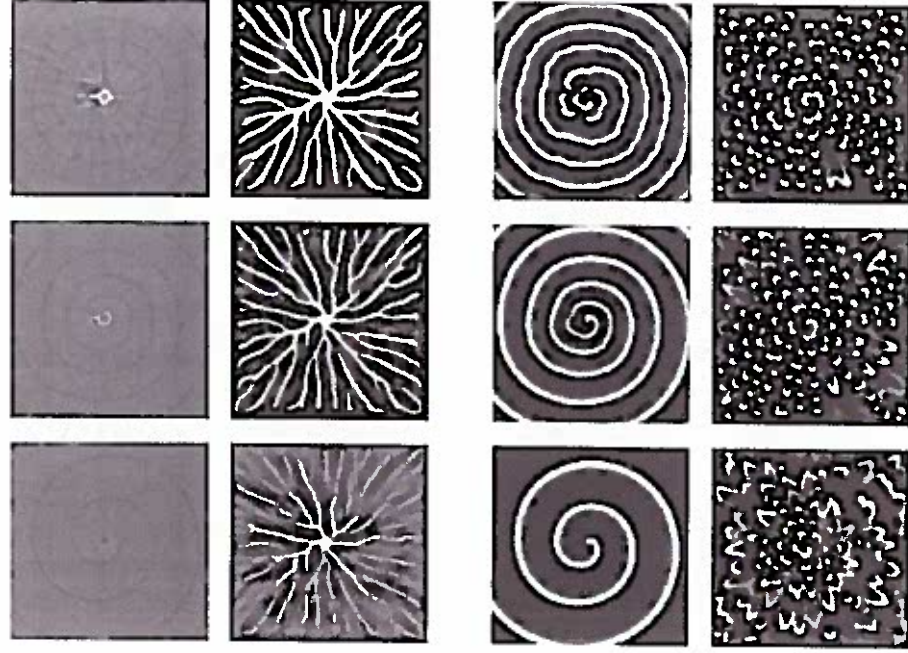
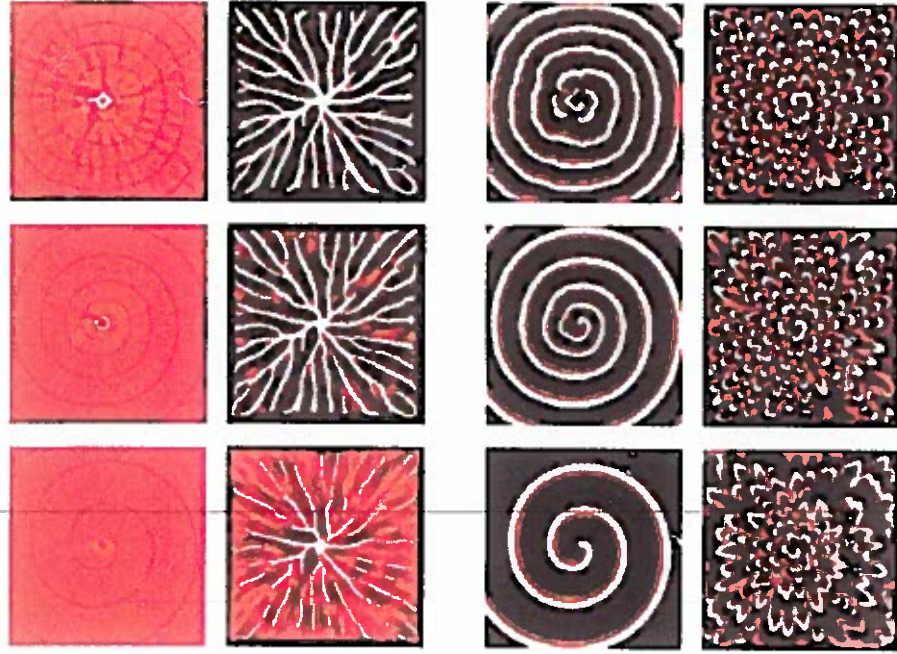


Department of Mathematics

Department of Mathematics



HERIOT-WATT UNIVERSITY
DEPARTMENT OF MATHEMATICS

ANNUAL REPORT 1998

The last year has been one of considerable change for the Department of Mathematics at Heriot-Watt. Two long-standing members of staff, Professor Robin Knops and Mr Jim Bree, retired during the year. Robin Knops has been at Heriot-Watt for 27 years, including periods as Head of Department, Dean of Science and Vice-Principal; we are pleased that he continues to be involved in the local mathematical community through ICMS and ICIAM99.

