THE LONDON MATHEMATICAL SOCIETY



NEWSLETTER

No. 343 December 2005

Forthcoming Society Meetings

2006

Friday 10 February London G. Segal U. Tillmann (Mary Cartwright Lecture)

Monday 15 May

Leicester Midlands Regional Meeting M. Bridson A. Zelevinsky

Friday 16 June

London Yu Manin (Hardy Lecture)

Friday 3 July

Leeds Northern Regional Meeting U. Haagerup N. Kalton

Friday 17 November

London Annual General Meeting

COUNCIL DIARY 14 October 2005

Being a relative newcomer to the LMS Council, I am on dangerous ground speaking of generalities, but it seems that at each meeting, amongst the many and varied items for discussion, one or two have a tendency to recur throughout the day; their relevance to many different areas make them pervasive and the subject of lively discussion.

At the October meeting such a theme was the need for a recognised procedure for the Society to develop and monitor a long-term strategic policy on the relative priority of its various activities. The consensus was that Council would agree on the direction for the Society to take over the next few years, and it would be ensured that the allocation of funds was representative of these aims. As these priorities are likely to change over time, and to give the Society the ability to adapt to changing circumstances, the mechanism to do this is to introduce a pre-budget discussion at the March Council meeting to review priorities for the available funds. This would affect the budget settlement by the Finance and General Purposes Committee, who would submit

the budget for the approval of Council in June as usual.

Factoring largely into the future direction of the Society will be the outcome of the Framework Studies Initiative assessing the pros and cons of a merging of the IMA and LMS. Members may have taken advantage of the various means for expressing their views on this debate, and all written comments will be circulated to Council members prior to the November meeting where further discussion will take place.

There were, of course, many other topics covered at the long October Council meeting. The numerous issues of LMS business that require Council attention create a packed agenda. I can mention just a few of these, and perhaps the first should be the suggestion that more authority be delegated to the various committees to make decisions following the general principles agreed by Council. In this way every item would not need to be approved at the Council meetings. This issue will be discussed further, but it seems that something in this direction is necessary for a modern Society that is active on so many fronts it's either that or cancel even the short lunch break during which Council members dash downstairs for a bite to eat before

being herded back to the meeting room still chewing their slice of melon.

Another issue touched upon, and which will be a subject of further discussion, is that of the retrodigitization of the archive of the *Bulletin*, *Journal* and *Proceedings* of the LMS – material dating back to 1865. This will be an impressive resource and the Council will continue to debate on how to distribute it, either with current journal subscriptions or as part of the digital library of Oxford University Press.

In a pleasant break from the discussions over the more contentious issues. Council decided unanimously to give £2000 to the World Federation of National Mathematics Competitions to support participants from Eastern Europe and Africa to attend their workshop in Cambridge next July. Most of us have seen first-hand how mathematics competitions stimulate and encourage students who will grow up to be the next generation of mathematicians and this grant will help ensure that the Cambridge meeting is attended by some of the most experienced competition organisers, as well as those from countries where competitions are still in their infancy. Nina C. Snaith

MATHEMATICS NIGHT

On Tuesday evening 6 December BBC4 TV celebrates mathematics and the beauty of numbers by showing a series of films: 21:05 *Go Forth and Multiply* Ancient

- Ethiopian number system
- 21.10 Music of the Primes Marcus Du Sautoy 22.10 Phi's the Limit: The Golden Ratio
- 22.15 Breaking the Code Alan Turing
- 23.45 The Mathematical Art of MC Escher
- 23.50 Horizon: Fermat's Last Theorem
- Andrew Wiles

24.40 Music of the Primes (repeat)

LMS SUBSCRIPTION 2005-06

The Society is appreciative of those members who have paid their 2005-06 subscriptions. May we remind those who have not yet paid, that subscriptions were due on **1 November 2005**. Prompt payment ensures continuity of publications and avoids the need for timeconsuming reminders. If you have misplaced your renewal of subscription form (enclosed with your October *News/etter*) contact the LMS office (email: membership@lms.ac.uk; tel: 020 7637 3686; fax: 020 7323 3655).

LMS Newsletter

2

General Editor: Dr D.R.J. Chillingworth (D.R.J.Chillingworth@maths.soton.ac.uk) Reports Editor: Dr S.A. Huggett (s.huggett@plymouth.ac.uk) Reviews Editor: Professor M.P.F. du Sautoy (dusautoy@maths.ox.ac.uk) Administrative Editor: Miss S.M. Oakes (oakes@lms.ac.uk) Editorial office address: London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS (tel: 020 7637 3686; fax: 020 7323 3655; email: oakes@lms.ac.uk, web: www.lms.ac.uk) Designed by CHP Design (tel: 020 7240 0466, email: info@chpdesign.com, web:www.chpdesign.com) Publication dates and deadlines: published monthly, except August. Items and advertisements by first day of the month prior to publication. Information in the *Newsletter* is free to be used elsewhere unless otherwise stated; attribution is requested when reproducing whole articles. The LMS cannot accept responsibility for the accuracy of information in the *Newsletter*. Views expressed do not necessarily represent the views or policy of the London Mathematical Society. Charity registration number: 252660.

LONDON MATHEMATICAL SOCIETY

MARY CARTWRIGHT LECTURE

Friday 10 February 2006

Chemistry Auditorium, Christopher Ingold Building, University College London, 20 Gordon Street, London WC1

4.15 pm Graeme Segal (Oxford University)

5.15 pm Tea

5.45 pm Mary Cartwright Lecture Ulrike Tillmann (Oxford University)

A reception will be held at De Morgan House at 7.00 pm with a dinner afterwards. For further details contact Susan Oakes (oakes@lms.ac.uk).

There are limited funds available to contribute to the travel expenses of Society members or research students to attend the Society meeting. Requests for support, including an estimate of costs, may be addressed to Isabelle Robinson at the Society (robinson@lms.ac.uk).

4

ALFRED GOLDIE

Professor Alfred Goldie, who was elected a member of the London Mathematical Society on 25 April 1949, died on 8 October 2005. Born in 1920, Alfred Goldie attended Wolverhampton Grammar School before being awarded a State Scholarship and an Open Major Scholarship at St John's College, Cambridge, to read Mathematics. He was awarded a First in Part II of the Mathematical Tripos in 1941, then leaving Cambridge for war work and receiving his BA degree in 1942.

In 1946 Goldie entered academic life as an assistant lecturer at the University of Nottingham. He took up a lectureship in Pure Mathematics at King's College, Newcastle in 1948, becoming Senior Lecturer in 1958 and Reader in Algebra in 1960.

In 1963 Professor Goldie was appointed to the second Chair in Pure Mathematics at Leeds, with a specific brief to foster research and postgraduate teaching. He had already established an international reputation as an algebraist, particularly in the theory of rings. His early research had been concerned with a study of general algebraic systems, but in the early 1950s his interests switched to ring theory and the new ideas that had recently been introduced by the then leading authority in this field, Nathan Jacobson of Yale University. Goldie initially collaborated with his colleague F.F. Bonsall in the successful application of Jacobson's work to the study of Banach algebras, their 1954 paper 'Annihilator Algebras' in the Proceedings of the LMS producing considerable interest. Goldie went on to produce seminal papers on the theory of noncommutative rings. leading to an invitation from Jacobson to spend the year 1960-61 at Yale. 'Goldie's Theorem' was to provide the cornerstone of a whole body of future research; substantial applications of the theorem were made by Goldie and his students, whilst many doctoral theses and publications by researchers in other parts of the world had their origins in his work.

With Professor Goldie's example and guidance, the Department of Pure Mathematics at Leeds achieved a very considerable reputation nationally and internationally for the quality and calibre of its research. A most successful Head of Department from 1970 to 1972, and Chairman of the School of Mathematics from 1976 to 1979, Professor Goldie also held a number of visiting appointments in the USA, Canada and Europe. He was a strong believer in the stimulus of international collaboration and he and colleagues in the Department, including John McConnell, Christopher Robson and Toby Stafford (the first two of whom had been his research students), enjoyed fruitful interactions with a series of distinguished academic visitors to Leeds. Alfred Goldie was awarded the prestigious Senior Berwick Prize of the London Mathematical Society in 1970, and served on the Council of the Society and as its Vice-President from 1978 to 1980. A man of vivid personality and strong opinions, he was a tireless advocate of the need for proper resources to sustain the international quality of mathematics and the other sciences in the UK.

Professor Goldie retired in 1986, the occasion being marked by an international symposium in Leeds. In the words of the Senate resolution adopted on his retirement 'at this symposium the extent of his fame, and the affection and admiration felt for him, were movingly demonstrated by over one hundred participants from around the world'. Professor Goldie remained active in his subject after retirement, including serving as an editor of the *Journal of Algebra*. He is survived by his second wife, Margaret, and a son and two daughters.

Springer

springeronline.com

The SUMS of Mathematical Teaching



Hyperbolic Geometry

J. W Anderson, University of Southampton, UK

Praise for the first edition ► ... The textbook is a good and useful

introduction to hyperbolic geometry, and can be recommended for undergraduate courses. Newsletter of the EM5, Issue 41, December 2001

2nd ed. 2005. XII, 276 p. 21 illus. (Springer Undergraduate Mathematics Series) Softcover ISBN 1-85233-934-9 ► € 29.95 | £ 19.95



Essential Topology

M. D. Crossley, University of Wales Swansea, UK This thoroughly modern introduction to under-

graduate topology brings the most exciting and useful aspects of modern

topology to the reader.

2005. X, 224 p. 110 illus. (Springer Undergraduate Mathematics Series) Softcover ISBN 1-85233-782-6 ► € 29,95 | £ 19.95

Calculus of One Variable

K. E. Hirst, University of Southampton, UK

Understanding the techniques and applications of calculus is at the heart of mathematics, science and engineering. This book presents the key topics of introductory calculus through an extensive, well-chosen collection of worked examples.

2006. XII, 268 p. 72 illus. [Springer Undergraduate Mathematics Series] Softcover ISBN 1-85233-940-3 ► € 29,95 [£ 16.95

Fields and Galois Theory

J. M. Howie, University of St Andrews, UK

This book provides a gentle introduction to Galois theory suitable for third- and fourth-year undergraduates and beginning graduates. The approach is unashamedly unhistorical: it uses the language and techniques of abstract algebra to express complex arguments in contemporary terms.

2006. Approx. 240 p. 22 illus. (Springer Undergraduate Mathematics Series) Softcover ISBN 1-85233-986-1 ► € 34,95 [£ 19.95

Easy Ways to Order for the Americas ► Write: Springer Order Department, PO Box 2485, Secaucus, NJ 07096-2485, USA ► Call: (toll free) 1-800-SPRINGER ► Fax: (201)348-4505

► Email: orders-ny/aspringer-sbm.com or for outside the Americas ► Write: Springer Distribution Center GmbH, Haberstrasse 7, 69126 Heidelberg, Germany ► Call: +49 (0) 6221-345-4301

► Fax : +49 (0) 6221-345-6229 ► Email: SDC-bookorder@springer-sbm.com ► Prices are subject to change without notice. All prices are net prices. 012012x

7

LONDON MATHEMATICAL SOCIETY

Cecil King Travel Scholarship

The London Mathematical Society annually awards a Cecil King Travel Scholarship in Mathematics to the value of £5000, to a young mathematician of outstanding promise, to support a period of study or research abroad for a typical period of three months. Many mathematicians have found that such a visit has benefited both their mathematics and their career; the Society urges young mathematicians and their supervisors seriously to consider this opportunity.

The award is competitive and based on a written proposal describing the intended programme of study or research abroad and the benefits to be gained from such a visit.

Applicants should normally be nationals of the UK or Republic of Ireland, under the age of 25 years, either registered for or having recently completed a doctoral degree at a UK University.

