Curriculum Vitae

PROF. C.J. BUDD

PERSONAL INFORMATION

Name: Christopher John Budd,
Address: School of Mathematical Sciences, University of Bath, Bath, BA2 7AY,
Date of Birth: 15-02-60,
Nationality: British,
Status: Married, daughter born 26-05-92, son born 27-11-94.

PRESENT APPOINTMENTS

Professor in Applied Mathematics, University of Bath, from September 1995.

Director of the Centre for Nonlinear Mechanics from January 2000.

Chair of Mathematics at the Royal Institution of Great Britain, from May 2000.

Director of the Bath Institute for Complex Systems from January 2005.

PREVIOUS APPOINTMENTS

Reader in numerical analysis, University of Bristol, June 1994 - August 1995.

1989-1994, Lecturer in numerical analysis, University of Bristol.

1986-1989, CEGB Research Fellow in numerical analysis, at the Oxford University Computing Laboratory and Hertford College Oxford.

1979 and some summer vacations, Theoretical Support Services (signal processing section), Marconi Research Laboratories, Great Baddow, Chelmsford.

ACADEMIC QUALIFICATIONS

D. Phil. in Mathematics, Oxford University, 1983-1986.

Certificate of Advanced Study in Mathematics, Cambridge University, 1982-1983, Distinction,

Mathematics M.A. Degree, Cambridge University, 1979-1982, First Class Honours,

SPECIAL AWARDS, HONOURS AND DISTINCTIONS

Senior Wrangler (top first class degree), Cambridge, 1982.

First Prize in the international Leslie Fox competition for Numerical Analysis, 1991.

Elected one of ten 'Scientists for the New Century' by the Royal Institution, 1999, in recognition for work in the Public Understanding of Science.

Royal Institution of Great Britain, Chair of Mathematics, 2000.

ILT National Teaching Fellowship (NTF), 2001

LMS Popular Lecturer in Mathematics, 2001

IOP Award for Outstanding Contributions to the Public Understanding of Physics, 2002.

Portrait exhibited in the National Portrait Gallery, 2005.

Adjunct Professor at the University of Limerick, 2008-

British Science Association Prize for the Best Science Festival in NSEW, 2009.

Royal Society Summer Exhibition, 2010

TEACHING AND LEARNING

I am an ILT Teaching Fellow (one of 20 such fellowships awarded across all disciplines in 2001). I was part of the team which presented the case for the Dept. of Mathematical Sciences' submission for the QAA review in 2000 for which it was awarded 24/24. I am course director for the Bath MSc. in Modern Applications of Mathematics.
At Bath I have taught the courses MATH0003 (Integration and differential equations), *MATH0014 (Numerical analysis), QM6 (Vectors and Fluids), QM58 (Finite Element Methods), MATH0045 (Dynamical Systems), NL2 (Dynamical Systems for the MSc course), MATH0060 (Nonlinear systems and chaos), MATH0101 (Maths for electrical engineers 3), MSC Course MA50174 (Differential equations, computations and applications), *MA10002, *XX0164. Here the * courses are ones I am currently teaching. I have tutored many small groups and have many personal students.
At Bristol I taught the following courses: Signal Processing, Methods of Numerical Analysis, Methods of Applied Mathematics, Computational Mathematics, Computational Fluid Dynamics (MSc). I was also closely involved with small group teaching and acted as tutor/supervisor to about 15 students each year. I collaborated with Drs. W. Boyd, T. Dewson and W. Banks in preparing a manual for the Computational Mathematics course.

RESEARCH INTERESTS

I have fairly wide research interests which reflect my two beliefs that mathematics can be applied to almost all situations and that we can learn new and interesting mathematics from almost any problem. Here is a summary of my main research interests.

- **Scientific Computation**. In particular the new field of *geometric integration* which aims to make numerical methods more reliable by incorporating qualitative information about the underlying problem in a natural way into the computational algorithm. In particular (i) developing adaptive mesh methods for partial differential equations which are effective in calculating the solutions of problems with singularities and interfaces (ii) finding methods for determining the reliability of a computed solution. I am currently collaborating with the Meteorological Office with the aim of designing reliable codes for calculating the location of weather fronts.

