# THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 305

June 2002

 FORTHCOMING SOCIETY MEETINGS Wednesday 5 June 2002 – Liverpool Northern Regional Meeting

 Algebraic Geometry, Knot Theory and Related Topics

 Friday 21 June 2002 – London
 Professor A.R. Its (Hardy Lecture), J Marklof
 Wednesday 23 October 2002 - London
 The Four-colour Problem
 Joint meeting with the British Society
 for the History of Mathematics
 Friday 22 November 2002 - London
 Annual General Meeting
 J.T. Stuart (Presidential Address), J.D. Gibbon
 Monday 25 November 2002
 South West and South Wales Regional Meeting

### **RELATIONS BETWEEN IMA AND LMS**

Over the past few years there have been discussions between the Presidents and other Officers of the two Societies, albeit intermittently, with the intention of discussing collaboration in areas of common interest. Each Society has produced a document stating its aims in respect of such collaboration.

More recently the Councils of the two Societies resolved to set up a joint IMA-LMS Working Party, which had its first meeting on 12 April 2002 at the University of Warwick during the B(A)MC.

The LMS was represented by its President (J.T. Stuart), President-designate (P. Goddard), Treasurer (N.M.J. Woodhouse) and Executive Secretary (D.J.H. Garling). The IMA was represented by its President (J.G. McWhirter), Treasurer (R. Smith), a Council Member (J. Whiteman) and its Executive Secretary (A. Lepper). Amongst items discussed were the following:

- the relations between the two Societies and with the Royal Statistical Society, through the Council for Mathematical Sciences; representations to the Government and the Research Councils are relevant here;
- (2) relations with the Science Council, a body which is chaired by Sir Gareth Roberts and which represents all the Sciences;
- (3) meetings between the chairs and secretaries of the Education Committees of the two Societies, and the development of a Common Policy at

University level towards government;

- (4) closures of Mathematics Departments, or potential closures, and our joint responses;
- (5) the sharing of information and resources between the LMS "Newsletter" and IMA's "Mathematics Today".
- (6) regular meetings of equivalent Officers of the two Societies, with reference to different rules and procedures;
- (7) relations with HoDoMS and with CPAM (Conference of Professors of Applied Mathematics); the joint session at the B(A)MC at Warwick was noted as an indication of support in the community.

The next meeting will be held in September 2002.

J.T. Stuart & J.G. McWhirter

### FELLOWS OF THE ROYAL SOCIETY

Amongst those elected to Fellowship of the Royal Society in May 2002 were: Professor Terry Lyons, University of Oxford, Professor Eric Priest, St Andrews University, Dr Mary Rees, Reader, University of Liverpool, Professor Miles Reid, University of Warwick and Professor Peter Sarnak, Princeton University.

### YORKSHIRE DIFFERENTIAL GEOMETRY DAY

A Yorkshire Differential Geometry Day will be held on Friday 14 June 2002, at the University of Hull. This is a joint meeting of Yorkshire Differential Geometry Days seminars of the Universities of Hull. Leeds and York and is supported by an LMS Scheme 3 grant. For further information contact Jürgen Berndt, Department of Mathematics, University of Hull, Hull HU6 7RX (tel: 01482 465149, e-mail: j.berndt@hull.ac.uk), or view the website (http://www.hull.ac.uk /php/masjb/ hggworkshop.html).

### **PROFESSOR BARRY JOHNSON**

Professor Barry E. Johnson, FRS, President of the London Mathematical Society from 1980-82, died on Sunday 5 May 2002, after a courageous struggle with cancer.

Barry was born on 1 August 1937 in London, was an undergraduate at the University of Tasmania, Australia, from 1953 to 1957, and a graduate student of John Williamson at Cambridge University from 1958 to 1961. After positions in America and Exeter, he joined the staff of Newcastle University in 1965, becoming a Professor in 1969 and Dean of the Faculty of Science from 1986 to 1989. Barry became a Fellow of the Royal Society in 1978.

Besides his period of service as President, Barry served on the Society's Council from 1975-78, was Editor of the Newsletter from 1976-80 and was Editor of the Monograph series from 1983-87. Elected a member of the LMS on 16 May 1963.

Barry was a towering and innovative mathematician in the areas of harmonic analysis, Banach algebra theory, and C\*algebra theory; his work is truly seminal. Very many colleagues attended a meeting, sponsored by the LMS, that was held in Newcastle in June 2001 to mark Barry's retirement and to pay tribute to his work.

### LMS MEETING & RECEPTION INTERNATIONAL CONGRESS OF MATHEMATICIANS

The London Mathematical Society will be holding a Meeting and Reception, for its members, during ICM2002, Beijing, at 6.30 pm on Friday 23 August. Members who wish to attend should apply for their free ticket to the Administrator, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (e-mail: Ims@Ims.ac.uk) no later than 24 July. The Society hopes to entertain as many as possible of its members who are attending the Congress, but numbers are limited.

# LONDON MATHEMATICAL SOCIETY

# POPULAR LECTURES 2002

Strathclyde University - Thursday 20th June Leeds University - Thursday 27th June Institute of Education, London University - Wednesday 3rd July

### Dr Helen Mason

### 'Our Dynamic Sun'

'Mathematics helps to unravel the mysteries of the sun, by looking beyond visible light to amazing ultra-violet and Xray observations.'





### Dr John Silvester

### 'Geometry Ancient and Modern'

'Euclid found many curious properties of circles - this talk describes a theorem he could have proved but didn't, and gives some more modern approaches to it.'

STRATHCLYDE Commences at 2.00 pm, refreshments at 3.00 pm, ends at 4.30 pm. Admission is free. Enquiries to Professor A. McBride or Dr A. Ramage, Department of Mathematics, Strathclyde University, Livingstone Tower, 26 Richmond Street, Glasgow G1 1XH (tel: 0141 548 3647/3801, e-mails: a.c.mcbride@strath.ac.uk, a.ram age@strath.ac.uk).

LEEDS Commences at 6.30 pm, refreshments at 7.30 pm, ends at 9.00 pm. Admission is free. Enquiries to Dr R.B.J.T. Allenby, School of Mathematics, University of Leeds, Leeds LS2 9JT (tel: 0113 233 5122, e-mail: pmt6ra@leeds.ac.uk).

LONDON Commences at 7.00 pm, refreshments at 8.00 pm, ends at 9.30 pm. Admission is free, with ticket. Apply by **28 June** to Miss L. Taylor, London Mathematical Society, 57-58 Russell Square, London WC1B 4HS (e-mail: taylor@lms.ac.uk). A stamped addressed envelope would be appreciated.

### ABSTRACTS

### INTEGRABLE SYSTEMS AND INTEGRABILITY Alexander R. Its

The goal of this talk is twofold. The first and the main objective is to present to a general mathematical audience an overview of the modern theory of integrable systems. The theory was originated in the remarkable work of Gardner, Green, Kruskal, and Miura of 1967 on the Korteweg-de Vries equation. Since then it has gradually transformed into a subject which could be called 'nonlinear special functions' and which overlaps now with many areas that have never been considered before as 'integrable systems'. The focus of the talk will be on the analytic aspects of the theory of integrable systems represented by its principal analytic ingredient - the Riemann-Hilbert method. We will argue that the method can be thought of as a non-commutative analogue of the method of contour integral representations. The connections of the Riemann-Hilbert method to the algebraic (Kac-

Moody algebras) and geometric (holomorphic vector bundles) aspects of integrable systems will also be outlined.

The second objective of the lecture is, to a certain extent, of a speculative nature. We will try to use the main topic as an opportunity to reflect on the very notion of 'integrability'. In fact, we shall try to go beyond the classical definitions of integrability in the sense of Liouville and Frobenius. An ideal goal would be a rigorous understanding of such commonly used terms as 'explicit solution', 'exact formula', etc. Most certainly we are, at the moment, very far from even a rigorous formulation of the question. Still, some relevant observations toward the goal mentioned can be made, and we will try to do so when discussing the recent applications of the Riemann-Hilbert method in matrix models, special functions and combinatorics

### MATHEMATICAL MODELS OF QUANTUM CHAOS Jens Marklof

One of the major achievements in the theory of dynamical systems is the construction of statistical measures, which characterize the degree of "randomness" of the long-time evolution of a Hamiltonian system. Ergodicity, mixing and the existence of a central limit theorem are examples of such statistical properties.

In my lecture, I will explain that a similar scheme works in quantum mechanics. The main idea is to ask how well statistical properties of a given quantum Hamiltonian can be modelled by a large random matrix in a suitably chosen ensemble. Numerical investigations have led to conjectures of striking universality, which in turn have connections to deep unsolved problems in number theory. I will report on recent progress in the case of "simple" mathematical models: the Laplacian on Riemann surfaces and graphs, and symplectic maps of the torus.

