable of working. He then told the audience that if they dropped their pet hamsters off multi-storey buildings, the animals would probably survive. After a guick tutorial on how to model your pet hamster as a sphere, Dr Midownik showed us examples of the many surprising correlations that arise throughout nature involving scale. Most notable examples involved body mass, heart rate and life expectancy. A log graph of body mass against heart rate for mammals produced a striking straight line. Whereas a mouse has a very high heart rate, an elephant, with a much smaller surface area to volume ratio and so smaller rate of heat loss, has a very low heart rate. In contrast, the log graph of body mass against average life expectancy had a negative gradient of the same magnitude. It has since been shown that all mammals have on average the same number of heart beats in their life time. It was also startling that certain gradients such as 1/4 and 3/4 cropped up repeatedly in many natural correlations. Dr Midownik then showed how many surprising things can be found in our immediate vicinity and with the help of a microscope demonstrated the fine structures that we rely on so much, from Velcro to woollen jumpers to bricks. He then explained to us that it was due to a hamster's relatively large surface area to volume ratio and the large cross sectional area of its paws with respect to its weight that a hamster is not as easy to kill as you may think.

In conclusion, the evening's lectures were both highly entertaining and educational, introducing the students to the beauty and complexity of mathematics beyond rigid curricula. Thank you to the hosts, Birmingham University and the speakers, Dr Snaith and Dr Midownik.

> Students of King Edward's School, Birmingham

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NEWSLETTER

RECORDS OF PROCEEDINGS AT MEETINGS

REGIONAL ORDINARY MEETING

held on *16 September 2009* at the University of Leicester. Around 60 members and visitors were present for all or part of the meeting.

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The meeting began at 2.00 pm, with the Vice-President, Professor D.G. LARMAN, in the Chair.

Four members signed the book and were admitted to the Society.

Professor N.J. SNASHALL introduced a lecture given by Professor Jean-Louis Loday on *Koszul duality*.

After tea, Professor Snashall introduced a lecture given by Professor Idun Reiten on *Coxeter groups and associated rings and categories*.

Professor Snashall then introduced a lecture given by Professor Ulrike Tillmann entitled *From configuration to moduli spaces*.

The Chair expressed the thanks of the Society to the local organisers and the speakers for putting on such an excellent meeting.

After the meeting a dinner was held at a local restaurant.

LMS MIDLANDS REGIONAL MEETING

6 September 2009

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The London Mathematical Society Midlands Regional Meeting took place in the afternoon of Wednesday 16 September 2009 at the University of Leicester and was attended by about 60 members and visitors. The Meeting was chaired by LMS Vice-President Professor David Larman and began after formal business.

The first talk was given by Professor Jean-Louis Loday (CNRS, Strasbourg) on *Koszul duality*. Beginning with an excellent introduction to Koszul duality and the standard Koszul complex for a quadratic associative algebra, he went on to give a more general setting for Koszul duality theory. This provides a framework between algebraic operads and types of algebras, with connections to symmetric groups and Schur functors, and explains, among other things, why the Koszul dual of a commutative algebra is a Lie algebra and *vice versa*.

The second talk on *Coxeter groups and associated rings and categories* was given by Professor Idun Reiten (NTNU, Trondheim, Norway). Her aim was to associate a ring or category with an element of the Coxeter group and relate this to the cluster algebras of Fomin and Zelevinsky. These elegant results are connected with 2-Calabi–Yau categories with cluster-tilting object, and unify other recent work on cluster categories.

The final talk was given by Professor Ulrike

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Tillmann (University of Oxford) and was entitled *From configuration to moduli spaces*. The motivation lies in the problem of classifying manifolds and Riemann surfaces, and the talk discussed cobordism categories and their classifying spaces, explaining the connections with topological and quantum field theories in both topology and algebra. Her talk complemented the other two talks well, providing us with a day of accessible and interesting talks, which gave new insight into the connections between several areas of mathematics.

After the meeting, a dinner was held in a local restaurant, which was enjoyed by all.

Nicole Snashall and Teimuraz Pirashvili Department of Mathematics University of Leicester

DERIVED CATEGORIES IN ALGEBRA, TOPOLOGY AND GEOMETRY

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Following on from the LMS Midlands Regional Meeting was a three-day workshop on *Derived Categories in Algebra, Topology and Geometry* at the Department of Mathematics, University of Leicester, from 17 to 19 September 2009. It was supported by the London Mathematical Society.

