

LONDON MATHEMATICAL SOCIETY

NEWSLETTER

No. 418 October 2012

Society Meetings and Events

2012

Monday 1 October

SW & South Wales Regional Meeting, Bristol

Friday 16 November

Annual General Meeting, London page 9

2013

Friday 1 March Mary Cartwright Lecture, London

Monday 18 March Northern Regional Meeting, Newcastle

18-19 April Women in Maths Day Cambridge

Friday 5 July LMS Meeting London

NEWSLETTER ONLINE:

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LMS ANNOUNCES PRESIDENT DESIGNATE

The London Mathematical Society is pleased to announce Professor Terry Lyons, FRS, Wallis Professor of Mathematics, University of Oxford, as President-Designate. Professor Lyons will take over from the current President, Dr Graeme Segal, FRS, in November 2013.

Professor Lyons has been at Oxford since 2000, having previously held positions at Imperial College London and the University of Edinburgh. He is also a founding member and current Director of the Oxford-Man Institute of Quantitative Finance and previously the Director of the Wales Institute of Mathematical and Computational Science. Professor Lyons researches in stochastic analysis, the area of mathematics which focuses on providing tools for describing high dimensional and interacting random systems. His research has contributed to the pure mathematical foundations, and to applications, for example: providing efficient new methods for numerical calculation and novel wavs to summarise vast data sets effectively. He is supported by European and UK research councils as well as by commercial funds. He coordinated three European network projects that have helped to build stochastic analysis across Europe. Professor Lyons was elected a Fellow of the Royal Society in 2002.

Professor Lyons said, 'It is a tremendous honour to be asked to take over the prestigious office of LMS President. These are challenging times for mathematics and in particular for mathematics research and education. It is vitally important that we continue to promote and extend mathematical knowledge and ensure it continues to have an effective impact on our society. I am looking forward to working with LMS members and the wider mathematics community to continue to build on the excellent work towards this goal by Graeme and his colleagues'.

1

Dr Graeme Segal, said, 'I am delighted that Terry has accepted the nomination to become the next LMS President. He has forged a hugely successful career in mathematics and has been at the forefront of developing several high profile organisations. The LMS is confident that his wide knowledge, expertise and leadership skills will help the LMS to grow and continue to benefit the mathematics community'.

http://newsletter.lms.ac.uk

ANNUAL GENERAL MEETING

The Annual General Meeting of the Society will be held at 3.00 pm on Friday 16 November 2012 in the Jeffrey Hall at the Institute of Education, 20 Bedford Way, London WC1H 0AL.

The business shall be:

1. Elections to Council and Nominating Committee

2. Report of the President

3. Report of the Treasurer

2

a.adoption of the Trustees Report for 2011/12

b.appointment of Auditors

It is hoped that as many members as possible will be able to attend.

> Fiona Nixon Executive Secretary

LMS ANNUAL DINNER

The 2012 LMS Annual Dinner will be held on Friday 16 November 2012 at 7.30 pm (for 8.00 pm start) at The Russell Hotel, London WC1. The LMS Annual Dinner follows the Society's Annual General Meeting at the Institute of Education, and the Society's wine reception at De Morgan House.

The cost for members and their quests to attend the LMS Annual Dinner is £45 per person, which is for a three-course meal and wine. Members wishing to attend should make cheques payable to 'London Mathematical Society' and send to: Leanne Marshall, London Mathematical Society, De Morgan House, 57-58 Russell Square, London WC1B 4HS. Please also indicate any dietary requirements. Payment should arrive by Monday 5 November 2012. Any queries should be sent to leanne. marshall@lms.ac.uk.

IMS Newsletter

http://newsletter.lms.ac.uk

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Articles: please send articles to newsletter@lms.ac.uk

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

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Charity registration number: 252660.

2012 ELECTIONS TO COUNCIL AND NOMINATING COMMITTEE

This year, to facilitate an electronic voting option, the LMS elections will be administered by the Electoral Reform Services (ERS). Unlike in previous years, ballot papers are not being enclosed with this edition of the Newsletter. Instead, members will be contacted directly by the complete and return the subscription ERS, who will send out the election material.

In advance of this an email will be sent by the Society to all members who are registered for electronic communication informing them that they can expect to shortly receive the September edition of the Newsletsome election correspondence from the ERS. Those not registered to receive email correspondence will receive all communications in paper format, both from the Society and from the ERS. Members should check their post/email regularly in October for communications regarding the elections.

two candidates for the post of General Secretary and two for Education Secretary. Sixteen candidates are proposed for seven vacancies for Member-at-Large. Six candidates have been proposed for three vacancies in the membership of Nominating Committee. The slates and candidate biographies for the election can be found on the LMS website at http://www.lms. ac.uk/content/lms-elections-2012.

deadline for receipt of votes is 8 November.

Members may like to note that a LMS Election blog, moderated by the cheque or credit/debit card. Scrutineers, can be found at: http://discussions. lms.ac.uk/elections2012/.

Future elections

Members are invited to make suggestions for future nominees for election to Council. These should be addressed to the Nominating Committee (nominations@lms.ac.uk). Members may also make direct nominations: details will be published in the May 2013 Newsletter or are available from Duncan Turton at the LMS (duncan.turton@lms.ac.uk).

ANNUAL LMS SUBSCRIPTION 2012-13

Members are reminded that their annual subscription, including payment for publications, for the period November 2012-October 2013 is due on 8 November 2012 and should be paid no later than 8 December 2012.

Please note all members are asked to form as it also requests permission to include members' details in the Members' Handbook 2013.

A subscription form was included with ter for members to complete and return with payment in the enclosed envelope. If you have not received a subscription form, please email membership@lms. ac.uk.

Further information about subscription rates for 2012-13 and a subscription With respect to the election itself, there are form may also be found on the Societv's website: www.lms.ac.uk/content/ paving-vour-subscription.

The Society encourages payment by direct debit. If you do not already pay by this method and would like to set up a direct debit (this requires a UK bank account), please visit the LMS website to download the direct debit mandate form: www.lms.ac.uk/sites/default/files/ For both electronic and postal voting the Membership/Direct%20Debit%20Form. pdf

The Society also accepts payment by

Elizabeth Fisher Membership & Activities Officer

LMS CONFERENCE FACILITIES

Organising a conference in central London? Meeting rooms and catering are available in De Morgan House. For terms and availability, please call 020 7927 0800 or email roombookings@demorganhouse.co.uk.

No. 418 October 2012

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CHRISTOPHER SHADDOCK

elected a member of the London Mathematical Society on 21 February 1986, died 2012, aged 80. on 8 March 2012, aged 79.

ANDRZEJ ORCHEL

Dr Andrzej W. Orchel, who was elected a member of the London Mathematical Society on 22 November 1969, died on 22 ciety on 17 December 1964, died in June January 2012, aged 65.

LMS REPRESENTATIVES

4

The continued health of the Society depends on nurturing and maintaining close contact with its membership. As current Treasurer I am making the development of a vibrant and active network of LMS representatives a priority. Forty or so members have already agreed to serve in this important role, which is a very positive start. (The names of the current representatives and their universities are listed below.) If there is no representative listed for your institution please contact membership@lms.ac.uk. By the autumn we aim to have representatives at every higher educational institution in the UK. It is essential that your representatives on Council are kept aware of the challenges and opportunities facing mathematics in the UK so that they can reflect your views accurately.

Although the majority of LMS members are pure mathematicians, the Society exists to serve all branches of mathematics - pure, applied and applicable. The diverse research interests of our Presidents over the past decade make this very clear. and our current representatives have a similar wide range of research interests.

> Professor Robert Curtis LMS Treasurer

JOHN TAYLOR

Professor John Taylor, who was elected a Mr Christopher J. Shaddock, who was member of the London Mathematical Society on 20 June 1986, died on 10 March

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FREDERICK BRICKELL

Dr Frederick Brickell, who was elected a member of the London Mathematical So-2012.