# LONDON MATHEMATICAL SOCIETY

# FRIDAY 21 JUNE 2002

# J. Marklof (Bristol University) will speak at 3.30 pm on Mathematical Models of Quantum Chaos

# A. Its (Indiana University-Purdue University) will give the 2002 Hardy Lecture at 5.00 pm on Integrable Systems and Integrability

The meeting will be held at the Chemistry Auditorium, Christopher Ingold Building, Department of Chemistry, University College, 20 Gordon Street, London WC1.

Tea will be served at 4.30 pm

A dinner will be held at Poons Restaurant, 50 Woburn Place, London WC1 at 7.30 pm. The cost will be £23.00 per person, inclusive of wine, and a reception at De Morgan House beforehand. Those wishing to attend should inform Susan Oakes, Administrator, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS, enclosing a cheque payable to the 'London Mathematical Society' to arrive no later than **Tuesday 18 June**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Requests for support may be addressed to the Meetings & Membership Secretary, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (e-mail: grants@lms.ac.uk). Requests should include an estimate of expenses and a very brief *curriculum vitae*; research students should include brief letters of endorsement form their supervisors.

> Enquiries may be addressed to Susan Oakes (tel: 020 7637 3686, e-mail: oakes@lms.ac.uk)

### PANDA

A one-day meeting on Patterns and Nonlinear Dynamics will be held on Tuesday 25 June 2002 in the Department of Mathematics and Statistics, University of Surrey. This is the third meeting in the LMS funded PANDA (Pattern Formation, Nonlinear Dynamics and Applications) network series, following successful meetings in Cambridge (December 2001) and Leeds (March 2002).

There will be two pedagogical review lectures aimed at research students by Pete Ashwin (Exeter) and James Robinson (Warwick). These will be followed by shorter research talks. Contributions are invited for this session - email Rebecca Hoyle (r.hoyle@surrey.ac .uk) with a title. Please draw this notice to the attention of anyone you think might be interested in coming.

Post-doctoral researchers and research students are warmly encouraged to attend and will be given preference in financial support. Further details, including programme and travel information can be found on the web (http://www. maths.surrey.ac.uk/personal/st/R.Hoyle /panda/). For further information contact Rebecca Hoyle (r.hoyle@surrey. ac.uk).

### BEAUTIFUL MIND: CORRECTIONS

The mathematician John Forbes Nash, whose life was depicted in 'A Beautiful Mind' should not have been confused with the artist Paul Nash. Games theory was introduced by von Neumann and Morgenstern in their book 'Theory of Games and Economic Behaviour': Nash subsequently made major contributions to the subject.

### MISS JUDITH RUSSELL

Miss Judith Z. Russell, who was elected a member of the London Mathematical Society on 16 March 1972, died on 26 January 2002, aged 64.

### DISCRETE GROUPS AND ANALYSIS

A workshop on Discrete Groups and Analysis will be held at the University of Southampton from Thursday 5th to Saturday 7th September 2002. This workshop is supported by an LMS conference grant and is organised by J. Brodzki (j.brodzki@maths. soton.ac.uk) and I. Leary (i.j.leary@maths.soton.ac.uk), to whom all enquiries should be directed.

The meeting will address recent exciting developments on the boundary of Geometric Group Theory and Functional Analysis. Main themes of the workshop will include L<sup>2</sup>-group cohomology and the Atiyah conjecture, exactness of group C\*algebras for discrete groups, and results surrounding the Baum-Connes conjecture. Invited speakers include: P. Baum, N. Higson, T. Januszkiewicz, R. Nest, J. Roe, T. Schick, J. Swiatkowski, A. Valette, A. Zuk. Limited funds are available to support PhD students who are encouraged to apply. Details regarding accommodation arrangements, registration and programme can be found on the web (http://www.maths.soton.ac.uk/ ~jb /DGA).

### VISIT OF A. DIMCA

Professor Alexandru Dimca, of the University of Bordeaux, will be visiting the UK from 4-15 June, supported by an LMS Scheme 2 grant. Professor Dimca is an expert in singularity theory and algebraic geometry. He will give talks at the Universities of Liverpool, Leeds and Warwick. For further details contact Professor V.V. Goryunov (goryunov @liv.ac.uk).

### PROFESSOR WILLIAM TUTTE

Professor William T. Tutte, FRS, who was elected a member of the London Mathematical Society on 28 June 1945, died on 2 May 2002, aged 84.



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### NEWS FROM THE EUROPEAN MATHEMATICAL SOCIETY

In April, the European Mathematical Society organised a brainstorming meeting in Berlingen on the Swiss shore of Lake Constance. The LMS was represented by Chris Lance and Susan Hezlet. Four topics were on the menu: the future of Zentralblatt-MATH, European participation in the world maths digitised library, the Society's relationship with its newlyformed publishing house, and the Society's policy on meetings. Besides formulating policy, the meeting was also to draft 'expressions of interest' for support for some of these activities within the European 6th Framework Programme.

Currently, Zentralblatt-MATH is run by a governing body representing the Society, Springer Verlag, and FIZ Karlsruhe (the latter being a German national organisation). To ensure its future, the organisation needs other European partners and continuing funding from the European Union (which is where the European Mathematical Society comes in).

Various projects are already afoot to make back issues of mathematical journals and books available electronically. One such, the EMIS Electronic Library of Mathematics, is already available, free, on the web (www.emis.de) and there are several other significant projects in hand. However, the new project discussed at Berlingen is an ambitious one, initiated by the AMS, but requiring international partners, to 'digitise' all past mathematical literature. The project, according to a paper by John Ewing of the AMS, is to make the digitised material freely available. But to make it useful there will have to be indexing systems and search engines: these should be supplied at a commercial rate. Our Society, if it can find the funding, wants to be the European partner in this enterprise.

The Society intends to continue its Summer Schools, EMS Lectures and Diderot Forums and will seek EU funding for them. It is seeking to expand the EMS lectures to small conferences centred on the lectures. It is also starting to hold joint meetings with its member societies. The first one will be in Nice next February, jointly with both French Societies, SMF and SMAI. The subject will be Applied Mathematics and Applications of Mathematics. Thereafter, it is hoped to hold a joint conference with the Portuguese Mathematics Society.

Much of the discussion of the publishing house was devoted to getting the right internal structure to ensure good communication between the Society and the Publishing House, which has been set up as a separate trust in Switzerland, with significant support from the ETH in Zürich.

Our President, Rolf Jeltsch, worked us hard, but we were permitted an hour's walk up the hillside overlooking the lake, where it narrows into the river Rhein.

David Salinger EMS Publicity Officer

### THOMPSON FEST

There will be a meeting at the Centre for Mathematical Studies, Cambridge, from 26-29 September 2002, to celebrate the 70th birthday of John G. Thompson. The conference will start on Thursday 26th after lunch and will finish on Sunday 29th at lunchtime. The speakers will include M. Aschbacher, J.H. Conway, W. Feit, G. Glauberman, R. Guralnick, R. Lyons, G.R. Robinson, J-P. Serre, B. Stellmacher, H. Volklein and E. Zelmanov.

The organisers are Richard Lyons (Rutgers University), Gordon James (Imperial College), Chat Ho (University of Florida) and Jan Saxl (University of Cambridge). There will be a small registration fee, and accommodation has been arranged at Wolfson College (about £25 B&B single a night) and at New Hall (about £51.50 B&B single a night). Some financial support is available for research students studying at a UK university. The meeting is supported by the NSA and LMS. For further information, contact Jan Saxl (j.saxl@dpmms.cam.ac.uk).

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# TOPICS IN ALGEBRAIC NUMBER THEORY

# LMS/EPSRC Short Course

# King's College London, 2-6 September 2002 Organiser: David Burns

Algebraic number theory has a long and distinguished history and remains one of the most significant areas of research in mathematics. The subject has in particular enjoyed spectacular advances in recent years, with Wiles's proof of Fermat's Last Theorem standing as one of the undisputed milestones of twentieth century mathematics. The analysis of problems in number theory, even those of a seemingly concrete and explicit nature, may well however involve the interplay of results and techniques from many different branches of pure mathematics. In conjunction with the increasing pace of current developments this means that it is all too easy to feel relatively isolated from the fundamental advances which are being achieved today.

