

# THE LONDON MATHEMATICAL SOCIETY NEWSLETTER

No. 295

July 2001

## FORTHCOMING SOCIETY MEETINGS

*Friday 6 July - Manchester*

Northern Regional Meeting

*Wednesday 12 September - Bristol*

South West and South Wales Regional Meeting

*Friday 23 November - London*

Annual General Meeting

## COUNCIL DIARY

11 May 2001

The May Council meeting was a remarkably short one, but some important issues were discussed. As reported earlier in this Diary, it is now Council policy to invite periodically the chairs of major Society committees, if not already Council members, to a Council meeting to report and answer questions on the work of their committee. The May Council meeting was the first such, and in attendance were two committee chairmen.

Iain Stewart presented the work of the Computer Science Committee. Its most important activity is the jointly run LMS/EPSRC MathFIT (Mathematics for IT) programme, which supports research and training through various grant schemes. These have been an overall success, and more applications to the schemes are actively encouraged, particularly for workshops and short courses.

Peter Saunders reported on the work of the recently reorganised Education

Committee. One area of concern is the possible conflict between the QAA's National Qualifications Framework and 4-year undergraduate mathematics degrees. The Council for Mathematical Sciences has set up a committee to write a report on this subject. He also reported on the progress of the Advisory Committee for Mathematics Education, which is being set up to exchanges views between the mathematics community and the DfEE.

On a more personal note, readers will have noted with sadness the recent death of Professor Robert Rankin, who was an active member of the Society for many years, a former Council member and a De Morgan medallist of the Society. Professor Rankin's daughter has donated to the LMS a fine portrait of her father, which will be hung in De Morgan House.

Tony Scholl

## LMS 2001 HONORARY MEMBERS

SIR ANDREW WILES is elected to Honorary Membership of the Society in recognition of his unique contributions to Number Theory. Through his celebrated proof of Fermat's Last Theorem, he has changed both the landscape of modern number theory and our perception of mathematical endeavour. His work on the Shimura-Taniyama-Weil conjecture has opened up a new route to many formerly intractable problems in modern number theory. His other outstanding contributions include his explicit reciprocity law in local class field theory; jointly with John Coates, progress towards the Birch-Swinnerton-Dyer conjecture for elliptic curves with complex multiplication; (partly in joint work with Mazur) a proof of Iwasawa's 'Main Conjecture' for arbitrary totally real number fields. Andrew Wiles has been Eugene Higgins Professor of Mathematics at Princeton University since 1994, and is a Fellow of the Royal Society and a foreign member of the US National Academy of Sciences.

PROFESSOR CATHLEEN SYNGE MORAWETZ is elected to Honorary Membership of the Society as one of the most distinguished applied mathematicians in the United States and indeed worldwide. During the decade before the 1960s Cathleen Morawetz produced extremely ambitious and important results on transonic flow (flow near to the speed of sound), results that completely transformed theoretical and practical research in airfoil design. For such mixed hyperbolic/elliptic problems, she proved that "almost all" shapes of airfoil produce shock waves and an associated wave drag, and showed that any possible perturbation of a shock-free airfoil would develop shock waves. Her analytic and computational work was confirmed experimentally. Even so, careful transonic aerodynamic design can result in airfoils having a very low wave drag at certain

speeds. This knowledge follows from Cathleen Morawetz's work, followed by that of Paul Garabedian.

In later work, Professor Morawetz has produced important results on wave scattering, involving studies of hyperbolic equations and associated energy identities. She is a member of the United States National Academy of Sciences and in 1998 was a recipient of the United States National Medal of Science.

## ANNUAL ELECTIONS TO COUNCIL

The normal way in which nominations to Council are now made is via the Nominating Committee, but there is still provision for any member of the Society to make nominations directly. Anyone who wishes to propose someone for a position as an Officer of the Society or as a member of Council is invited to inform J.H. Coates, who is currently chairing the Nominating Committee (j.h.coates@dpms.cam.ac.uk) or one of the other members of the Committee (J.M. Ball, K.A. Brown, A.R. Camina, T.A. Gillespie, N.J. Hitchin, U. Martin and C.M. Series). Any direct nominations should be sent to the Council and General Secretary (John Pym, Department of Pure Mathematics, The University, Sheffield S3 7RH; j.pym@sheffield.ac.uk) to arrive before noon on **1 September 2000**; such nominations must bear the signatures of the Nominator and three Seconders and of the Nominee.

## DOUGLAS DERRY

Professor D. Derry, who was elected a member of the London Mathematical Society on 15 December 1938, died on 24 April 2001, aged 93.

## ERNEST WILKES

Mr E.W. Wilkes, who was elected a member of the London Mathematical Society on 16 November 1944, died on 15 May 2001, aged 82.

## LMS PRIZES 2001

### De Morgan Medal

PROFESSOR J.A. (SANDY) GREEN is awarded the De Morgan Medal for his fundamental contributions to group representation theory. Green has been one of the most influential figures in representation theory of the last fifty years. In a 1955 paper Green startled the world of representation theory by giving the complex character table of  $GL(n, q)$  in all generality. This was completely unexpected in view of the very partial information available prior to his work.

Green then turned to the modular representation theory of finite groups. He established the now fundamental Green correspondence and his work provided the impetus for focussing attention on modules, in contrast to Brauer's original character theoretic approach. In particular, his work laid the foundations for the cyclic defect theory and for the categorical representation theory that has been at the centre of much of the most recent activity in this area.

His emphasis then changed to algebraic groups. His 1981 Springer volume on polynomial representations of general linear groups has been enormously influential while in recent years he has made fundamental contributions to the Hall algebra approach to quantum groups. Green has written key papers on many other topics, including the converse to Brauer's induction theorem and modular representations of groups of Lie type, and has introduced the concepts of Mackey functors, the Green ring, and  $G$ -algebras.

It is internationally agreed that Green is one of those who have most shaped modern representation theory, and he enjoys widespread respect and affection. It is especially fitting that this recognition of his work is given in the year that sees both the centenary of Brauer's birth and his own 75th birthday.

### Senior Whitehead Prize

PROFESSOR DEREK W. MOORE of the Imperial College of Science, Technology

and Medicine, is awarded the Senior Whitehead Prize. Moore, one of the most distinguished British applied mathematicians, has played a leading role in the application of scientific computing and computational applied mathematics to the solution of problems in many areas of theoretical fluid mechanics: motions of drops and bubbles, axial flow in trailing vortices, the motion of a body through a rapidly rotating fluid. In particular, he has had a revolutionary influence on the study of problems in vortex mechanics, showing that a vortex sheet can develop a singularity, now known as Moore's singularity, in finite time.

### Berwick Prize

DR MARCUS DU SAUTOY is awarded the Berwick Prize. The work of du Sautoy has completely transformed the study of zeta functions associated to infinite groups. His first major contribution was a general rationality theorem for a large class of  $p$ -adic integrals defined over  $p$ -adic analytic pro- $p$  groups. An outgrowth of this work was the influential book 'Analytic pro- $p$  groups' (1991, with an extended second edition in 1999), written jointly with Dixon, Mann and Segal. With this book and numerous other writings du Sautoy has been one of the leading contributors to a worldwide renaissance of interest in the theory and applications of pro- $p$  groups. Recently, he has made striking new applications of his rationality theorem, to the enumeration of finite  $p$ -groups and to the classification of  $p$ -groups of fixed coclass, using model-theoretic methods in an unexpected and radical way. He is also responsible (together with Grunewald) for major new results on the subgroup growth of finitely generated nilpotent groups. This work establishes deep and subtle connections between the zeta functions of non-commutative groups and the mainstream of arithmetic geometry, and opens the way to further progress at a much deeper level than hitherto thought possible.

### Whitehead Prizes

PROFESSOR JOHN R. KING of the University of Nottingham is awarded a Whitehead Prize for his contributions to applied mathematics, particularly through his work on nonlinear diffusion equations and free-boundary problems. He is renowned for the novelty and precision of his asymptotic analysis and for discovering remarkable self-similar solutions in nonlinear situations.

He has contributed to many areas of applications, including semiconductor device manufacture, drug design, materials science, optics, lubrication and phase transitions. He has recently brought a new and original perspective to the modelling of tumour avascular growth, developing a model which for the first time considers the explicit dynamics of the different cell populations within the tumour.

DR MICHAEL MCQUILLAN, of All Souls College and Glasgow University, is awarded a Whitehead Prize for his work on diophantine and complex analytic geometry. In his Harvard thesis, McQuillan completed the proof of a twenty-year-old conjecture of Serge Lang on the Zariski density in a complex semi-abelian variety of the intersection of a closed integral subvariety and a subgroup of finite rank. He has subsequently created from Vogta's famous analogies between Nevanlinna Theory and diophantine approximation the powerful tools of "dynamic diophantine approximation".

He used these to give a new proof of Bloch's conjecture on holomorphic curves in closed subvarieties of abelian varieties. This was followed by truly spectacular work, proving the Green-Griffiths conjecture for the case of an integral curve of a holomorphic foliation on a surface, even obtaining strong quantitative Nevanlinna inequalities, and proving Kobayashi's conjecture, which says that a generic hypersurface of sufficiently high degree in complex projective 3-space is hyperbolic.