In 1998 we were pleased to honour one of our former colleagues, Professor John M Ball, FRs, who was given an honorary degree in the July graduation.

The department has also welcomed many new faces during the year, which started with the arrival of Professors Sergei Kuksin and Jonathan Sherratt, and Dr Robert Weston. During the summer, Drs Chris Boulter and Paul Turner were appointed, and joined us later in the year, and we look forward to the arrival of Drs Jan Kristensen and Andrew White, who have recently been appointed.

With these new appointments, our research activity continues to grow and broaden. An exciting development during the year was the award of a prestigious grade 1 to a Teaching Company project, lead by Dr Dugald Duncan and Professors Chris Eilbeck and Andrew Lacey, in collaboration with Edinburgh Petroleum Services, and follow-up projects are building on this success. Mathematical biology is growing within the department, and a Scottish Theoretical Biology Forum, part-lead by Professor Jonathan Sherratt, was established during the year. Professor Cliff Beevers and the CALM group went from strength to strength, gaining a major contract in 1998 for the development of computer examinations for use in the Far East.

As in previous years, members of the Department made several invited lectures at international conferences. Most notable of these was the invite address given by Professor Sergei Kuksin at the International Congress of Mathematicians in Berlin.

In 1999, we look forward to a number of scientific meetings run by members of the department at the International Centre for Mathematical Sciences, and to the Fourth International Congress of Industrial and Applied Mathematics, coordinated by Professor Jack Carr and Dr Michael Levitin, which will bring several thousand mathematicians to Edinburgh.

STAFF**Head of Department**

J Howie

Professors

C E Beevers
K J Brown
J Carr
J C Eilbeck
R J Knops
S Kuksin
A A Lacey
J A Sherratt

Professor Emeritus

O Penrose

Honorary Professor

F M Russell

Readers

R N Hills
D A Johnston
K Khanin
B P Rynne

Senior Lecturers

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

Lecturers

C J Boulter
J Bree
B P Dodds
N D Gilbert
M Levitin
L E Nicholas
C Noble
H U Rahman
P R Turner
R A Weston
D G Wilkinson
M A Youngson

Temporary Lecturers

R M Dunwell
A Lipowski

Research Fellow

J L Marin

Research Associates

L Cruzero-Hansson
J C Dalton
D J Fiddes
E Notorantonio
D G Wild

Teaching Company Associate

J Tracey

Computing Officers

M Foster
S Mowbray

Secretaries

I Fraser
P Hampton
S Meikle
F Paterson

VISITORS TO THE DEPARTMENT

The following made long-term visits:

Bario R, Zaragoza
 Binczak S, Dijon
 Enolskii V Z, Kiev
 Metaftsis V, University of the Aegean
 Srisatkunaratjah S, Jaffna

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

Baesens, C, Cambridge University	Nechaev, S, CNRS-Universite Paris XI & Landau Institute
Blank, Michael, Moscow	Pego, R, University of Maryland
Braden, H W, Edinburgh University	Piatnitski, A, Moscow and Narvik
Brindley, J, Leeds	Pohozhaev, S, Steklov Institute, Moscow
Buchstaber, V, Moscow	Pollicott, M, University of Manchester
Carstensen, C, Kiel	Richmond, N J, Leeds
Chaplain, M A J, Dundee	Silhavy, M, Prague
Chaves, M, Universidad Autonoma de Madrid	Skubachevskii, A L, Moscow
Davie, S, Edinburgh University	Slemrod, M, University of Wisconsin
Davies, B, King's College	Suhov, Y, Cambridge University
Ekeland, I, Université Paris-Dauphine	Ward, M, University of British Columbia
Enolskii, V, Kiev	Weigel, M, Leipzig
Evans, D, Bristol University	Wilson, J S, Birmingham University
Eynard, B, Durham University	
Friedman, A, University of Minnesota	
Funken, S, Kiel	
Gaffney, E A, Oxford	
Gilson, C, Glasgow University	
Gonzales, R, Madrid	
Gordon, I G, Edinburgh University	
Handley-Schachler, S, Edinburgh Petroleum Services	
Henkel, M, LPS, Nancy	
Iserles, A, Cambridge University	
Kovalev, A, Edinburgh University	
Kropholler, P H, Queen Mary & Westfield College	
Lewis, M A, University of Utah	
Mikhailov, S, Leeds University	

CONFERENCES ORGANISED BY MEMBERS OF STAFF

Scottish Computational Mathematics Symposium, Strathclyde University, 21 September 1998 – D B Duncan