With this problem in mind, the lectures at this short course aim to provide students with a grounding in some of the areas which are of central importance in both algebraic number theory and arithmetic algebraic geometry. The topics to be discussed have been chosen both because they have been of pivotal significance to recent developments and also because they illustrate well the wide variety of techniques and the nature of the problems which arise in much of the fundamental research which is being conducted today. The course titles and lecturers are:

- Local Fields : Ivan Fesenko (University of Nottingham)
- Iwasawa Theory : David Burns (King's College, London)
- Modular Forms : Kevin Buzzard (Imperial College, London)

The course on Local Fields will discuss the basic properties of rings which arise naturally in all areas of arithmetic algebraic geometry and will also describe the foundational aspects of class field theory; the course on Iwasawa Theory will introduce students to one of the most useful techniques currently available to number theorists; the course on Modular Forms will take students to the point at which they can understand the statement of the Shimura-Taniyama-Weil Conjecture, its connections to Fermat's Last Theorem and the statement of results of Wiles and others related to this conjecture. Each course comprises six lectures and will start from a discussion of basic definitions and concepts. Prerequisites will be kept to a minimum so that the courses are for the most part accessible to beginning graduate students, presupposing only a thorough knowledge of undergraduate material. The lectures will be illustrated by the careful treatment of concrete examples. In addition, worksheets and exercises will be supplied, to be discussed with post-doctoral tutors in afternoon sessions. Suggestions for background reading will be available at www.maths.kcl.ac.uk/~burns/

The registration fee is £60, which for all UK-based research students includes the cost of course accommodation and meals. Participants must pay their own travel costs. EPSRC-supported students can expect that their registration fees and travel costs will be met by their departments from the EPSRC Research Traning and Support Grant that is paid to universities with each studentship award (or from the Doctoral Training Account in the case of first-year students).

Application forms may be obtained from Frances Spoor, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (spoor@lms.ac.uk) or from the LMS website http://www.lms.ac.uk/activities/research meet com/short course/11 app.html

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is **21 June 2002**.

### B(A)MC WARWICK 2002

As an applied mathematician the high spots of the conference for me were the excellent plenary lectures I attended. I especially enjoyed Ingrid Daubechies on wavelets and their applications, Jonathan Chapman on subcritical transition in a channel. Nick Trefethen on wave packet modes of matrices and differential operators and Persi Diaconis on the search for randomness, the last of which certainly gave me a new insight in what is meant by randomness in physical systems. As always at the BAMC I'm hard put to choose amongst the competing minisymposia and contributed sessions, especially as this year, in addition to the sessions on fluids, solids, etc., which are a regular feature of the BAMC, there were several sessions in the overlap region between pure and applied mathematics including dynamical systems, nonlinear dynamics and partial differential equations. It was hard to tell, however, how successful some of these sessions were at achieving the organisers' hoped for maximal interaction between pure and applied mathematicians. A welcome return, at least to the BAMC after some five years absence, was a session on mathematical education which highlighted the problems university mathematics departments face in the lessening know-how and understanding with which students enter degree courses even if it wasn't clear what are the primary causes of this. Some remedial projects were outlined and a way of encouraging interest in mathematics in schools via master classes described. Whilst the poster sessions were on a much greater scale than at previous BAMC's, this did make it possible to sample a wider range of work than usual.

The organisers designed the programme to give considerable overlap between the pure and applied mathematics themes from the Tuesday afternoon to the Thursday morning. Applied mathematicians, however, were not much in evidence on the Tuesday, by one count only eleven other than those from

Warwick at the Tuesday evening reception. Equally, there didn't seem many pure mathematicians around on the Thursday morning. Having the two colloquia in parallel as is planned for Liverpool in three years' time may prove a more successful way of mixing pure and applied mathematicians and should also avoid the late ending of the BAMC on the Friday.

The organisers are to be congratulated on the smooth running of the conference and I certainly found it a very worthwhile meeting.

> Derek Collins University of Sheffield

I remember a sequence of BMCs some while ago when there was always a flurry of snow on one day. The splendid weather this year gave an extra boost to a very enjoyable and smoothly-run meeting.

I very much appreciated the wellpitched plenary talks during my stay, which lasted from the start on Monday until Thursday afternoon. A bonus of the joint meeting was the chance to hear talks in unfamiliar areas; I particularly enjoyed Ingrid Daubechies' splendid introduction to wavelets, as well as the talks on probability and the practical relations of pseudospectra to spectra.

Since this was largely a 'back to back' meeting of the BMC and BAMC there was a relatively limited amount of cohabitation, although the BMC was well served by the plenary talks over the major overlap period.

I was less happy with the remaining programme on the main joint day, Wednesday, in that there seemed to be a bit of a sag in proceedings outside the plenary talks, where the discussion sessions had a rather mixed reception. To some extent I felt that the venue of the Arts Centre for the central day was rather impersonal and less encouraging of interaction than the very easy informal atmosphere in the Mathematics Institute itself, where all the mathematical activities took place on other days. To offset this, the joint dinner on Wednesday evening provided a good opportunity for bonding in the face of common adversity, when a fire alarm just as our very tasty main course was served resulted in 15 cold minutes in the restaurant's car park.

One innovation from the BMC point of view was the adoption of poster sessions in addition to the traditional splinter group activity. These are still a less familiar means of communication in Pure Mathematics. Having myself contributed a poster I can see some of their advantages as well as the potential difficulties. It seems very important to arrange sessions at a time and place to maximise the potential audience; when they were placed by the exit of related special sessions there was particularly good interaction, while the more anonymous pre/post view sessions on the central day appeared to have much less impact. Poster sessions will clearly continue to be developed, but they do need careful planning and active management.

An advantage of the joint meeting was the chance for wider viewpoints in the evening forums. The discussion about research support, with the participation of a panel representing EPSRC, LMS, IMA and SIAM, was well attended and helpful. The chance to have formal and informal talks on such areas of common interest, as well as the more mathematical overlaps, are an encouragement for the plans to hold a further joint meeting in April 2005 in Liverpool.

The present thinking for the joint meeting is to run much more in parallel than in Warwick, probably starting on Monday afternoon, and finishing at some time on Thursday. This would entail some reduction in the total number of plenary sessions, but would otherwise simply mean a larger number of concurrent scientific sessions. I would welcome comments about the format, and any foreseen losses or gains from a shortened timetable.

> H.R. Morton University of Liverpool

### **IMO 2002**

The annual International Mathematical Olympiad is about to come to the United Kingdom. The event will be held in Glasgow during 19 - 30 July 2002 under the wing of the United Kingdom Mathematics Trust, and the 500 competitors will be guests of the University of Strathclyde.

We expect 87 countries to be represented. Examination of past question papers indicates that the standard of problems is getting progressively more demanding. The students taking part are in teams of six per country, and are the best secondary school mathematicians that their nations have to offer (in the case of the UK, the students are identified by the British Mathematical Olympiad). Two former UK team members have gone on to win Fields Medals. Half the students taking part receive a medal of some colour, and the best twelfth will receive a gold medal from HRH the Princess Royal. The competitors sit two papers of three very hard questions each, and have four and half-hours to work on each paper.

As well as the competitors, there are a large number of team leaders and deputies, observers, co-ordinators (marking police), guides, organisers and other helpers. This is therefore a vast undertaking. To read more about the event, find out who has done all the work, read details of the generous academic, commercial and government sponsorship and see past papers, visit the event virtually (http://www.imo2002.com).

The UK team is in the final stages of intensive training, which included a New Year visit to Budapest and camps at the Universities of Bath and Birmingham, Oundle School and Trinity College Cambridge. We are confident of giving the best performance by a UK team for several years. Visit the UK squad site http://www.bath.ac.uk/~masgcs/ukimo 2002 to see the sort of materials that we use to train our students.

> Geoff Smith, UK Team Leader University of Bath

### BRITISH MATHEMATICAL COLLOQUIUM

The first BMC took place in September 1949: the Chairman was M. Newman, and around 100 persons attended. The last meeting to be in the month of September was in 1963, when the meeting took place at RMC Shrivenham, and 149 people attended. Since that year the meeting has settled into a routine of meeting in a week close to Easter. The number of people attending has varied considerably; meetings with more than 400 participants were at Birmingham in 1969, York in 1970, Kent in 1971, Glasgow in 1972, Manchester in 1973 (this was the 25th meeting, with 542 registered members, apparently the maximum ever), Sussex in 1974, Newcastle 1975. Edinburgh in 1977, UCL in 1979, and Oxford in 1981. The only meetings since 1981 with more than 300 participants were at Cambridge in 1985, Heriot-Watt in 1995, and Leeds in 2000. However in the last decade the average has been around 200 registered members.

The format of the meeting has evolved with time. There was a dramatic change for the 54th meeting this year: the meeting at Warwick was the first joint meeting with the British Applied Mathematical Colloquium. This meeting is discussed elsewhere in this *Newsletter*; here I just note that there will be a 'single' BMC in Birmingham from 7 to 10 April 2003 and in Belfast from 5 to 8 April 2004, whereas there will be another joint meeting in Liverpool in 2005.