DR ALEXEI N. SKOROBOGATOV, of Imperial College of Science, Technology and Medicine is awarded a Whitehead Prize. Though his work is based on algebraic geometry, it ranges from number theory to combinatorics and the theory of error-correcting codes.

His main work in number theory has been on the Hasse principle for rational points in algebraic varieties over number fields, and on obstructions to it. He has constructed the first (and so far the only known) counter-example to the Hasse principle not accounted for by the Brauer-Manin obstruction. Motivated by this, he found, in part jointly with D. Harari, new and stronger obstructions to the Hasse principle. He has made essential contributions to the study of the arithmetic and topology of rational points on pencils of curves of genus zero and of genus one (some of them jointly with Colliot-Thélène and Swinnerton-Dyer). Skorobogatov, jointly with S.G. Vladut, constructed the first general decoding algorithm for Goppa codes, and this has served as the basis of numerous decoding algorithms subsequently designed both by mathematicians and by electrical engineers.

DR VALERY SMYSHLYAEV, of Bath University, is awarded a Whitehead Prize. Smyshlyaev has deployed his distinctive combination of powerful analytical technique and deep physical insight in two distinct areas of applied mathematics. The most striking of his many achievements to date are as follows. He solved the outstanding canonical problem of diffraction from a cone (of arbitrary cross-section) by reducing it to a two-dimensional boundary value problem on a part of the sphere, and subsequently to a one-dimensional integral equation whose solution could be computed efficiently. He has applied, and advanced, methodology for "homogenization" to obtain the best bounds currently available for the nonlinear response of composite materials, and for the quasiconvex envelope of a multi-well energy as displayed, for example, by a shape-memory alloy.

# LONDON MATHEMATICAL SOCIETY

## LMS NORTHERN REGIONAL MEETING

Friday 6 July 2001, UMIST

- |             |   |
|-------------|---|
| 3.15 - 4.15 | Professor Boris Fedosov (Moscow)<br><i>Deformation quantization: pro and contra</i> |
| 4.15 - 5.00 | Tea   |
| 5.00 - 6.00 | Professor Arkady Vaintrob (Oregon)<br><i>Homological vector fields</i>              |
| 6.30 - 7.00 | Reception   |
| 7.00        | Dinner  |

The dinner will cost approximately £16 excluding drinks. For further details contact Dr Mike Prest (e-mail: [prest@ma.man.ac.uk](mailto:prest@ma.man.ac.uk)) or Dr Theodore Voronov (e-mail: [theodore.voronov@umist.ac.uk](mailto:theodore.voronov@umist.ac.uk)). Alternatively look on the website (<http://www.ma.umist.ac.uk/tv/LMS>).

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](mailto: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 from their supervisors.

The meeting will take place on Friday afternoon and will be followed by a workshop on: **Quantization, Deformations, and New Homological and Categorical Methods in Mathematical Physics Workshop** from Saturday 7 - Friday 13 July 2001.

# QUANTIZATION, DEFORMATIONS, AND NEW HOMOLOGICAL AND CATEGORICAL METHODS IN MATHEMATICAL PHYSICS WORKSHOP

Saturday 7 - Friday 13 July 2001, UMIST

Mini lecture courses:

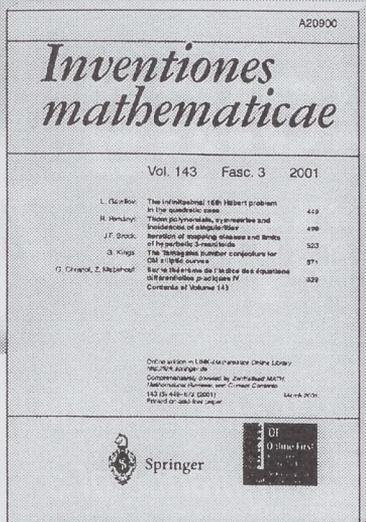
- Professor John Jones (Warwick)  
*Operad theory*
- Professor Arkady Vaintrob (Oregon)  
*Homological vector fields and their applications*
- Professor Klaas Landsman (Amsterdam)  
*Quantization as a functor*

Sessions: Saturday morning, Sunday afternoon, Monday to Thursday morning and afternoon, Friday morning.

Topics include: deformation theory and various aspects of quantization; supermanifolds; even and odd Poisson geometry; application of operads; Lie groupoids and Lie algebroids, Lie bialgebroids and related structures.

Expected speakers include: M. Crainic (Utrecht), J. Donin (Bar-Ilan), J. Jones (Warwick), M. Karasev (Moscow), H. Khudavrdian (Yerevan and Manchester), Y. Kosmann-Schwarzbach (Paris), N.P. Landsman (Amsterdam), Liu Zhang-Ju (Peking), K. Mackenzie (Sheffield), Y. Maeda (Keio), S. Merkulov (Glasgow), I. Moerdijk (Utrecht), J. Rawnsley (Warwick), D. Roytenberg (PennState), A. Vaintrob (Oregon), A. Voronov (Michigan), Ping Xu (PennState).

For further details e-mail: Dr Mike Prest ([prest@ma.man.ac.uk](mailto:prest@ma.man.ac.uk)) or Dr Theodore Voronov ([theodore.voronov@umist.ac.uk](mailto:theodore.voronov@umist.ac.uk)). You will then be put on the mailing list and informed of further details when they are available. Some support will be available for postgraduate students.



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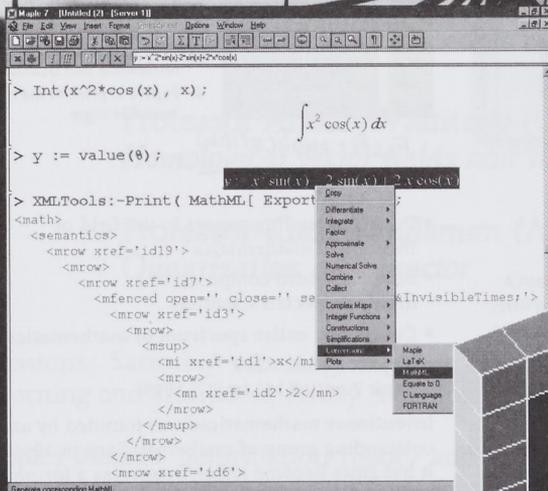
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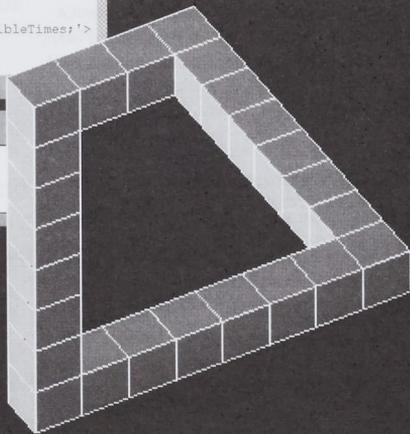
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## LMS PROGRAMME AND CONFERENCE FUND

The Society's Programme and Conference Fund is used to give financial support to various mathematical activities in the UK. Grants are made under five main headings, which are set out in summary form below. The information is available on the Society's web site at ([http://www.lms.ac.uk/activities/prog\\_com/index.html](http://www.lms.ac.uk/activities/prog_com/index.html)) and also on pp 24-27 of the "Handbook and List of Members".

Only Society members are eligible for Scheme 4 grants. Otherwise, any mathematician working in the UK is eligible for a grant; applications from non-members must be countersigned by a Society member. Application forms for conference and scheme 2, 3 and 5 grants are available either from the Society's Office ([grants@lms.ac.uk](mailto:grants@lms.ac.uk)), or from the Society's web site at the address above. For scheme 4 only, applications should be made by letter, including the academic case for the visit, including a detailed description of a specific project, the standing of the collaborator, the proposed timetable, and an estimate of costs. Applications should be sent to Dr N.M.J. Woodhouse, Meetings & Membership Secretary at De Morgan House, 57-58 Russell Square, London WC1B 4HS (Secretary, Mrs S. Daly, tel: 0207 637 3686; e-mail: [grants@lms.ac.uk](mailto:grants@lms.ac.uk); fax: 0207 323 3655). Further information and advice can be obtained from her or from Dr N.M.J. Woodhouse (e-mail: [nwoodh@maths.ox.ac.uk](mailto:nwoodh@maths.ox.ac.uk)).