- **Dynamical Systems**. In particular the new field of *non-smooth dynamics* looking at problems with impact, friction, hysteresis, chatter, squeal, switching and discontinuous control, many of which arise in industrial applications. I have made careful comparisons of theoretical predictions with experiments in collaboration with experts in experimental techniques and have identified some novel bifurcations both theoretically and experimentally. I look at the applications and implications of chaos in industrial design. I am also collaborating with the National Grid Company, looking at voltage collapse and power cuts and the relation of these to chaotic behaviour which seems (oddly) to stabilise the electrical supply network in certain operating modes.

- **Partial Differential Equations** in particular the theory, analysis and computation of nonlinear second order and fourth order systems. I am currently studying the nature of singularity formation in the nonlinear Schrödinger equation and, in collaboration with a group of geologists, I am trying to find effective mathematical models to describe the folding of rock. This latter work has involved some field trips and experiments. The systems of fourth order parabolic equations that we have developed have solutions which really do look like rock formations.

- **Mathematical Modelling and Industrial Mathematics** looking at many interesting problems mostly arising from industry for which mathematical modelling gives new and valuable insights. I am currently fascinated by the wonderful nonlinear problems that arise in the food industry. I have recently founded the interdisciplinary 'Centre for Nonlinear Mechanics' joint between the mathematics and engineering departments in Bath and the engineering mathematics department in Bristol. The centre aims to identify interesting problems arising in industry and in engineering which have a strong mathematical content. The centre also aims to train and encourage PhD students to work in the interdisciplinary field of industrial mathematics.

PUBLIC UNDERSTANDING OF SCIENCE

I believe very strongly indeed that the excitement and importance of mathematics and science should be communicated to as wide an audience as possible. I am actively involved in doing this, particularly developing programmes with young people. My current activites are as follows:

- Chair of Mathematics at the Royal Institution of Great Britain.
- Vice-chairman of the Royal Institution Bath-Bristol Mathematics Masterclass programme for young people aged 13-14. This programme presents mathematics in an exciting, stimulating and encouraging way to about 300 children in the Bath and Bristol area each year. I present masterclasses frequently in Bath and Bristol and have also given masterclasses in Bangor and Exeter. My masterclasses have been on: symmetry and folk-dancing, amazing mazes, knots, codes and ciphers, origami and the mathematics of paper folding, how to attack a castle armed only with mathematics, sundials and a brief history of telling the time. I am writing a book based upon these classes.
- Panel member (since 2000) of the EPSRC Public Understanding of Science Committee
- Member of the Royal Institution Mathematics Education Board.
- Organiser of the Royal Institution series on 'Maths in Action', 2001-2002.
- Trustee of the Bath Royal Literary and Scientific Institution
- Organiser of the 'Bath Taps Into Science' activities for Science Week from 2000.
- Organiser since 1996, of mathematical field trips to mathematically interesting locations (such as mazes) for children in the Bath and Bristol area.
- Advisor and presenter for the 'Bath and North East Somerset' APEX classes for gifted children aged 10-11.
- Organiser and team leader for a Bath University roadshow presenting Science and Mathematics Discovery Classes to primary schools in the Bath and Bristol area (including a science stall in a school fete).
- Frequent talks to Sixth Form audiences on subjects in mathematics and science, including working with the 'Training Partnership' in London and with schools all over the UK.
- An annual series of lectures on 'Discoveries in Mathematics' to an adult audience as part of the programme organised by the Bristol University Department of Continuing Education. I have also presented lectures to an adult audience at the 'Bath Royal Literary and Scientific Institution' and the 'Royal Society of Arts'.
- Mathematics advisor to the 'Bristol Exploratory' (including helping in the design of 'Plores' for an exhibition on Chaos in 1994-1995) and to 'Explore @t Bristol' the new Bristol Science museum for the Millennium.
- Occasional TV and Radio features for BBC West and HTV including, in 1997, a section of the HTV programme 'The Learning Curve' on mathematics masterclasses.