Derived and triangulated categories play an important role in algebra, topology, geometry and physics, and thus this is a subject where several areas of mathematics are confluent. Many important conjectures in algebra, topology and geometry can only be formulated, or explained, in terms of derived categories. For example, the theory of derived categories is central to the homological mirror symmetry of Kontsevich in mathematical physics, the abelian defect group conjecture of Broué in the representation theory of finite groups, and the Bondal–Orlov conjecture on Calabi-Yau varieties. The conference achieved its aim of bringing together a group of top experts from algebra, topology and geometry who are working on derived categories to present new directions and ideas in the subject.

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The speakers at the workshop were Hideto Asashiba (Shizuoka), Roland Berger (St Etienne), John Greenlees (Sheffield), Thorsten Holm (Hannover), Peter Jørgensen (Newcastle). Dominic Joyce (Oxford), Bernhard Keller (Paris VII), Henning Krause (Paderborn), Fernando Muro (Seville), Konstanze Rietsch (King's College, London), Claus Ringel (Bielefeld) and Stefan Schwede (Bonn). An additional 35 people also participated in the workshop, including many PhD students and early-career researchers. The programme was arranged so as to encourage dialogue and interaction between the participants on different aspects and applications of derived categories. This interesting and exciting meeting made a timely contribution to this topic, and we thank the LMS for their support.

> Nicole Snashall and Teimuraz Pirashvili Department of Mathematics University of Leicester

FEYNMAN PATH INTEGRALS AND THEIR APPLICATIONS

A meeting on the rigorous theory of Feynman path integrals and their applications will take place at the Department of Mathematics, Swansea University, from 18 to 19 January 2010. The meeting is being organised under the auspices of the Wales Institute of Mathematical and Computational Sciences (WIMCS, www.wimcs. ac.uk). Speakers will include:

- Laura Cattaneo (Imperial)
- John Gough (Aberystwyth)
- Naoto Kumano-Go (Kogakuin)
- Sonia Mazzucchi (Trento)
- Oleg Smolyanov (Moscow State)

The meeting will begin with lunch at 12 pm on Monday 18 January. For further details visit the department website at www-maths.swan. ac.uk. There are limited funds to support graduate students attending the meeting. For further information contact the organisers Andrew Neate (a.d.neate@swansea.ac.uk) or Aubrey Truman (a.truman@swansea.ac.uk). ()

NEWSLETTER

BRAINMODES 2009

BrainModes is an annual meeting whose focus is to bring researchers from different backgrounds in the neurosciences together to understand the role of neural oscillations. The theme of this year's meeting is Neural Oscillations and Clinical Disorders, with four main themes: Epilepsy, Movement Disorders, Neuroendocrine Disorders and Neurodegenerative Disease. The meeting will take place from 10 to12 December 2009 at the University of Bristol.

The workshop will be structured as follows: The first day will be a 'training day' where leading experts will give overviews of particular topics and techniques. The second and third days will be devoted to half-day sessions on each of the main themes. The meeting will be structured to maximise the opportunities for interactions between participants.

Though registration has closed, it may be possible to accept registrations, although it cannot be guaranteed. If you are interested in attending the conference contact the organisers immediately.

Registration is £100, covering the cost of attendance at the meeting, lunches on each day and the conference dinner on the Friday evening. Accommodation must be arranged separately by the participant. There will be an opportunity to present posters at the meeting.

The London Mathematical Society has generously made a donation to the meeting to enable five bursaries for PhD students. These will consist of a full registration waiver and £100 towards travel and subsistence. PhD students are eligible if studying in the UK for a mathematics PhD. To be considered for one of these bursaries contact J.R. Terry (J.R.Terry@ bristol.ac.uk).

For further details about the meeting, including the schedule and latest list of participants, visit the meeting web page at www. enm.bris.ac.uk/anm/bm09.

REVIEWS

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Mathematicians: An outer view of the inner world by Mariana Cook, Princeton University Press, 2009, 208 pp, £24.95, \$35.00, ISBN 978-0-691-13951-7.

This book features ninety-two leading mathematicians. For each mathematician a photograph is given on the right-hand page and an autobiographical account appears on the left-hand page. The black-and-white photographs are by Mariana Cook who has a high reputation for books of photographic portraits. Cook superbly captures the character of these mathematicians in this stunning collection of photographs. They are works of art. The autobiographical texts vary greatly in nature. Some mathematicians give details of their career while others concentrate on how they became interested in the subject and why they are so passionate about it.