Type of Grant	General Purpose	Amount	Deadlines
Conference	Support of conferences within the UK. The grant may be either a substantial contribution to a small meeting or a small contribution to a large meeting.	Up to £5000 (including £1000 to support research students and £1000 to support Scheme 5 participants).	31 January, 31 May and 31 August
Scheme 2	Support for a foreign visitor who will give lectures at three places in the UK.	Return travel to UK up to a maximum of £1000.	At least three months before the visit
Scheme 3	Support of incidental costs for collaborative work by research groups from three (or more) different places. New rules can be seen on the Society's web site at the address above.	Travel or other costs up to £1000 for one year.	31 August
Scheme 4	Support of travel and subsistence costs incurred by a UK member or their collaborator in carrying out joint research.	Up to £500.	31 January, 31 May and 31 August
Scheme 5	Support of visits to UK by mathematicians from countries of the former Soviet Union and Eastern Europe including the former Yugoslavia, Africa, China, India, Pakistan and Bangladesh, and countries of similar standing.	Basic travel up to £500 and living expenses up to £1400.	At least three months before the visit.
	Also support of visits to these countries by UK mathematicians.	Up to £1200	

Grants awarded since January 2001:

Conference

Applicant	Topic	Grant £
A.D. Scott	Combinatorics	1,000
A. Reuter	3rd Postgraduate Group Theory Conference 2001	2,400
J.T. Fairley		
D. Cariolaro	XII Postgraduate Combinatorial Conference	1,500
M. Johnson		
M.V. Lawson	University of Wales Mathematics Colloquium 2001	1,090
G.W. Roberts		
P.J. Harris	3rd UK Conference on Boundary Integral Methods	1,000
N.J. Higham	15th Householder Symposium on Numerical Algebra	2,000
A.J. W Hilton	Reading One Day Combinatorics Conference	400
J. Allanson	Research Student's Conference in Probability and Statistics (RSC2001)	1,000
S. Pott	York Operator Theory Day	800
J. Partington		
M.A.B. Whitaker	10th UK Conference on the Foundations of Physics	2,600
M. Mathieu	All Ireland Algebra Days 2001 (AIAD 2001)	3,240
C. Series	Kleinian Groups and Hyperbolic 3-Manifolds	3,700
G. Wilks	40th European Study Group with Industry	1,000
J.B. Paris	British Logic Colloquium	2,280
K.M. Ball	Conference in honour of the 60th Birthday of Professor D.G. Larman	1,600
N.A. Hill	Pattern Formation by Swimming Micro-Organisms and Cells (INI satellite meeting)	5,850
G. Watts	2D Integrable Models and Conformal Field Theory Informal UK Meeting	700
S.J. Hogan	Nonlinear Dynamics and Chaos: Where do we go from here?	5,000
G.W. Gibbons	The Future of Theoretical Physics & Cosmology: Stephen Hawking's 60th Birthday Meeting	2,500
D. Strauss	5th Galway Colloquium on General Topology	146
A.A. Lacey	The Impact of Mathematics on Science and Technology ... and vice versa	1,000
M.W. Liebeck	Function Theory Conference in honour of Walter Hayman's 75th Birthday	4,000
U. Tillmann	New Developments in K-Theory	4,175

**Scheme 2**

<b>Applicant</b>	<b>Visitor</b>	<b>To Visit</b>	<b>Grant £</b>
H.G. Dales	R.J. Loy	QUB, Newcastle, Leeds, Cambridge	1,000
S. Koenig	V. Mazorchuk	Leicester, Oxford, Leeds, Liverpool	600
N. Cutland, V. Vladimirov	A. Shnirelman	Cambridge, Bristol, Hull	620
J.P.C. Greenlees	H.-B. Foxby	Sheffield, Edinburgh, Leicester	286
L. Mason	M. Weaver	Oxford, QMW, Southampton	200
A. Grigor'yan	P. Li L. Saloff-Coste	Imperial, UCL, Oxford Imperial, UCL, Oxford, Cambridge	1,000

**Scheme 3**

<b>Applicant</b>	<b>Institution</b>	<b>Topic</b>	<b>Grant £</b>
R.J. Sharp	Manchester	Dynamical Systems	1,000
J.M. Ball	Oxford	Phase Transitions in Crystalline Solids	1,250
B. Krauskopf	Bristol	Dynamics in the South West	1,000
A. Veselov	Loughborough	East Midlands Mathematical Physics Seminar	750
N. Jacob	Swansea	Lévy and Lévy-type Processes	1,000
J.P.C. Greenlees	Sheffield	Transpennine Topology Triangle	1,000
R. Thomas	Imperial	London Topology & Geometry Seminar	500
P. Glendinning	UMIST	Nonlinear Dynamics and Bifurcations	1,000

**Scheme 4**

<b>Applicant</b>	<b>Institution</b>	<b>Collaborator</b>	<b>Institution(s)</b>	<b>Grant £</b>
E.B. Davies	King's	V. Burenkov	Cardiff	332
E.V. Ferapontov	Loughborough	V.V. Sokolov	Moscow	415
D. Reeve	Nottingham	M. Spivack	Cambridge	200
C-H. Chu	Goldsmiths	A.T.M. Lau	Alberta	500
A.M. Sinclair	Edinburgh	E. Christensen	Copenhagen	250
V.V. Kisil	Leeds	I. Spitkovsky	Williamsburg	500
F. Leinen	Newcastle	O. Puglisi	Firenze	500
S. Pott	York	O. Blasco	Valencia	500
R. Cook	Sheffield	J. Brüdern	Stuttgart	500
N.J. Ford	Chester	K. Diethelm	Braunschweig	450
N. Snashall	Leicester	O. Solberg	NTNU, Trondheim	500
P.J. Rowley	UMIST	C.W. Parker	Birmingham	450
J.B. Fountain	York	G. Gomes B. Steinberg	Lisbon Porto	500
T. Ward	East Anglia	M. Einsiedler	Vienna	500
V.M. Rothos	Loughborough	C.M. Schober	Old Dominion	500
A.G. Thomason	Cambridge	F. Lazebnik	Delaware	500
A. Stuart	Warwick	J. Mattingly	Stanford	500

### Scheme 5

Applicant	Visitor	Institution(s)	To Visit	Grant £
F.M. Borodich	A.Y. Volovikov	Steklov MI	Liverpool, Glasgow, Sheffield	1800
R. Tribe	A. Piatnitski	Moscow	Warwick, Leeds, Swansea, Hull	1,550
M. Dunajski	M. Przanowski	Cinvestav, Mexico & Lodz, Poland	Oxford	1,277
V.V. Kisil N. Young	D.S. Kalyuzhniy- Verbovetzky	Ukraine	Leeds, Newcastle	1,780
M. Dzamonja			Winter School in Abstract Analysis & the Centre for Theoretical Study, Prague	313
Y.M. Suhov	A.N. Rybko	Moscow	Cambridge, QMW, Swansea, Heriot-Watt	700
J. S. Pym	Y. Zelenyuk	Lviv	Sheffield, Hull, Cambridge	1,100
J. S. Pym	I.V. Protasov	Kiev	Sheffield, Hull, Cambridge	1,100
T.H. Lenagan	M. Domokos	Budapest	Edinburgh	1,425
S.B. Kuksin	N. Bobylev	Moscow	Heriot-Watt, Edinburgh, Leeds	1,470
B. Zilber	V. Tolstykh	Kemerovo	Oxford	1,400
A.H. Osbaldestin	S.P. Kuznetsov	Russian Academy of Sciences	Loughborough	1,800
A. Pressley	N. Xi	Beijing	Beijing	1,200
A. Grigor'yan	V.A. Kondratiev	Moscow	Moscow	714
T.J. Bridges	A. Afendikov	Keldysh Inst, Moscow	Surrey	1,300
J.S. Wilson	S. Sidki	Brasilia	Birmingham	1,900
J.W.P. Hirschfeld	V.I. Levenshtein	Keldysh Inst, Moscow	Sussex, Imperial	1,500
D.V. Alekseevsky I. Strachan	A. Fomenko	Moscow	Hull	950
J. Berndt	I. Taimanov	Novosibirsk	Hull, Oxford, Bath, Imperial	1,900
J. Kaplunov	B. Shorr	Moscow	Manchester	1,100
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S.B. Kuksin			Moscow	600
R.G. Halburd	B. Herbst	Stellenbosch, S. Africa	Stellenbosch & Durban	1,150
M. Bartuccelli	A. Ilyin	Moscow	Moscow	1,200

# CONNECTIVITY BETWEEN MATHEMATICS AND ENGINEERING

UMIST, Manchester

Thursday 20 September 2001

This one-day meeting is intended to stimulate discussion and new interactive research between mathematicians and engineers, and in particular to investigate how new areas of mathematics can be used in engineering, and how problems in engineering can lead to new mathematical ideas.

- Professor John Ball FRS (Mathematics, University of Oxford)  
*Is rigorous mathematics relevant to engineering in the age of computing or a distraction?*
- Dr Richard Craster (Mathematics, Imperial College)  
*The role of exact and asymptotic solutions in applications*
- Professor Norman Fleck (Engineering, University of Cambridge)  
*Size effects in plasticity*
- Professor Gero Friesecke (Mathematics, University of Warwick)  
*Bending of plates*
- Professor Sergio Pellegrino (Engineering, University of Cambridge)  
*Closed-loop kinematics: applications to deployable radar structures*
- Dr Jey Sivaloganathan (Mathematics, University of Bath)  
*Challenges in nonlinear elasticity*
- Professor Michael Thompson FRS (Engineering, University College London)  
*From mathematical dynamics to engineering structures: the static-dynamic analogy*
- Professor Gordon Williams FRS FREng (Engineering, Imperial College)  
*The vital role of analytical results*
- Professor John Willis FRS (Mathematics, University of Cambridge)  
*Problems in the dynamics of fracture*
- Professor Phil Withers (Materials Science Centre, UMIST)  
*New tools for empowering crack growth and lifing models*

The event is organised by EPSRC (Mathematics and Engineering Programmes), the Institute of Mathematics and its Applications and the London Mathematical Society. The organisers are pleased to acknowledge additional financial support from The Royal Academy of Engineering and UMIST.