The BMC is run by two separate committees. First, each meeting has an Organizing Committee, comprising members of the Department hosting the conference; this committee is dissolved when the particular BMC finishes, and has no ongoing existence (for tax and other reasons). It is important to note that responsibility for all local arrangements, including finance, accommodation, and invitations to speakers lie with this committee.

For some years there has also been a Scientific Committee. The main task of this committee is to suggest the names of speakers at a particular BMC to the local organizing committee. The Scientific Committee should also provide an element of continuity between successive meetings of the BMC. Until now the Chairman of the Scientific Committee has been the Chairman of the individual Organizing Committee, and so has held office for just one year. However a feeling developed that this was not an ideal arrangement: it is difficult both to deal with the details of an individual meeting and to look to the future. (Bookings and plans must now be made several years in advance.) Thus a committee was convened under the Chairmanship of Professor John Greenlees of Sheffield to consider this problem and to make proposals: the proposals were presented to the Annual General Meeting of the BMC at Warwick in April 2002, and were carried unanimously after some small amendments were accepted.

The tasks of the modified Scientific Committee are: to provide continuity in the organization of the BMC; to advise individual Organizing Committees, specially on the names of possible speakers; to plan future meetings of the BMC, including making proposals to the Annual General Meeting on the location of such meetings; to have discussions with the BAMC about possible joint meetings: to seek to maintain a good balance, over time, for the different subjects considered at the successive meetings; and to keep good records and establish an archive (to be held at De Morgan House).

The proposals put to the AGM were that the Scientific Committee should have a Chair, not a member of any local Organizing Committee, to serve for three years; I was elected to this position. Also the Scientific Committee will now meet twice a year - once at the BMC meeting near Easter and also in September/October. The particular task of this latter meeting is to 'review strategy in a pro-active way, encouraging and developing new ideas and initiatives....'.

The membership of the Scientific Committee from April 2002 is as follows: Chair: Garth Dales (Leeds) Elected by the BMC:

Ulrike Tillmann (Oxford) Three LMS Nominees: Ken Brown (Glasgow) John Greenlees (Sheffield) Helen Robinson (Coventry)

Three EMS Nominees: Steve Pride (Glasgow) Michael Weiss (Aberdeen) Graham Jameson (Lancaster) Representatives of Birmingham 2003: Rob Curtis & Robert Wilson Representatives of Belfast 2004:

David Armitage & Martin Mathieu Representatives of Liverpool 2005:

Peter Giblin & Hugh Morton

The LMS has agreed in principle to support the BMC financially, and, in particular, it will meet the costs of the meetings of the Scientific Committee. We are very grateful to the LMS for this support.

The first meeting of the new Scientific Committee will be in London on 14 October 2002. We are eager to receive comments from the UK mathematical community on the evolving role of the BMC; such comments could be sent to myself or to any member of the Committee. Here are some questions that come to mind.

- The LMS (directly) and individual Mathematics Departments (indirectly) do provide considerable financial support for the BMC. Is this money wellspent?
- Are there changes to the format that would make the meeting more attractive or useful to the community?
- The BAMC seems to be more successful than we are in attracting graduate students - what more should the BMC do?
- We have had one joint meeting with the BAMC, and the next such meeting will be in 2005. How should such meetings evolve? What is the most

valuable format?

• The BMC seeks to balance lectures of general interest with more specialized 'special sessions'. Further, whilst most lectures are directly on mathematics, some related activities concern organizational and political matters. Is the present balance among these various activities the best-possible one?

We hope that you will communicate with us - and support the BMC in the future.

H.G. Dales University of Leeds

### **ICIAM 2003**

Arrangements are in hand for the hosting of the fifth International Congress in Industrial and Applied Mathematics in Sydney, Australia from 7 - 11 July 2003. This is the first time the ICIAM conference has been held in the southern hemisphere and plans are for an attendance of 2000 participants. There is a raft of 27 invited speakers covering most areas of IAM. Embedded meetings (including the sixth Australian/New Zealand Mathematics Convention) also mean that all areas of mathematics and its applications are represented. The conference is hosted by ANZIAM (Australian and New Zealand Industrial and Applied Mathematics), and details (including registration details) are available on the web (www.iciam.org).

### SIXTIETH BIRTHDAY OF PROFESSOR T. TERZIOGLU

A workshop on Analysis, to mark the occasion of the sixtieth birthday of Professor Tosun Terzioglu, will be held on 30-31 August 2002 at Middle East Technical University, Ankara-Turkey. The speakers include: D. Vogt (Wuppertal), R. Meise (Dusseldorf), P. Djakov (Sofia), P. Chalov (Rostov), J. Krone (Wuppertal), I. Bonet (Valencia), V.P. Zahariuta (Rostov). For further information contact Professor S. Alpay (safak@metu.edu.tr).

### **BELFAST FUNCTIONAL ANALYSIS DAY 2002**

The fifth annual Functional Analysis Conference at Queen's University Belfast will be held on Saturday, 16 November 2002 in the Department of Pure Mathematics, David Bates Building. As the format of the previous meetings has proved successful, there will be two onehour lectures by the main speaker and several contributed 30-minute talks. This year's speaker is Professor Isabelle Chalendar (Université de Lyon), who will speak on "The operator-valued Poisson kernel and its applications".

The meeting gratefully receives support by the London Mathematical Society, we can therefore offer research students support for their attendance. To obtain this, and for any other information, contact Dr Martin Mathieu (m.m@qub.ac.uk) or look on the web (www.qub.ac.uk/bfad).

# LONDON MATHEMATICAL SOCIETY

# INVITED LECTURES SERIES

The Society's Invited Lectures series consists of meetings at which a single speaker gives a course of about ten expository lectures, examining some subject in depth, over a five day period (Monday to Friday) during a University vacation. The meetings are residential and open to all interested. It is intended that the texts of the lectures given in the series shall be published. In addition to full expenses, the lecturer is offered a fee of £1250 for giving the course and a further fee of £1500 on delivery of the text in a form suitable for publication. Recent lecturers in the series have been P.F. Baum (1995), F.J. Almgren (1996), J. Alperin (1997), D. Zagier (1998), A. Mielke (1999), B. Dubrovin (2000), T. Goodwillie (2001). The 2002 lectures will be given at the University of Leeds by P. van Moerbeke.

For the 2003 meeting, proposals are now invited from any member who, in addition to suggesting a topic and lecturer, would be prepared to organize the meeting at the member's own institution or a suitable conference centre. Enquiries about this series should be directed to the Executive Secretary, Dr D.J.H. Garling, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (e-mail: garling@lms.ac.uk, tel: 020 7637 3686, fax: 020 7323 3655). Programme Committee hopes to make a decision on **Friday 21 June 2002**.

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### ELLIPTIC COHOMOLOGY AND CHROMATIC PHENOMENA (9 - 13 December 2002)

87

### HIGHER CHROMATIC PHENOMENA (16 - 20 December 2002)

Supported by the European Commission, Research DG, Human Potential Programme, High-Level Scientific Conferences - HPCF-2001-00105

in association with the Newton Institute programme entitled New Contexts for Stable Homotopy Theory (2 September - 20 December 2002)

Organisers: Haynes Miller (MIT) and Doug Ravenel (Rochester).

Theme of EuroWorkshop: This EuroWorkshop will bring together the many disparate directions of research on elliptic genera and cohomology. These include: topological modular forms, obstruction theory technology, the enriched Witten genus, homotopical level structures, the Waldhausen K-theory of topological K-theory, equivariance and rigidity, twisted K-theory and the Verlinde algebra, the chiral de Rham complex, fundamental classes of algebraic varieties, orbifold genera, index theory on loop spaces, elliptic phenomena in physics, and moonshine representation theory.

The principal objective will be to make connections between these developments, and speakers will be encouraged to bridge the gaps between them.

#### Invited speakers include:

- M. Ando (Champaign)\* L. Borisov (Columbia)\* P. Goerss (Northwestern)\* J. Greenlees (Sheffield)\* I. Grojnowski (Cambridge)\* M. Hopkins (MIT)\* M. Kapranov (Toronto)\* I. Kriz (Ann Arbor)\*
- G. Laures (Heidelberg)\* G. Mason (Santa Cruz) G. Moore (Rutgers) J. Morava (Johns Hopkins)\* J. Rognes (Oslo)\* V. Schechtman (Toulouse) N. Strickland (Sheffield)\* B. Totaro (Cambridge)\*

\* Confirmed speaker

Location and cost: The EuroWorkshop will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Wolfson Court. The workshop package, costing £330 per week or £715 for two weeks, includes accommodation, breakfast and dinner from dinner on Sunday 8 December 2002 until breakfast on Saturday 21 December 2002, and lunch and refreshments during the days that lectures take place. Numbers will be restricted to about 50 participants.