The initial application should include:

- a completed application form;
- a short proposal (4 pages maximum) indicating the proposed programme of study abroad, the benefit of such an opportunity in advancing the candidate's studies, and the Institution that the candidate wishes to visit;
- a letter of support from the applicant's Head of Department, or from his or her Research Supervisor.

Candidates selected for interview will be asked to approach the intended research institution or research leader to be visited, to confirm that a visit would indeed be welcomed if an award were made.

At the end of the Scholarship, the student will be expected to write a short report indicating the activities and benefits gained from the visit.

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

Application forms for the 2006 Scholarship are available on the Society's website (www.lms.ac.uk/activities/cecil_king/index.html) or from Isabelle Robinson at the Society (robinson@lms.ac.uk). The closing date for applications is **Friday 10 February 2006**.

The London Mathematical Society is a registered charity for the promotion of mathematical knowledge.

LONDON MATHEMATICAL SOCIETY PRIZES 2006 Announcement and Call

for Nominations

A Prizes Committee has been appointed for 2006. The membership is: Professor David Abrahams Professor Stephen Donkin Professor Frank Kelly Professor Malcolm MacCallum Professor David Preiss Professor David Rand Professor John Toland (Chair) Professor Richard Ward

In 2006, Council expects to award the Polya Prize, the Senior Berwick Prize, the Fröhlich Prize and up to four Whitehead Prizes.

Members wishing to nominate candidates should use the designated form, which is available to download from the LMS website (www.lms.ac.uk) or can be obtained by contacting the Secretary to the Committee at the Society (tel: 020 7927 0800, email: prizes@lms.ac.uk). Nominations should be received no later than Friday 13 January 2006.

Brief descriptions of the criteria for each Prize are given below. Council reserves the right not to make an award of any particular Prize in the event that no candidate of sufficient merit is recommended by the Prizes Committee. The full regulations for each prize can be obtained from the Society (contact details as above).

The Polya Prize is awarded in those years, not numbered by a multiple of 3, in which the De Morgan Medal is not available for award. The Prize is in memory of Professor G. Polya, who was a Member (and later Honorary Member) of the Society for about 60 years. The Polya Prize is awarded in recognition of outstanding creativity in, imaginative exposition of, or distinguished contribution to mathematics within the United Kingdom; it may not be awarded to any person who has previously received the De Morgan Medal. The Senior Berwick Prize is named after Professor W.E.H. Berwick, a former Vice-President of the Society, and is awarded in even-numbered years. The Senior Berwick Prize for year X can only be awarded to a mathematician who is a member of the Society on 1st January of year X; it is awarded in recognition of an outstanding piece of mathematical research actually published by the Society during the eight years ending on 31st December of year X-1; and it may not be awarded to any person who has previously received the De Morgan Medal, Polya Prize, Senior Whitehead Prize or Naylor Prize.

The Fröhlich Prize is awarded in even numbered years in memory of Professor Albrecht Fröhlich (De Morgan Medallist 1992). The Fröhlich Fund for this purpose was based on a generous donation from Mrs Fröhlich. reflecting Professor Fröhlich's great enthusiasm for, and gratitude to, the London Mathematical Society. No person shall be awarded a Fröhlich Prize more than once. A Fröhlich Prize may not be awarded to any person who has received the De Morgan Medal or the Polya Prize. The Prize shall be restricted to mathematicians who, on 1st January of the year of the award, are either (i) normally resident in the United Kingdom of Great Britain and Northern Ireland, or (ii) members of the Society mainly educated in the United Kingdom. The Prize shall only be awarded to a mathematician who on the 1st January of the year of its award is under 50 years old except that this age restriction may be relaxed when it appears desirable to do so in order to take fair account of a broken career pattern. The Prize shall be awarded for original and extremely innovative work in any branch of mathematics.

The Whitehead Prizes are awarded to mathematicians who on 1 January 2006 are normally resident in the United Kingdom or members of the Society mainly educated in the United Kingdom, who are not already Fellows of the Royal Society, and who are under the

No. 343 December 2005

THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

age of forty years (except that this age restriction may be relaxed when it appears desirable to do so in order to take fair account of broken career patterns). Grounds for the award may include work in and influence on mathematics. This Prize may not be awarded to anyone who has won any of the Society's other Prizes. Members are reminded that the scope of the Whitehead Prizes (as of the other Society Prizes to be awarded in 2006) includes all aspects of mathematics, and Council has emphasised that this includes applied mathematics, mathematical physics and mathematical aspects of computer science.

DAVID CRIGHTON MEDAL

The David Crighton Medal was established by

the Councils of the LMS and IMA in 2002 in order to pay tribute to the memory of Professor David George Crighton FRS. The silver gilt medal will be awarded to an eminent mathematician for services both to mathematics and to the mathematical community, who is normally resident in the mathematical community represented by the two organisations on the 1 January of the year of the award. The award will be considered triennially by the Councils of the Institute and the Society. The medal-winner will normally be presented with the award at a joint meeting of the Institute of Mathematics and its Applications and the London Mathematical Society, and will be invited to give a lecture.

The first Medal was awarded to Professor John Ball FRS, in 2003.

A David Crighton Medal Committee has been established, comprising three members from the LMS and three from the IMA.

LMS Members:

Professor J.F. Toland Professor K. Falconer Professor M. du Sautov **IMA Members:** Professor P. Grindrod Professor T. Pedlev Professor J. Hogan

Nominations are invited. These should be made on a nomination form available on both Societies' websites or from the Secretary to the David Crighton Committee (prizes@lms.ac.uk). Nominations must be received by 31 January 2006.

SIR HARRY RAYMOND PITT

Sir Harry Raymond Pitt FRS, who was elected a member of the London Mathematical Society on 16 December 1937, died on 8 October 2005 at the age of 91. He was born on 3 June 1914 and attended King Edward's School, Stourbridge, before winning a scholarship to Peterhouse, Cambridge. From 1964-79 he was Vice-Chancellor of the University of Reading, where he is still remembered with great affection and where the Sir Harry Pitt Building houses Statistics.

As well as his research papers in the mathematical journals, he published three wellknown books, Tauberian Theorems (1957), Measure, Integration and Probability (1963) and Measure and Integration for Use (1986). Up to the end of his life he maintained his interest in mathematics.

Sir Harry was a Bye-Fellow of Peterhouse, Cambridge, 1936-39; Choate Memorial Fellow, Harvard University, 1937-38; lecturer at the University of Aberdeen, 1939-42; worked at the Air Ministry and Ministry of Aircraft Production, 1942-45: Professor of Mathematics. Oueen's University, Belfast, 1945-50; Professor of Pure Mathematics, University of Nottingham, 1950-1964, Visiting Professor, Yale University, 1962-63; President of the IMA, 1984-85.

He received honorary degrees from the Universities of Aberdeen (1970), Nottingham (1970) and Reading (1978). He was knighted in 1978, elected Fellow of the Royal Society in 1957 and served on the LMS Council.

He was predeceased by Catherine, Lady Pitt, but is survived by his sons Mathew, John, Daniel and Julian.

HISTORY OF MATHEMATICS SERIES A CO-PUBLISHING PARTNERSHIP





Mathematics and Social Utopias in France

Olinde Rodrigues and His Times

Simon Altmann, Brasenose College, Oxford University, England, and Eduardo L. Ortiz, Imperial College of Science & Technology, London, England, Editors



Social reformer, banker, and mathematician, Olinde Rodrigues is a fascinating figure of nineteenth-century Paris. Information about him is obscure-scattered in publications on history, mathematics, and the social sciences-and often inaccurate. Rodrigues left no papers or archives. Here, for the first time, is an authoritative account of his family history, education, and important mathematical works. Written by a team of prominent mathematicians and historians, the book comprises the interests and associations that make Rodrigues such a remarkable character in the history of mathematics. This is a superb panorama of nineteenth-century France, portrayed through the life and work of Olinde Rodrigues.

History of Mathematics, Volume 28; 2005; approximately 184 pages; Hardcover; ISBN 0-8218-3860-1; List US\$49: All AMS members US\$39: Order code HMATH/28

Also in the History of Mathematics Series ...

John von Neumann: Selected Letters

Miklós Rédei, Ectvos Lorand University, Budapest, Hungary, Editor

History of Mathematics Volume 27: 2005: 301 pages: Hardcover: ISBN 0-8218-3776-1; List US\$59: AI AMS members US\$47; Order code HMATH/27

Kolmogorov in Perspective History of Mathematics, Volume 20: 2000: 230 pages: Hardcover: ISBN

0-8218-0872-9: List US\$49: AI AMS members US\$39; Order code HMATH/20

Pioneers of Representation Theory: Frobenius, Burnside, Schur, and Brauer

Charles W. Curtis, University of Oregon, Eugene, OR

History of Mathematics. Volume 15; 1999; 292 pages: Softcover; ISBN 0-8218-2677-R: List LIS\$39:All AMS members US\$31: Order code HMATH/15.5



Copublished with the London Mathematical Society. Members of the LMS may order directly from the AMS at the AMS member price. The LMS is registered with the Charity. Commissioners.

Order Today! www.ams.org/bookstore

9

IMA-LMS FRAMEWORKS STUDY INITIATIVE

Looking at the future options for the IMA and LMS

Mathematics Department Meeting – Warwick As part of the debate on the possibility of the two societies moving into a different relationship at some point in the future, mathematics departments were asked to arrange meetings at their regions to discuss this document, and to offer their opinions. A meeting to this effect has been organised at Warwick on 17 February 2006 at 4.00 pm to which anyone interested is invited. Further details will be included in the *Newsletter* or see www.maths.warwick.ac.uk/research/ colloquia.html.

10

SIR HERMANN BONDI

Sir Hermann Bondi FRS, born (in Vienna) 1 November 1919, died 10 September 2005, was an outstanding figure, both as an applied mathematician and scientific administrator. As Professor of Mathematics at King's College London between 1954 and 1971, he built one of the leading research groups world-wide, at the time, in the study of Einstein's general relativity.

Bondi's own work on gravitational radiation was seminal, laying the foundations of the modern understanding of the subtleties of gravitational wave energy, leading to the renaissance in the 1960s of theoretical activity in general relativity. He was a distinguished cosmologist, especially well known for his introduction, with Gold and Hoyle, of the steadystate model of the universe, providing its sound mathematical basis, yet being well prepared to abandon the model when inconsistencies with the microwave background began to be apparent. He was a superb expositor and an inspiration to many, with his jovial nature and original wit, delivered with a characteristically Austrian-tinged precise English.

He was Secretary of the Royal Astronomical Society (1956-64), elected an FRS in 1959. His administrative jobs included Director Generalship of ESRO from 1967, becoming Chief Scientific Advisor in the Ministry of Defence in 1971, moving to the Department of Energy as chief scientist in 1977, and then in 1980 to Swindon to be chairman of NERC for four years. He was Master of Churchill College, Cambridge, from 1983 to 1990.

In 1947 he married Christine Stockman, one of Hoyle's postgraduate physics students, who survives him, as do their two sons and three daughters.

R. Penrose

LMS PROGRAMME AND CONFERENCE FUND

The Programme and Conference Fund is used to give financial support for mathematical research, mainly in the UK. The fund is administered by the LMS Programme Committee, which distributes as grants some of the funds that the Society receives from its investments and publishing activities. This is one of the mechanisms through which the Society achieves its central purpose, namely to 'promote and extend mathematical knowledge'. The Society operates as a charity and thus Programme Committee has different opportunities and works within a different regulatory framework from other funding bodies, such as the EPSRC. In particular, we do not meet the 'full economic cost' of the activities supported by our grants.

