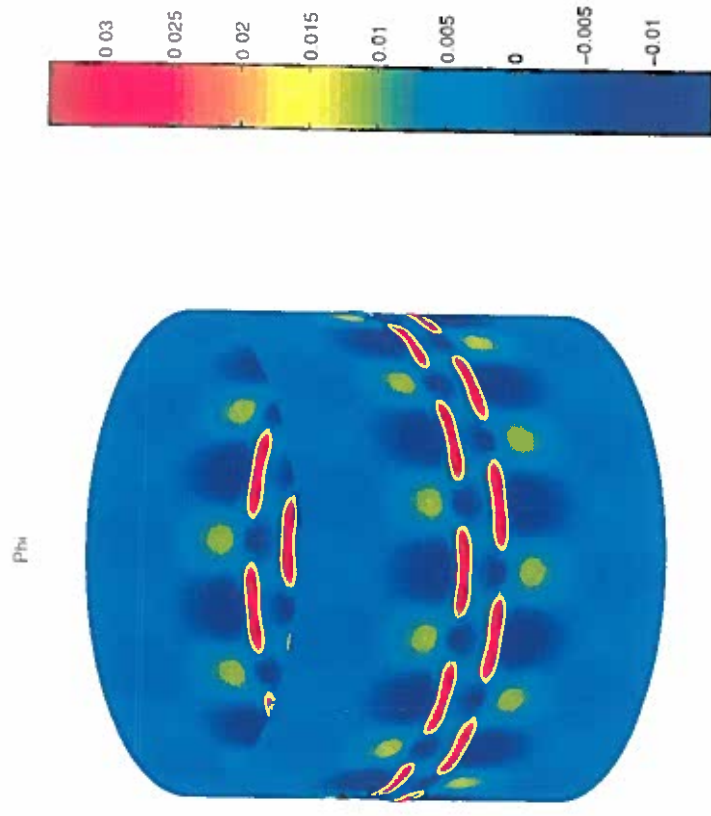


Department of Mathematics



HERIOT-WATT UNIVERSITY
DEPARTMENT OF MATHEMATICS
ANNUAL REPORT 1999

In July 1999, Edinburgh hosted the largest mathematical conference ever held in the UK: ICIAM (International Congress of Applied and Industrial Mathematics) conference. This involved nearly 2000 participants and was probably the most important mathematics conference world-wide held in 1999. The Department, in particular Jack Carr, Michael Levitin and Robin Knops, had been involved in planning the conference over a period of several years and played a major role in its organization; thus we are delighted that the event seems to have been universally judged to be a great success. Earlier in the year, the Department was also responsible for the organisation of three other international conferences run under the auspices of ICMS.

Another of the year's highlights was the success of our Teaching Company Project lead by Dugald Duncan, Chris Eilbeck and Andrew Lacey in collaboration with Edinburgh Petroleum Services. This won the prize for Best Application of Knowledge and Technology in the 1999 TCS awards.

The department continues to grow, and we were pleased to welcome Dr Andy White to the department in October and looked forward to the arrival of further new appointments: Dr Jan Kristensen and Dr Gabriel Lord in January 2000. We were delighted that Des Johnston and Kosiya Khaini were promoted to personal chairs during the year. Kosiya has also been granted leave of absence to take up the Hewlett Packard Senior Research Fellowship at the Isaac Newton Institute.

We had a very good year in winning research grants – the list later in the report totals to over £1 million. Jonathan Sherratt obtained a SHJFC Research and Development grant for a Centre for Theoretical Modelling in Medicine. Major EPSRC grants were won by Dugald Duncan (Overlapping grids for efficient and flexible numerical simulation of welltest in oil and gas reservoirs) and Robert Weston (Algebraic approaches to solvable lattice models). We were also successful in obtaining EC funding. Des Johnston is to co-ordinate a research network on 'Discrete Random Geometries' with total funding of 850K while Chris Eilbeck and Andy White are also involved in other newly funded research networks. Finally EPSRC Partnership for Public Understanding grants have been won by Jonathan Sherratt (A multi-media exhibit for mathematical modelling in medicine) and Nick Gilbert (Faces of mathematics: a portrait gallery).

Cover picture: The stress function of an axially compressed thin cylindrical shell computed as a homoclinic orbit along the axis of the shell (Courtesy of Gabriel Lord).