The audience is limited to approximately 120 and preference will be given to younger applicants. Those wishing to receive an invitation to the event should contact Professor S.R. Reid (tel: 0161 200 3848; e-mail: [steve.reid@umist.ac.uk](mailto:steve.reid@umist.ac.uk)) at the Department of Mechanical, Aerospace and Manufacturing Engineering, UMIST, PO Box 88, Sackville Street, Manchester M60 1 QD.

## THE ICIAM 99 FUND

The Council of the London Mathematical Society invites applications to a restricted fund created by a donation from ICIAM 99 Ltd. To advise on the award of grants, an *ad hoc* committee has been established consisting of Professor R.J. Knops (Convener), Professor J. Carr, Dr B.A. Olde Daalhuis and Professor L. Thomas.

The purpose of the fund is to help promote one or more of the following:

- (i) Organisation of short workshops in the UK that continue the most promising themes to emerge from the Congress.
- (ii) Assistance to attend ICIAM 03 from delegates normally resident in the UK.
- (iii) Support for any other UK activity in industrial and applied mathematics that the committee deems suitable for recommendation.

No formal application form is required, but information supplied should include as appropriate:

- (i) Brief description, purpose, duration and intended location of the proposed activity.
- (ii) Names and affiliation of those principally involved.
- (iii) Itemised list of costs with supporting justification.
- (iv) For meetings, whether a registration fee and its amount is intended to be charged.
- (v) Other (proposed) sources of income.
- (vi) Any other relevant information.

The fund will close once its resources are exhausted and in any case no later than summer 2004. Applications, which will be considered three times per year, should reach the Convener, Professor R.J. Knops (Department of Mathematics, Heriot-Watt University, Edinburgh EH14 4AS) by **1 October 2001** or thereafter at four monthly intervals.

## ZETA FUNCTIONS, RANDOM MATRICES AND QUANTUM CHAOS WORKSHOP

13 - 14 September 2001, Bristol

### Workshop Speakers:

- Brian Conrey, American Institute of Mathematics, Palo Alto
- Kurt Johansson, Institutionen for Matematik, KTH, Stockholm
- Andrew Odlyzko, AT&T Labs (to be confirmed)
- Leonid Pastur, Centre de Physique Theorique de CNRS, Marseille
- Peter Sarnak, Department of Mathematics, Princeton University
- Nina Snaith, American Institute of Mathematics, Palo Alto
- Andreas Strombergsson, Matematiska institutionen, Uppsala University
- Martin Zirnbauer, Institut für Theoretische Physik, University of Cologne
- Zeev Rudnick, Mathematics Department, Tel Aviv University

The workshop venue is to be confirmed. For further information contact Dr Jens Marklof, School of Mathematics, University of Bristol, University Walk, Bristol BS8 1TW (tel: 0117 928 8247, fax: 0117 928 7999, e-mail: [j.marklof@bristol.ac.uk](mailto:j.marklof@bristol.ac.uk)).

# LONDON MATHEMATICAL SOCIETY

## LMS SOUTH WEST AND SOUTH WALES REGIONAL MEETING

UNIVERSITY OF BRISTOL  
SCHOOL OF MATHEMATICS & STATISTICS

12 September 2001

### Speakers:

- 3.00 - 4.00 Kurt Johansson (Institutionen for Matematik, KTH, Stockholm)
- 4.00 - 4.45 Tea
- 4.45 - 5.45 Peter Sarnak (Department of Mathematics, Princeton University)

The meeting will be held at the School of Mathematics, University of Bristol. For further details contact Dr Jens Marklof, School of Mathematics, University of Bristol, University Walk, Bristol BS8 1TW (tel: 0117 928 7980, fax: 0117 928 7999, e-mail: [j.marklof@bristol.ac.uk](mailto:j.marklof@bristol.ac.uk)).

There are limited funds available to contribute in part to the expenses of members of the Society or research students attending 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](mailto: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 from their supervisors.

The meeting will be followed by a workshop on: **Zeta Functions, Random Matrices and Quantum Chaos** from 13 - 14

## LMS/EPSRC SHORT INSTRUCTIONAL COURSES

Since the contract with EPSRC for the provision of Short Instructional Courses for research students was established, the following courses have been held:

1999

- Topology (J.D.S. Jones)

2000

- Stochastic Analysis (A.M. Etheridge)
- Mathematical Biology (H.M. Byrne)
- Partial Differential Equations (G.R. Burton, G.C. Smith)
- Set Theory and Analysis (J.K. Truss)

2001

- Wave Motion (J. Billingham, A.C. King)

The following courses have been arranged.

- Geometric Aspects of Group Theory (M.R. Bridson, W.J. Harvey, G.C. Smith) University of Bath, 3-7 September 2001
- New Trends in Computational Differential Equations (C.J. Budd, A. Iserles, N. Nikiforakis) University of Cambridge, March 2002
- Numerical Analysis Summer School (J.F. Blowey, A. Craig) University of Durham, 7-19 July 2002

Other proposals are in preparation. The LMS Research Meetings Committee, which has responsibility for the Short Courses programme, will welcome further proposals for 2002. 'Notes for Organisers' appeared in Issue 279 (February 2000) of the Newsletter and are available at the Society's website ([http://www.lms.ac.uk/activities/research\\_meet\\_com/short\\_course/org\\_notes.html](http://www.lms.ac.uk/activities/research_meet_com/short_course/org_notes.html)).

Dr A.R. Pears, Facilitator for the programme, will be pleased to discuss ideas with potential organisers and to help with the preparation of proposals and a budget (e-mail: [alan@lowfld.u-net.com](mailto:alan@lowfld.u-net.com), tel: 0118 9470831).

## CALL FOR PROPOSALS

The Isaac Newton Institute for Mathematical Sciences now invites new proposals for programmes for 2004 onwards. A choice of six-month or four-month programmes is available. In addition, from 2002, short programmes of four weeks duration will be available during July/August each year. These short programmes are intended for more narrowly focussed topics or for subjects that may be at an embryonic stage of development, and for which a longer programme might not be as yet justified.

Proposals should be addressed to the Director, Professor H.K. Moffatt, Isaac Newton Institute for Mathematical Sciences, 20 Clarkson Road, Cambridge CB3 0EH. Proposers should state whether they would prefer a four-month, six-month or four-week programme. The Institute is pleased to receive proposals at any time. Proposals for consideration at the next meeting of the Scientific Steering Committee should be received by **31 July 2001**.

Submission guidelines and further information can be found on the web (<http://www.newton.cam.ac.uk>). Further information is also available from the Director (tel: 01223 335999, e-mail: [info@newton.cam.ac.uk](mailto:info@newton.cam.ac.uk)) who will answer any enquiries.

## CECIL KING TRAVELLING SCHOLARSHIP

The LMS Council has awarded the first Cecil King Travelling Scholarship, worth £5,000, to Kevin Costello, of the Department of Pure Mathematics and Mathematical Statistics at Cambridge University. Mr Costello will use the prize to spend four months (January-April 2002) to attend two concurrent programmes at the Mathematical Sciences Research Institute, Berkeley, California on "Infinite Dimensional Algebras and Mathematical Physics", and on "Algebraic Stacks, Intersection Theory and Non-Abelian Hodge Theory".

## GRESHAM COLLEGE Appointment of Professors

Gresham College announce the following appointments, with effect from 1 September 2001:

### Gresham Professor of Geometry - Professor Harold Thimbleby

Professor Thimbleby has recently been appointed to a chair at University College London, where he moves from his post as Professor of Computing Research and Senior Manager at Middlesex University.

Professor Thimbleby's proposed programme at Gresham includes lectures on Algorithmic graph theory (maths in action); Usability, and myths of 'ease of use'; Computer magic (questioning whether computers always increase efficiency in business); Understanding modern cryptography; Programming; Visualising the unimaginable (using computers to visualise complex information); The future impact of computers; New designs; Science of the artificial (the study of computer systems as a science).

### Visiting Professor in the History of Mathematics - Professor Robin Wilson

The Visiting Professorship will run for a one-year term. Robin Wilson is a senior lecturer in the Faculty of Mathematics and Computing at the Open University, and part-time senior lecturer in Mathematics at Keble College, Oxford.