The Role of the LMS Representative

Membership

Encourage membership

- Act as proposer/seconder and assist in finding a proposer/seconder
- Encourage local members to vote in the annual LMS Elections
- Act as a local contact for the LMS Grants
- Promote LMS grants to colleagues **Events and Activities**
- Encourage attendance at Regional Meetinas
- Promote LMS events and activities e.g. displaying posters, emails to colleagues Students
- Liaise with student societies
- Encourage membership amongst students

Working with the LMS and other LMS representatives

- Liaise with LMS Regional Representatives and the LMS Treasurer
- Work with other LMS departmental representatives
- Attend an annual LMS Representatives Meeting at De Morgan House
- Regular liaison with De Morgan House, requesting support where needed
- Produce an annual report for the LMS

newsletter@lms.ac.uk

List of LMS Representatives (August 2012) **Regional Representatives**

Region	Representative	In	stitution	E-mail
Midlands	Chris Parker	Bir	mingham	c.w.parker@bham.ac.uk
Northern	Mike Prest	Ma	anchester	mprest@manchester.ac.uk
South West & South	Tomasz Brzezinski	Sv	ansea	T.Brzezinski@Swansea.ac.uk
Wales				
Representatives				
Institution	Representative		E-mail	
Aberystwyth	John Gough		jug@aber.ac.uk	
Bath	Jonathan Dawes		j.h.p.dawes@bath.ac	uk
Birkbeck	Ben Fairbairn		b.fairbairn@bbk.ac.u	ık
B <mark>ir</mark> mingham	Natalia Petrovskaya		n.b.petrovskaya@bh	am.ac.uk
B <mark>rig</mark> hton	Paul Harris		P.J.Harris@brighton.a	ac.uk
C <mark>ardi</mark> ff	Federica Dragoni		DragoniF@cardiff.ac	.uk
Chester	Jason Roberts		j.roberts@chester.ac.	uk
Coventry	Robert Low		mtx014@coventry.ac	uk
Durham	Norbert Peyerimhoff		norbert.peyerimhoff	f@durham.ac.uk
Edinburgh	Sue Sierra		s.sierra@ed.ac.uk	
Glasgow	Brendan Owens		Brendan.Owens@gla	asgow.ac.uk
Greenwich	Tony Mann		A.Mann@gre.ac.uk	5
Hull	Michael Bingham		m.s.bingham@hull.a	c.uk
Heriot-Watt	Anke Wiese		a.wiese@hw.ac.uk	
KCL	Yuri Safarov		vuri.safarov@kcl.ac.u	ık
Kent	Peter Eleischmann		, P.Fleischmann@kent.	.ac.uk
Leeds	Alison Parker		a e parker@leeds.ac	uk
Leicester	Frank Neumann		fn8@mcs.le.ac.uk	
Liverpool	Ion Woolf		Ionathan Woolf@liv	erpool ac uk
Loughborough	Alexandre Veselov		A PVeselov@lboro.a	
Manchester	Charles Faton		charles eaton@manc	hester ac uk
Newcastle	Sarah Rees		Sarah Rees@ncl.ac.ul	k
Nottingham	Martin Edivet		martin edivet@notti	ngham ac uk
Oxford	Karin Erdmann		Karin Erdmann@mat	the ox ac uk
Open University	Phil Rippon			
Blymouth	Stophon Huggott		S Huggott@plymout	h ac uk
OMU	Pob Wilson	-	P A Wilson@gmul ac	
	Martin Mathiau		m m@gub ac uk	
Colford	Pay Hill		R Hill@calford.ac.uk	
Southampton			thurnass@satar ar	
St Androws	Colva Ropov Dougol		colvo@mcs.ct.and	
Stratholyda	Bonny Davies		convaemes.st-andrev	
Surainciyae	Les Deuletere		penny.gavies@strath	.ac.uk
Surrey			I. rouistone@surrey.a	c.uk
swansea	Iomasz Brzezinski		I.Brzezinski@Swanse	еа.ас.ик
	Jason Lotay		J.lotay@ucl.ac.uk	
UEA	Jonathan Kirby		jonathan.kirby@uea	.ac.uk
UWE	Tim Swift		tim.swift@uwe.ac.uk	<
Warwick	John Cremona		J.E.Cremona@warwi	ck.ac.uk
York	Stephen Donkin		sd510@york.ac.uk	

http://newsletter.lms.ac.uk

ANNE BENNETT

The staff at De Morgan House and Members of the LMS Council were devastated to hear the terrible news that Anne Bennett, Head of Society Business at the LMS, had suddenly died of a heart attack on 6 September 2012 at the age of 56. This is a terrible loss for all who knew her and had the good fortune to work with her. Anne lived for her family and her work. She enjoyed being at the Society and was extremely proud of what she was achieving during her time here, which has been so sadly cut

off by her premature death.

Her most notable impact has been in the area of public affairs. Her role at the Society was two-fold. Firstly, she dealt with the governance and complex activities of the many committees of the LMS, in particular with the Council, and with the Finance and General Purposes, Research Policy, and Women in Mathematics com-

6

mittees. Her second role was to establish links with national policymakers and funders, both for the LMS and for the Council for Mathematical Sciences (CMS), as well as developing the public face of mathematics. Her natural ability at encouraging collaborative working, her energy and application to the task in hand, and her real interest in ensuring that mathematics is properly represented at the highest levels made her wonderfully suitable for the role.

Anne graduated from Kings College, London in 1979 with a BA(Hons) in French. She started work that same year with the London University Careers Advisory Service as an Administrative Assistant, supporting the annual Graduate Recruitment Programme. From there she moved to the Centre for British Teachers, working on the Morocco and Brunei desk. In 1986

Anne took up a post as Examinations Officer at the Royal Society of Chemistry (RSC), where she was to work for the next 24 years in a variety of positions including: Divisional Affairs Officer, managing the Secretariat of the four Science Divisions and the European Chemist Registration Board; Manager (Development and Support), developing corporate governance following the introduction of a new organisational structure at the RSC; and latterly as Manager (Interest Groups) responsible for the management of the 85 RSC Special Interest Groups. This year Anne was nominated



for an RSC Outstanding Achievement Award for services to the Society, which she was due to pick up in November. Anne joined the LMS in May 2010

Anyone who met Anne will remember her as a very dignified, cultured, intelligent and compassionate woman, whose French heritage shone through in her bearing and outlook. She was a passionate follower of early and baroque classical music as well as opera and theatre. With her dual nationality she was also a great lover of international food and cuisine and an excellent cook herself. Anne was completely loyal and dedicated to the Society and to the CMS, and she had a sense of vocation in the furtherance of mathematics. She brought to a new level the exposure of mathematics to national policymakers

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and officials at Westminster and Whitehall, and also to national funders of mathematics research and education. She set up opportunities for mathematicians to present their case, quietly and effectively networking with officials, politicians, government agencies and the most senior figures in the academic world, striving to ensure that the M (mathematics) in STEM was both recognised and included in all national discussions on science.

Anne was a unique person, warm and absolutely genuine. Expressions of sympathy and admiration have come in from the many agencies, bodies and individuals with which she fostered strong links over the last two years. These include:

'her warm personality and radiant smile were always a great source of encouragement.... her contribution to the mathematics community was extraordinary"

'a fantastic colleague'

'a wonderfully helpful person who kept information flowing'

'she will be sadly missed by so many'

'Anne was indeed a very supportive and helpful person'

'she was so helpful and kind and could always find time'

'Anne was charming, diligent, friendly and a stalwart for mathematics. Her loss will be felt most deeply.'

'Anne was both a friend and a true professional. I will miss her and her wise advice.... she was highly regarded in the maths community.'

Anne was always thinking of others and was one of the kindest people you could hope to meet, and this combined with her sharp and perceptive intellect made her contribution to both the LMS and the CMS so valuable. Her particular personality and skill-set will be impossible to find again, and she will hold a special place in the memories of those lucky to have been her friend and colleague.

Anne is survived by her husband Philip Treloar, daughter Isabelle and son Nicholas. Our thoughts are with them at this sad time.

> Fiona Nixon Executive Secretary

WILLIAM THURSTON

William Thurston died on 21 August 2012, at the age of 65. He was born in Washington DC, was an undergraduate at New College in Florida, and a graduate student at UC Berkeley. In 1974, he became a professor at Princeton, but he returned to Berkeley in 1991, where he became director of the MSRI in 1993. He moved to UC Davis in 1996, and then Cornell in 2003.

He was one of the most creative and outstanding mathematicians in recent times. He worked in many different fields, including foliation theory, complex dynamics and geometric group theory, but his most far-reaching research was in the areas of hyperbolic geometry and 3-manifold theory.

His famous Geometrisation Conjecture, which he put forward in the late 1970s, revolutionised the study of 3-manifolds. Roughly speaking, this proposed that every compact orientable 3-manifold has a 'canonical decomposition' into 'geometric pieces'. This was a remarkable structural picture that contained the infamous Poincaré coniecture as a mere special case. It was proved by Perelman in 2003. However, Bill Thurston himself made significant progress towards it, by proving it in the case of Haken 3-manifolds. His argument developed an extraordinary array of new techniques, which involved ideas from complex analysis, dynamics and of course hyperbolic geometry. For many years, the full details of the proof were not written down, and there were few who understood it fully. But it was highly influential, and it set the agenda for the field for three decades. He received a Fields Medal for this work in 1982.