Undergraduate recruitment was buoyant and the number of PhD students in the Department increased significantly and is now standing at an all time high. Although we acquired some extra office accommodation in the course of the year, we continue to suffer from lack of space to house our increasing numbers of postgraduates and RA's. We are delighted, however, that the University is now committed to building a new Institute of Mathematics which should be completed in 2002 and this will significantly increase our capabilities long term.

During the year, the University bestowed honorary degrees on two mathematicians – Robin Knops, ex-Head of Department, Dean of Science and Vice-Principal and Sir Michael Atiyah, a winner of the Fields Medal, who has been associated with the department through ICMS and the organisation of the ICTAM conference. We look forward to their continuing involvement with the Department.

STAFF

Head of Department

K J Brown

Professors

C E Beevers
K J Brown
J Carr
J C Eilbeck
J Howie
D A Johnston
K Khanin
S Kuksin
A A Lacey
J A Sherratt

Professor Emeritus

R J Knops
O Penrose

Honorary Professor

F M Russell

Readers

R N Hills
M Leviin
B P Rynne

Senior Lecturers

D E R Clark
D B Duncan
G R McGuire
A R Prince

Lecturers

C J Boutilier
N D Gilbert
L E Nicholas
C Noble
H U Rahman
P R Turner
R A Weston
A R White
D G Wilkinson
M A Youngson

Temporary Lecturer

A Lipowski

Research Fellows

J I. Marin
J Rougement

K J Brown, Head of Department

Research Associates

M Brightwell
L Cruzeiro-Hansson
J C Dallon
D J Fiddes
G J Henderson
L Notarantonio
J Paterson
Y Qiu
N J Savill
A Shirikyan
D Watson
D G Wild

Teaching Company Associate

J Tracey

Computing Officers

M Foster
S Mowbray

Secretaries

G Berry (CIAM99)
I Fraser
A Glasgow
P Hampton
S Meikle
F Paterson

VISITORS TO THE DEPARTMENT

The following made long-term visits:

Carstensen C, University of Kiel
Enolskii V Z, Kiev University
Gatto S, TRACS visitor
Harper J, Victoria University of Wellington
Metaftsis V, University of the Aegean

In addition short-term visits were made and seminars given by the following:

Aiyah M, University of Edinburgh
Baladi V, Geneva University
Bartels, S, University of Kiel
Bialas P, Jagellonian University of Krakow
Bialy M, Tel-Aviv University
Binczak S, University of Bourgogne
Bogacz L, Jagellonian University of Krakow
Clarysse F, Katholieke Universiteit Leuven
Doikou A, University of Durham
Elgin J, Imperial College
Espriu D, University of Barcelona
Fish R, Velindre Hospital, Cardiff
Friescke G, University of Oxford
Funken S, University of Kiel
Fursikov N, Moscow State University
Gyongy I, University of Edinburgh
Hayes M A, University College, Dublin
Iwaniec T, Syracuse University
Janke W, University of Leipzig
Jona-Lasinio G, University of Rome
Jozsa R, Bristol University
Kaare-Rasmussen K, Los Alamos National Laboratory, New Mexico
Kaniffman R, University of Alabama
Keating J, Bristol University
Kramkov D, Tokyo-Mitsubishi International plc
Krylov N V, University of Minneapolis
Kuznetsov V, University of Leeds
Lopata M, Krakow
Lyons T, Imperial College
Maistroenko Y, Institute of Mathematics, Kiev
Maslowski B, University of Prague
Mikhailov A, University of Leeds
Murray J, University of Washington
Neishadt A, Moscow University
Nilsson S, Chalmers University, Sweden
Oleaga G, University of Madrid
Owen M, Loughborough University
Pego R, University of Minnesota
Plotnikov P, Novosibirsk University

Polizhaev A, Moscow
 Previato E, University of Boston
 Pushnitski A, Sussex University
 Rodriguez-Archidia JF, University of Seville
 Rougemont J, Geneva University
 Russell FM, Honorary Professor, Heriot-Watt University
 Salvatore P, Mathematisches Institut, Bonn
 Scott A C, DTU Lyngby Denmark and University of Arizona
 Sobolev A, University of Sussex
 Susliko I, Institute of Mathematics, Kiev
 Szutiman A S, University of Zurich
 Tam Y, Imperial College
 Toland J, University of Bath
 Van Steen S, Warwick University
 Veselov S, Loughborough University
 Wiegand M, University of Leipzig
 Wood D, University of Oxford
 Woods A, Bristol University
 Zabornski O, University of Warwick
 Zhikov V, University of Cambridge