It is planned to hold a day school entitled *A Millennium of British Mathematics* at the Royal Institution in November 2001 as part of Professor Wilson's Gresham programme, with an audience drawn from schools and the general public. His programme for the forthcoming academic year also includes two lectures at Gresham College during the Autumn, followed by a series in the Spring covering three major figures in mathematics: Euclid, Newton and Euler.

Further information from Barbara Anderson, Gresham College, Barnard's Inn Hall, Holborn, London EC1N 2HH (tel: 020 7831 0575, fax: 020 7831 5208, e-mail: m.k.butcher@gresham.ac.uk).



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## *Lectureship in Mathematics*

### *School of Mathematical and Computing Sciences*

Applications are invited for the tenured position of Lecturer in Mathematics, which will become available in the School of Mathematical and Computing Sciences in January 2002.

(A Lecturer corresponds approximately to a North American Assistant Professor).

The School of Mathematical and Computing Sciences includes the disciplines, Computer Science, Mathematics, Operations Research and Statistics. The Mathematics Group currently has strengths in Differential Equations & Mathematical Modelling, Analysis, Logic & Computability Theory, and Discrete Mathematics & Complexity Theory. Applications are welcome in these or any other area of Mathematics.

Candidates should have demonstrated an ability to contribute to the high research profile of the Mathematics Group, and to be committed to quality teaching. The appointee will be welcome to join any of the School's research teams.

Further information about the School can be found at  
<http://www.mcs.vuw.ac.nz>

Enquiries about the position may be directed to Professor Rod Downey (Rod.Downey@vuw.ac.nz) or Professor Rob Goldblatt (Rob.Goldblatt@vuw.ac.nz). The Head of School, Dr Ross Renner may also be contacted for more information (Ross.Renner@mcs.vuw.ac.nz).

Screening of applications will commence on 1 October 2001 and continue until an appointment has been made.

**Please Quote Ref: SA0131M.**

*Role descriptions and application forms are available from the HR Asst, Faculty of Science, Victoria University of Wellington, PO Box 600, Wellington, New Zealand, (tel: +64-4-463 5100; fax: +64-4-463 5122; email: Science-appoint@vuw.ac.nz).*

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## BOOK REVIEWS

*The Pursuit of Perfect Packing* by Tomaso Aste and Denis Wearie (Institute of Physics Publishing, 2000), Paperback £17.50, ISBN 0750306483

The Kepler conjecture (in effect) asserts that the density of the closest packing of unit balls in ordinary space is that of the densest lattice packing; to paraphrase C.A. Rogers, this has long been "..... what every mathematician believes, and every physicist knows." However, mathematicians now know this too; the recent proof of the conjecture by Thomas Hales has gained wide acceptance, despite its length and intricacy. This proof is one starting point and a main motivation for the book under review, which, however, ranges well beyond that particular subject. I shall not attempt to describe all the contents of the book; instead, I shall briefly discuss topics in it which particularly attracted my attention.

Packing problems have their origin firmly in the real world: a nice practical example is the difference between the loose packing of corn employed by English merchants, and the denser packing obtained by shaking down the container preferred by their Continental counterparts. Closer to Kepler's problem is the piling of oranges on a greengrocer's stall into pyramids. Of course, these are finite rather than infinite problems, but their flavour is similar.

Nature herself has addressed many such problems. During her enforced stay in Hades, Persephone was tempted by Pluto to eat six pomegranate seeds, and so condemned mankind to six months of winter each year. Why the pomegranate should have played this role in the myth is unclear, but its intricate internal structure, with its seeds packed so tightly together, surely fascinated the ancients as much as it does us.

Ideal pomegranate seeds would have the same volume; one might then think

of trying to pack them so that the total surface area of the seeds was minimized. This is an old problem, and Lord Kelvin (William Thomson) made a conjecture about the form of the answer. The common surface between two seeds would be minimal, that is, a Plateau surface, and Kelvin's guess was that each seed would take the shape of a curved truncated octahedron. (Actually, of course, the problem was posed in terms of foam formed by soap bubbles.) Unfortunately, what Kelvin suggested is not true; using a simulation technique devised by Ken Brakke, the second author of the book and his student Robert Phelan found a better example related to chemical compounds called clathrates. Their example, by the way, in part confirmed an old observation, that lead shot under compression formed (roughly) polyhedral shapes with pentagonal faces predominating (but not regular dodecahedra, as one over-enthusiastic early researcher would have it).

Similar kinds of minimization problems arise in, for example, a bee's honeycomb, where (all other things being equal) evolution would naturally lead to economizing on use of wax. To some extent, this is the case; the walls of the cells on the two sides of a honeycomb do meet at three equal angles. However, this is far from the whole story; as the authors point out, other factors such as simplicity and mechanical stability must surely come into play. A superficially analogous question asks why cooling basaltic rock (such as that in Giant's Causeway) also seems to form into roughly hexagonal columns. On the reason for this, the jury is still out; in any case, the columns are not nearly as regular as a casual glance might suggest.

Returning to problems related to packing, an old problem of Tammes asks how to place a number of points on a sphere so that the minimal distance between any pair of them is maximized. Perhaps unsurprisingly, this problem is

still far from being solved in general, although naturally the answer is known for small numbers of points.

The problem of Tammes can be related to the real world (or, at least, the mathematician's view of it), as, for example, the way discrete electric charges will distribute themselves on a sphere. One that is definitely in the real world concerns the structure of crystals; this is largely determined by considerations of energy—the interactions among the various chemical elements which compose it. For all its hardness, diamond is mostly empty space; the tetrahedral bonds between adjacent carbon atoms leave large interstices. In an anticipation of what was later found in nature, Roger Penrose discovered quasi-periodic tilings of the plane; these look much like ordinary periodic tilings, but contain local symmetries other than the 2-, 3-, 4- or 6-fold allowed by the crystallographic conditions (Penrose's tilings had local 5-fold symmetry). To most people's surprise, a decade later such local 5-fold symmetry was found to occur naturally in quasi-crystals, a vindication (if one were needed) of the utility and relevance of abstract mathematics.

Most of the topics considered in the book are firmly three-dimensional, but towards the end the authors have a digression into higher dimensional sphere packing problems, which enables them to discuss (in general terms) dense lattice packings in dimensions 4, 8 and 24 (the last coming from the Leech lattice), and the related 'monster' simple group.

In this review, I have dipped into this comparatively short book in a nearly random fashion, pulling out a few plums which have caught my eye. (It is worth noting that there are very many illustrations, so that the actual text is even shorter than the page count might suggest. This is all to the good, though, since the contents are firmly geometrical.) But this is very much a volume which encourages such dipping. That is

not to say that it cannot be read chapter by chapter - I did this myself initially, in only a couple of sittings - but the reader will want to return to it often to treasure its various little gems. I found it a most delightful book, and I hope that you will too.

Peter McMullen  
University College London

*The Hilbert Challenge* by Jeremy J. Gray (Oxford University Press, 2000), £20.00, ISBN 0-19-850651-1.

'Who among us would not be glad to lift the veil behind which the future lies hidden; to cast a glance at the next advances of our science and at the secrets of its development during future centuries?' This famous quotation is from Hilbert's address to the International Congress in 1900. The *Hilbert Challenge* discusses the 23 problems posed by Hilbert in his address, and their influence on the development of mathematics in the twentieth century. The main features are the following:

1. An English translation of Hilbert's address. The translation is basically the one by Mary Winston (later Newson), published in the *AMS Bulletin* in 1902.
2. A biography of Hilbert, focussing on his mathematical work in general, and his work on topics related to the 23 problems in particular.
3. Explanation of the mathematical background to each of the problems.
4. The story of the problems in the twentieth century.

The background to the problems is described in language that should be intelligible to students studying for a degree in a mathematical subject. Indeed, the book could be used as background for MMath projects, as well as courses in the history of mathematics. Doubtless some experts will find fault with some details of the exposition, but on the whole it is done remarkably well. (There is a mistake on page 2, where it

is stated that the brachistochrone is part of a catenary, but the right answer is given on page 3.)

The book as a whole is well-planned, and the claim of the dust-jacket blurb that it is 'fascinating' is quite justified. One reason is that, in addition to the serious topics listed above, there are frequent digressions into matters that are not directly connected with Hilbert's problems, but nevertheless make good reading. As well as the usual stuff about national pride, world wars, the space race, and other mundane affairs, there is the big issue of the twentieth century: what is the relation between pure and applied mathematics?

All this is enlivened by snippets of information derived from Jeremy Gray's extensive knowledge of the mathematical world. I was particularly interested to learn more about Charlotte Angas Scott, the first woman to become a member of the LMS, and one of only two women whose photographs were collected by Robert Tucker, secretary of the Society 1867-1902. (Her photograph is currently on display in the Science Museum, London, and it can also be viewed on the excellent website at St Andrews.) Scott enters the Hilbert story in several ways. She wrote an extensive report on the 1900 ICM, which was published in the *AMS Bulletin* and undoubtedly helped to disseminate the problems in the USA. Among other things, she observed that Hilbert's address evoked little discussion at the time. She had taught Mary Winston (the translator) at Bryn Mawr, and she encouraged another of her students, Virginia Ragsdale, to work on part of Hilbert's 16th problem, concerning the possible arrangements of branches of algebraic curves. Ragsdale's work was published in 1906, and some of her beautiful but mysterious diagrams were reprinted in Coolidge's *Algebraic Plane Curves* (1931).