He was also passionate about mathematical education, partly because he felt that the way that mathematics is traditionally presented, via a sequence of formal definitions, theorems and proofs, can often hinder one's intuition. He tried to entice mathematicians to think about their subject in new ways, and in doing so, he had a huge influence on the direction of modern mathematics.

> Marc Lackenby University of Oxford

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DAVID CRIGHTON MEDAL 2012

The Councils of the Institute of Mathematics and its Applications (IMA) and the London Mathematical Society (LMS) have awarded the 2012 David Crighton Medal for services to mathematics and the mathematics community jointly to **Professor Arieh Iserles**, University of Cambridge and **Dr Peter Neumann** OBE, University of Oxford.

Peter Neumann has been an animator of UK mathematics for 50 years, and has thrown himself energetically into every aspect of mathematics.

As an algebraist, his research covered permutation groups, combinatorics, and computational group theory. Several of Neumann's papers have been highly influential. For example, his creation, jointly with Cheryl Praeger, of a recognition algorithm for special linear groups opened a new area in computational group theory; his memoir with Adeleke giving a general theory of tree-like relational structures inspired new directions in infinite permutation groups, model theory and graph theory; and his recent paper on synchronising groups is the first of a new attack on the Cerny conjecture for synchronising automatons.

8

As a teacher, Neumann's enthusiasm and originality have made him legendary. Very many who encountered him as undergraduates, some of them now prominent mathematicians and some no longer in the mathematical world, speak of how he was the first to awaken them to the joy and fascination of mathematics.

On the national mathematics stage he was chairman, in 1991/2 of the committee that presented to the LMS, IMA, and RSS the report that led to four-year MMaths degrees.

Neumann became founding chairman of the UK Mathematics Trust in 1996, which took over responsibility for the British Mathematical Olympiad Committee, and hosted the worldwide Congress of the International Mathematical Olympiad in Glasgow in 2002. He brought the Trust from small beginnings to a large educational charity, and he has continued to work

on the Trust's training programmes.

Neumann has been a stalwart of the British Society for the History of Mathematics for many years, and has done as much as anyone to promote the study of the history of mathematics as an important discipline in UK universities.

Arieh Iserles' research has been at the leading edge of numerical analysis for his whole career. His early papers dealt with stability and accuracy, which were at the forefront of numerical analysis at the time. In particular, he wrote an important paper with Gilbert Strang (1983) on the accuracy of difference schemes and a first book with Syvert Nøřrsett (1991) on the theory of order stars.

His most important mathematical contributions include being one of the leading practitioners of geometric numerical integration and in particular the sub-discipline of Lie group methods, which are numerical integration methods for ordinary differential equations on Lie groups and homogeneous spaces.

Two other areas of Iserles' research are worthy of special mention. One is a seminal contribution to approximation theory, by developing the theory of Sobolev Orthogonal Polynomials, with Koch, Nøřrsett and Sanz-Serna (1991). Another is recent work with Tony Bloch on isospectral flows with Poisson structure, leading to the discovery of a new and fascinating integrable system of Toda type, now known as the Bloch-Iserles system.

Iserles has an outstanding record of service to the research community in his editorial work, especially that of *Acta Numerica*; to the Society for the Foundations of Computational Mathematics, and finally, teaching and mentoring.

Iserles' contributions to teaching and mentoring are second to none with award winning former students, a strong contribution to women in mathematics, and a textbook on numerical analysis. It is hard to give him sufficient credit for the influence he has on others, his energy, enthusiasm, commitment and friendship.

Full citations will appear on the websites of the LMS and the IMA.

LONDON MATHEMATICAL SOCIETY ANNUAL GENERAL MEETING

16 November 2012

newsletter@lms.ac.uk

Jeffrey Hall, Institute of Education, 20 Bedford Way, London WC1H 0AL (Nearest tube: Russell Square)

Programme:

3.00–3.30	Annual General Meeting
3.30–4.30	Charles Stuart (EPFL, Lausanne) Bifurcation, asymptotic bifurcation and elliptic equations on \mathbf{R}^{N}
4.30–4.55	Теа
4.55–5.00	Announcement of Election Results
5.00–6.00	Bryce McLeod (Oxford) Naylor Lecture The wedge entry problem

The meeting will include the presentation of certificates to the 2012 LMS prize winners.

The meeting will be followed by a reception at De Morgan House.

The Society's Annual Dinner will be held in The Russell Hotel's Fitzroy Doll's Restaurant at 7.30 pm after the reception. Members and their guests are invited to attend the Annual Dinner. The cost to attend the dinner will be £45 per person. Those wishing to attend the dinner should contact Leanne Marshall (leanne.marshall@lms.ac.uk) before **8 November**.

There are limited funds available to contribute in part to the expenses of members of the Society or research students to attend the meeting. Requests for support, including an estimate of expenses, and any other queries about the AGM, should be sent to Elizabeth Fisher (meetings@lms.ac.uk).

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EPSRC Engineering and Physical Sciences Research Council

The London Mathematical Society in association with the EPSRC Network on *Numerical Algorithms and High Performance Computing*

Verification and Numerical Algorithms

Tuesday 13 November, 10.30 - 16.30

De Morgan House, 57-58 Russell Square, London, WC1B 4HS. (Nearest tube: Russell Square)



The aim of the colloquium is to provide an opportunity for dialogue between researchers working in the Mathematics of Numerical Algorithms and Computer Scientists working in Formal Verification of numerical programs. The programme of talks will interest both Graduate Students and more established researchers undertaking work in these areas, and the event will provide an occasion for informal networking and the exploration of connections between Numerical Analysis and Formal Verification. All interested Mathematicians and Computer Scientists are warmly encouraged to participate in this unique colloquium.

Jean-Michel Muller (ENS Lyon) Proof of Properties in Floating-Point Arithmetic

David Monniaux (CNRS/VERIMAG) Formal verification of safety-critical software

Daniel Kroening (University of Oxford) Deciding Floating-Point Logic with Systematic Abstraction

George A. Constantinides (Imperial College London) Numerical Algorithms in Hardware

Full abstracts and timetable for the day can be found at: http://www.lms.ac.uk/content/computer-science-day

The Computer Science Colloquium is part of an LMS initiative of activities at the interface between Mathematics and Computer Science.

To register, please contact Duncan Turton (<u>computerscience@lms.ac.uk</u>) The day is free for students and £5 for all others which is payable on the day. A sandwich lunch will be provided. Limited funds are available to help with students' travel costs. Further details are available from Duncan Turton the Society (<u>computerscience@lms.ac.uk</u>)

Journals of the London Mathematical Society



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SOCIETY CONFERENCE GRANTS

The Society is pleased to report that in 2011-12 awards totalling £217,100 were made in the support of mathematics conferences. Funds are granted to the organisers of conferences to be held in the United Kingdom, and may be used to cover the expenses of principal speakers, and to provide support for research students and for participants from Scheme 5 or former Soviet Union countries. For Postgraduate Research Conferences funds are granted to support participants. Applicants wishing to apply for funding for a conference will find further details on the Society's website at www.lms.ac.uk/content/research-grants.