NBDES Anniversary Meeting, 2 February 1998, University of Glasgow – D B Duncan

ICMS meeting on Algebraic Geometry, the "Baker" meeting, 19-22 September 1998 – J C Eilbeck, with E Rees, Edinburgh and V Z Enolskii, Kiev

Workshop on "Computational and Geometric Aspects of Modern Algebra", Heriot-Watt University, 22 – 31 July 1998 – N D Gilbert and J Howie, and M D Atkinson, S A Linton and E F Robertson, St Andrews

Scottish Algebra Day, 1 May 1998 – J Howie with K A Brown, Glasgow and T H Letagan, Edinburgh

Meeting to mark the retirement of R J Knops, 11 September 1998, "Applied Analysis and Continuum Mechanics" - J C Eilbeck, J Howie, and A A Lacey

Workshop on "Chaos and Fractals in Medicine", 15 – 16 December 1998, University of Warwick – J A Sherratt

INVITED PAPERS AND SEMINARS GIVEN BY MEMBERS OF STAFF

Professor C E Beevers Seminar, MATHWISE User Group, Nottingham University, January 1998 (with J Dörner, Napier University), 'CAL – Assessment by Computer'
 Seminar, ICBL, Heriot-Watt University, January 1998 (with Dr D G Wild), 'CALM view of assessment'
 Seminar, Training day for mathematics examiners, Cambridge University, April 1998 (with Dr D G Wild), 'Setting questions in a template'
 Invited talk, "Teaching over the Web" workshop, Heriot-Watt University, June 1998 'Assessment in the SUMSMAN project'
 Conference talk "SUMSMAN Training Day" (Video conference from Napier University), September 1998, 'Assessment in the SUMSMAN project'
 Contributed talk, "MATHWISE User Group First Annual Conference", Birmingham University, September 1998, 'Using MATHWISE in a university course'
 Contributed talk "Alt-C Annual Conference", Oxford University, September 1998, 'Issues of partial credit in mathematical coursework'

Contributed talk, "Assessment Strand of TALISMAN Video Conference to Scottish Universities", October 1998, from Napier University studio, "The role of the computer in assessment"

Professor J Carr

Seminar, University of Oxford, June 1998, 'Coarsening'
Seminar, University of Glasgow, October 1998,
'Asymptotics of nonlocal partial differential equations'
Lecture, International Congress of Mathematicians, Berlin, August 1998, 'Lifshitz-Slyozov theory of coarsening'

Dr J C Dallon

Seminar, Brigham Young University, April 1998,
'Mathematical modelling in biology: wound healing and slime mould'
Invited talk, Workshop on "Pattern Formation and Morphogenesis: the Basic Process" (part of the IMA program on Mathematical Biology), Minnesota, 7-12 September 1998, 'Streaming and spiral waves in slime mould'

Professor J C Eilbeck

Seminar, University of Swansea, March 1998, 'Breathers in 1D and 2D lattices'
Conference talk, International workshop on "Transmission and Signal Processing in Nonlinear Electronics and Optics", Dijon, France, 8-10 June 1998, 'Some studies of travelling waves on discrete systems'
Conference talk, Nonlinear Science Festival, 7-12 December 1998 Niels Bohr Institute, Copenhagen,
'Localized breathers on two-dimensional lattices'

Dr N D Gilbert

Seminar, University of Leeds, November 1998, 'Groups with braid presentations'

Professor J Howie

Seminar, UMIST, February 1998, 'Bestvina-Brady groups and the plus construction'
Seminar, University of St Andrews, February 1998,
'Bestvina-Brady groups and the plus construction'
Seminar, Université de Provence, Marseille, September 1998 'Variétés de Seifert pour les noeuds rubans de dimension supérieures'
Seminar, Université de Provence, Marseille, September 1998, 'Bestvina-Brady groups and the plus construction'
Seminar, University of Cambridge, November 1998,
'Generalised triangle groups and the existence of free subgroups'
Invited talk "Groups in Galway", Galway, 21 - 23 May 1998, 'Rigidity of one-relator groups with centre'

Dr A D Johnston

Seminar: Albert Einstein Institute, Potsdam, May 1998, 'Balls in boxes and quantum gravity'

University of Edinburgh, September 1998, 'Quantum gravity as a load of balls'
Invited talk at 'Quantum Geometry, Random Matrices, Statistical Models of Strings and Quantum Gravity', November 26-28, Copenhagen University