Programme Committee grants are made under six schemes which are described on the LMS website (www.lms.ac.uk/activities/ prog_com/index.html).

Please note that Programme Committee's budget is under pressure, and we are not always able to make awards as often or as fully as we would like. 11

Grants awarded between June and October 2005

Scheme 1

Applicant	Title	Grant
J. Levesley	Developments in Pattern Recognition and Data Mining	£2,600
G. Wilks, Y. Fu	BAMC 2006	£3,000
D.F. Holt	Magma Workshop on Group Theory and Algebraic Geometry	£2,500
H. Zheng	Mathematical Finance and Stochastic Analysis Workshop	£3,000
S. Whitehouse	Sheffield Homotopy Mini-Conference	£3,000
T. Holm	Triangulated Categories in Modern Mathematics	£3,500
D.W. Hoffmann	Quadratic Forms, Linear Algebraic Groups and Related Topics	£4,000
J. Bolton	Yorkshire Durham Geometry Day in Honour of Tom Willmore	£1,190
J. Billingham	A Meeting in Memory of Professor Andy King	£2,395
A. Beckmann	Computability in Europe 2006: Logical Approaches to Computational Barriers	£3,890
V.B. Kuznetsov	Sklyanin Algebras and Beyond	£2,500
G.R. Robinson	Sixth Century Conference in Representation Theory	£2,500
F. Theil	Mathematics of Biomolecules	£2,300
N. Jacob	BMC 2007	£8,000
J.M. Lindsay	Noncommutative Analysis, Quantum Theory and Stochastic Analysis	£200

Scheme 2

Applicant	Visitor	To Visit	Grant
A. Ranicki	J. Levine	Warwick, Durham, Edinburgh	£450
J.R. Whiteman	H.T. Banks	Brunel, Reading, Cardiff	£1,200
B. Zegarlinski	D. Bakry	Oxford, Warwick, Imperial College	£950
T. Konstantopoulos	A.I. Sakhanenko	Heriot-Watt, Edinburgh, Strathclyde	£900
P.H. Kropholler	I. Chatterji	Glasgow, Imperial College, Southampton	£1,000

THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

Scheme 3

Applicant	Institution	Title	Grant
I. McIntosh	York	Yorkshire Durham Geometry Days	£900
D. Mond	Warwick	Singularity Theory and Applications	£1,200
J.P.C. Greenlees	Sheffield	Transpennine Topology Triangle	£1,200
A.P. Fordy	Leeds	Classic and Quantum Integrability	£1,200
N. Snashall	Leicester	BLOC (Bristol Leicester Oxford Colloquium)	£1,200
Xue-Mei Li	Loughborough	East Midlands Stochastic Analysis seminar	£1,200
A.F. Jarvis	Sheffield	North of England Algebraic Number Theory Group	£750
S. Pott	Glasgow	North British Functional Analysis Seminar	£900
M. Dzamonja	East Anglia	CAMELEON	£900
J. Brodzki	Southampton	K-theory and Analysis	£1,200
A. Scott	Oxford	OWL research group in Combinatorics and Statistical Mechanics	£900
J. Bennett	Birmingham	The UK Harmonic Analysis and PDE's Research Network	£1,200
W. Lionheart	Manchester	Multidimensional Inverse Problems	£1,200
R. Sharp	Manchester	Ergodic Theory	£1,200
A. Duncan	Newcastle	North Eastern Geometric Group Theory Seminar	£900

Scheme 4

Applicant	Institution	Collaborator	Institution	Grant
F.P.A. Coolen	Durham	T. Augustin	Ludwig Maximilians, Münich	£440
P. Harris	Brighton	K. Chen	Liverpool	£250
L. Sbano	Warwick	D.R.J. Chillingworth	Southampton	£250
R. Baker	Oxford	N. Kotov	Kazan, Russia	£500
R.S. Simon	LSE	B. Weiss	Hebrew, Israel	£500

No. 343 December 2005

13

Scheme 4

Applicant	Institution	Collaborator	Institution	Grant
K.J. Sandiford	Salford	D.A. Prikazchikov	Russian State Technical University of Railway Transport	£500
P. Vámos	Exeter	R. Wiegand S. Wiegand	Nebraska-Lincoln, USA	£500
N. Nikolov	Oxford	M. Kassabov	Cornell, USA	£500
J. Sivaloganathan	Bath	N. Marerro E. Montes	Puerto Rico	£500
R. Hazrat	QUB	N. Vavilov	State University of St Petersburg	£500
S. Pott	Glasgow	S. Petermichl	University of Texas at Austin, USA	£250
F. Neumann	Leicester	D. Juan-Pineda	UNAM, Morelia, Mexico	£430
J.H. Merkin	Leeds	D.J. Needham	Reading	£250

Scheme 5

Applicant	Visitor/Institution	To Visit	Grant
D.L. Salinger	H. Dedania (Sardar Patel, India)	Leeds	£1,400
J. Eggers	M. Habibi (IASBS, Iran)	Bristol	£1,500
D. Strauss	Y. Zelenyuk (Witwatersrand, South Africa)	Hull, Leeds	£1,400
J.R. Whiteman	Brunel University	Kanpur, Delhi and Mumbai	£1,100
A.L. Brown	University College, London	Sultan Qaboos, Oman	£400

VISIT OF PROFESSOR R.L. DEVANEY

will be visiting the UK in early 2006, supported by an LMS Scheme 2 grant. He will be based in Warwick from 22-28 January (local organisers Caroline Series and Adam Epstein), Manchester from 31 January -3 February (local organiser Richard Sharp)

Professor R.L. Devaney (Boston University) and Queen Mary, University of London, from 4 - 18 February. Professor Devaney will give talks at these locations and at the Open University, on various topics around the theme of 'complex topology meets complex dynamics'. For details contact Shaun Bullett (s.r.bullett@qmul.ac.uk).

14

UCL

UCL Department of Mathematics

Chair of Mathematics and Head of Department

UCL invites applications for the post of Professor and Head of the Department of Mathematics. This is an important strategic appointment, which UCL sees as key to a longer-term process of development for the Department in the years ahead. We are seeking an outstanding research leader with the imagination and managerial skills to handle growth within the Department, to harness the skills and to foster the enthusiasms of its academic and research staff. The successful candidate will have a distinguished academic record in pure and/or applied mathematics as well as a strong background in and understanding of the higher education and research funding sectors.

The starting date will be by agreement between the successful candidate and UCL. but will be October 2006 at the latest. Professorial salaries are determined by negotiation and there is a Head of Department supplement.

Informal enguiries may be made to Professor Frank Smith (frank@math.ucl.ac.uk), and further particulars about the post and an application form can be obtained from the Departmental Administrator Helen Higgins (helen@math.ucl.ac.uk) or from the departmental website: http://www.ucl.ac.uk/maths/. General information about UCL and the Department of Mathematics can also be found on the website.

Applications for the Chair should include a full curriculum vitae (with publications list), a statement of research interests and plans, the names and contact details of three referees (including at least one referee based outside the candidate's country of residence) and details of current salary. It would be appreciated if candidates would submit both a hard copy (under cover of a signed letter) and an electronic copy of their application, addressed to the President and Provost of UCL and sent to the Director of Academic Services, University College London, 5 Gower Street, London WC1E 6BT (e-mail: tim.perry@ucl.ac.uk).

We particularly welcome female applicants and those from an ethnic minority, as they are currently under-represented within UCL at this level.

Closing date: 13 January 2006.

RANDOM GRAPHS AND LARGE-SCALE REAL-WORLD NETWORKS

The Institute for Mathematical Sciences (Singapore) is organizing a programme on Random Graphs and Large-Scale Real-World Networks from 1 May - 30 June 2006 in Singapore. The organizing committee is: Chair

• Bela Bollobás (University of Memphis and University of Cambridge)

Co-chairs

- Khee-Meng Koh (National University of Singapore)
- Oliver Riordan (University of Cambridge)
- Chung-Piaw Teo (National University of Singapore)
- Vikram Srinivasan (National University of Sanjeeb Dash (IBM T.J. Watson Research Singapore)

The aim of the programme is to bring together people who have done much work on the rigorous mathematical theory of random graphs and experts (mostly physicists and computer scientists) on measuring realworld graphs, modeling them and studying them experimentally. The problems concerning complex networks vary greatly in importance and difficulty, so the programme should not only enable young researchers to gain access to the methods and problems of a large and very active field, but the research community should also benefit from the collective wisdom of the participants as to the direction of future research.

The programme will consist of tutorials, workshop and a public lecture, with ample opportunities for collaborative research among local and international participants, as follows:

Tutorials (8-12 May) L. Lovász, B. Bollobás, P. Balister, O. Riordan, S. Janson

Workshop (12-16 June)

Public Lecture (to be advised) J.T. Chayes, A.L. Barabási

For further information and registration, visit www.ims.nus.edu.sg/Programs/randomgraphs. For general enquiries email imssec@ nus.edu.sg. For enguiries on scientific aspects of the programme email Bela Bollobás (bollobas@msci.memphis.edu).

COMBINATORIAL **OPTIMIZATION** SUMMER SCHOOL

Center)

An SMS-NATO Advanced Summer Institute Summer School on Combinatorial Optimization: Methods and Applications will take place from 19-30 June at the Université de Montréal, Canada. The Invited Lecturers are:

- Gérard Cornuéiols (Carnegie Mellon University)
 - 15
- Friedrich Eisenbrand (Max-Planck-Institut für Informatik)
- Lisa K. Fleischer (Carnegie Mellon University)
- Michael X. Goemans (Massachusetts Institute of Technology)
- Yuri Kochetov (Russian Academy of Sciences)
- Bernhard Korte (University of Bonn)
- Gleb Koshevoy (Russian Academy of Sciences)
- Shmuel Onn (Technion Israel Institute of Technology)
- Dieter Rautenbach (University of Bonn)
- Najiba Sbihi (École Mohammadia)
- Jens Vygen (University of Bonn)

Topics will include (but will not be restricted to) integer and mixed integer programming, game theory, convexity in combinatorial optimization, facility location, VLSI design, and supply chain management. Deadline for applications is 28 February. For further information and an application form visit: www.dms.umontreal.ca/sms or email belanger@dms.umontreal.ca.

WINTER COMBINATORICS **MEETING**

The 2006 Open University Winter Combinatorics Meeting will be held on Wednesday 25 January in the Christodoulou Meeting Room 15 (CMR 15) on the Open University campus in Milton Keynes. All are welcome and coffee will be available from 10.15 am. The speakers will be:

- Rosemary Bailey (Queen Mary, London)
- Simon Blackburn (Royal Holloway, London)
- Diane Donovan (Queensland, Australia)
- Martin Knor (Slovak Technical University, Bratislava)
- Nigel Martin (Durham)

16

For further information http://puremaths.open.ac.uk/combin. or contact Mike Grannell (M.J.Grannell@open.ac.uk) or Terry Griggs (T.S.Griggs@open.ac.uk). The organisers gratefully acknowledge the support of the British Combinatorial Committee and the Leverhulme Trust.

MODEL THEORY SUMMER SCHOOL

There will be a Summer School in Model Theory, at the University of Leeds, Monday 12 December – Saturday 17 December (last lecture on 16 December). It will consist of three short courses, each of 5-6 lectures, by Mike Prest (University of Manchester), Angus Macintyre (Queen Mary, University of London) and Eric Jaligot (University of Lyon 1). There will also be tutorial discussion sessions in the evenings. It is particularly intended for first and second year research students in model theory, but may also be useful for more advanced researchers in other areas. This is an event of the EU Marie Curie Research Training Network MODNET, but all are welcome. For details contact Dugald Macpherson (h.d.macpherson@leeds.ac.uk), or see www.maths.leeds.ac.uk/Pure/logic/ modnet.dec.html.