One final thought: the ICM in 1900 was part of a large programme of academic conferences held in Paris that year,

as part of the French ambition to lead the world into the twentieth century. Although (as Scott remarked) 'the arrangements excited a good deal of criticism', the legacy of the event has been, and still is, a significant factor in the story of human achievement. Will the year 2000 produce anything comparable?

Norman Biggs  
London School of Economics

## MATHEFIT WORKSHOPS AND SUMMER SCHOOLS IN 2002

The Engineering and Physical Sciences Research Council invites applications for workshops and summer schools proposals for 2002 under the MathFIT (Mathematics for Information Technology) initiative. The initiative is sponsored by the EPSRC and benefits from funding given by the London Mathematical Society

The basic aim of MathFIT is to develop new interactions between mathematics and computer science, where 'mathematics' and 'computer science' are to be interpreted broadly and to include, for example, statistics and operations research, and information technology and artificial intelligence, respectively. It should be noted that MathFIT is solely concerned with the development of new interactions. Of course, this does not necessarily mean new research topics, as a new interaction can be built upon existing research; but in any such interaction there must be a new 'dimension' not previously present.

Proposals for workshops and summer schools will be peer reviewed in conjunction with the Computer Science Committee of the LMS and will be considered in competition for available funding. A case for support should be submitted (taking up to not more than six pages). It should be noted that it is EPSRC policy only to support EPSRC students, though the LMS may support non-EPSRC students. Eight copies of the Case for Support should be sent to Deborah

Miller, Mathematics Programme, EPSRC, Polaris House, North Star Avenue, Swindon SN2 1ET. The Case for Support should arrive no later than 5 pm on **Friday 19 October 2001**. This deadline will be strictly enforced. Original copies are required for processing and faxed copies will not be accepted. Applicants wanting to discuss their proposal prior to submission are advised to telephone or e-mail the MathFIT Co-ordinator Professor Iain A. Stewart (tel: 0116 2525356; e-mail: [ias4@mcs.le.ac.uk](mailto:ias4@mcs.le.ac.uk)). Details of what is required are given on the web (<http://www.mcs.le.ac.uk/~istewart/MathFIT/MathFITSummSchools.html>).

## **SIMULATION OF FLUID AND STRUCTURE INTERACTION**

### **European Mathematical Society Summer School**

The EMS Summer School (supported by the ESF-AMIF programme and International Visegrad Fund) will be held at the Faculty of Mathematics and Physics, Charles University, Prague from 19 - 29 August 2001. The Summer School will be concerned with mathematical and numerical methods in fluid dynamics, structural mechanics and, particularly, the interaction of fluids and structures. This last is a relatively new but extensively developing area having great importance from the standpoint of applications in science and technology. There will be a comprehensive series of lectures on the above subjects. The level will be appropriate for graduate students and young researchers. Details of the preliminary programme can be found on the web (<http://adela.karlin.mff.cuni.cz/katedry/knm/eurointer/programme.htm>).

The speakers at the event are:

- J. Ballmann (TH Aachen, Germany)
- D. Causon (University of Manchester, UK)
- P. Hemon (Institute Aerotechnique, France)
- P. Leyland (EPFL, Switzerland)
- A. Quarteroni (EPFL, Switzerland)

- M. Schaefer (TH Darmstadt, Germany)
- L. Tobiska (Otto-von-Guericke University of Magdeburg, Germany)
- J. Vierendeels (University of Gent, Belgium)

The organisers of the event are P. Wesseling (Delft University of Technology) L. Tobiska (Otto-von-Guericke University of Magdeburg), M. Feistauer, J. Felcman (Charles University Prague) along with co-organisers P. Chocholaty (Comenius University, Bratislava), G. Stoyan (ELTE University, Budapest), J. Rokicki (Warsaw University of Technology).

The course fee is 30 Euros. The price for accommodation is 15 Euros per day for a shared double room and 25 Euros per day for a single room. The course fee and the fee for the accommodation can be paid by cash at the registration desk after arrival. Limited financial support will also be available for graduate students and young researchers. Scholarships paying for registration fee, accommodation, subsistence and travel may be awarded based on the merits of the application. State the exact cost, in Euros, the amount of money that you are applying for to cover the cost of your return ticket to Prague. A limited number of scholarships are available. Please apply as soon as possible.

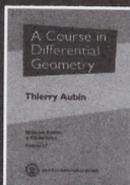
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It is highly recommended to send the registration form via e-mail ([felcman@karlin.mff.cuni.cz](mailto:felcman@karlin.mff.cuni.cz)) or by post as soon as possible to Miloslav Feistauer and Jiri Felcman, Faculty of Mathematics and Physics, Charles University Prague, Sokolovska 83, 186 75 Praha 8, Czech Republic (e-mail: [felcman@karlin.mff.cuni.cz](mailto:felcman@karlin.mff.cuni.cz), tel: (420-2) 2191 3392, (420-2) 2191 3388, fax: (420-2) 2481 1036, web: <http://www.karlin.mff.cuni.cz/katedry/knm/eurointer/index.html>).

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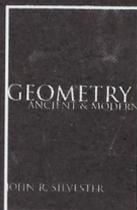
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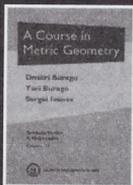


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Covers harmonic maps between singular spaces, with much new material appearing for the first time in book form. It will serve as a concise source and reference for all researchers working in this field or a similar one.

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Jun Kigami

A self-contained introduction to analysis on fractals, a developing area of mathematics which focuses on the dynamical aspects of fractals. Suitable for graduate students and researchers in analysis and probability theory.

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*Cambridge Tracts in Mathematics, 143*

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## The Eightfold Way

*The Beauty of Klein's Quartic Curve*

Silvio Levy

Explores the rich tangle of properties and theories surrounding the Klein quartic. The book includes a beautifully illustrated essay by the mathematical sculptor Helaman Ferguson and the first English translation of Klein's seminal article on this surface.

**£19.95** PB 0 521 00419 5 352pp 2001  
*Mathematical Sciences Research Institute Publications, 35*



## Clifford Algebras and Spinors

*Second edition*

Pertti Lounesto

This is the second edition of Professor Lounesto's unique introduction to Clifford algebras and spinors.

'The author gives a concise but thorough introduction to spinors and Clifford algebras extending from the very beginning to present research ...'

G. Kowol, *Monatshefte für Mathematik*

'This book sets standards in the field of quality and careful notation, especially in the relation of several kinds of spinors. It is highly recommended to teachers and researchers active in this field.'

B. Fauser, *ZBL Math*

**£29.95** PB 0 521 00551 5 348pp 2001  
*London Mathematical Society Lecture Note Series, 286*



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## LMS BOOK SERIES ANNUAL REPORT

### Lecture Notes Series

The LMS Lecture Note Series, published jointly by the Society and Cambridge University Press, has now produced over 280 titles. Most volumes are short monographs giving an authoritative account of the present state of knowledge on a topic of general interest. These include a variety of formats cutting across a broad swathe of mathematics, based on lecture courses, instructional conferences or books whose subject matter and presentation make them appropriate for both graduate students and workers in adjacent disciplines. Proposals resulting from conferences should also have this general appeal.

In line with the current policy of the LMS, the series wishes to attract proposals which have a significant interface with both pure and applied mathematics. The present team of Editorial Advisors consists of Stephen Donkin (QMW) in Algebra, Ivan Fesenko (Nottingham) in Number Theory, John Roe (Penn State) in Topology and Analysis and Endre Suli (Oxford) in Numerical Analysis.

Manuscripts or proposals for consideration should be sent either to one of the editors or to Roger Astley at Cambridge University Press (e-mail: rastley@cup.cam.ac.uk), any of whom will also be happy to answer enquiries about the series.

Nigel Hitchin  
Oxford

### Student Texts Series

Two volumes were published this year: M. Rørdam, N. Larsen and N. Laustsen, *Introduction to  $K$ -theory for  $C^*$ -algebras*, and R. Sharp, *Commutative algebra*, 2nd edition. Due for publication shortly: P. Swinnerton-Dyer, *A guide to algebraic number theory*.

We have contracts for Davidoff, Sarnak and Valette (*Ramanujan Graphs*), Eberlein-Armitage (*Elliptic functions*), Cohen (*Algorithms and computer algebra*), Simson (*Representation theory of associative algebras*), Diaconis (*Geometry and*

*Randomness*), Pinch and Swinnerton Dyer (*Modular forms*) and Pinch (*Computational number theory*). Around 6 other manuscripts are being actively considered, including two quality proceedings from instructional conferences. In all I have handled about fifteen new proposals of which most came through CUP. About 4 possible titles have been passed on to the Lecture Note series and several others have been rejected. Disappointingly, despite our intention to include more applied topics, we have not yet received any suitable good proposals, although there are several titles with substantial computing content.