Dr K Khanin

Series of 3 talks in the Series "Seminars on Problems of Turbulence", Heriot-Watt and Edinburgh Universities, March 1998, 'Random Burgers equations and turbulence'
Seminar, University of Sussex, May 1998, 'Rigidity in one-dimensional dynamics'
Seminar, EPFL, Lausanne, June 1998, 'Rigidity in one-dimensional dynamics'
Seminar, Queen Mary and Westfield College, December 1998, 'Dynamical systems and random Burgers equation'
Invited talk, European Conference on "Probabilistic Methods in Non-Hyperbolic Dynamics", University of Warwick, 30 April - 4 May 1998, 'Simultaneous Diophantine approximations'
Invited talk, International Workshop on "Dynamical Systems", Trieste, 30 August - 21 September 1998,
'Dynamical Systems and Kolmogorov's Turbulence' and 'Simultaneous Diophantine approximations'
Invited talk, Mini-symposium on "Dynamical Systems", Helsinki, December 1998, 'Random forced Burgers equation'

Professor R J Knops

Seminar, University of Oxford, January 1998, 'Uniqueness in nonlinear elasticity'
Seminar, University of Pisa, October 1998, 'Saint-Venant's principle: the search of an engineering conjecture for mathematical verification'
Conference talk, British Applied Mathematics Colloquium, Brunel University, 6-9 April 1998, 'Spatial stability in a partially constrained elastic plate'
Conference talk, Symposium "Trends in Applications of Mathematics to Mechanics", Nice, 25-29 May 1998,
'Uniqueness in the traction boundary value problem of nonlinear elasticity'
Invited talk, Symposium on "Mechanics of Materials", Oberwolfach, August 1998, 'Spatial behaviour in continua'
Invited talk "2nd International Symposium, Problemi Attuali dell'Analise e della Fisica Matematica, Taormina, 15-17 October 1998, 'Aspects of spatial stability in elasticity'
Seminar, "North British Probability Seminar", January 1998, 'Stochastic NLS equation'
Seminar, University of Cambridge, February 1998, 'Turbulence in nonlinear PDEs'
Seminars, University Paris VI, 6 and 8 April 1998, 'KAM theory for partial differential equations'

Professor S Kuksin

Series of 3 talks in the Series "Seminars on Problem of Turbulence", Herriot-Watt and Edinburgh Universities, April and May 1998, 'Theory of turbulence'
 Seminar, Imperial College, June 1998, 'Turbulence in nonlinear PDEs'
 Seminar, University of Liverpool, October 1998, 'How to count solutions of a nonlinear PDE in a manifold'
 Seminar, University of Oxford, November 1998, 'Turbulence in nonlinear PDEs'
 Seminar, University of Surrey, November 1998
 'Turbulence in nonlinear Schrödinger equation'
 Seminar, University of Bath, December 1998, 'Elliptic equations for maps solved in manifolds'
 Seminar, University of Edinburgh, December 1998, 'Lefschets formula from PDEs in manifolds'
 Invited talk, Conference in honour of Professor Novikov's 60th birthday, Moscow, 25-29 May 1998, 'On persistence of finite-gap solutions'
 Invited talks, CIME Conference " Dynamical Systems and Small Divisors", Cetraro, Italy, 13-20 June, 1998, 3 lectures
 'KAM theory for partial differential equations'
 Invited talk, International Congress of Mathematicians, Berlin, 17-28 August 1998, 'Elements of a qualitative theory of Hamiltonian PDEs'

Professor A A Lacey

Seminar, Instituto Superior Tecnico, Lisbon, September 1998, 'A nonlocal hyperbolic problem modelling food sterilization'
 Seminar, Universidade de Beira Interior, Covilha, September 1998, 'Persistence of corners in free boundaries in Hele-Shaw flow'
 Seminar, Centro de Matematica e applicacoes Fundamentais, Universidade de Lisboa, September 1998, 'A nonlocal hyperbolic problem modelling food sterilization'
 Invited talk, British Applied Mathematics Colloquium, Brunel University, 6-9 April, 1998, 'Use of complex-variable theory in oil-reservoir testing'

Dr J L Marin

Seminar, University of Arizona, October 1998, 'Moving breathers in 2D Hamiltonian lattices'
 Seminar, Centre for Non-Linear Studies, Los Alamos National Laboratory, New Mexico, October 1998, 'Moving breathers in 2D Hamiltonian lattices'
 Talk, CECAM Conference "Nonlinear Localized Excitations in Condensed Matter and Molecular Physics", Lyon, 7 July 1998, 'Moving breathers in 2D: the mica problem'

Professor O Penrose

Seminar, Rutgers University, Mathematics Department, March 1998, 'Asymptotic behaviour of a simplified Becker-Döring equation'

Seminar, Rutgers University, Physics Department, April 1998, 'Does off-diagonal long-range order help to explain superconductivity?'