LOGICAL APPROACHES TO **COMPUTATIONAL BARRIERS**

Computability in Europe 2006 (CiE 2006) is the second of a new conference series on Computability Theory and related topics which started in Amsterdam in 2005. CiE 2006, which will take place from 30 June -5 July at Swansea University, will focus on (but not be limited to) logical approaches to computational barriers:

- practical and feasible barriers, eq, centred around the P vs. NP problem:
- computable barriers connected to models of computers and programming languages:
- hypercomputable barriers related to physical systems.
- Invited Speakers:
- Jan Bergstra (Amsterdam)
- Luca Cardelli (Microsoft Cambridge)
- Martin Davis (New York)
- John W Dawson (York, PA)
- Jan Krajicek (Prague)
- Elvira Mayordomo Camara (Zaragoza)
- Istvan Nemeti (Budapest)
- Helmut Schwichtenberg (München)
- Andreas Weiermann (Utrecht)

Special Sessions:

- Proofs and Computation
- Computable Analysis
- Challenges in Complexity
- Foundations of Programming
- Mathematical Models of Computers and **Hypercomputers**
- Gödel Centenary: His Legacy for Computability

The programme committee invites all researchers (European and non-European) in the area of Computability Theory to submit their papers (in PDF-format, at most 10 pages) for presentation at CiE 2006 by 15 December. The committee particularly invites papers that build bridges between different parts of the research community. Since women are under-represented in mathematics and computer science, the committee emphatically encourage submissions by female authors. The proceedings are intended to be published within Springer's LNCS series.

For more information about the conference please check the CiE conference series www.illc.uva.nl/CiE/ and the website www.cs.swansea.ac.uk/cie06/. The conference is supported by a London Mathematical Society grant.

UK-JAPAN WINTER SCHOOL

The UK-Japan Winter Schools have been held since 1999. Every year the focus is on a special topic. For the next Winter School the topic will be Dynamics and Arithmetics. The aim of the School is to bring together Japanese and UK scientists, in particular also young researchers and students from mathematics and mathematical physics, in a relaxing and stimulating atmosphere. It will be held from 8-12 January at Nowton Court, Burv St Edmunds.

For further information contact John Bolton, Department of Mathematical Sciences, Universitv of Durham (john.bolton@durham.ac.uk) or David Elworthy, University of Warwick (kde@maths.warwick.ac.uk) or visit the website http://euclid.ucc.ie/pages/staff/berndt/ ws2006home.html.

GRESHAM LECTURES 2006 Geometry and other Mathematical Sciences

Professor Robin Wilson: Gresham Professor of Geometry

Wallpaper patterns and buckyballs Wednesday 18 January

We are all familiar with patterned wallpaper, but how many regular patterns are there? Can you tile your bathroom floor with square, hexagonal and octagonal tiles? Footballs are made up of pentagons and hexagons, but how many pentagons are there? What are buckyballs, and what have they to do with the Montreal World Fair?

How to grow trees

Wednesday 1 February

Tree diagrams arise in many contexts, from family trees to chemical molecules, electrical networks, the design of canals and the bracing of frameworks. We describe these examples and others from the allied subject of graph theory, and show you how you can cope with instant insanity.

Problems with schoolgirls

Wednesday 22 February

Block designs are used in agriculture in connection with the planting of wheat. But earlier they arose in the so-called 'schoolgirls problem'. What are block designs, what is the schoolgirls problem, and what is their connection with geometry and music?

17

Yea, why try her raw wet hat?

Special lecture on Tuesday 2 May at 6 pm at the City of London School

It is often said that mathematics and music go together, but what does this mean? This illustrated lecture features a small choir and instrumentalists who perform music ranging from Tallis and Bach to Bartok and Hindemith, and answers such questions as: Why are pianos always out of tune? Can music have a 'geometry'? Why are there seven colours in the rainbow? and What is the meaning of the title of this talk?

All the lectures are held at Gresham College, Barnard's Inn Hall, Holborn, London EC1N 2HH (near Chancery Lane tube station) at 1 pm and 6 pm on Wednesdays, apart from the Special Lecture which is on Tuesday 2 May at 6 pm. Entrance is free. Telephone: 020 7831 0575; website: www.gresham.ac.uk.

visit

18

THE 46TH INTERNATIONAL MATHEMATICAL **OLYMPIAD AND HURRICANE EMILY**

The 46th International Mathematical Olympiad was held in Mérida, Mexico in July 2005. This place is on the Yucatán peninsula, in the area inhabited by the Mayan people.

The actual competition consists of two papers, each containing three very hard guestions drawn from algebra, combinatorics, geometry and number theory. Each guestion is marked out of 7, according to an agreed marking scheme. Half the competitors receive medals, and these are awarded in the ratio gold:silver:bronze = 1:2:3. This year 91 nations competed. Each country may send up to six students, and most do send the maximum number. Like the athletic olympic games, the competition is between individuals, not countries, but inevitably nations compete unofficially by comparing the sum of the marks obtained by their students. Populations of countries, educational standards and levels of preparation vary widely between nations. Some countries have specialist IMO schools which take talented young mathematicians out of the normal school system at a young age, and others have training regimes which

involve weekly meetings of the most able students with their trainers. In the UK we do not allow IMO preparations to interfere with normal school life, and almost all our events take place during school vacations.

When trying to measure UK performance at the IMO we tend to compare ourselves with the other large social democracies of Western Europe since this is, broadly speaking, a fair contest. The UK team was: Saul Glasman, Latymer School, London; Nathan Kettle, Hitchin Boys School, Hertfordshire: Andre Kueh, Bromsgrove School, Worcestershire; Matthew Lee, Robert Smyth School, Market Harborough, Leicestershire; Martin Orr, Methodist College, Belfast, and finally Jack Shotton, Portsmouth Grammar School. The two reserves were Tom Eccles of St Paul's School, London and Alex Smith (for the second year running) of King Edward VIth Five Ways, Birmingham.

Each of the six questions is marked out of 7. It is interesting to note that the UK secured perfect scores on both number theory questions.

	P1	P2	P3	P4	P5	P6	Σ	Medal
Saul Glasman	2	7	0	7	3	1	20	Bronze
Nathan Kettle	7	7	7	7	3	2	33	Silver
Andre Kueh	3	7	7	7	1	7	32	Silver
Matthew Lee	1	7	0	7	7	1	23	Silver
Martin Orr	7	7	6	7	7	1	35	Gold
Jack Shotton	2	7	0	7	0	0	16	Bronze
	22	42	20	42	21	12	159	1G, 3S, 2B

Martin Orr became the first ever resident of Ireland (from either side of the border) to secure an IMO gold medal. The medal harvest of 1G, 3S, 2B is the best since 1996. Collectively the team scored 159 points giv-

ing the UK an unofficial position of 13/91. This year the UK retained its 2004 ranking of 3rd in the EU, after Hungary and Germany (passing Poland but passed by Germany). We improved our position in the place in 2005. Nations performing very well this year include Italy (120), which unusually managed to finish ahead of France (83). and Denmark (69) which took the Scandinavian championship. Peru (104) has made dramatic strides this year, and almost

Commonwealth from 3rd in 2004 to 1st snatched the Latin American championship from Colombia (105). The jury awarded a special prize to a student from Moldova for a remarkable solution to an inequality problem.

> Here is the unofficial table of the top 30 countries (out of 91) in 2005.

1	China	235	11	Bulgaria	173	21	Moldova	130
2	USA	213	12	Germany	163	22	Turkey	130
3	Russia	212	13	United Kingdom	159	23	Thailand	128
4	Iran	201	14	Singapore	145	24	Italy	120
5	Korea	200	15	Vietnam	143	25	Australia	117
6	Romania	191	16	Czech Republic	139	26	Kazakhstan	112
7	Taiwan	190	17	Hong Kong	138	27	Columbia	105
8	Japan	188	18	Belarus	136	28	Poland	105
9	Hungary	181	19	Canada	132	29	Peru	104
10	Ukraine	181	20	Slovakia	131	30	Israel	99+

The rankings of selected other countries are France 32nd, India 36th, New Zealand 38th, Ireland 51st, Spain 58th and South Africa 62nd. One question on the Hebrew paper was not printed correctly. This impeded two students and a small indefinite quantity should be added to the Israeli score, so their true position is given by a probability distribution.

The quality of hospitality and organization delivered by our Mexican hosts was quite exceptional. Throughout the IMO, hurricane Emily bored across the Caribbean toward us, and hit the Yucatán peninsula on the very day that the closing ceremony was scheduled. The forecast track of Emily had the eye passing straight over us. Shelters were constructed in windowless function rooms, and events were rescheduled and relocated at very short notice. Happily for Mérida and the IMO, Emily turned at the last moment, and only clipped us.

The hurricane safety measures and rescheduling of the event all happened with

remarkable smoothness. Congratulations to the Mexican organizers.

I thank everyone who helped in the vast collective effort which goes into UK IMO training and support. The team delivered the goods, very near to the upper limits of our most optimistic forecasts. Adrian Sanders made an exceptional effort coaching the squad this year, and he now retires from his role as deputy leader.

As well as thanking everyone who helped train our team, I would like to thank the reserves who played a vital role. We are also grateful for financial and other support from the Department for Education and Skills, the United Kingdom Mathematics Trust, the microelectronics company ARM, The Royal Society, the Bolyai Society of Hungary and the publishing house Springer Verlag. A much more detailed report is available at www.imo-register.org.uk/reports.html.

> Geoff Smith University of Bath UK IMO team leader

21

CAMBRIDGE

For the Books that Count

Hiles Reid and Balázs Szendrői

Geometry and Topology



Textbook Geometry and Topology Miles Reid and Balazs Szendroi

An introduction to the ideas of geometry. Includes generous helpings of simple explanations and examples. £ 55.00 | HB | 240pp

£ 24.99 PB

20

Graduate Textbook Lie Algebras of Finite and Affine Type Roger Carter

This book provides a thorough but relaxed mathematical treatment of Lie algebras. Cambridge Studies in Advanced Mathematics, 96

£ 45.00 | HB | 540pp

Textbook

Measures, Integrals and Martingales Rene Schilling

A concise undergraduate introduction to contemporary measure and integration theory as it is needed in many parts of analysis and probability. £ 50.00 | HB | 352pp £ 24.99 | PB

Modular Representations of Finite Groups of Lie Type

J. E. Humphreys

Comprehensive treatment of the representation theory of finite groups of Lie type over a field of the defining prime characteristic.

London Mathematical Society Lecture Note Series, 326

£ 30.00 PB 220pp LMS Member Price: £22.50

MAD ABOUT MATHS? Visit our recreational maths web site at http://www.cambridge.org/ mathematics/recreation

25% Discount on LMS books for LMS members

(visit www.cambridge.org to see the full range of LMS titles from Cambridge)

ORDER FORM

Graduate Textbook

An Introduction to Sieve Methods and Their Applications

Alina Cojocaru and Ram Murty

This book provides a motivated introduction to sieve theory. Suitable for a senior level undergraduate course or an introductory graduate course in analytic number theory. London Mathematical Society Student Texts, 66 £ 50.00 |HB| 280pp |LMS Member Price: £37.50 £ 22.99 |PB| LMS Member Price: £17.25

Graduate Textbook

Elements of the Representation Theory of Associative Algebras Techniques of Representation Theory, Volume 1, I. Assem, A. Skowronski and D. Simson Provides an elementary but up-to-date introduction to the representation theory of algebras. London Mathematical Society Student Texts, 65 £ 55.00 |HB | 472pp |LMS Member Price: £41.25 £ 26.00 |PB |LMS Member Price: £19.50

Fundamentals of Hyperbolic 3-Manifolds Selected Expositions

Edited by R. D. Canary, A. Marden, and D. B. A. Epstein

Reissued articles from two classic sources on hyperbolic manifolds with new sections describing recent work.