Recent publications selling well are Terras (*Fourier analysis on finite groups and applications*), Olver (*Classical invariant theory*), Hajnal and Hamburger (*Set theory*).

The new editorial team, consisting of Elmer Rees, Martin Liebeck, Peter Olver and John Gibbon, is proving most helpful, all members having given very useful advice on a wide range of topics. As usual I have been working in close collaboration with Roger Astley who is now managing the series for CUP.

Caroline Series  
Warwick.

### Monographs

The LMS Monographs are published for the Society by Oxford University Press. The Series is at present edited by H.G. Dales (Leeds) and P.M. Neumann (Oxford), but there will soon be a change: E.B. Davies of King's College, London, will take over from H.G. Dales on 1 January 2002. The advisers are J.H. Coates (Cambridge), S.K. Donaldson (Imperial College), J.F. Toland (Bath), and W.S. Kendall (Warwick).

The aim of the Series is to publish authoritative accounts of current research in mathematics and high-quality expository works bringing the reader to the frontiers of research. The volumes are designed to be accessible to graduate students.

The books are produced in an attractive

hard-back style, and are published under the imprint of 'Clarendon Press, Oxford'. It has been arranged that they will remain in print as long as there is an academic justification for this. We are pleased to say that LMS members can buy the volumes at the substantial discount of 30% - one way of doing this is to telephone OUP (tel: 01536 454534) or use their website.

Recently we have published a number of strong volumes:

Volume 21: *Characters of finite Coxeter groups and Iwahori-Hecke algebras*, by M. Geck and G. Pfeiffer (304 pages) ISBN 0-19-850250-8, full price £65, LMS Members, £45.50. This is the first book to systematically develop the theory of conjugacy classes and irreducible characters of Coxeter groups from both a theoretical and algorithmic point of view.

Volume 22: *Classical harmonic analysis and locally compact groups*, by H. Reiter and J. Stegeman (320 pages) ISBN 0-19-850250-8, full price £65, LMS Members, £45.50. This is a new edition of the classic 1968 work by Hans Reiter. It has been carefully revised and updated by Jan Stegeman.

Volume 23: *Operator spaces*, by E. G. Effros and Z. J. Ruan, (368 pages) ISBN 0-19-853482-5 (full price £60, LMS Members, £42. This is the first published exposition of the exciting and rapidly expanding topic of 'Operator spaces'. This volume provides a synthesis of Banach space theory and the non-commuting 'quantum' theory of operator algebras. The authors are leading experts in the area.

Volume 24: *Banach algebras and automatic continuity*, by H. G. Dales, (906 pages) ISBN 0-19-850013-0, full price £110, LMS Members, £77. This is a substantial new account of the algebraic and analytic theory of Banach algebras, and, in particular, of their homomorphisms and derivations. Many examples are given in some detail.

A volume in preparation is '*The mysteries of the real prime*', by S. Haran; this exciting new approach to a topic in number theory

will appear soon in 2001. The editors are always happy to receive proposals or suggestions about possible future Monographs; we are pleased to have informal discussions, and to give advice and assistance at an early stage of the development of a project. We have a 'manifesto' that gives quite a lot of information on the technicalities of preparing a manuscript; most authors now prepare their own TEX version of the book, using macros supplied by OUP, but it is not necessary to proceed in this way, and OUP will themselves set a manuscript in TEX. Please contact H.G. Dales (pmt6hgd@amsta.leeds.ac.uk) or the managing editor at OUP, Elizabeth Johnston (johnstoe@oup.co.uk) for further information.

Garth Dales  
Leeds

### **LMS/AMS History of Mathematics Series**

During the last two years the following new books have been published:

Volume 15: Charles W. Curtis, *Pioneers of representation theory: Frobenius, Burnside, Schur, and Brauer*, 1999.

Volume 16: P.G.L. Dirichlet with supplements by R. Dedekind, *Lectures on number theory* (Translation John Stillwell), 1999 \*

Volume 17: Jacques Hadamard, *Non-Euclidean geometry in the theory of automorphic functions* (Translation and editors, Jeremy Gray and Abe Shenitzer), 1999 \*

Volume 18: Joe Albree, David C. Arney, and V. Frederick Rickey, *A station favorable to the pursuits of science: Primary materials in the history of mathematics at the United States Military Academy*, 2000.

Volume 19: Herman Grassman, *Extension theory* (Translation Lloyd C. Kannenberg), 2000 \*

Volume 20: *Kolmogorov in perspective*, 2000.

The volumes marked with an asterisk are in a new subspecies of translations of important works. They will appear in

paperback right from the start, to make them as inexpensive as possible, since they may also be of general interest to graduates and undergraduates. (There has already been a translation in the series (John Stillwell, *Sources of Hyperbolic Geometry*, 1997), but these are the first in the new and what looks to be a promising subseries.) Plans for several further volumes are under serious discussion or near completion.

The series has benefited enormously from the energy that Chris Thivierge, the AMS Acquisitions Assistant, has put into the project and the way in which the editorial boards, especially the AMS team, have pursued the projects. The good results are clearly visible.

The members of the Editorial Committee are, from the AMS, George Andrews, Joe Dauben, Karen Parshall (Chair) and Mike Rosen and from the LMS, David Fowler (Chair), Jeremy Gray, Tom Körner and Peter Neumann.

David Fowler  
Warwick.

### **PUBLIC AWARENESS AWARDS**

EPSRC Public Awareness Awards enable researchers to communicate the challenge and excitement of their work to a wider public. A total of £1.7 million has been committed to 68 projects since 1998.

Projects can be carried out by individual researchers or with the active participation of members of a research team, perhaps involving younger scientists and engineers, communications specialists and partner organisations. Eligible applicants are current holders of EPSRC research grants or fellowships, or those who have held grants or fellowships since 1 April 1994. Bids for highly innovative projects as well as 'tried and tested' types of activity will be welcomed. Interactive exhibits, media partnerships, videos, public lectures, demonstrations, and internet based activities are examples of possible initiatives.

The closing date for proposals is 5

**September 2001** and the announcement of successful bids is expected in January 2002. For further, more detailed information, visit the EPSRC website (<http://www.epsrc.ac.uk/EPSRCWEB/MAIN/INFO/PUB/PUBUND/INTRO/INTRO.asp?Main.htm>).

### **KLEINIAN GROUPS AND HYPERBOLIC 3-MANIFOLDS**

An intensive short workshop based around six lectures by Yair Minsky (Stony Brook) on combinatorial and geometrical aspects of hyperbolic 3 manifolds will be held in the Mathematics Institute, Warwick University from 11 - 15 September 2001. Other speakers include: J. Anderson (Southampton), B. Bowditch (Southampton), J. Brock (Chicago), K. Bromberg (Michigan), C. Earle (Cornell), S. Kerckhoff (Stanford), Y. Komori (Osaka City), C. Maclachlan (Aberdeen), A. Marden (Minnesota), V. Markovic (Warwick), A. Mednykh (Novosibirsk), H. Miyachi (Osaka City), J.P. Otal (Orleans), J. Parker (Durham), M. Sakuma (Osaka).

The meeting will run from Tuesday to Saturday lunchtimes. This meeting is funded by the LMS, directly and through the Warwick British Visitors Fund. All interested are welcome but please note that owing to limited availability of campus accommodation it is essential to book accommodation in good time. Limited funds will be available to help with expenses for mathematicians based in the UK, especially research students and postdocs. There will be no registration fee. E-mail [yohei@maths.warwick.ac.uk](mailto:yohei@maths.warwick.ac.uk) to join the mailing list or for other mathematical information. The organisers are Y. Choi, Y. Komori, M. Sakuma and C. Series. For further details about accommodation contact Hazel Grayley, Mathematics Institute, Warwick University, Coventry CV4 7AL (tel: 024-76-528317, fax: 024-76-523548, e-mail: [hazel@maths.warwick.ac.uk](mailto:hazel@maths.warwick.ac.uk)) or look on the website (web: <http://www.maths.warwick.ac.uk/>).

## 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

## Essays in the History of Lie Groups and Algebraic Groups

Armand Borel, *Institute for Advanced Study, Princeton, NJ*

Lie groups and algebraic groups are important in many major areas of mathematics and mathematical physics. We find them in diverse roles, notably as groups of automorphisms of geometric structures, as symmetries of differential systems, or as basic tools in the theory of automorphic forms. The author looks at their development, highlighting the evolution from the almost purely local theory at the start to the global theory that we know today. Starting from Lie's theory of local analytic transformation groups and early work on Lie algebras, he follows the process of globalization in its two main frameworks: differential geometry and topology on one hand, algebraic geometry on the other.

Professor Borel brings a unique perspective to this study. As an important developer of some of the modern elements of both the differential geometric and the algebraic geometric sides of the theory, he has a particularly deep understanding of the underlying mathematics. His lifelong involvement and his historical research in the subject area give him a special appreciation of the story of its development.