CONFERENCES ORGANISED BY MEMBERS OF STAFF

J Carr, R J Knops and M Levitina: International Congress on Industrial and Applied Mathematics (ICIAM), Edinburgh 5 – 9 July 1999
 D B Duncan: Scottish Computational Mathematics Symposium, University of Edinburgh, 15 September 1999
 J Howie, Scottish Algebra Day, 14 May 1999, University of Glasgow, with K A Brown and T H Lenagan
 K Khani: Conference "PDEs and small divisors", May – June 1999, ICMS, Edinburgh
 S Kuksin: Co-organiser of ICMS Workshop "Hamiltonian mechanics and small divisors in PDEs, Edinburgh, 24 May – 4 June 1999
 S Kuksin: member of scientific committee for conference on "Partial Differential and Partial Difference Equations", Moscow, 16 – 20 August 1999.
 A A Lacey: 34th European Study Group with Industry, 6 – 9 April 1999, University of Edinburgh
 L E Nicholas: Annual IMA Symposium, 12 May 1999, University of Strathclyde
 J A Sherratt: Workshop - "From Single Cells to Continua", 22-25 March 1999, ICMS, Edinburgh

CONFERENCE PAPERS AND SEMINARS GIVEN BY MEMBERS OF STAFF

C E Beevers
 Conference Talk, ICIAM 99, Fourth International Congress on Industrial and Applied Mathematics, Edinburgh 5-9 July 1999, "The emerging philosophy behind computer based assessment"
 Conference Talk, Twelfth International Conference on Technology and Collegiate Mathematics, San Francisco, November 1999, "Automatic assessment – Mathwise and beyond"
 Seminar, Paisley University, May 1999 to Mathwise User Group meeting, "Assessment in Mathwise modules"
 Seminar, Heriot-Watt University, May 1999, Mathematics teachers conference, "Introduction to CALM"
 Seminar, Heriot-Watt University, September 1999, Commercialisation Forum "Experiences with marketing CALM"
 C J Boulter
 Invited talk, symposium on "Wetting Phenomena in Petroleum Reservoirs", Leuven (Belgium), 23-24 April 1999, "Unbinding in ternary amphiphilic systems"
 Seminar, Imperial College, May 1999, "Wetting and interface behaviour – from classical superconductors to complex fluids"
 K J Brown
 Seminar, University of Leicester, February 1999, "Complexity in the structure of bifurcation diagrams for nonlinear boundary value problems"
 D B Duncan
 Conference Talk, Dundee conference on Numerical Analysis, 29 June – 2 July 1999, "Approximating a convolution model of phase separation"
 Seminar, Dundee University, February 1999, "Approximating the Becker-Döring equations"
 Seminar, Bath University, June 1999, "Numerics of retarded potential integral equations"
 J C Fillbeck
 Invited talk, main speaker, Applied Mathematics Colloquium, Gregynog, 26-28 May 1999, "Solitons and breathers in discrete lattices – from coupled pendulums to HTc" and "Complex Algebraic geometry and nonlinear integrable systems – updating Baker using Maple"
 Seminar, Mathematical Institute Oxford, May 1999, "Solitons and breathers in discrete lattices – from coupled pendulums to HTc"

- Seminar, University of Leicester, October 1999,
 "Automorphism groups acting on trees"
 Seminar, University of Edinburgh, October 1999,
 "Homology of Peiffer products of groups"
 Seminar, University of Exeter, November 1999,
 "Automorphism groups acting on trees"
 Seminar, University of Glasgow, November 1999,
 "Homology of Peiffer products of groups"

- Invited talk, British Mathematical Colloquium, University
 of Southampton, 29 March - 1 April 1999, "Rigidity
 of some one-relator groups"
 Invited series of 4 lectures, Summer school on "Groups and
 Applications", University of the Aegean, 11-18 July,
 1999, "Hyperbolic groups"
 Seminar, University of Leeds, October 1999, "Tree actions
 of automorphism groups"