Seminar, University of Leoben, Austria, June 1998, 'Diffusion-induced grain boundary motion'

Invited talk, Combinatorics '98 Conference, Palermo, 14-20 June, 1998, 'Covering sets of spreads in PG(3,q)'

Dr A R Prince

Seminar, Dundee University, April 1998, 'Oscillating global continua of positive solutions of semilinear elliptic problems'

Dr B P Rynne

Seminar, joint Strathclyde/Glasgow Universities Analysis Seminar, November 1998, 'The Fucik spectrum: what is it and what does it look like?'

Professor J A Sherratt

Seminar, Strathclyde University, January 1998, 'Mathematical modelling in cancer'
 Seminar, University of Glasgow, May 1998, 'Mathematical modelling of tumour invasion'
 Seminar, University of St Andrews, November 1998, 'Invasive wave fronts and spatiotemporal oscillations in predator-prey systems'
 Colloquium, University of Edinburgh, November 1998, 'Can mathematics help to cure cancer'
 Seminar, Glasgow Caledonian University, November 1998, 'Can mathematics help to cure cancer'
 Invited talk, Conference on "The Mathematical Biology of Patterns and Processes", Bath, 5-9 April 1998, 'Discrete mathematical models for cell populations'
 Invited talk, Gordon Conference on "Theoretical Biology and Biomathematics", Tilton, New Hampshire, USA, 7-12 June 1998, 'Mathematical modelling of scar tissue structure'
 Invited talk, Workshop on "Pattern Formation and Morphogenesis: the Basic Process" (part of the IMA program on Mathematical Biology), Minnesota, 7-12 September 1998, 'Signal range and spatial patterns in juxtacrine signalling'
 Invited talk, Conference on "On Growth and Form" (a meeting to commemorate the work of D'Arcy Thompson), Dundee, 20-24 September 1998, 'Pattern formation in cancer'

Conference talk, "2nd Informal UK meeting on 2D Integrable Models, conformal Field Theory and Related Topics, Durham, April 1998", 'Vertex models with alternating spins'
 Conference talk, Second Annual European TMR
 Conference on "Integrability, Non-perturbative Effects and symmetry in Quantum Field Theory, Durham, September 1998, 'Mixing of ground states in vertex models.'
 Lecture series, Heriot-Watt University, January and February 1998, 5 lectures 'The algebraic analysis of solvable lattice models'
 Seminar, University of Edinburgh, Department of Physics, June 1998, 'Correlation functions in solvable lattice models'
 Seminar, Edinburgh/Heriot-Watt Algebra seminar, December 1998, 'Crystals, paths and walls: vertex models and crystal bases'

SERVICE TO THE MATHEMATICAL COMMUNITY

Professor C E Beevers	External examiner (BSc), University of Sunderland Vice-Chairman MATHWISE Executive Committee Member of SUMSMAN Committee
Professor K J Brown	Executive Editor of Proceedings of the Royal Society of Edinburgh
Professor J Carr	External Examiner (BSc), University of Aberdeen External Examiner (BSc), University of Glasgow Chairman, Programme Management Committee ICIAM 99
Dr D B Duncan	External examiner (PhD), University of Dundee External examiner (PhD), Strathclyde University Member of Edinburgh Mathematical Society NBDES Chairman
Professor J C Eilbeck	External examiner (BSc), University of Dundee External Examiner (DSc), University of Dijon Member of Council, Royal Society of Edinburgh
Dr N D Gilbert	Member of EPSRC Research Fellowship Panel External examiner (PhD), University of St Andrews
Professor J Howie	External examiner (PhD), Queen Mary and Westfield College External examiner (BSc), York University Member of EPSRC Mathematics College Member of Mathematics Sectional Panel of Royal Society of Edinburgh Vice-President, Edinburgh Mathematical Society Member of Executive Committee of International Centre for Mathematical Sciences Member of Editorial Board of International Journal of Algebra and Computation
Dr D A Johnston	Mathematical Challenge organiser for Edinburgh and Borders regions Mathematics masterclass for secondary school pupils on "The Game of Life", October 1998 External examiner (PhD), University of Oxford
Dr K Khanin	Member of Editorial Board of the journal Dynamics and Stability of Systems Member of Advisory Board of the journal Chaos