Conference grants awarded during 2011-12

Conference	Dates, Place	Applicant	Grant
One-Day Meeting in Combinatorics	14 Mar 2012, Oxford	A. Scott	£2,000
Asymptotic Group Theory and Model Theory	26-27 Mar 2012, RHUL	B. Klopsch	£2, <mark>378</mark>
Biological Flow: A Conference to Celebrate the 70th birthday of Professor T. Pedley	2-3 Ap <mark>r 2012,</mark> Ca <mark>mbridge</mark>	O. Jensen	£4,700
Modern Perspectives in Homotopy Theory: Infinity Categories, Infinity Operads and Homotopy Type Theory	10 <mark>-13 Apr 2012,</mark> Swansea	J. Giansiracusa	£1,371
ICFT2012: 16th UK Meeting on Integrable Models, Conformal Field Theory and Re- lated Topics	13-1 <mark>4 Apr</mark> 2012, York	N. MacKay	£1,590
Recent Advances in Gauge and String Theory	3-4 Ma <mark>y 2012</mark> , London	B. Stefanski	£5,000
Two linked one-day colloquia in Combinatorics	16-17 May 2012, London	J. Skokan	£1,800
Wales Mathematics Colloquium 2012	21-23 May 2012, Wales	S. Cox	£1,658
Workshop on Infinite Ergodic Theory	28 May - 1 Jun 2012, Surrey	I. Melbourne	£5,725
Workshop on Arithmetic Geometry and Homotopy Theory	31 May - 1 Jun 2012, Imperial College London	A. Pal	£5,000
Recent Developments in Lie Theory	1-2 Jun 2012, Manchester	Y. Bazlow	£600
Numerical Linear Algebra, Control Theory and Data Assimilation: A Conference in Honour of Nancy Nichols' 70th birthday	2-3 Jun 2012, Reading	S. Langdon	£4,955
Beauville Surfaces and Groups	6-9 Jun 2012, Newcastle	A. Vdovina	£4,460
Stochastic Modelling in Ecosystems	11-12 Jun 2012, Glasgow	X. Mao	£5,500

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No. 418 October 2012

Numerical Analysis of Stochastic Partial Differential Equations	11-12 Jun 2012, Warwick	I. Graham, R. Scheichl	£4,930	
Nevanlinna theory and number theory	18-20 Jun 2012, UCL	R. Halburd	£5,800	
Singularity Theory, its Modern Applications and Future Prospects	18-22 Jun 2012, Liverpool	P. Giblin	£6,000	
Alan Turing Centenary: Satellite Workshops	22 Jun 2012, Manchester	J. Paris	£2,800	
Geometry, Representation Theory and Clusters	21-23 Jun 2012, Leicester	S. Schroll	£4,900	
Supergravity, Branes and M-Theory	2-3 Jul 2012, Cambridge	G. Gibbons	£4,000	
15th Galway Topology Colloquium	9-11 Jul 2012, Oxford	P. Collins	£4,800	
Galois Representations and Arithmetic Geometry: Conference to Honour Sir Martin J. Taylor on his 60th birthday	11-13 Jul 2012, Bordeaux, France	N. Byott	£2,500	
Logic Colloquium 2012	12-18 Jul 2012, Manchester	A. Wilkie	£4,803	
Infinite Combinatorics Mini Conference	25 Jul 2012, L <mark>SE</mark>	A. Ostaszewski	£304	
Probability at Warwick Young Researchers Workshop	23-27 Jul 2012, Warwick	D. Croydon	£1,000	
Finite Groups, Representations and Related Topics	20-24 Aug 2012, Oxford	R. Rouquier	£5,000	
5th International Workshop on Physics and Computation	28-31 Aug 2012, Swansea	E. Beggs	£4,654	
Function Theory Meeting	3 Sep 2012, London	A. Fletcher	£1,442	
Stochastic Methods and Nonlinear PDEs	5-7 Sep 2012, Cardiff	F. Dragoni	£5,000	
Future Directions for Quantum Groups	6-8 Sep 2012, Lancaster	J. Grabowski	£2,567	
27th British Topology Meeting	6-8 Sep 2012, Cambridge	I. Smith	£5,000	
International Conference on Nonlinear PDE and Satellite Workshop - Free Surface and Interface Problems	10-13 Sep 2012, Oxford	G-Q. Chen	£966	
Nonlinear Waves in Fluids	12-14 Sep 2012, Loughborough	K.Khusnutdinova	£6,000	
Topological Solitons: Conference to Cel- ebrate the 60th birthday of Professor N. Manton	19-22 Sept 2012, Cambridge	M. Dunajski	£5,600	
Categorical Methods in Representation Theory	24-28- Sep 2012, Bristol	J. MacQuarrie	£1,000	

13

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Non-equilibrium Statistical Mechanics and the Theory of Extreme Events in Earth Science	14-17 Jan 2013, Reading	T. Kuna	£5,000
65th British Mathematical Colloquium 2013	25-28 Mar 2013, Sheffield	D. Jordan	£12,000
Large Deviations and Asymptotic Methods in Finance	9-12 Apr 2013, Imperial Col- lege London	A. Jacquier	£6,000
High-Dimensional Inference with Applications	<mark>20 - 21 Jun</mark> 2013, Kent	J. Zhang	£4,330
Bifurcation Theory, Numerical Linear Algebra and Applications	1-2 Jul 2013, Bath	M. Freitag	£4,995
Brauer's Problems in Representation Theory - 50 years on	3-6 Sep 2013, Manchester	C. Eaton	£5,000
British Mathematical Colloquium	7-10 Apr 2014, QMUL	P. Cameron	£12,500
Mathematics of John Thompson	Date to be	J. Saxl	£5,000
	confirmed CMS Cambridge		

14 Postgraduate Research Conference grants awarded during 2011–12

Conference	Dates, Place	Applicant/Organiser	Grant
Postgraduate Model Theory Conference	4-6 Jan 2012, Oxford	Applicant: A. Pillay Organiser: C. Kestner	£4,000
Young Functional Analysts' Workshop	21-22 Mar 2012, Oxford	Applicant: S. Eveson Organiser: T. Potts	£3,984
Young Researchers in Mathematics 2012	2-4 Apr 2012, Bristol	Applicant: S. Siksek Organiser: D. Holmes	£5,500
Techniques for Multiscale Analysis	6 Jun 2012, Edinburgh	Applicant: R. Kessar Organiser: J. Taylor	£2,950
Essex-Greenwich-Hertfordshire Workshop on Applied and Numerical Mathematics	7-8 Jun 2012, Greenwich	Applicant: C-H. Lai Organiser: C. Su	£4,000
14th Postgraduate Group Theory Con- ference (PGTC)	9-12 Jul 2012, York	Applicant: M. Bate Organizer: M. Connolly	£4,000
Postgraduate Combinatorial Conference	15-17 Aug 2012, Warwick	Applicant: V. Lozin. Organisers: K. Dab- rowski, C. Purcell	£4,000
Student Conference on Mathematical Techniques for Quantum Physics	7-9 Nov 2012, Nottingham	Applicant: G. Adesso Organisers: D. Girolami, S. Ragy	£4,000
British Postgraduate Model Theory Conference	16-18 Jan 2013, Manchester	Applicant: M. Prest Organiser: H. Alzahrani	£4,000

MATHEMATICS POLICY ROUND-UP September 2012

SCHOOLS AND COLLEGES

Mathematics A-level numbers rise again

The number of A-level mathematics entries across the UK is up 3.3% on last year, with 85,714 students sitting the exam. In other STEM subjects – physics was up 5% (to 34,509), biology up 1.7% (to 63,074) and chemistry up 2.4% (to 49,234).

Figures released by the Joint Council for Qualifications also show that:

- A-level further mathematics has continued to rise in popularity, with entries increasing by 5.1% (to 13,223)
- AS mathematics entries increased by 7.6% (to 148,550)
- AS further mathematics entries continued the trend, increasing by 24.7% (to 20,,954)

This means that since 2007 the number of A-level mathematics entries has risen by 42.7% and in further mathematics the increase is even greater at 68%.

Full tables of results are available on the Joint Council for Qualifications website at http://tinyurl. com/bwr7q7b.

GCSE results

The number of GCSE mathematics entries has fallen by 12.6% compared with last year's entries. 675,789 students sat the exam in 2012 compared with 772,944 in 2011. In other STEM subjects, entries for biology, chemistry and physics rose by 12.3%.

ACME response to draft primary curriculum

On 11 June 2012, a draft National Curriculum for primary mathematics was published by the Department for Education for informal consultation, as a precursor to a more formal consultation in early 2013, and publication of the final version in September 2013, ACME was asked to gather the views of the mathematics community on the draft.

ACME's submission is in two parts:

 Part A (http://tinyurl.com/cbfdnfx) provides overarching messages and recommendations, highlighting the most important aspects to be addressed before formal consultation in 2013.

 Part B (http://tinyurl.com/crob555) is a collation of the detailed comments made by respondents and by ACME on the statements included in the curriculum document.

ACME's response was informed by workshops, e-seminars and a written consultation with the mathematics community – ninety-nine responses were received. The summary of the responses, as well as the responses themselves, have been sent to the Department for Education. The summary of responses is available at http://tinyurl.com/bmkomac and the collated responses are available at www.acme-uk.org/media/10145/collated.pdf. The LMS response is included in these documents.