- Invited talk, VIELATT99 meeting, Technical University of
 Vienna, 8 September 1999, "Potts models on
 quenched random graphs"
 Contributed talk, Rutgers University, 10 December 1999,
 "Potts models on quenched random graphs"
 Seminar, University of Leipzig, 22 January 1999, "Vertex
 models on random graphs"
 Seminar, Department of Physics, University of Manchester,
 24 March 1999, "Thin animals"

- Invited talk, conference on "Turbulence", June 1999, Nice,
 "Burgers turbulence"
 Conference Talk, "Integrating Integrability into
 Mathematics and Science", Tucson, Arizona, 29.31
 October 1999, "Multidimensional continued
 fractions"
 Seminar, Oxford University, January 1999, "Dynamics of
 minimisers and random Burgers equation"
 Seminar, Liverpool University, February 1999,
 "Multidimensional continued fractions"
 Seminars, Heriot-Watt University, February 1999, three
 talks on "Random Burgers equation"
 Seminar, Observatoire de Nice, April 1999, "Simultaneous
 Diophantine approximations"
 Seminar, University of Marsel (Lumini), April 1999,
 "Random Burgers equation"
 Seminar, Isaac Newton Institute, University of Cambridge,
 October 1999, "Dynamical systems approach to
 Burgers turbulence"

- Invited talks: BRIMS, Hewlett-Packard Laboratories,
 October and December 1999, three talks on
 "Random Burgers equation"

- Seminar, Heriot-Watt University, November 1999,
 "Thermodynamic formalism for random dynamical
 systems"

- Seminar, University of Warwick, November 1999,
 "Thermodynamic formalism for random dynamical
 systems"

- Seminars, CIMAT, Guanajuato, Mexico, November 1999,
 two talks, "Burgers equation and multidimensional
 continued fractions"

- Seminar, King's College, University of Cambridge,
 December 1999, "Thermodynamic formalism and
 Gibbs measures for random dynamical systems"

- Invited talk, Advances in Mechanics conference, University
 College, Dublin, (Irish Mechanics Society), 24 - 25
 May 1999, "Uniqueness in the null traction problem
 in finite elasticity"

- Invited talk, The IN Sueddon 80th Birthday Meeting,
 University of Glasgow, 3 December 1999,
 "Alternative spatial behaviour in the incompressible
 linear elastic prismatic cylinder"

- Invited talk, workshop on "Integrable Systems", Leeds, 5-6
 March 1999, "KAM theory for nearly integrable
 PDEs"

- Invited talk, conference "Geometry and Analysis", Obernai,
 France, 4-10 June 1999, "On elliptic equations for
 maps, valued in compact manifolds"

- Invited cycle of four lectures at the summer school
 "Hamiltonian equations", Cosenza, Italy, 1-10 July
 1999, "Qualitative theory of Hamiltonian PDEs"

- Invited talk, conference on "Partial differential and partial
 differential equations", Moscow, 16-20 August
 1999, "Elliptic equations for maps, valued in
 compact manifolds"

- Seminar, University of Sussex, January 1999, "On the
 turbulence-limit in nonlinear Schrödinger equation"
 Seminar, University of Edinburgh, March 1999, "On Singh
 lemma and harmonic maps"

- Seminar, University of Warwick, April 1999, "On
 turbulence in nonlinear PDEs"

- Seminar, University of Minneapolis, June 1999,
 "Turbulence in nonlinear PDEs",

- Seminar, Moscow State University, December 1999 "2D
 hydrodynamics and Gibbs measures"

Invited talk, IMA Minisymposium on Mathematical Investigations of Models in Combustion, University of Minnesota, Minneapolis, Minnesota, USA 14-17 November 1999, "Influence of reactant consumption on a reaction diffusion model for ignition"
 Conference Talk at ICIAM 99, Edinburgh, 5-9 July 1999, "Thermal runaway in nonlocal models of Ohmic heating"
 Conference Talk at ICIAM 99, Edinburgh 5-9 July 1999, "Heat and mass transport in sugar stoks"
 Seminar, Reading University, January 1999, "The influence of reactant consumption on a reaction diffusion model for ignition"
 Seminar, Universidad de la Laguna, Tenerife, Spain, March 1999, "Blow-up for a nonlocal hyperbolic problem modelling thermal treatment of foods"