The different approaches taken by each mathematician not only gives us insight into the person but also make for a more interesting book. Many draw parallels between mathematics and composing music or writing poetry. We read comments such as "In a way, doing mathematics feels like writing a novel where your problem evolves like a live character" and "Sitting in a good mathematics lecture is like sitting in a good opera." We learn about the interaction between mathematicians, about their joys and disappointments, and most of all their deep feelings towards their subject.

The book is aimed at the general public so the mathematicians try to avoid technical descriptions of their work. This produces some beautiful comments such as: "Should I explain what a lemma is? A mountain climber needs holds to get from one level to the next one. Lemmas are the holds of mathematicians." There are, however, a few statements which will have little meaning to the general reader such as one mathematician speaking about "Carlos Simpson's development of а Но ma A ma ma alt bee the toc tw fro trie bad the τοι Bri are the of hig are rea ٦ joy wh

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a non-Abelian version of Hodge theory for Kähler manifolds".

All the featured mathematicians are winners of major awards and honours, although no attempt has been made to list precisely the 'top' mathematicians of today. Although these ninetytwo mathematicians come from many different countries and a wide variety of backgrounds, all but one of them is based in one of four countries, the United States.

Britain, France or Germany. In fact over 80% are based in the United States. It is clear that the choice has been somewhat biased by ease of obtaining the portraits, yet clearly a very high proportion of the 'top' mathematicians are based in the United States. Let me ask the reader to ponder: does this matter?

This large-format, coffee-table book, is a joy to dip into. It will certainly help everyone who reads it glimpse into the world of mathematics and begin to understand the passion that drives its creators.

Edmund Robertson University of St Andrews

Logicomix: An Epic Search for Truth by A. Doxiadis, C.H. Papadimitriou, A. Papadatos, A. Di Donna, Bloomsbury, 2009, 352 pp, £16.99, ISBN 978-0-747-59720-9.

Logicomix is a full-colour 'graphic novel' on the life of Bertrand Russell and the foundations of mathematics. Although 347 pages long, the format means that the book can be comfortably, and enjoyably, read in an afternoon. The story takes the form of Bertrand Russell giving a talk on the story his own life and his search for mathematical certainty. This use of self-reference is just one of a number of clever techniques the authors and artists use throughout the book.



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Another is that on a number of occasions the narrative is interrupted by sections where the authors and artists argue over the nature of the story, and how well it is being told. Visually the book is very pleasing, and the narrative moves along well with good coverage of the major characters (such as Whitehead, Wittgenstein, Gödel and Hilbert) and, given the genre of the book, appropriate explanations of mathematical ideas such as Hilbert's Hotel, Russell's paradox and Gödel's Incompleteness Theorem.

It must be noted however that this is a graphic, historical, novel. Thus it does take liberties with the truth. Into the story the authors weave meetings which never took place (such as Russell meeting Cantor), or events which Russell did not attend (such as a lecture by Gödel). The authors are explicit about this, and in a section at the end of the book entitled Logicomix and reality freely confess that they have simplified facts, invented events and deviated from history, and after giving some examples of where they had done so remark that "Historically keen readers can have fun locating many more such deviations from fact" (p. 345). I have to admit to initially being both irritated and suspicious of a book that played 'fast and loose' with history. However I quickly accepted the book on 29

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NEWSLETTER

its own terms, admitted that it was not aimed at a middle-aged academic such as myself, and got on with enjoying the broad sweep of the narrative. I consider this an excellent book. The format is eye-catching and novel, and the material is pitched at a level which will engage and enthuse a teenage reader. I hope that it will find its way into many school libraries and Christmas stockings.

> Mark McCartney University of Ulster

Symmetry in Chaos (2nd edition) by Michael Field and Martin Golubitsky, SIAM, 2009, 199 pp, \$59.00, ISBN 978-0-898716-72-6.

This beautiful book is an updated version of the original 1992 publication. In addition to a general enhancement of quality and colouring in the computergenerated images this edition includes new material on patterns on average and some additional diagrams explaining the mathematics, while the original appendix on now-outdated Basic programs has been removed.

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The book shows three

types of pattern generated by suitably chosen dynamical systems in the plane with symmetry: the *icons* arising from polygonal symmetry, the *quilts* with planar lattice symmetry and the *fractals* obtained from symmetric iterated function systems. The strange forms of attractors that can arise in planar dynamical systems have been studied since the 1970s when computing power became readily available, and polygonal and planar symmetries have a long mathematical pedigree – but when the two are combined, together with careful colour-coding of orbitdensities, the results are more than the sum of the parts and quite spectacular.