Government urged to reconsider content of draft programmes

In a letter to the Education Secretary, Michael Gove, National Numeracy's chair, Chris Humphries CBE, says that the government's draft proposals for the primary mathematics curriculum 'prescribe an overloaded and undeliverable curriculum that will not allow children to develop genuine mathematical understanding. The curriculum should be reduced to the essential core so that all children can be secure in key aspects before leaving primary school'. The full response is available at http://tinyurl.com/d96ktln.

15

Mathematics graduates go into teaching

Data reveal that almost one in five mathematics graduates are becoming teachers. In addition, for the first time, over half of new mathematics trainee teachers have upper second-class degrees, or better.

The data, from the Higher Education Statistical Unit (HESA), shows that 18.5 % of mathematics graduates surveyed three and a half years after graduating chose to go into teaching. Teacher Training Agency data also show that the proportion of mathematics graduates entering training with a 2:1 degree or better has risen from 44 % to 51 % in just three years.

Together, these figures confirm that teaching is an increasingly popular choice for the most able graduates, reflecting the good employment prospects that teaching currently enjoys. Teachers are also twice as likely to attain management positions early in their careers when compared to many of their fellow graduates.

Education for Engineering (E4E) report

A recent report entitled Opportunity or Ability? Key Stage 4 science and mathematics participation and attainment in England 2010 examines national and regional participation and attainment in science and mathematics across England in 2010. The report finds that there are significant differences in participation in sciences across many regions of England and asks the question, is this because of opportunity or ability? The potential consequence is that some able young people will be denied a future in science, engineering or technology if they choose the wrong combinations of subjects'. The full report is available at http://tiny-url.com/chd36pd.

> Dr John Johnston Mathematics Promotion Unit

INSTITUT DES HAUTES ÉTUDES SCIENTIFIQUES

16

The Institut des Hautes Études Scientifiques, located in Bures-sur-Yvette (France), welcomes each year up to 250 mathematicians and theoretical physicists from all over the world for research periods ranging from two to three weeks up to one or two years.

Created in 1958, IHÉS is an international research institute, registered as a Foundation in the public interest since 1981. Its mission is to support and develop theoretical research in mathematical sciences, physics and more recently, at the interface with biology and medicine. Support for IHÉS comes from several sources: the French Ministry of Research, several European research agencies among which the Engineering and Physical Sciences Research Council (EPSRC), the US National Science Foundation, the Max-Planck-Gesellschaft, the Swiss National Science Foundation, and also some private foundations and companies.

EPSRC has been supporting IHÉS for a number of years, fostering closer links between British and French mathematical research centres. British mathematicians and theoretical physicists are invited to apply to IHÉS for visits (for more information, visit www.ihes.fr). Their visit can be an opportunity to work with researchers from other research groups in the Paris area.

Director: Jean-Pierre Bourguignon

Permanent Professors: Thibault Damour, Mikhael Gromov, Maxim Kontsevich, Laurent Lafforgue, Nikita Nekrasov

http://newsletter.lms.ac.uk

- Honorary Professor: David Ruelle
- Léon Motchane Chair: Alain Connes

Louis Michel Chairs: Ali Chamseddine, Samson Shatashvili

Long term CNRS visitors: Ahmed Abbes, Ofer Gabber, Christophe Soulé

External Members of the Scientific Council: Costas Bachas, Emmanuel Candčs, Bertrand Duplantier, Gerd Faltings, Raymond E. Goldstein, Gabriele Veneziano

William Hodge Fellowships 2013 / 2014

In 2000 the EPSRC committee reviewing IHÉS suggested that the EPSRC and IHÉS offer each year two one-year fellowships bearing the name of Sir William HODGE, the eminent British mathematician. The fellowships enable outstanding young mathematicians and theoretical physicists to spend time at IHÉS. Fellows are encouraged to have a UK-based mentor and to be in contact with the UK mathematics community.

Applicants must have a PhD in Mathematical Sciences or Theoretical Physics obtained in 2011, 2012 or in early 2013. One of the two grants will be awarded to an applicant who has spent at least the preceding nine months at a UK academic institution or has just graduated from a UK institution. Applications will be reviewed and selection made based on the sole criterion of excellence in research by the IHÉS Scientific Council in December 2012. The Committee consists of the Permanent Professors, the Director, and the external members (the list can be found above). The fellowship would start in Autumn 2013.

Applications should be made on the IHÉS website (www.ihes.fr) and should include: the application form, a cover letter, a CV, a publication list, a research project, two or three letters of recommendation, and a proposal for a UK mentor. Deadline for applications is **15 November 2012.**

For more information contact: IHÉS, 35 route de Chartres, F-91440 Bures-sur-Yvette, France; tel: +33 1 6092 6605; fax: +33 1 6092 6609; email: hodge@ihes.fr; website: www.ihes.fr.

EUROPEAN MATHEMATICAL SOCIETY

The European Mathematical Society (EMS) is a learned society representing mathematicians across Europe. Around 60 national mathematical societies are members, of which the LMS is one. The governing body of the EMS is its Council, which is comprised of nominated representatives from the member societies and elected representatives of the individual members. Council comprises around 100 people, so it only meets every two years. From 1 to 2 July 2012 the EMS Council met in sunny and historic Krakow. The LMS sent the President, Graham Segal, together with Wilfred Kendall, Rob Wilson, and myself as voting delegates.

We were briefed with a frankly terrifying amount of papers beforehand – around 200 pages – but it gradually became apparent that only a small number of issues were liable to cause much discussion. On the first day, the Kosovar Mathematical Society was accepted (by secret ballot) as a new member of the EMS. I was especially impressed that the fledgling society had raised some of its initial funds by making many of its first members run a sponsored half-marathon! Council also decided that the 7th European Congress of Mathematics in 2016 will take place in Berlin: there had been two other candidate cities, but unfortunately the financial crisis meant that their bids had to be withdrawn.

The second day started with elections to the EMS Executive Committee, which were carried out by a mixture of secret ballot (for the contested posts) and acclamation (for the uncontested ones). Franco Brezzi and Martin Raussen were elected as Vice-Presidents, whilst Laurence Halpern, Gert-Martin Greuel, Alice Fialowski, and Armen Sergeev were elected as Members-At-Large. Council concluded with a panel discussion on changes in publishing procedures and financing and on a proposal of a code of practice presented by the EMS ethics committees.

> Colva Roney-Dougal St Andrews University

17



The *Mathematika* editors, Keith Ball, Alex Sobolev and Frank Smith, going the extra mile to support the journal. The t-shirts were given away by CUP to participants at this summer's European Congress of Mathematics in Kraków.



18

Isaac Newton Institute for Mathematical Sciences

HIGHER STRUCTURE 2013:

OPERADS AND DEFORMATION THEORY

2 - 5 April 2013

in association with the Newton Institute programme Grothendieck-Teichmüller Groups, Deformation and Operads (3 January - 26 April 2013)

Organisers: Anton Alekseev (Université de Genčve), John Jones (University of Warwick), Bruno Vallette (Université de Nice Sophia Antipolis) and Chenchang Zhu Bartholdi (Georg-August-Universität Göttingen).

Theme of conference: The notion of an operad was introduced in the late 60's in algebraic topology as a tool to encode higher homotopies. It enjoyed a renaissance in the 90's when M. Kontsevich and others used algebraic operads in deformation theory.

The passage from classical mechanics to quantum mechanics prompted the general mathematical problem of deformation quantization. In Poisson geometry, such a problem was solved by D. Fedosov for symplectic manifolds, by V. Drinfeld for Poisson-Lie groups, and by M. Kontsevich for Poisson manifolds. In 1998, six months after Kontsevich's original proof, D. Tamarkin gave another but purely operadic proof of the deformation quantization of Poisson manifolds, using the formality of the little discs operad, the Deligne conjecture, and the deformation-quantization of Lie bialgebras due to P. Etingof and D. Kazhdan.

The introduction of operadic graph homology in 1991 by M. Kontsevich allowed V. Ginzburg and M. Kapranov, and E. Getzler and J. Jones to develop the Koszul duality theory on the level of algebraic operads. This theory gives a conceptual explanation of the duality between commutative algebras and Lie algebras in Rational Homotopy Theory, developed by D. Quillen and D. Sullivan. It was also shown by M. Kontsevich, E. Getzler, and Y.I. Manin to share nice relationships with moduli spaces of curves, i.e. quantum cohomology and Frobenius manifolds. The operadic calculus plays a key role in Quantum Field Theory in mathematical physics since it provides an algebraic way to control higher structures.

The goal of this conference is to cover the most recent and interesting developments of these fields of research.