Name	Role	Amount	Description
Professor R J Knops	<p>Convenor of Executive Committee of International Centre for Mathematical Sciences</p> <p>Member of Board of Directors of ICIAM 99 Ltd</p> <p>Member of Local Organising Group for ICIAM 99</p> <p>Member of Editorial Board of Meccania</p> <p>Vice-President, International Society for the Interaction of Mathematics and Mechanics (ISIMM)</p> <p>Convenor of Editorial Board for ISIMM</p>	£80000	University of Cambridge Local Examinations Syndicate, awarded to Professor C E Beavers and the CALM group for the development of computer examinations
Professor A A Lacey	External examiner (BSc), Strathclyde University	£61423	EPSRC, awarded to Professor J C Eilbeck, Postdoctoral Visiting Fellowship for Dr J M Speight, 1.3.98 – 28.2.01
Dr M Levitin	Member of Programme Management Committee, ICIAM 99	£38829	EPSRC, awarded to Dr K Khanin, research into "Random Lagrangian Systems and Burgers Equation"
Dr G R McGuire	External examiner (BSc), University of Glasgow	£34246	EPSRC, awarded to Professor R J Knops, administrative support for ICMS
Dr L E Nicholas	Member of IMA Scottish Committee	£32380	BBSRC, awarded to Professor J A Sherratt, Earmarked postgraduate studentship: "Mathematical modelling of the spatiotemporal dynamics of cell signalling in the epidermis"
Professor O Penrose	Member of the Editorial Board of the Royal Society of Edinburgh Proceedings A	£25000	London Mathematical Society, awarded to Professor R J Knops, support for ICIAM 99
Dr A R Prince	External examiner (BSc), University of Stirling	£24000	EPSRC, awarded to Professor R J Knops, support for ICIAM 99
Professor J A Sherratt	<p>Member of EPSRC Mathematics College and Research Grant Panel</p> <p>Member of Wellcome Trust Research Grant Panel</p> <p>Associate Editor of the IMA Journal of Mathematics</p> <p>Applied in Medicine and Biology</p> <p>Associate Editor of the Journal of Theoretical Medicine</p> <p>External examiner (PhD), University of Bath</p> <p>External examiner (DSc), University of Technology, Sydney</p>	£21360	Royal Society of Edinburgh Fellowship awarded to Dr D A Johnston
Dr R A Weston	<p>Member of EPSRC Mathematics College</p> <p>External examiner (PhD), University of Durham</p>	£20000	EPSRC, awarded to Professor J Carr for workshop "Hamiltonian Mechanics and Small Divisors in PDEs", June 1999
		£19182	EPSRC, awarded to Professor R J Knops, administrative support for ICMS
		£15000	Napier University, awarded to Professor C E Beavers and the CALM group to develop software for formal and informal student assessment
		£8000	EPSRC, awarded to Professor J A Sherratt, support for scientific meeting, February – July 1999. "From single cells to continua: micro-scale to macro-scale modelling"
		£5344	Leverhulme Trust, Research Fellowship awarded to Dr D A Johnston
		£5000	Scottish Widows, awarded to Professor R J Knops, support for ICIAM 99
		£3125	EOARD awarded to Professor R J Knops, support for ICIAM 99
		£2250	British Council, ARC joint research grant awarded to Dr D A Johnston and Dr W Janke, Leipzig University
		£2000	British Council, JRP joint research grant awarded to Dr D A Johnston and Drs P Bialas and Z Burda, Jagellonian University, Krakow
		£2000	Bank of Scotland, awarded to Professor R J Knops, support for ICIAM 99
		£2000	Jaguar, awarded to Professor R J Knops, support for ICIAM 99
		£1500	Edinburgh Mathematical Society, support for ICIAM 99
		£1000	EMS Centenary Fund, support for ICMS meeting on Algebraic Geometry – the "Baker" meeting, 19-22 September, 1998
		£915	London Mathematical Society, support for Scottish Algebra day, 1 May 1998, awarded to Professor J Howie
		£800	The Royal Society of Edinburgh, awarded to Professor J Carr, support for Primary Mathematics Masterclasses
		£645	British Council travel grant awarded to Dr D A Johnston to visit Professor J Smit, University of Amsterdam
		£580	British Council travel grant awarded to Dr D A Johnston to visit Dr R Loll, Albert Einstein, Institute, Potsdam, Germany

THESES SUCCESSFULLY PRESENTED FOR HIGHER DEGREES

Yaroslav Zolotaryuk (PhD) "Nonlinear dynamics of molecular and atomic chains"