Conference Talk, The 1999 UAB-GTT International Conference on Differential Equations and Mathematical Physics, Birmingham, Alabama (USA), 16-20 March, 1999, "Commutators, spectral trace identities, and applications"
 Invited talk, EPSRC Gregynog Workshop, Computational and Analytic Problems in Spectral Theory, Gregynog, 11-16 July 1999, "Commutators, spectral trace identities, and applications"
 Conference Talk, International conference on Analysis and Mathematical Physics in honour of Lars Garding on his 80th birthday, Lund, Sweden, 16-20 August 1999, "Applications of spectral trace identities"
 Conference Talk, Workshop on Differential Equations and Physics on Fractals at the Newton Institute Cambridge, March 1999, "PDEs in domains with fractal boundary: unsolved problems"
 Functional Analysis Seminar, University of Oxford, October 1999 "Commutators, spectral trace identities, and applications"

Invited talk, CALM workshop "New Learning Software", Heriot-Watt University, May 1999, "The new CALM CD - units for Highers"
 Invited talk, workshop on "The WALTER Template", Napier University, May 1999, "Designing questions for interactive assessment"

Invited talk, workshop on Statistical Mechanics, Erwin Schroedinger Institute, Vienna 22-26 February 1999, "Two-dimensional turbulence"
 Invited talk, 81st Statistical Mechanics conference, Rutgers University, USA, 9-10 May 1999, "Close to close packing"
 Invited talk, ICIAM 99, Fourth International Congress on Industrial and Applied Mathematics, Edinburgh 5-9 July 1999, "Mathematical models of nucleation and coarsening in alloys: an overview"
 Invited talk, Societa Italiana di Fondamenti della Fisica conference on "Chance in Physics: Foundations and Perspectives", Ischia, 29 November - 23 December 1999, "The direction of time"
 Invited talk, workshop "Dynamics of phase transitions: discrete and continuum models", Oxford University Mathematics Institute, 6-7 December 1999
 "Diffusion-induced grain boundary motion"
 Seminar, University of Strathclyde, April 1999, "The Lifshitz-Slyozov coarsening equations and their behaviour at large times"

Invited talk, Third Shanghai Conference on Designs, codes and finite Geometries, Shanghai, Jiao Tong University, China, 14-18 May 1999, "Covering sets of spreads in PG(3,q)"
 Invited talk, Second Pythagorean Conference, Samos, Greece, 31 May - 5 June 1999, "Flag-transitive affine planes of order at most 125"
 Invited talk, Fifth International Conference on Finite Fields, Augsburg, 2 - 6 Germany 1999, "A permutation problem for finite fields"
 Seminar, University of East Anglia, October 1999, "A permutation problem for finite fields"
 Seminar, Newcastle University, December 1999, "A permutation problem for finite fields"
 Conference Talk, Equadiff 99, Berlin, 7 August 1999, "Geometric properties of the Fucik spectrum"

- Invited talk, Meeting of the Society for General Microbiology, Edinburgh, April 1999.
 "Mathematical modelling of signalling in Dictyostelium discoideum".
 Invited talk, Dynamics Days, Como, May 1999.
 "Mathematical modelling of wound healing".
 ICIAM99 minisymposium on "Spatiotemporal modelling of biological systems: bridging the scale gap", Edinburgh, July 1999, "Microscopic vs macroscopic mathematical models for spatiotemporal dynamics during wound healing".
 ICIAM99 minisymposium on "Tumour invasion and angiogenesis", Edinburgh, July 1999, "Mathematical modelling of tumour invasion: basic mechanisms and therapeutic implications".
 Invited talk, Scottish Computational Mathematics Symposium, Edinburgh, September 1999,
 "Computational problems in mathematical biology".
 Workshop: "From Single Cells to Continua", 22 - 25 March 1999, ICMS, Edinburgh
 Oncology seminar, University of Edinburgh, February 1999,
 "Theoretical modelling in cancer biology"
 Edinburgh Mathematical Society Colloquium, University of Aberystwyth, March 1999, "Modelling biological pattern formation"
 Seminar, University of Dundee, October 1999, "Oscillatory waves and chaotic wakes behind predator-prey invasion"
 Seminar, University of Stirling, November 1999,
 "Mathematical modelling of cancer"