London Mathematical Society Lecture Note Series, 328 £ 40.00 | PB | 344pp |LMS Member Price: £30.00



If you live in the Europan Union (excluding Austria, Denmark, Finland, Luxembourg and the Netherlands) and are not registered for WI we are required to charge WI at the rate applicable in your country of residence. If you live in Austria, Denmark, Finland, Luxembourg, or the Netherlands and are not registered for WI you will be charged VAT at the UK rate. Please add VAT for the full value of the order, including postage charges. If you are registered for WI please provide your registration number. Please note that disks, videos and cassettes are subject to WI throughout the EU, including the UK. If you are registrated for WI please supply your registration number and leave the VAT payment box blank.

- I enclose a sterling cheque/eurocheque (payable to Cambridge University Press)
- m Please debit my credit card (Access/Mastercard/VISA/Amet)* "Please delete as applicable

Card no.	
Signature	
Name of cardholder	
Address	
Please return coupon to:	

FREEPOST, The Edinburgh Building, Cambridge CB2 18R Email: science@cambridge.org



www.cambridge.org

RECORDS OF PROCEEDINGS AT MEETINGS

ORDINARY MEETING

held on *Friday 7 October 2005* at University College London. About 35 members and visitors were present for all or part of the meeting.

The meeting began at 3.15 pm, with the General Secretary, Professor N.L. BIGGS, in the Chair.

Five people were elected to Ordinary Membership: M. Herson, B.E.A. Nucinkis, S.C. Olhede, M.R. Samuels, T. Tanpradist; three people were elected to Associate Membership: L. Husbands, B.K. Muite, O.P.A. Sisask; and one person was elected a Member under a Reciprocity Agreement: S. Velusamy (Amer. Math. Soc.).

Three people signed the book and were admitted to the Society.

The Records of the Proceedings of the Society Meetings held on 10 June, 17 June and 8 July 2005 were signed as correct records.

Professor R.M. THOMAS introduced a lecture given by Professor Mark Jerrum on *Algorithmically feasible sampling: what are the limits?*

After tea, Professor Thomas introduced a lecture given by Professor Martin Dyer on *Spin systems: counting and sampling*.

After the meeting, a reception was held at De Morgan House, followed by a dinner at the Mercato Restaurant.

LMS ALGORITHMS MEETING

The October meeting of the LMS had two talks concerned with algorithms. This is a particularly important area of research and much of the work lies at the interface of Mathematics and Computer Science. The recent International Review of Mathematics stressed the need for the mathematical community in the UK to increase research in this area; it was therefore particularly appropriate that the LMS should devote one of its meetings to this particular theme. We were fortunate to have two of the leading researchers in algorithms, Mark Jerrum (Edinburgh) and Martin Dyer (Leeds), addressing the meeting.

The first talk was by Mark Jerrum with the title *Algorithmically feasible sampling: what are the limits?* Mark started by describing an example of an algorithmic sampling problem, that of a matching in a graph. With sequential choice the resulting distribution is highly dependent on the order in which we consider the edges; this is too naive an approach.

Mark then turned his attention to Monte Carlo methods. If we consider a Markov chain Monte Carlo, then the uniform distribution is the unique stationary distribution. One question here is that of how we measure the convergence time. We are interested in the 'mixing time', i.e. the time it takes to converge to near stationarity; we want this to be a polynomial function of the input size. Mark discussed canonical paths and multi-commodity flows and then defined the 'congestion constant'; we want to choose paths such that the congestion constant is small as this gives a good mixing time. He then augmented transitions in the Markov chain. The key to the method is to define the canonical paths in an appropriate way; Mark showed how to do this and how to calculate the congestion.

Matchings in a graph correspond to independent sets in line graphs. How far can we generalize this? One can show that (under a reasonable complexity assumption) there is no efficient sampler for independent sets in general graphs; in this sense, the general case is a step too far. There is a mysterious intermediate case however. If one considers independent sets in bipartite graphs, one can use network flow to show that the optimization problem (that of finding a maximum independent set) can be solved in polynomial time. On the other hand, sampling independent sets in bipartite graphs is inter-reducible with several other sampling problems which are complete for some logically defined complexity class. One might ask whether this is a class of sampling problems of some intermediate complexity.

Mark finished his talk with some intriguing open problems. If we consider perfect matchings, the mixing time can be exponential; does there exist a polynomial-time algorithm for sampling perfect matchings in a general graph? On the other hand, if we consider bipartite graphs, a strategy which uses a more refined weighting function (together with a 'simulated annealing' type approach) gives a polynomial-time method; one can still ask whether there is an algorithm for sampling perfect matchings in a bipartite graph that is efficient in practice. Mark also asked about the status of sampling independent sets in bipartite graphs; is it really intermediate in complexity between independent sets in general graphs and matchings in general graphs. His final observation was that 'natural' decision problems tend to be either NPcomplete or in P; is there a similar dichotomy for sampling problems?

After tea, Martin Dyer spoke on *Spin systems: counting and sampling*. He first introduced the idea of a spin system. We have a graph and a set of 'spins' or 'colours'; a configuration assigns a colour to each vertex of the graph. Computationally we are interested in spin systems which have a concise specification (i.e. such that, given any configuration, we can specify its weight in polynomial time).

Most spin systems of interest are specified

23

THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

24

by purely local information; examples include colourings of graphs and the Ising model from Physics. These are both examples of particular spin systems called 'weighted graph homomorphisms'. If H is a graph, then the problem of deciding whether an arbitrary graph has an H-colouring is NP-complete unless H has either a loop or a bipartite component (in which case the problem is trivially in P). Exact counting is #P-complete unless every component is either a complete looped graph or a complete unlooped bipartite graph (in which case the problem is trivially in P).

Given the difficulty of exact counting, we might ask how well we can approximate: the appropriate notion here is that of 'relative approximation'. Deterministic approximation is possible using an oracle from the second level of the polynomial-time hierarchy; so it may be harder than NP but not as hard as #P. On the other hand, randomized approximation is possible for any problem in #P given only an oracle for an NP-complete problem. Martin introduced the notion of a fpras ('fully polynomially randomized approximation scheme'). The existence of a fpras for counting is equivalent to sampling almost uniformly at random from the set of witnesses in many cases. (Strictly this holds only for 'self-reducible' problems.)

Physicists study the 'Gibbs distribution' in infinite graphs with a rich symmetry group. In finite graphs, the Gibbs distribution is unique, but this may not be true in infinite graphs; we say that there is a 'phase transition'. Suitably timed random walks on the spin configurations in the infinite graphs are studied. There is a relationship between the non-existence of phase transitions and the mixing time of simple Markov chains on finite subgraphs of the infinite graph. There appears to be some connection between the existence of phase transitions and the computational complexity of sampling. This apparent link between computational complexity and the laws of Physics is an interesting question!

Despite this there has been some success

with applying Markov chain sampling to these problems using chains which modify a few spins at each step. The most successful technique for analyzing such chains is 'coupling' and the variant 'path coupling'. Martin carefully described what these are and how they work, surveyed some recent research and pointed out that there are many interesting related open problems in the area of Statistical Physics. He finished with a couple of questions. Are there any positive results (like those for colouring) in the graph homomorphism setting? How far does the graph homomorphism setting extend to directed graphs (and what about hypergraphs)?

Both expositions were greatly enjoyed by the audience and provided an excellent survey of an important research area with wonderful insights into the key questions; in particular, we saw how the field was of great practical importance and how it used a large variety of fascinating mathematical ideas. Both speakers had put a great deal of effort in preparing talks which captured both the depth and the excitement of the field in a way that was accessible to a wide mathematical audience and those present were very appreciative of their efforts.

> R.M. Thomas Leicester University



Read Something Different

SPECTRA AND PSEUDOSPECTRA

The Behavior of Nonnormal Matrices and Operators

Lloyd N. Trefethen and Mark Embree

This is the authoritative work on nonnormal matrices and operators. The breadth of included topics and the numerous applications that provide links between fields will make this an essential reference in mathematics and related sciences.

Cloth \$65.00 £41.95 0-691-11946-5

OPTIMIZATION

Insights and Applications Jan Brinkhuis and Vladimir Tikhomirov

The focus of this self-contained textbook is on analytically solving aptimization problems with a finite number of continuous variables. The authors provide introductions to classical and modern numerical methods of optimization and to dynamic optimization. Princeton Series in Applied Mathematics Clash 579:50 \$51.95 0:691-10287-2

MOMENTS, MONODROMY, AND PERVERSITY

A Diophantine Perspective

Nicholas M. Katz

In Maments, Manadromy, and Perversity, Nicholas Katz develops new techniques, resolutely global in nature, for determining geometric manadromy groups. The theory of perverse sheaves and Larsen's Alternative are first developed and then used to calculate the geometric manadromy groups attached to some quite specific universal families of (L-functions attached to) character sums over finite fields. Anadr of Mathematics Staties Paper \$59,50 £85,00 0:691-12330.6 Cloth \$99,50 £85,00 0:691-12330.6

QUADRANGULAR ALGEBRAS Richard M. Weiss

This book develops a theory of these "quadrangular algebras" that opens the first purely algebraic approach to the exceptional Moufang quadrangles. Mathematical Notes Paper \$45.00 \$29.95 0.691-12460-4



26

EUCLID AND HIS HERITAGE

This conference held in Oxford University on the 7-8 October was organized by the Clay Mathematics Institute (CMI), the Bodleian Library (BL), Oxford University Mathematical Institute (MI) and Octavo (O), and was a celebration of the completion of the year-long project to digitize MS D'Orville 301. The latter is the oldest surviving manuscript of Euclid's Elements, dating from 888AD when it was copied by Stephen the Clerk in Constantinople for Arethas of Patras at the cost of 14 gold coins. The manuscript eventually reached the Bodleian Library in 1804. Two hundred years later, low (high) resolution image files are available free (to purchase) on the Internet.

After opening remarks by James Carlson (CMI) and Nigel Hitchin (MI) came the talk by Alexander Jones entitled From Euclid to Arethas: he spoke about 'the' man Euclid, often interpreted as a Bourbaki-like committee of Greek Mathematicians. Jeremy Gray followed this with Rethinking the Elements – two thousand vears of reflection on the foundation of geometry. The parallel postulate – often said to be the bane of the *Elements* – is a multi-faceted and mysterious postulate as in Euclid's time. Jeremy addressed its relation to physical space, clearing up a misunderstanding over Gauss. said to have conducted an experiment to prove that the sum of the internal angles of a triangle was two right angles: Jeremy showed that experimental measurement could not resolve the question 'Is physical space Euclidean?'. Nigel Wilson (currently working on the recently surfaced Archimedean palimpsest The Method) spoke about The Elements: the transmission of the Greek text and the problems that an 'intelligent' copyist creates by hand-copying the text and diagrams. Mark Schiefsky in New technologies for

study of Euclid's Elements demonstrated software developed at Harvard University that makes a linguist/classicist's job of deciphering/translating ancient manuscripts easier (http://archimedes.fas.harvard.edu). The afternoon talks started with Robin Harstorne giving a general talk about the Elements followed by Tony Lévy with a survev of the 33 editions of the Elements written in Hebrew. The final talk of the first day was by Bill Casselman, who showed a computer-generated construction of Euclid XIII.16, i.e. the construction of a icosahedron inside a sphere. Considering how complicated the construction is, it was bewildering to think that an ancient soldier might have whiled away time thinking about it, a hypothesis put forward to explain an ostrakon (broken piece of pottery) found on Elephantine Island.