The images chosen for the book have been

juxtaposition of visual art and mathematical images is purposeful, vividly making the point that the mathematical processes can themselves be powerful artistic tools. Not only have some of these images been adopted by others for decorative or symbolic use (for example the IMA, Minneapolis, uses one for its logo) but the authors have contributed to multidisciplinary conferences such as *Bridges* (see *Newsletter* 350) and Michael Field has

arrived at after considerable fine-tuning of the

parameters and colours, and are chosen for

their aesthetic qualities, in many cases bearing

startling resemblances to natural objects such

as flowers or snowflakes or to human artefacts

like floor tiles or stained glass windows. This

taught courses on symmetry to art students.

The authors aim to make the ideas in this book accessible to as wide an audience as possible, and therefore in the text they introduce the very basic concepts of symmetry and iteration as well as planar geometry using complex numbers. It is difficult to imagine that a reader quite unfamiliar with mathematics would be able to

follow the exposition all the way through to contraction maps on a space of subsets of the plane (with symmetry thrown in), but the effort to provide a friendly introduction to these topics, motivated by the fascination of the pictures, is laudable if not heroic. For a mathematics student interested in the techniques of symmetric chaos this exposition of the key ideas would be very helpful.

Whether you understand the mathematics or not, however, the pictures are wonderful and repay much contemplation: an excellent Christmas present for the more discerning relative.

> David Chillingworth University of Southampton

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CALENDAR OF EVENTS

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

DECEMBER 2009

1 Forward with Hoare, Joint LMS/BCS–FACS Evening Seminar, London (386) 4 Paris–London Analysis Seminar, IHÉS, Paris (386)

4-6 LMS–Belgian Mathematical Society joint meeting, Leuven

8-9 Brian Davies 65th Birthday Conference, London (386)

8-12 Operators and Operator AlgebrasConference, Edinburgh (382)10 London Analysis Seminar, London (386)

10-11 Aerodynamic Boundary Layers Meeting, East Anglia (387)

10-12 BrainModes 2009, Bristol (387)11 Yorkshire and Durham Geometry Day, Durham (387)

12 Visual Representations in the Mathematical Sciences in the Early Modern Period, BSHM Lecture, London (386)
12 Just Infinite Profinite Branch Groups Meeting, Royal Holloway (386)
14-16 Diverse Faces of Arithmetic, East

Anglia (387) 14-18 Non-Abelian Fundamental Groups in Arithmetic Geometry: Final Workshop, INI, Cambridge (386)

JANUARY 2010

4-8 Stochastic Partial Differential Equations Workshop, INI, Cambridge (383)
11-15 New Topics at the Interface Between Probability and Communications Workshop, INI, Cambridge (383) 12 Code Breaking in Everyday Life, Gresham College Public Lecture, Museum of London (384)

18-19 Feynman Path Integrals and their Applications Meeting, Swansea (387)

FEBRUARY 2010

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6 Undergraduate Mathematics Conference, London (387)

9 Trains and Boats and Planes, Gresham College Public Lecture, Museum of London (384)

25-28 EUROMATH 2010 Student Conference, Bad Goisern, Austria (386)

26 LMS Mary Cartwright Lecture, Durham (387)

MARCH 2010

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3-5 Mixture Estimation and Applications
ICMS Workshop, Edinburgh (386)
9 Maths and Sport, Gresham College Public
Lecture, Museum of London (384)
22-26 Stochastic Networks Workshop, INI,
Cambridge (386)

APRIL 2010

6-9 BMC/BAMC 2010, Edinburgh (387)
6-9 BCME7, Manchester (385)
6-9 Spatial Network Models for Wireless Communications, INI, Cambridge (386)
12-14 Stochastics, Control and Finance Workshop, Imperial College London (387)
19-21 Mathematical Neuroscience Conference, ICMS, Edinburgh (386)

MAY 2010

10-14 Numerical Solution of the Painlevé Equations ICMS Workshop, Edinburgh (386)

24-28 Uncertainty Quantification ICMS Workshop, Edinburgh (386)

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G.B. MATHEWS LMS member 1887–1899



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George Ballard Mathews, FRS LMS Council member 1897 Senior Wrangler, St John's College, Cambridge, 1883 Fellow of St John's College Specialised in number theory

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