- Conference Talk, Workshop on "Hamiltonian Mechanics and Small Divisors in PDEs", ICMS Edinburgh 23 May - 4 June, "Local dynamics of solutions for semilinear hyperbolic equations"
 Conference Talk, CIME summer school "Theory and Applications of Hamiltonian Dynamics", 1-10 July 1999, Cetraro, Italy, "A version of the Perron-Frobenius theorem and applications"
 Seminar, Edinburgh University, December 1999,
 "Exponential dichotomy and Calderon projections for hyperbolic PDE's"
 Conference Talk, Transpenine Topology Triangle, May 1999, "Representations of homotopy surface categories", Newcastle
 Seminar, Glasgow Algebra Seminar, June 1999, "Dickson invariants and symmetric groups"
 Seminar, Auckland Geometry Seminar, August 1999,
 "Introduction to topological quantum field theories"

- Invited talk, 1st meeting of UK collaboration on Integrable Boundary Quantum Field Theory, 23 October 1999, York University, "An introduction to crystals and paths"
 Conference Talk, Third Annual European TMR Conference on Integrability, Non-Perturbative Effects and Symmetry in Quantum Field Theory, 20 - 25 September 1999, "Impurity operators in RSOS models"

- Conference Talk, British Ecological Society Winter meeting, January 1999, University of Leicester,
 "Spatial patterns in host-pathogen systems"
 Seminar, University of Dundee, April 1999, "Spatial models in ecology"

SERVICE TO THE MATHEMATICAL COMMUNITY

- External examiner (BSc), University of Sunderland
 Deputy Chairman, Mathwise Executive Committee

- External Examiner (PhD), University of Glasgow
 Member of Appointments Board of Chalmers University, Gothenberg
 Executive Editor, Proceedings of the Royal Society of Edinburgh

- External Examiner (BSc), University of Aberdeen
 Chairman, Programme Management Committee ICIAM 99
 Executive Editor, Proceedings of the Royal Society of Edinburgh
 Organiser of 18 2-hour mathematics masterclasses for primary school children

- External examiner (PhD), Trinity College Dublin
 Member of EMS Centenary (Grants) Committee

- External examiner (PhD), University of Dijon, February 1999
 Member of EPSRC Mathematics peer review college

- Conference Talk, Transpenine Topology Triangle, May 1999, "Representations of homotopy surface categories", Newcastle
 Seminar, Glasgow Algebra Seminar, June 1999, "Dickson invariants and symmetric groups"
 Seminar, Auckland Geometry Seminar, August 1999,
 "Introduction to topological quantum field theories"

J Howie

External examiner (BSc), York University
Member of EPSRC evaluation panel for Pure Mathematics
Member of EPSRC Mathematics peer review college
Member of editorial board, London Mathematical Society
Member of editorial board, International Journal of Algebra and Computation
President, Edinburgh Mathematical Society
Member of executive committee, ICMS
Member of scientific committee, British mathematical Colloquium
External examiner (PhD), University of Wales, Swansea
Member of editorial board, Dynamics and Stability of Systems
Director of ICIAM 99
Member of ICIAM 99 Local Organising Committee
Member of ICMS Executive Committee (Convener unit September 1999)
Vice-President, ISIMM Executive Committee
Convener, ISIMM Editorial Board
Editor-in-Chief, Applied Mathematics and Mathematical Computation (Book Series); Chapman & Hall/CRC Press
Member of editorial board, Meccanica
Member of Scientific Committee, STAMM 2000, University College, Galway, July 2000
Member of Scientific Committee, Continuum Mechanics and Thermodynamics, Potsdam, Germany, July 2001

A A Lacey

External examiner (BSc), Strathclyde University
External examiner (PhD), Universidad de La Laguna, Tenerife, Spain

M Levitin

Member of Programme Management Committee, ICIAM 99
External examiner (PhD), University of Sussex

G R McGuire

External examiner (BSc), University of Glasgow
Member of Scottish Mathematical Council committee

I E Nicholas

Vice-Chairman, IMA, (Scottish Branch)

G Penrose

External examiner (PhD), Materials Science Department, Oxford University, April 1999
Member of Edinburgh Mathematical Society Investment Committee
Member of editorial board, Proceedings of the Royal Society of Edinburgh Proceedings A

A R Prince

External examiner (BSc), University of Stirling
External examiner (PhD), University of Wales, Aberystwyth

J A Sliemant

Member of EPSRC Mathematics Program earmarked studentship panel
Member of EPSRC Mathematics peer review college
Member of EPSRC Review Panel for Isaac Newton Institute
Member of Wellcome Trust Research Grant Panel.
Associate Editor, IMA Mathematical Biology Journal of Mathematics Applied in Medicine and Biology.
Associate Editor, Journal of Theoretical Medicine.
External examiner (PhD), University of Leeds.