Richard Ovenden (BL) and Chet Grvcz (O) opened the second day. Octavo is a USAbased company specializing in digitizing manuscripts. Examples of previous manuscripts include the second and third editions of Newton's Principia, Galileo's work on the military compass and Copernicus' De Revolutionibus Orbium Coelestium. Chet offered an open invitation to the mathematical community to suggest other manuscripts which should be digitised (www.octavo.com). Changing themes to ancient philosophy, Ian Mueller floated the idea of Who started the Euclid Myth? namely the belief that by starting with self-evident truths and proceeding by rigorous proof, the truths arrived at are certain, objective and eternal. Sonja Brentjes followed with a delightful talk about Euclid's Elements in the Islamic world, for without the Islamic Scholars collecting and preserving Greek manuscripts, the Elements would not have survived as a complete form.

fsky Eleanor Robson gave a pun-entitled talk the Clay mathematics: Euclid's Babylonian counterparts, tracing the mathematics in ancient Babylonia (now Irag) via cuneiform clav tablets. After this came Bernard Vitrac who looked at the Heiberg Edition of Euclid's Elements: an incorrect text or false history of the text?, asking the question 'Why are medieval manuscripts different from Greek manuscripts?'. One is able to tell which edition is based on which other by looking at the order of the theorems. the alternative proofs, and the way definitions are merged or inserted between other definitions. Catherine Jami balanced the diffusion of the *Elements* from the Islamic to European countries by looking at Euclid's Elements in Chinese and Manchu. Around 1AD the Chinese had their own collection of ideas about mathematics written in the Nine Chapters. The talk focused on how the *Elements* were first translated into Chinese and then incorporated into the Nine Chapters in medieval times. Sir

A K Peters, Ltd.

To Order:

Transatlantic Publishers Group

c/o ORCA Book Services

Stanley House, 3 Fleets Lane

Poole, Doniet 8H15 3AJ, England

Tel: +44 1202 665432

Fax: +44 1202 666219 www.transatlanticpublishers.com

arders@orcabookservices.co.uk

Or Contact:

A K Peters, Ltd.

888 Worcester St. Suite 230

Wellesley, MA 02482 USA

Tel: (781) 416-2888

Fac: (781) 416-2889

www.akpeters.com

service@aiipeters.com

Christopher Zeeman concluded the conference by fusing the past and the present in *The achievement and limitations of the theory of proportion in Euclid's Elements Book V* and in a way characteristic of new ideas – combining old ideas with new concepts. In this case it was the theory of ratios, now rendered in modern usage as the algebraic manipulation of fractions but conceptually very different in Book V. Christopher introduced an axiom analogous to the Archimedean axiom that excludes the existence of infinitesimals. With this axiom, V.8 can be rewritten and a new deductive structure for Book V arises.

The range of topics at this conference was wide and varied, and the Clay Mathematics Institute deserves thanks for sponsoring the digitization of the oldest copy of the *Elements* for the benefit of future mathematicians and classicists. N. Shah

27



ISBN 1-56881-242-6; Hardcovar; 397 pp.; £46.50 A practical guide to the mathematics behind signal processing, this book provides the assantial mathematical background and tools necessary to understand and employ signal processing techniques. Topics addressed include Fourier series and tunefforms in one and

several variables, applications to acoustic and electromagnetic propagation models, transmission and emission tomography and image reconstruction, optimization technicores, high-resolution methods, and more.

Fundamentals of Mathematical Logic

Peter G. Hinman

ISBN 1-56881-262-0; Hardcover; 896 pp.; £54.50

This introductory graduate text covers modern mathematical logic from propositional, first-order and infinitury logic and Gold's lacompleteness. Theorems to extensive introductions to set theory, model theory and recursion (computability) theory. Based on the author's more than 35 years of teaching experience, the book develops students' intuition by presenting complex ideas in the simplest contact for which they make sense.

BRITISH APPLIED MATHEMATICS COLLOQUIUM

BAMC06

Keele University, 24 – 27 April 2006

The Department of Mathematics at Keele University warmly invites all those with interests in applied mathematics and its applications to participate in the 48th British Applied Mathematics Colloquium, BAMC06.

The meeting will be held on the Keele campus from lunchtime on Monday 24 April to lunchtime on Thursday 27 April 2006. The programme will cover all aspects of applied mathematics research. PhD students are especially welcome to contribute and there are prizes for the best student presentations.

Plenary speakers

- H. Gao (Max Planck Institute, Stuttgart)
- P. Huerre (Ecole Polytechnique, Paris)
- J.P. Keener (University of Utah, USA)
- R.W. Ogden (University of Glasgow, UK)
- N. Peake (University of Cambridge, UK)
- R. Salmon (Scripps Institute of Oceanography, USA)

Venue

28

The venue has regularly been awarded the title of 'UK Academic Conference Venue of the Year'. All accommodation is en suite and all conference activities are within easy walking distance of residences.

Registration

The closing date for registration is **Friday 3 March 2006**. Registration after this date will be subject to a late fee of £25.

The website, electronic registration and further details are at: www.keele.ac.uk/bamc06 or contact BAMC06, School of Computing and Mathematics, Keele University, Staffordshire ST5 5BG Fax: + 44 (0) 1782 584268 Email: bamc06@maths.keele.ac.uk

Organising Committee

Graham Wilks, Yibin Fu (Co-chairs), Jonathan Healey (Secretary) and John Chapman (Treasurer).

The support of LMS, EPSRC, IMA, SIAM, Keele University and the Stewartson Memorial Lecture fund is gratefully acknowledged.

CAMBRIDGE



ready on a provide the state of the

Compositio

Mathematica

Compositio Mathematica

Compositio Mathematica – digital archive available to all subscribers!

We are delighted to announce that all subscribers will now be able to access a digital archive to all issues of Compositio Mathematica back to 1997! There has never been a better time to subscribe to this prestigious journal.

is available online at: www.journals.cambridge.org/jid_COM jou

To subscribe contact Customer Services

in Cambridge:

online.

Phone +44 (0)1223 326070 Fax +44 (0)1223 325150 Email journals@cambridge.org

in New York: Phone (845) 353 7500 Fax (845) 353 4141 Email journals_subscriptions@cup.org



Compositio Mathematica is a prestigious, well-established journal publishing first-class research papers that traditionally focus on the mainstream of pure mathematics. Compositio Mathematica has a broad scope which includes the fields of algebra, number theory, topology, algebraic and analytic geometry and (geometric) analysis. All contributions are required to meet high standards of quality and originality. Publications in this journal benefit from the added value of careful reviewing and editing.

> Price information is available at: www.journals.cambridge.org/jid_COM

Free email alerts! Keep up-to-date with new material sign up at www.journals.cambridge.org/register

> For a free online sample visit: www.journals.cambridge.org/jid_COM

> > CAMBRIDGE

www.cambridge.org

BOOK REVIEW

Piero della Francesca: A Mathematician's Art, J.V. Field, Yale University Press, 420 pp, £35 ISBN 0300103425.

Piero della Francesca (c.1412 - 1492) is the creator of such serene paintings as the National Gallery's *Baptism of Christ* – indeed, such is his current popularity that this was one of the paintings recently short-listed for the title of 'the nation's favourite painting'. But most of his admirers are probably not aware that he is also the author of no fewer than three mathematical treatises: so this book's provocative but appropriate and multi-layered title may come as a bit of a surprise.

We are given a comprehensive background to Piero's work, locating him as a 'learned craftsman'. The book begins with an account of the training that an artist like Piero would have received, including his likely mathematical education, and proceeds to discuss the techniques used by artists of the time to create illusions of perspective. Works by Masaccio and Donatello, for example, are discussed in the context of Alberti's writings on perspective: I found the discussion of perspective in Donatello's reliefs particularly interesting.

After this general introduction, we turn to Piero's early life, and then to discussion of his painting and mathematics. His mathematical texts survive in various manuscripts. The Trattato d'abaco is in the style of contemporary abacus books, a collection of problems and their solution, covering arithmetic, geometry, the rule of three and so on, and finishing with three-dimensional geometry. The Libellus de guingue corporibus regularibus, although in Latin in the only manuscript, was also presumably written in the vernacular. (It was printed in 1509, with no mention of Piero's name, as part of Pacioli's De divina proportione.) In this Piero investigates truncated polyhedra. He shows himself to be a thoroughly competent mathematician, who has studied Euclid carefully but sometimes takes an original route.

His third treatise, *De prospective pingendi*, is found in various vernacular and Latin manuscripts (including a Latin one in the British Library), and contains practical instructions about perspective in painting. It includes the first proof of a fundamental result which Field rightly suggests should be known as 'Piero's Theorem', that the perspective images of orthogonals converge to a point. Although a slightly later writer described this as 'written for idiots', it appears from Field's account as an important work: we are shown how original Piero was, and his methods are compared and contrasted with the methods of Alberti.

Alongside the mathematical discussion, Field provides fruitful analysis of paintings by Piero and his contemporaries, with an eye for telling detail (and some perceptive com-



ments on the limitations of reproductions) which leaves the reader eager to visit the original paintings.

The final section of the book looks more generally at the mathematics of the time, with exposition of the roles of Cusanus and Regiomontanus, and a concluding chapter 'From Piero della Francesca to Galileo Galilei', which looks at the changing role of mathematics during the Renaissance. Field's reflections on the connections between mathematics and the arts are fascinating and insightful. There is discussion as to how Piero saw his position in society: were his mathematical texts intended to raise the social standing of the artist? If so, they were less effective in so doing than the poems of Michelangelo.

The book, many years in the making and very much a labour of love, is beautifully produced, with many illustrations in colour and monochrome; not only of the paintings but also of the mathematical manuscripts. The wonderful cover detail of the hand of St Sigismund resting on a globe sets the tone, both in guality of reproduction and in appropriateness of the detail. There are helpful appendices, including examples of Piero's mathematical writing, and fuller exposition of some details (including an analysis of one error of Piero's: a faulty method for finding the height of a triangle). Helpfully, the book provides footnotes on the page, and there are exceptionally comprehensive and effective indices which will add to its value as a reference work.

Field writes with considerable wit; and is always entertaining. The mathematics is unfamiliar, but not difficult to follow. Mathematical readers will appreciate the author's comments on some of Piero's tricks, such as the clever duplication of letters on diagrams so that he can state two results in a single statement! Even if Piero's mathematical writings are 'detailed and hugely repetitive' – in the sixteenth century Daniele Barbaro felt that Hell was freezing over as he read *De prospectiva pingendi* – surely a complete English edition is needed.

Reading this book has enhanced my appreciation of the paintings of Piero and his contemporaries, and has also greatly expanded my knowledge of the mathematics of the period and the place of mathematics of society in Piero's time. It will surely continue to be a valuable companion to Piero's paintings. Anyone interested in the mathematics, or the art, of this period is likely to take much pleasure from this volume.