**Support:** The EuroWorkshop is supported by the European Community and funding is available to support a limited number of young (under 35 years of age) researchers and overseas senior researchers who are nationals of EC Member States or of the Associated States. Self-supporting participants of any age and nationality are welcome to apply.

Further information and applications forms are available from the web: (http://www.newton. cam.ac.uk/programs/NST/nstw04.html). Completed application forms should be sent to Tracey Andrew, Isaac Newton Institute for Mathematical Sciences, 20 Clarkson Road, Cambridge CB3 0EH, or via email (t.andrew@newton.cam.ac.uk). Closing date for the receipt of applications is 28 June 2002.

### NUMERICAL METHODS FOR NONLINEAR DYNAMICS AND BIFURCATIONS

A meeting on Numerical Methods for Nonlinear Dynamics and Bifurcations will be held at the University of Bristol from 1-3 July 2002. The meeting is funded by the EPSRC and the LMS and continues a series of informal and lively meetings organised by Willy Govaerts and Yuri Kuznetsov in Amsterdam, Utrecht and Gent. The focus will be on: Bifurcations in high-dimensional dynamical systems. Continuation methods for global bifurcations, Visualization of complex structures. The organisers for the meeting are Alan Champneys, Bernd Krauskopf, Hinke Osinga, Steve Wiggins. The Scientific Committee are Eusebius Doedel (Montreal). Willy Govaerts (Gent), Yuri Kuznetsov (Utrecht). The Invited Speakers are:

- Wolf-Jürgen Beyn (Bielefeld, Germany)
- Andrew Cliffe (AEA Technology, UK)
  Michael Dellnitz (Paderborn,
- Germany)
- Eusebius Doedel (Montreal, Canada)
- Willy Govaerts (Gent, Belgium)
- John Guckenheimer (Cornell, USA)
- Yuri Kuznetsov (Utrecht, The Netherlands)
- Gerald Moore (Imperial College, UK)
- Dirk Roose (Leuven, Belgium)
- Bjorn Sandstede (Ohio State, USA)

Registration is free. Thanks to the funding, participants will get two overnight stays and the conference dinner free of charge. Travel to/from Bristol and other expenses must be covered by the participants. There are limited funds for travel expenses of PhD students. To participate in the meeting fill out and return the registration form and email to Emma Weeks at (E.Weeks@bristol.ac.uk). Spaces are limited, so early registration is encouraged. Further information and the registration form can be found on the web (http://www.enm.bris.ac.uk/anm/nmnd b/).

### TOPOLOGY, GEOMETRY AND QUANTUM FIELD THEORY

A symposium on Topology, Geometry and Quantum Field Theory will be held from 24-29 June 2002 at Oxford. Geometry and quantum physics developed in parallel since the recognition of the central role of non-abelian gauge theory in elementary particle physics in the late seventies and the emerging study of supersymmetry and string theory. The topics of this symposium will be centred on string theory, M-theory, and quantum gravity on the one hand, and K-theory. elliptic cohomology, quantum cohomology and string topology on the other. Its purpose is to bring experts in topology, geometry and theoretical physics together.

The opening Astor Lecture will be given by Ed Witten. R. Dijkgraaf and M. Hopkins will each give a mini lecture course. Other speakers will be: M. Atiyah, N. Nekrasov, G. Moore, I. Feigin, G. Wilson, S. Stolz, D. McDuff, D. Sullivan, R. Cohen, C. Teleman and M. Kontsevich. There will be a conference dinner on Friday 28 June in honour of Graeme Segal's 60th birthday. The conference is supported by the LMS, EPSRC and Oxford University. For registration and further information, visit the website (http://www.maths.ox.ac.uk/notices/eve nts/special/tggfts/) or contact the organizer: U. Tillmann (tillmann@maths.ox .ac.uk).

### VISIT OF PROFESSOR A. PETROSYAN

Professor A. Petrosyan from the Russian Academy of Sciences will visit Imperial College, London from 16 June to 6 July 2002. He will also visit St Andrews on 18 June, and Sheffield on 28 June. The visit is supported by LMS Scheme 5. For further information, contact Richard Craster, Department of Mathematics, Imperial College, London SW7 2AZ (r.craster@ma.ic.ac.uk).



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### BOOK REVIEW

Mathematics of Genome Analysis by J.K. Percus (Cambridge Studies in Mathematical Biology 17) Cambridge University Press, 2002, 139pp, £40.00, ISBN 0 521 58526 0.

Most of us have read something about the massive research effort known as the Human Genome Project, an attempt to record the sequence of about three billion units that make up the human genome. We know that this project will have far-reaching implications, many of them beneficial, but some of them rather frightening. In the wake of the main project, research is now being directed towards secondary objectives. One of the themes of the new European Framework 6 Programme is 'Genomics and Biology for Health', with a budget of 2150 million euros. In this country the EPSRC has made grants to establish chairs in Bioinformatics at UCL. Oxford. Imperial, and Manchester, one of the declared aims being to develop techniques for analyzing the expected avalanche of data.

In this context, any book that seeks to explain some of the mathematical problems underlying Genome Analysis is welcome. At a very simplistic level the problems concern the statistics and combinatorics of sequences, specifically sequences with an alphabet of four letters C, G, A, T. The interest arises from the fact that the occurrences of the letters are not independent. For each given functional entity one can begin by finding the contingency table for consecutive letters, like the one given on page 43 of this book. It seems to me that the analysis of such tables leads straight to deep and interesting mathematical questions. Other topics discussed here include techniques for recomposing DNA, such as fingerprinting, anchoring, and pooling. There are also chapters on the long-range properties of DNA, various techniques for sequence comparison, and the spatial structure of DNA.

Many years ago I studied another book by Percus, 'Combinatorial Methods' (Springer 1971), so I was prepared for the approach that he uses here. An amazing repertoire of techniques is deployed, with varying levels of justification. This means that the gate is wide open for mathematicians to contribute to theory and practice of this important field of research.

Norman Biggs

### VISIT OF PROFESSOR S. NABOKO

Professor S. Naboko of St Petersburg University, Russia, will be visiting the UK during late June and July. He will give the following lectures:

- Kings College London, 4 July, Local host: Professor E.B. Davies (E.Brian.Davies@kcl.ac.uk) Spectral analysis of infinite Jacobi matrices with periodically modulated entries. Spectral phase transition examples in a class of unbounded Jacobi matrices.
- Cardiff, 10 July, Local host: Professor W.D. Evans (EvansWD@cf.ac.uk) Spectral analysis of infinite Jacobi matrices with periodically modulated entries. Spectral phase transition examples in a class of unbounded Jacobi matrices.
- Bath, 12 July, Local host: Professor D. Vassiliev (masdv@bath.ac.uk) Nevanlinna operator functions: boundary behaviour and its application to perturbation theory.
- Cardiff, 17 July, Local host: Dr B.M. Brown (Malcolm.Brown@cs.cf.ac . u k) Nevanlinna operator functions: boundary behaviour and its application to perturbation theory.

For further information, please contact the local host. The visit is supported by an LMS grant.

### **E-BOOKS OF MATHEMATICS**

E-books of Mathematics can be downloaded, printed, read for free from the web (http://www.gallup.unm.edu/~smaran dache/eBooks-otherformats.htm). For further information contact L. Kuciuk, University of New Mexico, Gallup, NM 87301, USA.

# DESIGNS IN COMBINATORICS AND STATISTICS

### LMS/EPSRC Short Course

### Queen Mary, University of London, 9-13 September 2002

### Organisers: R.A. Bailey and P.J. Cameron

Many topics in Combinatorial Design originated in Statistics. For example, twodesigns began life as balanced incomplete-block designs for agricultural field trials, while symmetric designs from Hadamard matrices originated in efficient factorial designs for industrial experiments. In other instances there has been parallel development under different names; for example, linear codes are the same as the duals of fractional factorial designs.

However, the knowledge that these topics cross from Combinatorics into Statistics has been lost on both sides, particularly at beginning PhD level. The aim of this course is to give PhD students in both Combinatorics and Statistics the basic building blocks in the area and to give them the language to be able to understand one another's literature. The course will give these PhD students an opportunity to meet other PhD students and PDRAs, both in their own area and in the other, and discuss their research interests in this wider group.