P R Turner

Topology editor, Proceedings of the Edinburgh Mathematical Society

R A Weston

Member of EPSRC Mathematics peer review college
Member of EPSRC Mathematics Program Responsive Mode Grant Assessment Panel

RESEARCH AND OTHER GRANTS AND MISCELLANEOUS INCOME REPORTED IN 1999

£425,000	J A Sherratt: from the Scottish Higher Education Funding Council, "Centre for Theoretical Modelling in Medicine", August 1999 – July 2002.	£3,178	R J Knops: from the European Office of Aerospace, Research and Development, support for ICTAM 99
£129,086	D B Duncan: from the Engineering and Physical Sciences Research Council, "Overlapping grids for efficient and flexible numerical simulation of welltests in oil and gas reservoirs."	£3,050	A A Lacey: from the London Mathematical Society to support the 34 th European Study Group with Industry
£127,919	R A Weston: from the Engineering and Physical Sciences Research Council, "Algebraic approaches to solvable lattice models"	£2,340	S Kuksin: from the Royal Society to support the visit of Professors S Bolotin and D Treschev, University of Moscow
£71,652	D A Johnston: EU Improving Human Potential Network Grant, "Discrete Random Geometries: From Solid State Physics to Quantum Gravity", 2000 – 2003, 12 Network sites	£2,000	R J Knops: from Scottish Provident to support ICTAM 99 and ICMS
£53,490	P R Turner: from the Engineering and Physical Sciences Research Council, "Classifying spaces of 1+1 dimensional cobordism categories"	£1,300	P R Turner: from the Nuffield Foundation, for travel and equipment
£46,475	D A Johnston: ESF Network Grant, "Geometry and Disorder: From Membranes to Quantum Gravity, 2000 – 2003, 12 Network sites	£850	S Kuksin: from the London Mathematical Society, to support the visit of Professor A Fursikov, Moscow State University
£45,000	C E Bevers: University of Cambridge Local Examinations Syndicate, continued support for the development of computer examinations	£860	J Carr: from The Royal Society of Edinburgh to support Primary Mathematics Masterclasses
£21,428	K Khanin: European Science Foundation, for a conference "Dynamical Systems 2000" to be held at ICMS from 10-14 July 2000.	£700	S Kuksin: from the London Mathematical Society, to support the visit of Professor B Maslowski, University of Prague
£20,000	R J Knops: from Schlumberger, support for ICTAM 99	£469	D B Duncan: London Mathematical Society, support for the Scottish Computational Mathematics Symposium 1999, Edinburgh, 15 September 1999
£18,780	K Khanin: from the Engineering and Physical Sciences Research Council, for a conference "Dynamical Systems 2000" to be held at ICMS from 10-14 July 2000	£400	S Kuksin: from the Edinburgh Mathematical Society, to support the visit of Professor G Jona-Lasinio, University of Rome
£13,100	J A Sherratt: from the Engineering and Physical Sciences Research Council, "A multi-media exhibit on mathematical modelling in medicine" Engineering and Physical Sciences Research Council, January 1999 – March 2000	£400	K Khanin: from the Edinburgh Mathematical Society, to support the visit of Dr Yuri Maistrenko, Institute of Mathematics, Kiev
£10,000	R J Knops: from the London Mathematical Society to support ICTAM 99	£350	J C Eilbeck: from the Royal Society of Edinburgh, visitor grant for Dr E Peviato, University of Boston
£10,000	C E Bevers: from EQL Livingston, support for collaborative assessment software	£1,018,347	
£5,520	J C Eilbeck: from The Royal Society of London, Visiting Fellowship grant for V Z Enolskii, University of Kiev		
£5,000	R J Knops: Cambridge Environmental Research Consultants, to support ICTAM 99		

HIGHER DEGREES and PRIZES AWARDED

Prize: D B Duncan, J C Eilbeck and A A Lacey: Best Application of Technology and Knowledge, TCS Awards 1999, for project with Edinburgh Petroleum Services Ltd