Closing date of the receipt of applications is **31 October 2012**. Further information and application forms are available from the website at www.newton.ac.uk/programmes/GDO/gdow02.html

CAMBRIDGE JOURNALS The Last Word in Mathematics ESAIM Mathematical Modelling and Numerical Analysis Compositio Mathematica Forum of Mathematics **Combinatorics Probability and Co RAIRO** Theoretical Informatics and Applications Mathematika Journal of the Institute of Mathematics of Jussieu Forum of Mathematics Pi Ergodic Theory and Dynamical Systems mputing Bulletin of the Australian Mathematical Society **RAIRO** Operations Proceedings of the ESAIM Control **ESAIM Probability and Statistics** Probability in the Engineering and Informational Sciences The Review of Symbolic Logic Journal of K-Theory Optimisation Res Edinburgh Mathematical Society Journal of the Australian Mathematical Society and Proceedings of the Royal Society of Edinburgh Section A Mathematics Cambridge Journals Calculus of Variat Mathematical Proceedings of the Cambridge Philosophical Society Mechanics 3 ANZIAN Mathematical Structures in Computer Science journals.cambridge.org/maths

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No. 418 October 2012

20

The Leverhulme Trust

RESEARCH AWARDS ADVISORY COMMITTEE

The Leverhulme Trust is now inviting applications for the following research awards:

RESEARCH FELLOWSHIPS to enable experienced researchers, but not only members of academia, who are permanent members of the UK scholarly community to undertake a programme of research. Approximately 90 Fellowships will be available. Up to £45,000 is available for research expenses and/or reasonable replacement costs or loss of earnings. Awards to commence between 1 June 2013 and 1 May 2014 and tenable for 3 to 24 months. Closing date: 8 November 2012.

INTERNATIONAL ACADEMIC FELLOWSHIPS to provide established UK researchers with a concentrated period based in one or more research centres outside the UK during which they will develop new knowledge, skills and ideas, for example by observing and learning ground-breaking techniques or practices, developing new lines of research through overseas collaboration, or developing innovations in teaching.

Up to 15 Fellowships will be available. Awards of up to £22,000 provide reasonable replacement costs and/or essential incidental expenses. Fellowships to commence between 1 June 2013 and 1 May 2014 and tenable for 3 to 12 months. Closing date: 8 November 2012.

STUDY ABROAD STUDENTSHIPS to support a period of advanced study or research anywhere in the world except for the UK and USA. Applicants must have been resident in the UK for at least five years and hold an undergraduate degree. Applicants must hold a degree from a UK institution. Candidates should either be a student at the time of application or have been registered as a student within the last 8 years. Up to 20 awards will be available and these provide an annual maintenance grant of £17,000. a return air fare and baccage allowance. Additional assistance with fees and research costs may also be provided. Studentships to commence between 1 June 2013 and 1 May 2014 and tenable for between 12 and 24 months. Closing date: 7 January 2013.

EMERITUS FELLOWSHIPS to enable retired academics from UK institutions to complete a body of research for publication. Approximately 30 Fellowships will be offered, and up to £22,000 is available for direct research costs related to the project. Fellowships to commence between 1 August 2013 and 1 July 2014 and tenable for between 3 and 24 months. Closing date: 31 January 2013.

Eligible applicants can access application materials from the Trust's website: www.leverhulme.ac.uk

Research Awards Advisory Committee, The Leverhulme Trust, 1 Pemberton Row, London EC4A 3BG

Registered charity number 288371

newsletter@lms.ac.uk

MOULDING THE FUTURE OF MATHEMATICS

For Professor Nick Woodhouse, newly appointed President of the Clay Mathematics Institute, it was relativity that caught his imagination at an early age, paving the way for a successful career in mathematics.

Woodhouse began his career at Oxford where he initially applied to read physics

but was encouraged to do mathematics. After his undergraduate studies, Woodhouse did his PhD at King's College London under Felix Pirani. As he says, 'At the time King's was a major centre for relativity. Roger Penrose was at Birkbeck and there was a very powerful group in London'. Woodhouse briefly attended Princeton University where he worked under Professor John A Wheeler. 'Wheeler was one of the legendary figures of American physics, who had known Einstein

and worked with Bohr on nuclear fission. Richard Feynman was one of his graduate students. He returned to Oxford in 1977 and has been there ever since, taking up his new position in July this year. Woodhouse served as LMS Treasurer from 2001 until 2009.

The Clay Mathematics Institute (CMI) was set up in 1998 by Landon T. Clay and its mission is clearly set out.

- To increase and disseminate mathematical knowledge.
- To educate mathematicians and other scientists about new discoveries in the field of mathematics.
- To encourage gifted students to pursue mathematical careers.
- To recognise extraordinary achievements and advances in mathematical research. With the appointment of Woodhouse the

President's office moved from Cambridge.

MA to Oxford. As Woodhouse explains, 'The CMI supports mathematics internationally and the nature of the Clay Institute is such that it needn't be in any particular place. It remains a US charitable corporation but the President's office is now in Oxford. The type of programmes it supports means that the administration can be in both the US and UK. All financial administration is in the US - where the endowment is held, and the science administration is now in Oxford. The position of



President is more like that of a Chief Executive than an honorary position. The President is responsible for running all scientific activities, under the Scientific Advisory Board and the Board of Directors'.

The CMI administers a number of activities including Research Fellowships. These are awarded on an individual basis and the fellow can undertake these fellowships wherever is convenient. These are similar to Royal Society fellowships and are very prestigious, allowing complete freedom to 'high-flying' mathematicians. Fellows are expected to be international leaders in their respective fields 10 years on.

All decisions on funding are made by the Board of Directors - Landon T. Clay, Lavinia Clay and Thomas Clay - which acts on the advice of the Scientific Advisory Board. 'The value of CMI is that it is a private foundation and is not subject to any outside influences or too

No. 418 October 2012

much bureaucracy. The structure is very flexible and those funded are given considerable freedom'.

The key constraint on the CMI is that it is an Operating Foundation. An operating foundation is a private foundation that uses its resources to conduct research or provide a direct service. This means that the Clay Foundation has to use the bulk of its income to do things itself. For example, Research Fellows are paid direct rather than a grant being paid to a university or institution for distribution. Woodhouse points out, 'It is very important that the activities are of the highest quality scientifically. CMI must be involved in the planning'.

Another important activity is the Senior Scholars Program. The aim of the Senior Scholar Program is to foster mathematical research and the exchange of ideas by providing support for senior mathematicians who will play a leading role as 'senior scientist' in a topical programme at an institute or university. Support for high school programmes in the US is also very important and these are aimed at very high achieving students.

One of the areas that Woodhouse is keen to promote is the Millennium Prizes and he believes that they have been 'hugely influential in raising the profile of mathematics'. He goes on the say, 'It gives the public the idea that there are still some significant problems in mathematics that remain unsolved and these Prizes have an inspirational role'.

Woodhouse's stewardship is in its early stages and he is looking forward to the challenges of the post. As he says, 'The focus of CMI is exceptional individuals internationally, and this will continue in the future'.

POSTGRADUATE COMBINATORIAL CONFERENCE

Report

22

The annual Postgraduate Combinatorial Conference took place at Warwick from 15 to 17 August 2012. Combinatorics is the study of mathematical objects which are countable, or fundamentally discrete in nature. For example, one could study subsets of the integers, considering arithmetic progressions, sumsets and so on, or you could take the first *n* integers and study permutations, or graphs on *n* vertices. Other areas involve Boolean formulae, binary matrices, and strings. Combinatorics is a very broad term, with lots of potential avenues for research, especially because there is a lot of overlap with other areas of mathematics. One can apply combinatorial ideas to many areas of mathematics, and in turn use the approach of other areas of mathematics to solve combinatorial problems.

The three invited speakers illustrated this perfectly, with three very different talks covering applications of discrete mathematics as well as results obtained from other areas. Professor Thomason opened proceedings with a talk on hypergraph containers, a very pure mathematical notion with applications to problems concerning independence in graphs. The second day began with a talk from Dr Gerke, who discussed random graph processes, and various ways of picking graphs at random from special graph classes and making use of results from probability theory. The final invited speaker, Dr Swanepoel, talked about discrete geometry, which is another great example of the interdisciplinary nature of discrete mathematics.

The contributed talks were similarly varied, covering everything from secret sharing to chessboard problems. All of the speakers were early in their careers, and the atmosphere was relaxed and supportive. The PCC has always been a great place to meet with fellow students in the field, but also to practice vital presentation skills in front of one's peers. It is great to see the thriving young research community, and to see our research in context, as doing a PhD can sometimes feel like researching in a vacuum. There was plenty of discussion at each meal and coffee break.