There will be three courses of lectures:

• Combinatorial Design : Dr Ian Anderson (University of Glasgow)

• Statistical Design : Professor R.A. Bailey (Queen Mary)

• Interface : Professor Peter Cameron (Queen Mary)

There will be three additional guest lectures by specialists to be announced. The courses will be supplemented with problem sessions: worksheets will be supplied and postdoctoral tutors will be available. Further details of the programme are available at: http://www.maths.qmul.ac.uk/~pjc/design/shortcourse.html

The registration fee is £60, which for all UK-based research students includes the cost of course accommodation and meals. Participants must pay their own travel costs. EPSRC-supported students can expect that their registration fees and travel costs will be met by their departments from the EPSRC Research Training and Support Grant that is paid to universities with each studentship award (or from the Doctoral Training Account in the case of first-year students).

Application forms may be obtained from Frances Spoor, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (spoor@lms.ac.uk) or from the LMS website (http://www.lms.ac.uk/activities/research\_meet\_com/short\_course/12\_app.html).

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is **28 June 2002**.

### SCIENCE - A HOT NIGHT OUT!

In the early nineteenth century, London audiences were thrilling to the excitements laid on by Humphry Davy in his lectures at the Royal Institution. Science was considered a good night out. Indeed Davy's lectures became so popular that all the people coming in their carriages made Albemarle Street so crowded that it became the first one way street in London.

Simon Singh, the author of Fermat's Last Theorem, teamed up during April with psychologist and magician Richard Wiseman to try to recreate some of that nineteenth century passion for science as performance art. Given the appetite for popular books on science, there is certainly an attentive audience out there who would lap up such scientific fodder. Their show called the Theatre of Science at the Soho Theatre may not have brought Dean Street to a standstill but the audiences certainly enjoyed the fun and games that Singh and Wiseman had to offer. This wasn't Copenhagen or Arcadia - theatre with a little science sprinkled on top for topical seasoning. Singh and Wiseman were offering their audience full-frontal science. The studio theatre at the Soho made an intimate setting for such a night of stand-up science.

Singh kicked off the first half with a guided tour of the mysterious world of probability. His presentation entitled The Mathematics of Gambling was peppered with a variety of interesting bets and anyone who could beat the odds was rewarded with a pint of beer at the Soho Theatre's bar. But as Singh explained, the cards were invariably stacked in his favour.

Anyone who has seen Singh talking about Fermat's Last Theorem will know that he has an endearing style which brings the audience on board. The crowds were heckling and participating from the outset. To ward off anyone in the audience with too much professional expertise he begins his routine with a joke about the astronomer, physicist and

mathematician who on a trip to Scotland see a black sheep outside the window. "Ah" the astronomer declares "All sheep in Scotland are black." "No" declares the physicist "you mean some of the sheep in Scotland are black." The mathematician though retorts "The best we can prove is that there exists one field, containing one sheep, one side of which is black."

In the wings Wiseman, Singh's partner for the evening, was measuring the audience's response to Singh's joke with his Laughometer. Wiseman is attempting to make laughter into a science. His Laughter Lab (http://www.laughlab.co. uk), a Science Year initiative, is a largescale public experiment to find the funniest joke in the world.

But it is the science of deception with which Wiseman entertained the audience after the interval. Trained originally as a magician his performance is slick. Unlike Persi Diaconis, last year's LMS Hardy lecturer who got fascinated in the mathematics of magic, Wiseman decided to study the psychology involved in performing tricks. He now researches psychological and paranormal phenomena at the University of Hertfordshire.

Wiseman's evening's entertainment begins by breaking the Magic Circle's vow of silence: he explains how to make a coin disappear, one of the first tricks any fledgling magician learns. The show is packed full of such nuggets which give you some insight into the world of deception.

There is one moment however, which represents one of those turning points in your life where you don't look at things in the same way ever again. Wiseman played a video to the audience which shows two teams of basketball players passing two balls between them. The audience is meant to count how many times the white team passes the ball. Wiseman primes the audience by claiming that there is a difference between how women and men count the ball. Intrigued, one begins counting carefully each pass of the ball. After intense concentration the video comes to an end and various scores are offered. At this point Wiseman asks how many people saw the man in the monkey suit walk into the centre of the screen, bang his chest and walk off. I could not believe that I had missed such an event but sure enough when he replays the tape, there is the monkey man, large and hairy. It is a salutary lesson to all of us chasing problems who get so fixated on certain viewpoints that we can't spot the obvious sitting under our noses.

The evening is meant to be the beginning of a wider programme of bringing science into the theatre. Like the best scientific experiments, the show is still evolving. Given the success of this first run there should be scope for further performances and perhaps even to expand the cast of characters involved. Anyone who might be interested in finding out more should contact Simon Singh (email: info@simonsingh.com).

Marcus du Sautoy

### ILT ACCREDITORS

A criticism of the ILT which I sometimes hear is that mathematicians resent their applications to join it being judged by non-mathematicians. It is indeed true that the ILT's 'accreditors' (who spend the equivalent of two weeks each year, for a modest payment, overseeing both individual applications and lecturer induction courses) include rather few mathematicians (and scientists generally), and few people from research-led universities.

The ILT is now advertising for more accreditors (at http://www.ilt.ac.uk/app ointments.html), deadline 21 June, and particularly wishes to receive applications from the research universities (and, implicitly, from subject experts). I would encourage those who believe that the ILT could have a positive influence to help bring this about by taking on this role.

Niall MacKay

### DIFFERENTIAL FORMS AND THEIR RELATIVES IN NUMERICAL ANALYSIS

There will be a one-day workshop on "Differential forms and their relatives in numerical analysis" on Friday 7 June 2002 at the University of Surrey. The workshop will explore the importance of differential forms, exterior algebra, geometric algebra, Clifford analysis, cohomology and topology in the formulation of numerical methods for problems in fluids, electromagnetics, and computational geometry. Speakers will include:

- M. Bluck (Imperial) Homology, cohomology and their application to finite and boundary element methods
- A. Bossavit (Electricité de France) The geometry of electromagnetism: implications for modelling and numerics
- C.J.L. Doran (Cambridge) Applications of geometric algebra in computer science
- P. Hydon (Surrey) *The discrete variational complex*

The workshop organiser is Tom Bridges, and the workshop is supported by EPSRC and the Surrey Numerics Network. Further details can be found on the web (http://www.maths.surrey.ac.uk/res earch/maths/NUMERICS/JUNE7/ June7.html).

### BRITGRAV II MEETING

This meeting will take place on 10-11 June 2002, at the School of Mathematical Sciences, Queen Mary, University of London. The topic of the meeting is General Relativity Theory, Mathematical Cosmology and Gravitational Physics, and contributions are invited. BritGravII is supported by an LMS Conference grant. For further information, contact Dr Henk van Elst, Astronomy Unit, School of Mathematical Sciences, Queen Mary, University of London, London E1 4NS (h.van.elst@qmul.ac.uk) or visit the website (www.maths.qmul.ac.uk/~brit grav/).

# **UMTC 2002**

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> Roger Porkess Project Leader, M.E.I. Examinations Board. talking on: Supply and demand: the school-university interface in mathematics

Further details at http://www.umtc.ac.uk/umtc2002 Dr Dave Pountney, Conference Chair, chair@umtc.ac.uk Dr Dirk Hermans, Local Organiser, info@umtc.ac.uk

# DIFFERENTIAL GEOMETRY, HOMOGENEOUS SPACES AND INTEGRABLE SYSTEMS

### LMS/EPSRC Short Course

### University of Durham, 16-20 September 2002 Organisers: J. Berndt and J. Bolton

In differential geometry, properties of geometric configurations are investigated by means of differential and integral calculus. Applications may be found in many branches of mathematics and modern sciences, in particular in theoretical physics.

Differential geometry is the main theme of the Short Course, and one of the three intensive lecture courses will provide an introduction to this area. The second lecture course discusses homogeneous geometry, in which differential geometric problems are tackled using algebraic methods. The third lecture course deals with integrable systems and discusses applications principally to surface theory of certain types of differential equations which arise frequently in pure and applied mathematics.

Our overriding objective is to feed the participants' appetites for geometrical mathematics. The Short Course, which will provide training for postgraduate students wishing to know about differential geometry and related areas, will have three main aims. First, a student with only a very limited previous exposure to differential geometry will attain a reasonable competence in this area and also get some idea of the many applications of the subject. Secondly, a student with a good initial knowledge will be given a significant insight into areas of current research activity. Thirdly, students should interact with each other and with the speakers and tutors.

The combination of well-established and comparatively recent mathematics will prove of benefit to a wide cross-section of graduate students particularly in pure mathematics, although students in theoretical physics will also benefit.

The course titles and lecturers are:

- Introduction to Differential Geometry : Mario Micallef (University of Warwick)
- Lie Groups and Homogeneous Spaces : Dmitri Alekseevsky (University of Hull)
- Geometry and Integrable Systems : Martin Guest (Tokyo Metropolitan University)

Each course comprises five lectures; supplementary worksheets and exercises will be supplied, to be discussed with post-doctoral tutors in afternoon sessions. More information about the courses and lecturers may be found on the Short Course website (http://www.hull.ac.uk/LMS-DG/).