DSc (Hon) Professor R J Knops, Heriot-Watt University, November 1999

MSc in Mathematics of Nonlinear Models - joint with the University of Edinburgh

Pamela Adamson	Compression of Optical Pulses
Darren Fidler	Dynamics of HIV and Immune Cell Interaction
Andrew Meycr	Analysis of Equilibria, Bifurcations and Dynamics of an Epidemic Model
Valerie Porter	The Morning Glory of the Gulf of Carpentaria
Avai Rajendra	Existence Theorems for Elliptic PDEs
Jaclyn Screen	Existence Theorems for Elliptic PDEs
Wessel van Wieringen	Mixtelling some Free-Boundary Problems

Publications

C E Beevers, D G Wild, G R McGuire, D Fiddes, M A Youngson
Issues of partial credit in mathematical assessment by computer
Association for Learning Technology Journal
7, 26-32, 1999

C E Beevers, D J Fiddes, G R McGuire, M A Youngson
The emerging philosophy behind computer-based assessment
Teaching Mathematics and its Applications, IMA
18, 147-149, 1999

C E Beevers, P Bishop, D Quinney
Mathwise testing and assessment
Eleventh International Conference on Technology and Collegiate Mathematics,
35-39, 1999

C J Boulter, F Clarysse
Adsorption phenomena in amphiphilic systems
Physical Review E
60, R2472-2475, 1999

G A Afrouzi, K J Brown
On principal eigenvalues for boundary value problems with indefinite weight and robin boundary conditions
Proceedings of the American Mathematical Society
127, 125-130, 1999

G A Afrouzi, K J Brown
Positive solutions for a semilinear elliptic problem with sign changing nonlinearity
Nonlinear Analysis
36, 507-510, 1999

J Carr, R M Dunwell
Asymptotic behaviour of solutions to the Becker-Doring equations
Proceedings Edinburgh Mathematical Society
42, 415-424, 1999

J Carr, R M Dunwell
Kinetics of cell surface capping
Applied Mathematics Letters
12, 45-49, 1999

- J Carr, O Penrose**
Asymptotic behaviour of solutions to a simplified Lifshitz-Slyozov equation
Physica D
124, 166-176
- G Little, R Tuttle, D E R Clark, J R Corney**
The Heriot-Watt feature finder: CIE97 results
Journal of Computer-Aided Design
30, 991-996, 1999
- Y Yong, J L Murray, J R Corney, D E R Clark**
Convex hull of a planar set of straight and circular line segments
Engineering Computations
8, 858-875, 1999
- I. Brizhik, I. Cruzeiro-Hansson, A Eremko**
Electromagnetic radiation influence on nonlinear charge and energy transport in biosystems
J Biol Phys
24, 223-232, 1999
- I. Brizhik, L. Cruzeiro-Hansson, A Eremko, Y Olkhovska**
Polaron dynamics and Peierls-Nabarro barrier in a discrete molecular chain
Sov Metals
7032, 1999
- J C Dallon, J A Sherratt, P K Maini**
Mathematical modelling of extracellular matrix dynamics using discrete cells: fibre orientation and tissue regeneration
Journal of Theoretical Biology
199, 449-471, 1999
- J Howie**
Besivina-Brady groups and the plus construction
Math Proc Cambridge Phil Soc
127, 487-493, 1999
- D A Johnston**
Symmetric vertex models on planar random graphs
Phys Lett B
463, 9-18, 1999
- P Bialas, Z Burda, D A Johnston**
Phase diagram of the mean field model of simplicial gravity
Nuclear Physics B
542, 413-424, 1999
- W Janke, D A Johnston**
The wrong kind of gravity
Phys Lett B
460, 271-275, 1999
- D A Johnston**
A Potts/Ising correspondence on thin graphs
J Phys A
32, 5029-5036, 1999
- K Khanin,**
Burgers equation with random force
Proceedings of the XII International Congress in Mathematical Physics, Brisbane, Conference, July 1997, International Press, Boston
32, 153-162, 1999
- R J Knops, P Villaggio**
Recovery of stresses in a beam from those in a cone
J Elast
53, 63-75, 1999
- J Kristensen**
On the non-locality of quasiconvexity
Ann. Inst. Henri Poincaré, Analyse non Linéaire
16, 1-13, 1999
- J Kristensen**
Lower semicontinuity in spaces of weakly differentiable functions
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