**History of Mathematics**, Volume 21; 2001; approximately 184 pages; Hardcover; ISBN 0-8218-0288-7; List \$39; All AMS members \$31; Order code HMATH/21LMS



## Kolmogorov in Perspective

The editorial board for the History of Mathematics series has selected for this volume a series of translations from two Russian publications, *Kolmogorov in Remembrance and Mathematics and its Historical Development*. This book, *Kolmogorov in Perspective*, includes articles written by Kolmogorov's students and colleagues and his personal accounts of shared experiences and lifelong mathematical friendships. The book is illustrated with photographs and includes quotations from Kolmogorov's letters and conversations, uniquely reflecting his mathematical tastes and opinions.

**History of Mathematics**, Volume 20; 2000; 230 pages; Hardcover; ISBN 0-8218-0872-9; List \$49; All AMS members \$39; Order code HMATH/20LMS



To order, call: 1-800-321-4AMS (4267), in the U.S. and Canada, or 1-401-455-4000; fax: 1-401-455-4046; email: [cust-serv@ams.org](mailto:cust-serv@ams.org). Visit the AMS Bookstore and order online at [www.ams.org/bookstore](http://www.ams.org/bookstore). Or write to: American Mathematical Society, P. O. Box 6248, Providence, RI 02940-6248. Prices subject to change without notice.

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](mailto:science.books@oup.co.uk).

## ICMS Workshop

# CLASSICAL AND QUANTUM INTEGRABLE SYSTEMS AND THEIR SYMMETRIES

Edinburgh, 2-8 December 2001

### Organising committee

Ed Corrigan (York)

Chris Eilbeck (Heriot-Watt)

Tetsuji Miwa (Kyoto)

Robert Weston (Heriot-Watt)

### Scientific programme

The meeting is a satellite workshop of the Isaac Newton Institute for Mathematical Sciences (<http://www.newton.cam.ac.uk/>) programme on Integrable Systems taking place from July to December 2001. The emphasis of the ICMS Workshop will be on quantum Integrable Systems and the symmetry approach, where recent progress has been rapid and intense. The aim is to analyse current developments and to encourage the exchange of ideas between researchers in the field of Integrable Systems and those working in representation theory, string theory and other areas of modern mathematics and physics.

### Invited speakers are expected to include:

John Cardy (Oxford)

Ivan Cherednik (Chapel Hill)

Patrick Dorey (Durham)

Kentaro Hori (Harvard)

Michio Jimbo (Tokyo)

Hitoshi Konno (Hiroshima)

Andre Leclair (Cornell)

Jean-Michel Maillet (Lyon)

Barry McCoy (Stony Brook)

Eugene Mukhin (Berkeley)

Maxim Nazarov (York)

Nikita Nekrasov (Paris)

Francesco Ravanini (Bologna)

N. Reshetikhin (Berkley)

Ryu Sasaki (Kyoto)

Jun'ichi Shiraishi (Tokyo)

Evgueni Sklyanin (York)

Feodor Smirnov (Paris)

Kanehisa Takasaki (Kyoto)

Gerard Watts (Kings College, London)

Alexei Zamolodchikov (Montpellier)

### Supporting institutions and organizations:

Engineering and Physical Sciences Research Council of the United Kingdom and the Isaac Newton Institute for Mathematical Sciences.

The meeting website contains detailed information, including a provisional timetable and Registration Forms. You can locate it via the current ICMS programme site (<http://www.ma.hw.ac.uk/icms/current/>).

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THE INSTITUTE OF MATHEMATICS AND ITS APPLICATIONS



**FORTHCOMING CONFERENCES**

**Second Wind-Over-Waves: Fundamentals, Forecasting and Applications**

Cambridge, 3-5 September 2001

**Eccomas 2001: Computational Fluid Dynamics**

Swansea, 4-7 September 2001

**Mathematical Modelling and Statistical Analysis of Infectious Diseases**

Cardiff, 11-13 September 2001

**Advanced Simulation and Control for Automotive Applications**

Keble College, Oxford, 24-26 September 2001

**Eighth Cryptography and Coding**

Royal Agricultural College, Cirencester, 17-19 December 2001

**Computational Aeroacoustics**

University of Greenwich, 9-11 April 2002

**Modelling Flows in Oil Reservoirs**

Cambridge, 15-17 April 2002

**Further details from:**

Mrs Pamela Bye, Conference Officer, The Institute of Mathematics and its Applications, Catherine Richards House, 16 Nelson Street, Southend-on-Sea, Essex SS1 1EF

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A. SELBERG  
HONORARY MEMBER 1985

## 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>).

### JULY 2001

- 1-6 British Combinatorial Conference, Sussex University (276)  
2-6 Nonlinear Elliptic Equations and Transition Phenomena EuroConference, Isaac Newton Institute, Cambridge (290)  
2-6 Singapore International Symposium on Topology and Geometry, National University of Singapore (291)  
3 LMS Popular Lectures, Institute of Education, London (294)  
4-6 Uncertainty in Geometric Computations MathFIT Workshop, Sheffield University (287)  
5-7 Removing Boundaries, BCME-5, Keele University (294)  
5-14 Combustion Theory LMS Durham Symposium, Durham University (291)  
6 LMS Northern Regional Meeting, UMIST (294)  
7-13 Quantization, Deformations, and New Homological and Categorical Methods in Mathematical Physics Workshop, UMIST (294)  
9-13 Stochastic Processes and their Applications Conference, Cambridge (275)  
9-13 Progress in Partial Differential Equations, ICMS Edinburgh (288)  
9-13 Algebraic Graph Theory Workshop, ICMS Edinburgh (288)  
9-13 Singapore-Warwick Workshop in Geometry and Topology, National University of Singapore (291)  
9-15 Symmetry in Nonlinear Mathematical Physics, Kyiv, Ukraine (293)  
9-20 Modern Methods in Scientific Computing and Applications Seminar, Université de Montréal, Canada (287)  
15-20 Algorithms for Approximation IV Symposium, Huddersfield University (286)  
16-26 Groups, Geometry and Combinatorics LMS Durham Symposium, Durham University (291)  
16-27 Stochastic Partial Differential Equations Workshop, Warwick University (287)  
17-20 AMS-SMF First Joint International Meeting, École Normale Supérieure, Lyon (292)  
19-25 Goldman Sachs International Mathematics Competition, Prague (293)  
24-31 Nonlinear Evolution Equations and Dynamical Systems EuroConference, Isaac Newton Institute, Cambridge (290)  
29-2 Aug Teaching of Mathematical Modelling and Applications (ICTMA 10), Tsinghua University, China (284)  
30 - 9 Aug Special Structures in Differential Geometry LMS Durham Symposium, Durham University (291)  
AUGUST 2001  
5-18 Groups-St Andrews, Oxford University (289)  
12-19 Homological Conjectures for Finite-Dimensional

- Algebras Summer School, Nordfjordeid, Norway (275)  
18-24 Convex Geometric Analysis Conference, Anogia, Crete (293)  
19 - 29 Simulation of Fluid and Structure Interaction EMS Summer School, Prague (295)  
SEPTEMBER 2001  
1-6 Number Theory and Arithmetical Geometry EURESCO Conference, Italy (292)  
3-7 Geometric Aspects of Group Theory, LMS/EPSRC Short Course, Bath University (293)  
2-6 Applied Mathematics in our Changing World, Berlin, Germany (292)  
6 Industrial Mathematics Meeting, Royal Society of Edinburgh (294)  
3-14 Discrete System and Integrability EuroWorkshop, INI, Cambridge (292)  
5-7 Domain Decomposition Methods in Fluid Mechanics LMS Workshop, Greenwich University (292)  
6-8 British Logic Colloquium 2001, Manchester University (293)  
10-11 Boundary Integral Methods Conference, Brighton University (293)  
11-15 Kleinian Groups and Hyperbolic 3-Manifolds Workshop, Warwick University (295)  
12 LMS South West and South Wales Regional Meeting, Bristol University (294)  
13-14 Zeta Functions, Random Matrices and Quantum Chaos Workshop, Bristol University (294)  
20 Mathematics for Solid and Structural Mechanics, UMIST (295)  
22-23 History of Mathematical Table Making Conference, Kellogg College, Oxford (291)  
24-28 Vertical Integration in Biology Workshop, Isaac Newton Institute, Cambridge (291)  
NOVEMBER 2001  
23 LMS Annual General Meeting, London (295)  
DECEMBER 2001  
2-8 ICMS Workshop, Edinburgh (295)  
3-5 Pattern Formation by Swimming Micro-organisms and Cells meeting, Leeds University (294)  
JUNE 2002  
24-28 Analytic Number Theory Workshop, Max Plank Institute, Bonn (288)  
APRIL 2002  
7-12 Joint BMC/BAMC, Warwick University (295)  
JULY 2002  
7-19 Numerical Analysis Summer School, University of Durham (295)  
AUGUST 2002  
5-15 New Directions in Dynamical Systems, Ryukoku and Kyoto Universities (293)  
20-28 ICM2002, Beijing, China (272)  
APRIL 2003  
7-10 BMC, University of Birmingham (295)

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.

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