The registration fee is £60, which for all UK-based research students includes the cost of course accommodation and meals. Participants must pay their own travel costs. EPSRC-supported students can expect that their registration fees and travel costs will be met by their departments from the EPSRC Research Training and Support Grant that is paid to universities with each studentship award (or from the Doctoral Training Account in the case of first-year students).

Application forms may be obtained from Frances Spoor, London Mathematical Society, 57-58 Russell Square, London WC1B 4HS (spoor@lms.ac.uk) or from the LMS website: (http://www.lms.ac.uk/activities/research\_meet\_com/short\_course/13\_app. html).

Numbers will be limited and those interested are advised to make an early application. The closing date for applications is **5 July 2002**.

### THE FAULKES INSTITUTE FOR GEOMETRY

On the western fringe of Cambridge, the University's Centre for Mathematical Sciences, once described by a visitor from Texas as 'Math City', is almost fully grown. The whole complex, containing about 300 offices for mathematicians of every hue, should be completed by late December 2002. The site contains in one corner the much loved Isaac Newton Institute, now significantly enhanced by having an extension in the Faulkes Gatehouse and by having access to the adjacent Betty and Gordon Moore Library with its fine collection of mathematical books and journals. The rooms in the Centre are grouped into eight pavilions surrounding a central grass-covered building housing lecture rooms and a cafeteria. Pictures of the ensemble may be seen on the web (www.cms.cam.ac.uk). The achievement of all this is the culmination of ten or more years of very hard work by many people in planning and fund-raising. It has been most gratifying to discover that there still are individual men and women of considerable means who believe in the teaching and study of academic mathematics as an intellectual discipline, as the foundation for a lifetime of clear thinking.

The impetus for these remarks is the recent celebration, on 1 May 2002, of the opening of the Faulkes Institute for Geometry, one of these eight pavilions. Dr Dill Faulkes, a goodly number of years ago, wrote a PhD thesis on an aspect of General Relativity and then embarked on a successful career in business. Now his generosity has resulted in this Institute for Geometry. With about 40 offices, a lecture room, committee room, common room, patio and balcony, it will house all geometers of every possible sort in the University, together with their research students and visitors. Its decoration includes a portrait of Sir William Hodge and two showcases for models which, at present, display the 59 stellations of the icosahedron manufactured by J.C.P. Miller. Its lecture room will be a focus for geometrical teaching and research and it is hoped that a contribution will be made to the popularisation of geometry.

In his remarks, before cutting the pink ribbon stretched across the doorway. Dr Faulkes said that he had been alarmed by recent reports of the state of mathematical education in the United Kingdom and he was distressed to hear that sometimes it now took four years at university to achieve what in former times had been possible in three. He regarded the rigorous study of mathematics, typified by the study of geometry, as an exceedingly necessary component of the nation's educational opportunity. He quoted with approval from the recent report of the Royal Society / Joint Mathematical Council working group on geometry in schools: "We recommend that the title of the attainment target Ma3 of the National Curriculum be changed from 'Shape, space and measures' to 'Geometry'."

Apart from tea, speeches and champagne, attention at this opening celebration was focussed by two lectures. In the first, Dr Piers Bursill-Hall (DPMMS, Cambridge) spoke on 'Why study geometry? Answers through the ages'. A little later Professor Nigel Hitchin (Savilian Professor of Geometry in Oxford University) spoke on 'Geometry: today's answers'. In two different scholarly ways these talks gave the context of and motivation for the study of a major part of mathematics in a manner seldom encountered and seldom so enjoyed.

W.B.R. Lickorish

### VISIT OF PROFESSOR K. KUDAIBERGENOV

Professor Kanat Kudaibergenov of the Kazakh Academy of Sciences will be visiting the University of Oxford during June. The visit is supported by an LMS Scheme 5 grant. His expected arrival date is 1 June. For further information contact Professor Institute. Mathematical Β. Zilber, Oxford (e-mail: University of 01865 zilber@maths.ox.ac.uk. tel: 273537).

# American Mathematical Society • London Mathematical Society

# **History of Mathematics Series**

These titles offer interesting historical perspectives on the people and communities that have profoundly influenced the development of mathematics. Beginning with Volume 4, the History of Mathematics series is co-published with the London Mathematical Society. The LMS is registered with the Charity Commissioners. LMS members may order directly from the AMS at the AMS member price.

Supplementary Reading



# Non-Euclidean Geometry in the Theory of Automorphic Functions

Jacques Hadamard (edited by Jeremy J. Gray and Abe Shenitzer)

It is cause for joy and celebration that the "Sources" subseries of the AMS/LMS "History of Mathematics" series continues to grow. This little book should be of interest both to historians seeking to understand the evolution of the theory of automorphic functions and to mathematicians working in the area, and thus it is a valuable addition to the (rather short) list of original source material available in English translation. Keep them coming, AMS! \_\_\_\_MAA Online

This is the English translation of a volume originally published only in Russian and now out of print. The book was written by Jacques Hadamard on the work of Poincaré.

Poincaré's creation of a theory of automorphic functions in the early 1880s was one of the most significant mathematical achievements of the nineteenth century. It directly inspired the uniformization theorem, led to a class of functions adequate to solve all linear ordinary differential equations, and focused attention on a large new class of discrete groups. It was the first significant application of non-Euclidean geometry. The implications of these discoveries continue to be important to this day in numerous different areas of mathematics.

Hadamard begins with hyperbolic geometry, which he compares with plane and spherical geometry. He discusses the corresponding isometry groups, introduces the idea of discrete subgroups, and shows that the corresponding quotient spaces are manifolds. In Chapter 2 he presents the appropriate automorphic functions, in particular, Fuchsian functions. He shows how to represent Fuchsian functions as quotients, and how Fuchsian functions invariant under the same group are related, and indicates how these functions can be used to solve differential equations. Chapter 4 is devoted to the outlines of the more complicated Kleinian case. Chapter 5 discusses algebraic functions and linear algebraic differential equations, and the last chapter sketches the theory of Fuchsian groups and geodesics.

This unique exposition by Hadamard offers a fascinating and intuitive introduction to the subject of automorphic functions and illuminates its connection to differential equations, a connection not often found in other texts.

This volume is one of an informal sequence of works within the History of Mathematics series. Volumes in this subset, "Sources", are classical mathematical works that served as cornerstones for modern mathematical thought.

History of Mathematics, Volume 17; 2000; 95 pages; Softcover; ISBN 0-8218-2030-3; List \$19; All AMS members \$15; Order code HMATH/17LMS

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AMS and LMS members may order through Oxford University Press and receive their member discounts off of the UK pound price: fax +44 (0) 1865 267782 or email at science.books@oup.co.uk.



### LMS-EPSRC Short Instructional Course X-th Summer School in Numerical Analysis

### University of Durham Organisers: James Blowey and Alan Craig

This will be the tenth in the series of summer schools sponsored by EPSRC and now LMS. Previous schools have been particularly successful in attracting a full quota of EPSRC sponsored research students and academic staff, with a good attendance of non-EPSRC supported participants, including an increasing number from overseas.

The purpose of the Summer Schools has always been the delivery of high quality instructional courses at postgraduate level. The organisers have aimed to invite speakers who are internationally renowned as researchers in numerical analysis, and who have a strong reputation as lucid communicators of mathematics. The intended audience is a wide one, and will include research students, academics and people from industry. The lecturers will be encouraged to enable a person with:

- an elementary knowledge of a subject to attain reasonable competence in it;
- a good initial knowledge to identify and begin work on unsolved problems.

The structure of the Summer School will be based on the successful format of the previous ones. The meeting is of two weeks duration. Each week will involve three five-hour lecture courses, given by distinguished researchers in the relevant field.

Each invited lecturer will be asked to provide a complete set of lecture notes. These will be available to participants during the summer school. It is anticipated that these will be published shortly after the meeting in book form.

Lectures will be supported by tutorials given by the speakers and tutors. This programme will be backed up by shorter contributions from participants co-ordinated by the local expert. As before, the organisers are particularly keen to encourage graduate research students to take the opportunity to present their work in public, by offering a prize supported by SIAM for the best student paper each week.

As in the past, it is expected that the school will attract researchers whose current interests are within the chosen areas, thus creating a fruitful atmosphere for the exchange and communication of ideas. The Summer School day will be structured in such a way as to leave substantial periods free for participants to pursue their own research and to consult with the assembled experts. Each week is self-contained, although it is expected many participants, especially graduate students, will attend both weeks.