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

Soren Bartels "Electromagnetic scattering"

Jennifer Hutchinson "A Comparison of various algorithms for solving semi-infinite linear-programming problems"

Daniel Jefferson "A numerical investigation of turbulence"

Russell Lee "An Autocatalator Model"

Toby Marthews "An investigation into the effects of nonlinear filtering on some simple weather-prediction models"

Helen Wearing "Mathematical modelling of juxtacrine patterning"

Stephen Paul Wombell "An Accelerating Soliton-Like Solution of a Non-Linear Schrodinger Equation"

Publications

AAfrouzi G A, Brown K J
On a diffusive logistic equation
Jour Math Analysis and Applications
Vol 225 pp 326-339 1998

Beavers C E, Fiddes D J, McGuire G R, Wild D G, Youngson M A
Interactive PastPapers for GCSE Mathematics
Lander Educational Software, Glasgow
1998

Beavers C E, Quinney D
Mathwise diagnostic testing and assessment
Information Services & Use
Vol 18 pp 191-205 1998

Benson D L, Maini P K, Sherratt J A
Unravelling the Turing bifurcation using spatially varying diffusion coefficients
Journal of Mathematical Biology
Vol 37 pp 381-417 1998

Bialas P, Burda Z, Johnston D A
Balls in boxes and quantum gravity
Nuclear Physics B (Proceedings Supplement)
Vol 63 pp 763-765 1998

Boulter C J
Interface Hamiltonian with a position-dependent stiffness: a nonlinear functional renormalization group study
Physical Review E
Vol 57 pp 2062-2072 1998

Boulter C J, Indekeu J O
Interfacial tension and interface delocalization phase boundary for strongly type-I superconductors
International Journal of Thermophysics
Vol 19 pp 857-865 1998

Brizhik L, Cruzeiro-Hansson L, Eremko A
Influence of electromagnetic radiation on molecular solitons
Journal of Biological Physics
1998

Brown K J, Stavrakakis N
On the construction of super and subsolutions for elliptic equations on all of \mathbb{R}^n
Journal Nonlinear Analysis
Vol 32 pp 87-95 1998

- Dallon J C, Othmer H G**
A continuum analysis of the chemotactic signal seen by dictyostelium discoideum
Journal of Theoretical Biology
Vol 194 pp 461-483 1998
- Dallon J C, Sherratt J A**
A mathematical model for fibroblast and collagen orientation
Bulletin of Mathematical Biology
Vol 60 pp 101-129 1998
- Duncan D B**
Difference approximations of acoustic and elastic wave equations
Numerical Methods for Wave Propagation, Eds E F Toro and J F Clarke, Fluid Mechanics and its Applications
Vol 47 pp 197-210 1998
- Duncan D B**
Proceedings of International Centre for Mathematical Sciences Conference on Grid Adaptation in Computational PDEs; Theory and Applications, 1996, Edinburgh.
Applied Numerical Mathematics
Vol 26 pp 1-275 1998
- Dzhalilov A, Khanin K**
Singularity of the invariant measures for homeomorphisms of the circle with break singularities
Functional Analysis and its Applications
Vol 32 pp 153-162 1998
- Gilbert N D**
Monoid presentations and associated groupoids
Int. J. Algebra and Computation
Vol 8 pp 141-152 1998
- Herrero M A, Velazquez J L, Lacey A A**
Global existence for reaction-diffusion systems modelling ignition
Arch. Rat. Mech. Anal.
Vol 142 pp 219-251 1998
- Howie J**
Minimal seifert manifolds for higher ribbon knots
Geometry and Topology Monographs: The Epstein Birthday Schrift, Editors I Rivin C Rourke and C Series, International Press
Vol 1 pp 261-293 1998
- Howie J**
Free subgroups in groups of small deficiency
J. Group Theory
Vol 1 pp 95-112 1998
- Hunton J, Turner P R**
Coalgebraic algebra
Journal of Pure and Applied Algebra
Vol 129 pp 297-313 1998
- Johnston D A**
The Yang Lee edge singularity on Feynman diagrams
J. Phys.
Vol A31 pp 5461-5469 1998
- Johnston D A, Plechac P**
Equivalence of ferromagnetic spin models on trees and random lattices
Journal of Physics A
Vol 31 pp 475-482 1998
- Johnston D A, Plechac P**
Vertex models on Feynman diagrams
Physics Letters
Vol A248 pp 37-45 1998
- Khanin K**
Burgers equation with random force
Proceedings of the XII International Congress in Mathematical Physics, Brisbane, July 1997
Vol 32 pp 153-162 1998
- Knops R J, Lupoli C**
Some recent results on Saint-Venant's principle
Nonlinear Analysis and Continuum Mechanics (Eds G Buttazzo, G P Galdi, E Lanconelli and Pucci)
Chapter 6 pp 61-71 1998
- Knops R J, Payne L E**
Spatial behaviour of energy in partially constrained thick elastic plates
Atti dei Congressi Lincei
Vol 140 pp 77-104 1998
- Knops R J, Villaggio P**
Transverse decay of solutions in an elastic cylinder
Meccanica
Vol 33 pp 577-585 1998
- Kuksin S B**
A KAM-theorem for equations of the Korteweg-de Vries type
Rev Math & Math Phys
Vol 10 pp 1-64 1998