> Tony Mann University of Greenwich

> > 31

MATHEMATICIANS VISITING THE UK IN 2005/2006

Anglia University

Heinrich, S. (Leipzig University) Astrophysics, general relativity, differential geometry, 12 Dec 05 – 15 Feb 06 **Brunel University** Banks, H.T. (North Carolina State University, USA) Mathematical and computational modelling, 12 – 26 June 06 Cambridge University (DPMMS) Fukava, T. (Keio University, Japan) Number theory, 26 Mar 06 – 25 Mar 08 Kuhn, N. (University of Virginia, USA) Algebraic geometry, 1 Jan – 30 Jun 06 Miermont, G. (CNRS, Paris) Probability, 1 Oct – 31 Dec 05 Tranquilli, P. (Roma 3, Italy) Categorical logic, 1 Oct – 31 Dec 05 Wachs, M. (Miami, USA) Representation theory, 5 Sep - 31 Dec 05 Cambridge University (DAMTP) Akbar, M. (Penn State University, USA)

General relativity and quantum gravity, Aug – Dec 05

Garcia del Moral, M.P. (University of Madrid, Spain) String phenomenology and M-theory, 1 Oct 05 - 30 Sep 07 Hashimoto, K. (University of Tokyo, Japan) Superstring theory, 1 Apr 05 – 31 Mar 06 Lohiya, D. (University of Delhi, India) Cosmology, Apr 05 – Jul 06 Maeda, K-C. (Waseda University, Japan) Cosmology, Mar –Sep 06 Monaghan, J.J. (Monash University, Melbourne, Australia) Geophysics and astrophysics, 19 Sep – 30 Nov 05 Singh, K. (J.F. Welch Tech Centre, Bangalore, India) Fluid dynamics, Apr – Sep 06 Taberlet, N. (University of Rennes, France) Fluid dynamics, Oct 05 – Sep 06 Wettlaufer, J.S. (Yale University, USA) Geophysics, 1 Aug – 24 Dec 05 Cardiff University

Lamberti, P.D. (Padova University, Italy) Analysis, 1 Dec 05 – 28 Feb 06 Rodriguez-Aragon, J. (University of Rey Juan Carlos, Madrid, Spain) Statistics, 21 Sep – 21 Dec 05

Durham University

32

- de Cooman, G. (Ghent, Belgium) Interval probability, Apr – June 06
- Lukierski, S. (Wroclaw, Poland) Mathematical physics, supersymmetric field theory, 23 Oct – 23 Dec 05
- Martins Brito, L.F. (UNESP-São Jose de Rio Preto, Brazil) *Real foliations, dynamical systems and singularities*,
- 10 Jan 10 Mar 06
- Samiou, E. (Nicosia, Cyprus) Differential geometry, homogeneous spaces, 10 Oct – 10 Nov 05
- Stichel, P. (Bielefeld, Germany) Mathematical physics, supersymmetric field theory, 30 Oct – 30 Nov 05

East Anglia University

- Holbrook, N. (Macquarie University, Sydney) Oceanography, Sept – Dec 05 Papageorgiou, D. (New Jersey Institute of Technology) Fluid mechanics, Nov 05 –
- Feb 06

Edinburgh University

Davison, L. (Laurentian University) Number theory, 1 – 28 Feb 06 Varisco, M. (Münster University) Topology, 19 Sep – 5 Nov 05

Heriot-Watt University

- Korshunov, D. (Sobolev Institute of Mathematics, Russia) *Probability, applied probability,* Feb – mid March 06 Puhalskii, A. (University of Colarado, USA)
- Probability, applied probability, Jan Dec 06
- Vatutin, V. (Steklov Institute of Mathematics, Russia) *Probability, applied probability,* Mar – Apr 06
- Imperial College London
- Aharonov, D. (Technion, Haifa, Israel) Complex analysis, 8 Aug – 26 Dec 05 Daskalopoulos, P. (Columbia University) Differential equations and geometric analysis, 1 Sep 05 – 1 Jan 06 Dupuis, N. (Centre Universitaire, Orsay,
- France) Theoretical condensed matter, 1 Sep 05 – 31 Aug 06
- Guo, S. (Hunan University, Rep of China) Bifurcation theory, 1 Jun 05 – 31 May 06 Gutierrez, J. (University of Nowarra, Spain)
- Matrix theory, 1 Jul 31 Dec 05 Haine, K. (Tampere Institute of Technology, Finland) Sequential Monte Carlo methods,
 - 25 Jan 15 Jul 06
- Schmidt, T. (Freiberg University) *Theoretical* condensed matter, 1 Oct 05 – 31 Apr 06 Sohn, S.Y. (University of Korea, Japan)
- Industrial statistics, 28 Dec 05 28 Feb 06 Tanveer, S. (Ohio State University, USA)
- Applied mathematics, 2 Aug 05 31 Jul 06 Zweimuller, R. (University of Salzburg)
- Dynamical systems and ergodic theory, 1 Jan 05 – 30 Sep 06

Keele University

- Prusa, V. (Charles University, Czech Republic) Fluid mechanics, 22 Sept 05 – 25 Jun 06
 Sharipova, L.L. (Institute of Mechanical Engineering Problems, Russia) Solid mechanics, 20 Aug – 20 Dec 05
- Song, Y.Q. (China University of Mining & Nottingham University Technology) Solid mechanics, 20 Sept 05 -20 Sept 07 Zhang, Y.T. (Tianiin University, China) Solid mechanics, 20 Sept - 20 Dec 05 Kent University Asadi, E. (Vrije Universitet, Amsterdam) Integrable systems, Sep – Dec 05 Lombardo, S. (Vrije Universitet, Amsterdam) Integrable systems, Sep – Dec 05 Sanders, J.A. (Vrije Universitet, Amsterdam) Integrable systems, Sep – Dec 05 Verhoeven, C. (Vrije Universiteit, Brussels) Integrable systems, Jun – Dec 05 Lancaster University Goldstein, S. (University of Łódź, Poland) Noncommutative probability, functional analysis, 1 Apr – 31 Aug 06 Parthasarathy, K.R. (Indian Statistical Institute, Delhi, India) Noncommutative probability, quantum information theory. 1 Jul – 1 Aug 06 Skalski, A.G. (University of Łódź, Poland) Noncommutative probability, functional analysis, 1 Jan – 31 Aug 06 Leeds University Dedania, H. (India) Banach algebras, Oct 05 – Jul 06 Polyakov, M. (Moscow, Russia) Banach algebras, Nov 04 – Sep 06 Su, Z. (Zhejiang University, China) Probability, 1 Dec 05 – 30 Nov 06 Ziealer, M. (Freiburg University) Model theory (mathematical logic), 4 Oct 05 -Mar 06 London Metropolitan University Shulman, V. (Vologda Technical University, Russia) Functional analysis, operator algebras, Nov – Dec 05 and Feb-Mar 06 Loughborough University Ma, Z. (Chinese Academy of Sciences, Beijing) Stochastic analysis, 20 Mar - 21 Apr 06 Zheng, Z. (Chinese Academy of Sciences,
- Zheng, Z. (Chinese Academy of Sciences Beijing) Random dynamical systems, 10 Dec 05 – 9 Mar 06

No. 343 December 2005

Grenier-Boley, N. (Université de Franche-Comté Besancon, France) Algebra, Oct 05 – Sep 06 Lequeu, E. (Georg-August-Universität Göttingen, Germany) Algebra, Oct 05 -Sep 06 Nottingham Trent University MacGillivrav, H. (Oueensland University of Technology, Australia) Statistical education, 30 Dec 05 - 4 Feb 06 **Oxford University (Mathematical Institute)** Baribeau, L. (Ouebec) Functional analysis. 1 Sep 05 – 31 Aug 06 Clark, A. (Texas) Algebra, Topology, 2 Aug 05 - 31 July 06 Derakhshan, L.W. (Israel) Logic, 1 Oct 05 -30 Sep 06 Escudero Liebana, P. (Madrid) Mathematical biology, 1 Oct 05 - 30 Sep 07 Guilen, I.A. (Spain) Finance, 1 Oct 05 – 1 Jul 06 Haibo Chen (China) Applied analysis, 1 Jan – 31 Dec 06 Hamanaka, M. (Japan) Relativity, 1 Oct 05 -30 Sep 06 Hinz, M. (Germany) Stochastic analysis, 8 Apr – 31 Dec 05 Krajicek, J. (Czech Republic) Mathematical *logic*, 22 Nov – 3 Dec 05 Majid (Canada) Mathematical physics, 1 Jan - 30 Jun 06 Miemietz (Germany) Representation theory, 1 Oct – 30 Nov 05 Ransford, T.J. (Quebec) Functional analysis, 1 Sep 05 – 31 Aug 06 Sadowski, W. (Warsaw) Applied mathematics, 2005-2006 Sole, J. (Spain) Mathematical biology, 1 Jun - 1 Dec 06 Oxford University (Statistics) Aasbjerg, A. (Technical University of Denmark) Informatics and mathematical modelling, Feb – Jul 06 **Plymouth University** Khevedelidee, A. (Russia) Mathematical physics and gauge theories, 1 Sept 05 – 31 Aug 06

THE LONDON MATHEMATICAL SOCIETY

NEWSLETTER

34

No. 343 December 2005

Oueen Mary, University of London Dezso, M. (Renvi Institute, Budapest) Extremal combinatorics, convexity, 12 Sep – 5 Nov 05 Eskridge, K. (University of Nebraska) Statistics and design of experiments, 1 Sep 05 – 30 Jun 06 Jezierski, J. (University of Warsaw) General relativity, 14 Sep – 20 Nov 05 Kazanidis, P. (University of the Philippines) Design theory, association schemes, 25 Jul 05 - 31 May 06 Santos, N. (Rio de Janeiro, Brazil) General relativity, 1 Aug 05 – 30 Jul 06 **Oueen's University of Belfast** Vavilov, N. (St Petersburg State University & Smirnov Institute) Algebra, 10 Jan – 10 Feb 06 Sheffield University Toda, Y. (University of Tokyo) Algebraic geometry, 1 Sept – 30 Dec 05 Southampton University Garcia de Abajo, F.J. (Spain) Applied mathematics, 1 Feb – 31 Mar 06 Martin, B. (University of Canterbury, New Zealand) Pure mathematics, 1 Jan -31 Mar 06 St Andrews University Baek, I.S. (Pusan University, South Korea) Multifractal analysis of Cantor sets, Aug 05 – Aug 06 Chen, P.F. (Nanjing University, China) Numerical solar MHD. Nov 05 - Oct 06 Surrey University Sahadevan, R. (University of Madras, India) Discrete integrable systems, 6 Nov -24 Dec 05 Swansea, University of Wales Höber, M. (University Mainz, Germany) Pseudo-differential operators, 1 Oct – 15 Dec 05 Pagani, C. (SISSA Trieste, Italy) Non-commutative geometry, 15 Jan - 15 Mar 06 Rodriguez Raposo, A. (University of Santiago de Compostela, Spain) Co-algebras and Hopf algebras, 15 Sep – 15 Dec 05

Smolvanov, O. (Moscow State University) Stochastic processes, functional integrals and applications. Feb 06 University College London Eckhoff, J. (University of Dortmund) Discrete geometry, 30 Sept 05 -30 Jun 06 Warwick University Ahn, T. (Kaist, Korea) Dvnamical systems. 3 Oct 05 – 28 Feb 06 Bloch, F. (University of Marseille, France) Economics. 1 Feb – 10 Mar 06 Elizondo, A. (University of Kaiserslautern, Germany) Molecular dynamics, 2 Oct -12 Dec 05 Inahama, Y. (Osaka University, Japan) Mathematical science, 24 Oct - 23 Nov 05 Kawabi, H. (Osaka University, Japan) Infinite dimensional analysis, 1 Apr 06 – 31 Mar 08 Kim Dong, H. (Korean Institute) Dynamical systems, 1 Feb 06 - 31 Jan 07 Larsen, C. (Worcester Polytechnic Institute, USA) Calculus of variations. 18 Aug -15 Dec 05 Marden, A. (University of Minnesota) Kleinian groups, 8 Jun – 11 Jul 06 Shoda, T. (Kyushu University) Differential geometry, 13 Oct 05 - 10 Feb 06 Taixes, J. (University of Barcelona) Complex dynamics, 1 Jan – 30 Jun 06 Zacher, G. (University of Padova) Algebra, 4 Nov - 2 Dec 05 York University Govorukhin, V. (Rostov State University) Computational fluid mechanics. 1 Feb -25 Dec 06 Morgulis, A. (Rostov State University) Mathematical fluid mechanics, 1 Feb -31 May 06 Roy, S. (Tata Institute of Fundamental Research, Mumbai, India) Ouantum information theory, 25 Sep 05 -24 Sep 06 Trotter, P. (University of Tasmania) Semigroup theory, 3 Oct – 16 Dec 05

School of Mathematics

Chair in Applied Mathematics Ref.AC598



A competitive salary package is available for an outstanding candidate

The University of East Anglia invites applications for a Chair in Applied Mathematics from candidates who are engaged in internationally leading research. Preference may be given to applicants whose research interests lie in Numerical Analysis related to Applied Mathematics, and whose research will complement the existing research of the Applied Mathematics Group and the wider science faculty.