Every day there was a lovely buffet lunch, and a tea and coffee session. This provided a great opportunity to wander around and join in various discussions and to get to know the other attendees. On the first evening we had a formal dinner in one of Warwick's conference centres, and on the second evening we had a barbecue in the common room, followed by a social where we played games and got to know each other further. More information about the Postgraduate Combinatorial Conference can be found at go.warwick.ac.uk/ pcc2012. The conference was supported by an LMS Postgraduate Research Conference Scheme 8 grant. Photographs from the conference can be found on the back cover of this *Newsletter*. PCC 2013 will be held at Royal Holloway, University of London.

> Chris Purcell University of Warwick

VISIT OF ROB KIRBY

newsletter@lms.ac.uk

Professor Rob Kirby (Berkeley) will be visiting the UK in November 2012, giving lectures at Cambridge, Warwick, Imperial College London and Edinburgh, as follows:

 Cambridge: Wednesday 31 October 31 at 16:00 Room MR13, Centre for Math-

CAMBRIDGE

Dense Sphere Packings A Blueprint for Formal Proofs Dense Sphere Packing A Blueprint for Formal Pre Thomas Hales. University of Pittsburgh Provides a significantly simplified proof of the Kepler conjecture · Equips the reader with knowledge of how to apply computer optimization methods to solve a family of related problems in geometry · Demonstrates how a new style of mathematical exposition is developing. in which mathematical claims are supported by formal proofs Content 1. Close packing; 2. Trigonometry; 3. Volume; 4. Hypermap; 5. Fan; 6. Packing; 7. Local fan; 8. Tame hypermap; 9. Further results. September 2012 | Paperback | 9780521617703 | 280 pages | £35.00

ematical Sciences Morse 2-functions and trisections of 4-manifolds Local organiser: Ivan Smith (is200@cam.ac.uk)

- Warwick: Thursday 1 November at 15:00 Room MS.04, Warwick Mathematics Institute, Morse 2-functions and trisections of 4 manifolds, Local organiser: Schleimer (s.schleimer@warwick.ac.uk)
- Imperial: Friday 2 November at 13.30, Huxley Building, Room TBC, Morse 2-functions and trisections of 4-manifolds, Local organizer: Mark Haskins (m.haskins@imperial.ac.uk)
- Edinburgh: Wednesday 7 November at 15.30, Lecture Room C, James Clerk Maxwell Building, The Arf/Rochlin invariant in manifold topology, Sir Michael Atiyah at 17.00, Chern classes for real vector bundles, Local organizer: Andrew Ranicki (a.ranicki@ed.ac.uk)

During his visit to Edinburgh, from 5 to 30 November, Professor Kirby will give a course of 12 lectures on *Topological manifolds: their triangulations and smoothings.* These lectures will be recorded on

23



The 400-year-old Kepler conjecture asserts that no packing of congruent balls in three dimensions can have a density exceeding the familiar pyramid-shaped cannonball arrangement. In this book, a new proof of the conjecture is presented that makes it accessible for the first time to a broad mathematical audience.

The book also presents solutions to other previously unresolved conjectures in discrete geometry, including the strong dodecahedral conjecture on the smallest surface area of a Voronol cell in a sphere packing. This book is also currently being used as a blueprint for a large-scale formal proof project, which aims to check every logical inference of the proof of the Kepler conjecture by computer.

www.cambridge.org

This is an indispensable resource for those who want to be brought up to date with research on the Kepler conjecture.

> CAMBRIDGE UNIVERSITY PRESS

http://newsletter.lms.ac.uk

video and posted on the internet www.maths.ed.ac.uk/~aar/kirby.htm.

For further information contact the local organizer Andrew Ranicki (a.ranicki@ ed.ac.uk). The visit is supported by an LMS Scheme 2 grant.

VISIT OF SERGEY FAVOROV

Professor Sergey Favorov (Kharkov, Ukraine) will be visiting the UK from 29 September to 10 October. His research interests include

at complex analysis, functional analysis, and discrete geometry.

During his visit, Professor Favorov will give talks at:

- Heriot-Watt, 1 October
- King's College London, 4 October
- Cardiff, 8 October

For further information contact Professor Eugene Shargorodsky, KCL (eugene. shargorodsky@kcl.ac.uk). The visit is supported by an LMS Scheme 2 grant.



24

Isaac Newton Institute for Mathematical Sciences

7 – 11 January 2013

SYMMETRY, BIFURCATION AND ORDER PARAMETERS

in association with the Newton Institute programme The Mathematics of Liquid Crystals (7 January - 5 July)

Workshop Organisers: David Chillingworth (University of Southampton) and Peter Palffy-Muhoray (Kent State University).

Aims of the workshop: This workshop in the first week of the Programme has two main aims.

To set the stage for the Programme as a whole, with an introduction to basic models, methods and results as well as outstanding problems, and to bring together researchers working in the field of liquid crystals with mathematicians working on bifurcation theory and geometric mechanics with emphasis on symmetry.

The goal is to inspire mathematicians to work on problems related to liquid crystals, and to introduce liquid crystal experts to new approaches and geometric techniques from bifurcation theory. With these aims in view, the talks will generally have an expository flavour as appropriate for an audience of mathematicians and physicists with diverse backgrounds.

It is anticipated that both the concepts and the interactions initiated at this workshop will continue to develop throughout the Programme, resulting in collaborations and the exploration of new areas.

Further information and application forms are available from the website at www.newton.ac.uk/programmes/MLC/mlcw01.html. Closing date of the receipt of applications is **11 November 2012.**

Formal Aspects of Computing Science Specialist Group

newsletter@lms.ac.uk



BCS-FACS Evening Seminar Joint event with the London Mathematical Society

Tuesday 6 November 2012, 6:00pm



Professor Jack Copeland (The University of Canterbury, New Zealand)

The Mathematical Objection: Turing, Gödel, and Penrose on the Mind

Is what the mind does always computable? What Turing called the 'Mathematical Objection' to machine intelligence suggests not. Turing's subtle and interesting treatment of the Mathematical Objection has a lot to teach us about his view of mind. Turing is often portrayed as a card-carrying computationalist, but he would, Professor Copeland suggests, disagree with the simple claim that the mind is a Turing machine. On Professor Copeland's interpretation of his response to the Mathematical Objection, Turing believes that the Objection has no force at all against machine intelligence, but not because the Objection is necessarily mistaken in its claim that what the mind does is not always computable.

The venue is the British Computer Society 1st Floor, The Davidson Building, 5 Southampton Street, London, WC2E 7HA. Refreshments will be available from 5.30pm.

The seminar is free of charge and open to everyone. If you would like to attend, please register at https://events.bcs.org/book/286/.

27

American Mathematical Society



THEORY OF ALGEBRAIC FUNCTIONS

OF ONE VARIABLE

EUCLIDEAN GEOMETRY A Guided Inquiry Approach

David M. Clark, *State University of New York* Geometry has been an essential element in the study of mathematics since antiquity. Traditionally, we have also learned formal reasoning by studying Euclidean geometry. In this book, David Clark develops a modern axiomatic approach to this ancient subject, both in content and presentation. Mathematically, Clark has chosen a new set of axioms that draw on a modern understanding of set theory and logic, the real number continuum and measure theory, none of which were available in Euclid's time. The result is a development of the standard content of Euclidean geometry with the mathematical precision of Hilbert's foundations of geometry.

MSRI Mathematical Circles Library, Vol. 9 Aug 2012 145pp 978-0-8218-8985-5 Paperback £30.95

A co-publication of the AMS and Mathematical Sciences Research Institute

THEORY OF ALGEBRAIC FUNCTIONS OF ONE VARIABLE

Richard Dedekind & Heinrich Weber Translated and introduced by John Stillwell

This is the first English translation of the classic long paper Theorie der algebraischen Functionen einer Veränderlichen (Theory of algebraic functions of one variable), published by Dedekind and Weber in 1882. The translation has been enriched by a Translator's Introduction that includes historical background, and also by extensive commentary embedded in the translation itself. The translation, introduction, and commentary provide the first easy access to this important paper for a wide mathematical audience: students, historians of mathematics, and professional mathematicians.

History of Mathematics, Vol. 39

Sep 2012 157pp 978-0-8218-8330-3 Paperback £38.95

Co-published with the London Mathematical Society beginning with Volume 4. Members of the LMS may order at the AMS member price. The LMS is registered with the Charity Commissioners.