- Kuksin S B**
 Elements of a qualitative theory of Hamiltonian PDEs
Proceedings of the International Congress of Mathematicians (Berlin, 1998)
 Vol 2 pp 819-829 1998
- Lacey A A**
 Diffusion models with blow-up
Journal of Computational and Applied Mathematics
 Vol 97 pp 39-49 1998
- Lacey A A, Ockendon J R, Sabina J**
 Multi-dimensional reaction diffusion equations with nonlinear boundary conditions
SIAM Journal of Applied Mathematics
 Vol 58 pp 1622-1647 1998
- Levitin M**
 Dirichlet and Neumann heat invariants for Euclidean balls
Journal of Differential Geometry & Applications
 Vol 8 pp 35-46 1998
- Little G, Clark D E R, Coney J R, Tuttle R,**
 Delta-volume decomposition for multi-sided components
Journal of Computer-Aided Design
 Vol 30 pp 695-705 1998
- Little G, Tuttle R, Coney J R, Clark D E R**
 A feature complexity index
IntechE Journal of Mechanical Engineering Science – Part C
 Vol 212 pp 405-413 1998
- Marin J L, Eilbeck J C, Russell F M**
 Localized moving breathers in a 2-D hexagonal lattice
Phys Lett A
 Vol 248 pp 225-229 1998
- Olsen L, Maini P K, Sherratt J A**
 Spatially varying equilibria of mechanical models: application to dermal wound contraction
Mathematical Biosciences
 Vol 147 pp 113-129 1998
- Olsen L, Maini P K, Sherratt J A, Marchant B P**
 Simple modelling of extracellular matrix alignment in dermal wound healing
Journal of Theoretical Medicine
 Vol 1 pp 172-192 1998
- Owen M R, Sherratt J A**
 Mathematical modelling of juxtacrine cell signalling
Mathematical Biosciences
 Vol 152 pp 125-150 1998
- Owen M R, Sherratt J A**
 Modelling the macrophage invasion of tumours: effects on growth and composition
IMA Journal of Mathematics Applied in Medicine and Biology
 Vol 15 pp 165-185 1998
- Prince A R**
 The cyclic parallelisms of PG(3,5)
European Journal of Combinatorics
 Vol 19 pp 603-612 1998
- Rahman H U**
 An analysis of neutron scattering spectroscopy in U_{20}
Physica B
 Vol 252 pp 160-166 1998
- Rahman H U**
 The splitting of the 3H_4 multiplet in uranium dioxide
Molecular Physics
 Vol 94 pp 623-626 1998
- Rahman H U**
 Crystal-field excitations in uranium dioxide
Physics Letters A
 Vol 240 pp 306-310 1998
- Rynne B P**
 The structure of Rabinowitz' global bifurcating continua for generic quasilinear elliptic equations
Nonlinear Analysis
 Vol 32 pp 167-181 1998
- Rynne B P**
 Hausdorff dimension and generalized Diophantine approximation
Bulletin of the London Mathematical Society
 Vol 30 pp 365-376 1998
- Rynne B P**
 The fractal dimension of quasi-periodic orbits
Ergod Theory and Dynamical Systems
 Vol 18 pp 1467-1471 1998
- Rynne B P, Dickinson H**
 Hausdorff dimension and a generalized form of simultaneous Diophantine approximation
Acta Arithmetica
 Vol pp 1998

- Sherratt J A**
Invasive transition waves and their oscillatory wakes are linked by a modulated phase resetting wave
Physica D
Vol 117 pp 145-166 1998
- Sherratt J A**
On the transition from initial data to travelling waves in the Fisher-KPP equation
Dynamics and Stability of Systems
Vol 13 pp 167-174 1998
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