The starting date for the appointment is 1 September 2006.

For informal discussions please contact the Head of School, Professor Tom Ward (+44 (0)1603 592849, e-mail: t.ward@uea.ac.uk) or Professor Jean-Marc Vanden-Broeck (+44 (0)1603 593869, e-mail: j.vanden-broeck@uea.ac.uk).

Information about the School can be found at http://www.mth.uea.ac.uk

Closing date: 27 January 2006.

Lectureship in Pure Mathematics Ref: AC599

£28,829 to £36,959 per annum plus USS benefits

The University of East Anglia invites applications for an indefinite term Lectureship in Pure Mathematics from candidates who are engaged in internationally leading research which complements the existing research groupings in Logic, Algebra, Number Theory and Dynamical Systems. Preference may be given to an Algebraist.

The starting date for the appointment is 1 September 2006.

For informal discussions please contact the Head of School, Professor Tom Ward (+44 (0)1603 592849, e-mail: t.ward@uea.ac.uk).

Information about the School can be found at http://www.mth.uea.ac.uk

Closing date: 13 January 2006.

Further particulars and an application form can be obtained from the University's web page at: http://www.uea.ac.uk/personnel/jobs/ or by e-mail at: personnel@uea.ac.uk or by calling the answerphone on 01603 593493 or by mail to the Personnel Office, University of East Anglia, Norwich NR4 7TJ. Please quote appropriate reference number.

No. 343 December 2005

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES

SPECTRAL THEORY AND ITS APPLICATIONS

24 – 28 July 2006

Sponsored by SPECT (European Science Foundation) in association with the Newton Institute programme entitled *Spectral Theory and Partial Differential Equations* (17 July to 11 August 2006)

Organisers: M. van den Berg (Bristol), B. Helffer (Orsay), A. Laptev (KTH, Stockholm) and A. Sobolev (Birmingham).

Theme of workshop: Spectral Theory is a vast area of research bringing together different parts of mathematics and physics. In mathematics it is Spectral Geometry, which links spectral properties of elliptic operators and related properties of parabolic operators to the geometry and topology of the underlying manifold. In physics methods of Spectral Theory are instrumental in the study of many fundamental results in solid states physics, statistical physics, quantum mechanics and large particle systems.

The aim of the Workshop is to emphasize the multidisciplinary character of research in this area by bringing together experts working on different aspects of Spectral Theory, and by inciting close collaboration between different groups.

Invited speakers: M. Birman (Petersburg), E.B. Davies (King's), A. Grigoryan (Imperial), A. Kiselev (Wisconsin), F. Klopp (Paris-13), E.H. Lieb (Princeton), R. Melrose (MIT), N. Nadirashvili (Marseille), P. Sarnak (Princeton), J.P. Solovej (Copenhagen), M. Zworski (Berkeley).

Location and cost: The workshop will take place at the Newton Institute and accommodation for participants will be provided in single study bedrooms with shared bathroom at Fitzwilliam College. Lunch and dinner will be served at Wolfson Court. The conference package, costing £490, includes accommodation, breakfast and dinner from dinner on Sunday 23 July to breakfast on Saturday 29 July, and lunch and refreshments during the days that lectures take place. Participants who wish to attend but do not require the conference package will be charged a registration fee of £40.

Further information and application forms are available from the web at: www.newton.cam.ac.uk/programmes/STP/stpw01.html. Completed application forms should be sent to Tracey Andrew, Programme & Conference Secretary, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is 3 March 2006.



LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

Department of Mathematics

Two Lectureships in Mathematics

Salary range £26,768 - £39,375 pa inc

Applications are invited from candidates with proven research ability in Mathematics. For one post, we seek someone with research expertise in the broad area of Discrete Mathematics. For the other post, we require expertise that complements the existing research strengths of the Department. Interest in applications of Mathematics to the Social Sciences is an asset for both posts.

It is expected that these posts will start on or before 1st September 2006.

For further details and a full application pack please see <u>www.ise.ac.ukriobastI.SE</u> If you cannot download the pack please email <u>HR.Recruit.Lec@ise.ac.uk</u> or call 020 7955 6718 quoting reference **AC/05/17**.

Further information about the Department can be found at www.maths.lse.ac.uk.

Closing date for receipt of applications: 16th January 2006

We value diversity and wish to promote equality at all levels

The Book of Presidents 1865-1965

The Book of Presidents 1865-1965 Water, which was defended the spectra damp descendence of the spectra damp descendence of the spectra damp descendence of the damp defendence of the spectra damp defendence of the damp defendence of the spectra based on the damp defendence of the damp defendence of the spectra damp defendence based based based on the spectra damp defendence based based

37

The London Mathematical Society was established during the energetic and confident heyday of Victorian Britain. Although several learned societies pre-date it, the LMS can claim to have led the way in a number of respects: firstly, in the rigorous reviewing standards it set from the outset, with two independent reviewers being appointed for each paper submitted to the Proceedings; and secondly, in its acceptance of women as full members, which was progressive for its day.

This volume, which contains over eighty photographs, concentrates on the first 100 years of the Society's existence and traces its evolution through its Presidents and De Morgan Medallists, each of whom was a pre-eminent mathematician of his or her day. Through them we learn which branches of the discipline were in vogue at any particular time, and come to appreciate the Society's rich history.

The Book of Presidents 1865-1965 is available from the London Mathematical Society. Email lms@lms.ac.uk to place your order. The LMS members price is £15, the full price is £19.

ISAAC NEWTON INSTITUTE FOR MATHEMATICAL SCIENCES NEW DIRECTIONS IN PROOF COMPLEXITY

10 – 13 April 2006

in association with the Newton Institute programme entitled *Logic and Algorithms* (16 January to 7 July 2006)

Organisers: S.R. Buss (California) and J. Krajicek (Prague).

Theme of conference: Proof complexity is an area of mathematics (and mathematical logic and computational complexity theory in particular) centered around the problem whether the complexity class NP is closed under complementation. With a suitable general definition of a propositional proof system (Cook and Reckhow 1979) this becomes a lengths-of-proofs question: Is there a propositional proof system in which every tautology admits a proof whose length is bounded above by a polynomial in the length of the tautology? The ultimate goal of proof complexity is to show that there is no such proof system; that is, to demonstrate superpolynomial lower bounds for all proof systems.

Strong lower bounds are known for some particular, classical proof systems. (In fact, also surprising upper bounds are known!) The methods used for proving these lower bounds borrow from all parts of logic, from finite combinatorics, from parts of complexity theory including circuit complexity, communication complexity, cryptography, derandomization, from classical algebra like field theory or representation theory, or from abstract concepts of geometry like Euler characteristic and Grothendieck ring.

The purpose of the conference is to bring together researchers in various parts of mathematics and computer science interested in proof complexity. Our ambition is to expose, through invited and contributed lectures, current developments in proof complexity as well as new ideas and directions of research pursued most recently.

Speakers: Misha Alekhnovich (Princeton), Steve Cook (Toronto), Stefan Dantchev (Durham), Russell Impagliazzo (California, San Diego), Toni Pitassi (Toronto), Pavel Pudlak (Prague), Nathan Segerlind (Washington), Neil Thapen (Oxford & Prague).

Location and cost: The conference 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 conference package, costing £385, includes accommodation, breakfast and dinner from dinner on Sunday 9 April to breakfast on Friday 14 April, and lunch and refreshments during the days that lectures take place. Participants who wish to attend but do not require the conference package will be charged a registration fee of £35. Self-supporting participants are very welcome to apply.

Further information and application forms are available from the web at: www.newton.cam.ac.uk/programmes/LAA/laaw04.html. Completed application forms should be sent to Tracey Andrew, Programme & Conference Secretary, Isaac Newton Institute, 20 Clarkson Road, Cambridge CB3 0EH or via email (t.andrew@newton.cam.ac.uk).

Closing date for the receipt of applications is 31 December 2005.

CALENDAR OF EVENTS

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

DECEMBER 2005

9 Edinburgh Mathematical Society Meeting, Heriot-Watt University (341) 17-19 International Symposium on Recent Advances in Mathematics & its Applications, Calcutta, India (340) 12-16 Einstein Constraint Equations Conference, INI, Cambridge (334) 12-17 Model Theory Summer School, Leeds University (343) 16 Meeting in Honour of L.E. Fraenkel, Bath University (342) 16-17 Sklyanin Algebras & Beyond, Leeds University (342) 19-21 Cryptography & Coding IMA Conference, Royal Agricultural College, Cirencester (342)

JANUARY 2006

1-31 Semi-definite Programming & Its Applications, Singapore (342) 4-5 Meeting in Memory of Professor Andy King, Reading University (342) 8-12 Dynamics and Arithmetics UK-Japan Winter School, Bury St Edmunds (343) 9-10 Mathematics of Biomolecules Workshop, Warwick University (342) 9-13 Relaxation Dynamics of Macroscopic Systems Conference, INI, Cambridge (338) 11-14 Homotopy Theory Conference, Sheffield University (342) 18 Gresham College Geometry Lecture, London (343) 20 Edinburgh Mathematical Society Meeting, Edinburgh University (341) 23-27 Models & Methods for Human

Genomics Conference, Italy (340) 25 Winter Combinatorics Meeting, Open University (343)

FEBRUARY 2006

 Gresham College Geometry Lecture, London (343)
 LMS Meeting, Mary Cartwright Lecture, London (343)
 Edinburgh Mathematical Society Meeting, Edinburgh University (341)
 Gresham College Geometry Lecture, London (343)

MARCH 2006

17 Edinburgh Mathematical Society Meeting, Dundee University (341)
27-7 Apr Non-Equilibrium Dynamics of Interacting Particle Systems School, INI, Cambridge (341)

39

APRIL 2006

3-7 Number Theory & Polynomials Workshop, Heilbronn Institute, Bristol University (340)
3-7 Jordan Structures in Analysis & Geometry Conference, Taiwan (342)
10-13 BMC, Newcastle University (329)
10-13 New Directions in Proof Complexity Workshop, INI, Cambridge (343)
11-13 Mathematical Education of Engineers IMA Conference, Loughborough University (342)
24-27 BAMC06, Keele University (343)
28 Edinburgh Mathematical Society Meeting, Aberdeen University (341)

MAY 2006

1-30 Jun Random Graphs and Large-Scale Real-World Networks, Singapore (343)
2 Gresham College Geometry Lecture, City of London School, London (343)
8-19 Combinatorics, Automata & Number Theory Conference, Liège University, Belgium (339)
26 Edinburgh Mathematical Society Meeting, St Andrews University (341) **CLAUDE AMBROSE ROGERS DE MORGAN MEDALLIST** 1977



Extract from the citation: 'In the period after the Second World War, Rogers rapidly emerged in the forefront of the renaissance tice remains definitive. Since about 1958, of the geometry of numbers. His work on the lattice constants of cylinders both convex moved to the theory of Hausdorff measures, and non-convex, on the reducibility of star bodies and on the implications for the existence of infinitely many lattice points in contributions.'

automorphic bodies, and on the successive minima of general sets with respect to a lat-Professor Rogers' main research interests of analytic sets and of general convex bodies, to all of which he has made important