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guezztimation

Alan Turing's Systems of Logic

The Princeton Thesis Edited and introduced by Andrew W. Appel

Presented here in its original form, this fascinating thesis is one of the key documents in the history of mathematics and computer science.

"For me, this is the most interesting of Alan Turing's writings, and it is a real delight to see a facsimile of the original typescript here. The work is packed with ideas that have turned out to be significant for all sorts of current research areas in computer science and mathematics." —Barry Cooper, University of Leeds Cloth 524.95 978-0-691-15574-6

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REVIEWS

Gems of Geometry by John Barnes, Springer, 2012, 2nd edition, 325 pp, 337 illus., £22.95, ISBN: 978-3-642-30963-2.

This book is based on a series of lectures for adult students given by the author, who is not a professional mathematician but has a long-standing interest in mathematical puz-

zles and curiosities. There are ten chapters, covering a wide range of topics more-or-less closely associated with geometry. Each chapter concludes with suggestions for further reading and some easy Additionally, exercises. there are seven appendices, some of which are essentially chapters in their own right (eg. 14 pages on sphere-packing and crystal structures), and some of which consist of additional resources for the lectures (eq. several pages of "stereo images" of geometric objects, which work like

28

the three-dimensional `magic eye' pictures).

The book covers a huge range of material: chapter headings range from polyhedra, to topology, to chaos and fractals, to relativity. Furthermore, each chapter contains a dense collection of topics. Thus in the first 11 pages the author starts by discussing the folding properties of the "A" series of paper sizes, as a lead-in to the golden ratio. The Fibonacci numbers are introduced, there's a discussion of dividing up rectangles into smaller squares of different sizes (including a suggestion that these make good mathematical jigsaw puzzles), and then we move on to continued fractions and their convergents, where the golden ratio reappears, together with e and ϖ . The pace then slows down slightly, as the rest of the chapter applies these concepts to analysing some basic properties of penta-



gons, making triangles and pentagons out of Meccano, and the appearance of the Fibonacci numbers in plants.

As may be apparent from the previous paragraph, the book has a pick-and-mix feel. Huge numbers of topics are covered, but often very briefly, and there's often no sense of continuity between the different sections. I

have a feeling that this approach was probably very effective for giving popular lectures, but it resulted in me finding the book quite irritating to read, due to the frenetic skipping from subject to subject. The author claims in the final chapter that his most important goal was to demonstrate that "solving and understanding a problem depends very much on getting the right point of view", and in this he succeeds, but at the expense (to my mind) of creating a `cabinet of curiosities' approach to mathematics, rather than displaying its structure or interconnect-

edness. The author doesn't formally state theorems or prove results, which means that although his style can often be engaging, I also found it hard to determine his key points.

Some of my criticism in the previous paragraph may be unfair, as I suspect that the intent is for the reader to dip into the text, looking for the title's "gems of geometry". I mistakenly picked the book up hoping to learn some actual geometry, and on this it failed, but sections of it could be a useful starting point for undergraduate projects. Additionally, it would be very great for anyone looking for some reasonably straightforward mathematical tricks and puzzles, for a general audience.

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Game of Life, Yard Theatre, HWFI, London

The first thing to say about *Game of Life* is that I enjoyed it. It's well worth going to see even if you aren't in a mood for reflecting on the ideas that lie behind it. If you are, however, then it may make you think a bit more about how some ideas from mathematics also apply – up to a point – in the real world. For non-mathematicians, it can be an interest-

ing introduction to concepts like emergence. The play has five characters, for example, but what happens is mostly a sequence of pairwise interactions.

One of the ways in which Conway's game of life is different from the real world is that the rules are fixed. Given an initial configuration, the trajectory and conclusion follow inexorably. Real life isn't quite the same, but it sometimes can feel like it is, which is why it can be useful to understand how



these things go. Thus in the play, Tom, a biology teacher, is an atheist and doesn't want a church wedding, but in the middle of an argument with his fiancée he admits to her that he will eventually give in. For him this is an undesirable conclusion but one he knows he will not be able to avoid. Significantly, he always seems to be carrying a copy of The Selfish Gene.

Game of Life is currently playing at the Yard Theatre in an area the locals call HWFI





(Hackney Wick and Fish Island). It used to be home to various small industries, and as they closed down or left, artists and artisan producers moved in. The area has become more attractive, with the predictable result that rents are going up and the people who live and work there are in danger of being forced out. This sort of thing has happened many times before, for instance in Hoxton in London and SoHo in New York.

Unlike Tom, the local residents are trying to stop the process from following its expected trajectory, to change the rules of the game, so to speak. It's too soon to know whether they'll succeed, but I very much hope they do. In the meantime, even if you're reading this too late to see the production at The Yard, you might want to find your way to HWFI just to visit an interesting bit of London that may not be there for much longer.

> Peter Saunders King's College London

CALENDAR OF EVENTS

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

Please send updates and corrections to calendar@lms.ac.uk.

OCTOBER 2012

1 LMS South-West and South Wales **Regional Meeting, Bristol (417)** 1-3 L-Functions of Curves Workshop, Bristol (417)

3-6 International Conference on Applied and Computational Mathematics, Ankara, Turkey

15-19 Tangled Magnetic Fields in Astroand Plasma Physics INI Satellite Meeting, ICMS Edinburgh (415)

22-25 Weather and Climate Prediction on Next Generation Supercomputers INI Satellite Meeting, Met Office, Exeter (413)

NOVEMBER 2012

6 The Mathematical Objection, BCS-FACS Evening Seminar, London (418) 6 Polynomials and their Roots, Gresham College London

7-9 Mathematical Techniques for Quantum Physics Postgraduate Student Conference, Nottingham (417)

16 LMS AGM, London (418)

24 Early Career Mathematicians' Autumn Conference, University of Greenwich (416) 26-30 Algebraic Geometry, Modular Forms and Applications to Physics ICMS Workshop, Edinburgh (415)

DECEMBER 2012

- 3-7 Quantized Flux in Tightly Knotted and Linked Systems INI Workshop, Cambridge (416)
- 11 From One to Many Geometries, Gresham College London
- 15-17 Thomas Harriot Seminar, St Chad's College, Durham (412)

17-20 Mathematics in Signal Processing 9th IMA International Conference, Austin Court, Birmingham (416)

JANUARY 2013

7-11 Symmetry, Bifurcation and Order Parameters INI Workshop, Cambridge (418) 14-17 Non-equilibrium Statistical Mechanics and the Theory of Extreme Events in Earch Science, Reading 16-18 British Postgraduate Model Theory Conference, Manchester 22 The Queen of Mathematics, Gresham College London

FEBRUARY 2013

19 Are Averages Typical? Gresham College, London

MARCH 2013

- 1 LMS Mary Cartwright Lecture, London
- 18 LMS Northern Regional Meeting,
- Newcastle

18-23 Workshop on Triangulations and Mutations, Newcastle

19 Modelling the World, Gresham College London

25-27 Quantitative Modelling in the Management of Health and Social Care 7th IMA Conference, Central London (416) 25-28 British Mathematical Colloquium, Sheffield

APRIL 2013 2-5 Higher Structure 2013: Operads and Deformation Theory INI Conference, Cambridge (418)

8-9 Mathematics in Finance IMA Conference, Heriot-Watt University (416) 9-11 Large Deviations and Asymptotic Methods in Finance, Imperial College London

18-19 Women in Maths Day, Cambridge

JUNE 2013

20-21 High-Dimensional Inference with Applications, Kent **JULY 2013** 1-2 Bifurcation Theory, Numerical Linear

Algebra and Applications, Bath 1-4 Dense Granular Flows 2nd IMA Conference, Isaac Newton Institute, Cambridge (416) 5 LMS Meeting, London

AUGUST 2013

3-11 Groups St Andrews 2013, St Andrews (410)

31

SEPTEMBER 2013

2 Heilbronn Day, Groups and Their Representations, Manchester 3-6 Brauer's Problems in Representation Theory - 50 years on, Manchester 11-13 Mathematics of Surfaces 14th IMA Conference, University of Birmingham (416)

17-19 Mathematical Cultures Conference, De Morgan House, London (417) **APRIL 2014**

7-10 British Mathematical Colloquium, QMUL

AUGUST 2014

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

LMS-FUNDED MEETING

Postgraduate Combinatorial Conference held at the University of Warwick from 15 to 17 August 2012 (report on page 22)



Robert Schumacher (City University) Andrew McDowell (Royal Holloway, University of London)

Matthew Wells (University of Essex)