#### Week 1: Sunday 7th July - Friday 12th July 2002

Professor Franco Brezzi: Recent trends in Finite Element approximation of PDEs Professor Dr Gerd Dziuk: Mean curvature flow and related topics

Professor Tom Hou: Multiscale problems/methods

The first week focuses on the diversity and importance of the Finite Element Method. Week 2: Sunday 14th July - Friday 19th July 2002

Professor Ernst Hairer: Symplectic methods

Dr Professor Volker Mehrmann: Generalized eigenproblems, control applications Professor Nick Gould: Optimization

This second week focuses on key topics within Numerical Linear Algebra and Geometric Integration.

The registration fee is £20, which for all UK-based research students includes the cost of course accommodation and meals. Participants must pay their own travel costs. EPSRC-supported students can expect that their registration fees and travel costs will be met by their departments from the EPSRC Research Training and Support Grant that is paid to universities with each studentship award (or from the Doctoral Training Account in the case of first-year students). Numbers are limited and those interested are advised to make an application at their earliest convenience.

Application forms and additional details are available from: http://maths.dur.ac.uk/nass/

# THE INSTITUTE OF MATHEMATICS AND ITS APPLICATIONS



### FORTHCOMING CONFERENCES

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Trinity College, Cambridge, 5-6 September 2002 Lancaster University, 16-18 December 2002 University of Loughborough, 1 - 3 April 2003 Bifurcations and the Use of Control Chaos University of Southampton, 28 - 30 July 2003 University of Leicester, 9-12 September 2003 University of Leicester, 16-19 September 2003 University of Leeds, 15 - 17 September 2003 University of Salford, 3-5 September 2003

> Royal Agricultural College, Cirencester, 16 -18 Dec 2003 University of Southampton, 30 March -1 April 2004

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**Modelling Permeable Rocks** 

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**RADAR 2002** 

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P.D. LAX Honorary Member 1997

### DIARY

The diary lists Society meetings and other events publicized 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 in the Society's web site (http://www.lms.ac.uk/meetings/diary.html). **IUNE 2002 26-27** Meeting in honour of 65th birthday of M.S.P. Eastham, University of Wales (296) 2-8 Combinatorics 2002 Conference, Maratea, Italy (301) 3-8 Abel Bicentennial Conference, University of Oslo (301) 29-8 Aug Astrophysical Fluid Mechanics, LMS Durham Symposia, 5-8 LMS Northern Regional Meeting & Workshop (Algebraic Geometry, Knot Theory and Related Topics) Liverpool University Durham University (302) AUGUST 2002 5-15 New Directions in Dynamical Systems, Ryukoku and Kyoto (304)7 Edinburgh Mathematical Society Meeting, St Andrews (296) 7 Differential Forms and their Relatives in Numerical Analysis, Universities (293) 10-12 Complex Analysis Satellite Conference, Kyoto (304) Surrey University (305) 14-17 Complex Analysis Satellite Conference, Shanghai (304) 10-11 Britgrav II, Queen Mary, University of London (305) 20-28 ICM2002, Beijing, China (297 10-16 Aarhus Topology Conference, Aarhus University (301) 21-29 Workshop on Modern Problems in Applied Probability, 10-16 Nonstandard Methods and Applications in Mathematics Heriot-Watt University (301) Congress, Pisa, Italy (303) 23 LMS Meeting and Reception, International Congress of 12-16 Unione Matematica Italiana/American Mathematical Society Mathematicians, Beijing (305) 26-30 Combinatorial & Computational Aspects of Statistical Joint Meeting, Pisa, Italy (303) 14 Yorkshire Differential Geometry Day, Hull University (305) 16 Bletchley Park and the Modern Computer Lecture, Bletchley Physics Workshop, Newton Institute, Cambridge (303) 29-2 Sept Nonlinear Partial Differential Equations International Park (304) Conference - Theory and Approximation, City University of Hong 17-21 Householder Symposium XV, Peebles Hydro Hotel, Scotland Kong (297) 30-31 Sixtieth Birthday of Professor T. Terzioglu, Middle East (296)20 LMS Popular Lectures, Strathclyde University (305) Technical University, Ankara, Turkey (305) 21 LMS Meeting, Hardy Lecture, London (304) SEPTEMBER 2002 21-26 Symmetries and Integrability of Difference Equations, Giens, 1-6 Real Functions Theory Conference, Slovakia (304) France (301) 1-9 Algebraic Hyperstructures and Applications Congress, 24-28 Analytic Number Theory Workshop, Max Plank Institute, Samothraki Island, Greece (300) Bonn (288) 2-6 Random Graphs & Structures Workshop, Newton Institute, 24-29 Topology, Geometry and Quantum Field Theory Symposium, Cambridge (303) Oxford University (305) 2-6 Topics in Algebraic Number Theory LMS/EPSRC Short Course, 25 Patterns and Nonlinear Dynamics One Day Meeting, Surrey King's College London (304) 5-7 Workshop on Discrete Groups and Analysis, Southampton University (305) 27 LMS Popular Lectures, Leeds University (304) University (305) 27-2 July LMS Invited Lectures, Professor P. van Moerbeke, Leeds 9-13 Designs in Combinatorics and Statistics LMS/EPSRC Short University (302) Course, Queen Mary, University of London (304) 30-6 July Real Methods in Complex and CR Geometry CIME 9-20 Axiomatic, Enriched and Motivic Homotopy Theory Course, Italy (304) Conference, Isaac Newton Institute, Cambridge (302) **IULY 2002** 9-27 Intersection Theory and Moduli, ICTP, Italy (300) 1-3 Meeting on Numerical Methods for Nonlinear Dynamics and 15-21 Theory and Applications of Imaging CIME Course, Italy Bifurcations, Bristol University (305) (304) 1-6 The Teaching of Mathematics Conference, Crete, Greece (297) 16-20 Differential Geometry, Homogeneous Spaces and Integrable 1-6 Wavelets and Applications Workshop, University of Barcelona Systems LMS/EPSRC Short Course, Durham University (304) (304)26-29 Thompson Fest, Cambridge University (305) 1-11 Representations of Finite Groups and Related Algebras, LMS 30-4 Oct K-theory and Arithmetic Conference, Isaac Newton Durham Symposia, Durham University (302) Institute, Cambridge (302) 3 LMS Popular Lectures, Institute of Education, London (305) OCTOBER 2002 7-19 LMS/EPSRC Short Course X-th Summer School in Numerical 23 BSHM/LMS Meeting, The Four-colour Problem, London Analysis, Durham University (305) NOVEMBER 2002 8-19 Normal Forms, Bifurcations and Finiteness Problems in Differential Equations SMS-NATO ASI Meeting, Université de 16 Functional Analysis Conference, Queen's University Belfast (305) Montréal, Canada (298) 22 LMS Annual General Meeting, London **8-26** Algebraic K-theory and its Applications School and Conference, ICTP, Italy (300) **10-19** Analytic Number Theory CIME Course, Italy (304) 25 LMS South West and South Wales Regional Meeting DECEMBER 2002 9-13 Elliptic Cohomology and Chromatic Phenomena EuroWorkshop, Newton Institute, Cambridge (305) 15-25 Computational Methods for Wave Propagation in Direct Scattering, LMS Durham Symposia, Durham University (302) 16-12 Higher Chromatic Phenomena EuroWorkshop, Newton 18-19 Mathematical Foundations of Computer Science and Institute, Cambridge (305) Information Technology Conference, National University of Ireland FEBRUARY 2003 (301) 10-14 Permutation Patterns Conference, Otago University, New 19-25 9th International Mathematics Competition for University Zealand (303) Students, Warsaw University, Poland (304) APRIL 2003 19-30 IMO 2002, Strathclyde University (305) 7-10 BMC, University of Birmingham (296) 21-26 Computation and Analytic Problems in Spectral Theory 7-10 BAMC 2003, Southampton University (296) Workshop, University of Wales (296) **JULY 2003** 21-27 Geometry, Symmetry and Mechanics II Workshop, Warwick 7-11 ICIAM 2003, Industrial and Applied Mathematics, Sydney, University (298) Australia (305) 23-2 Aug EDGE mid-term Summer School and Conference, **27-9 Aug** Banach Algebras and their Applications Conference, Edmonton, Alberta (302) Edinburgh (299) The Newsletter is published monthly except in August. Items and advertisements for inclusion in the Newsletter should be sent to the Editor, Susan Oakes, by e-mail, fax or post to the LMS office (addresses below), to arrive before the first day of the month prior to publication. The London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS Tel: 020 7637 3686 fax: 020 7323 3655, e-mail: Ims@Ims.ac.uk. World Wide Web: http://www.lms.ac.uk

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Printed by Armstrong Press Ltd, Southampton 023 8033 3132