- Collaboration with the University of Berkeley Botanical Gardens, Berkeley , California, in 1998, developing a programme on 'Math in the Garden'.

WORK WITH INDUSTRY

I believe that mathematics has much to learn from industry and that industry has much to gain from mathematics. To put this belief into practice I am involved with the following activities:

- Director of the Bath MSc, which has a very strong industrial mathematics component.
- Annual attendance and active participation in the European Study Group with Industry including organising study groups in Bristol (1992) and Bath (1997) and editing the resulting proceedings.
- Attending the Pacific Institute for the Mathematical Sciences industrial workshop in Calgary, Canada (1998) and generally advising this organisation (based in UBC, Vancouver, Canada) on industrial mathematics.
- Chairman of the EPSRC initiative on 'Computational Partial Differential Equations' which has as a major objective, the formation of effective collaborations between academia and industry based on scientific computation.
- Four of my PhD students have been on CASE awards.
- Active collaboration with many companies including: AEA Technology, QuantiSci, the National Grid, National Power, Shell Research (Amsterdam), Elkem Research (Christiansand), MAFF and the Meteorological Office.
- Much of my research and many of the examples I use in my teaching arise directly from my industrial contacts.

POSTGRADUATE SUPERVISION

MSc Students
Mr. P. Bradbury, 1988,
Miss P. Wilcock, 1991,
Mr. M. Hill, 1993,
Mr. M. Homer, 1995,
Miss J. Jones, 1996,
Mr. A. Arlow, 1997,
Miss. J. Wright, 2002,
Mr. A. Hill, 2002,

Mr. M. Elphick, 2003,
Miss. H. Munro, 2003.

PhD Students
Dr. Y-W Qi, 1986-1989,
Dr. F. Dux, 1989-1993,
Dr. R. Hare, 1990-1993,
Dr. H. Lamba, 1990-1993,
Dr. B. Davidson, 1992-1995, (jointly with Dr. A. Wathen),
Dr. G. Lee, 1993-1996,
Dr. G. Collins, 1994-1998,
Dr. J. Wilson, 1996-2001,
Dr. C. Coman, 1997-2000,
Mr. M O' Gorman 1997 (jointly with Prof. G. Hunt)
Dr. M. Piggott 1998-2002
Dr. J. Williams, 2000-2003
Dr. R. Edmunds, 2000-2003 (jointly with Prof. G. Hunt)
Dr. A. Leger, 2001-2004 (jointly with Prof. A. Spence)
Dr. A. Hill, 2002-2006
Dr. J. Wright, 2002-2006 (jointly with Prof. G. Hunt)
Dr. J. Boon, 2003- 2007 (jointly with Prof. G. Hunt)
Dr. C. Edwards, 2004-2008 (Jointly with Dr. H.A. Kim)
Dr. S. Pring, 2005-2009
Dr. S. Green, 2005- 2009 (jointly with Prof. G. Hunt)
Dr. E. Walsh, 2006-2010
Mr. T. Dodwell, 2008– (Jointly with Prof. G. Hunt)
Mr. P. Browne, 2008– (jointly with Dr. H.A. Kim)
Miss V. Stewart, 2009-2010 (MPhil)
Miss K. Mora, 2010-
Miss Leire GG, 2010-
Mr. Abdul , 2010-
Mr. K. Hobbs, 2010-
Miss S. Jenkins, 2010-

Post Doctoral Research Assistants
Dr. A. Humphries, 1993-1996 (with Dr. A. Wathen),
Dr. S. Keras, 1996
Dr. C. Carey, 1995-1997 (with Prof. A. Spence, Dr. I. Graham)
Dr. M. Peletier, 1997-1998 (jointly with Prof. G. Hunt).
Dr. A. Wadee, 1998-1999 (jointly with Prof. G. Hunt).
Dr. R. Beardmore, 1999-2000 (jointly with Prof. G. Hunt).
Dr. S. Blanes, 2000-2002
Dr. N. McCullen, 2007– 2009
Dr. M. Freitag, 2007 – 2010
Dr. D. Barton, 2007 – 2010
Dr. J. van Lent, 2008 – 2009.

RESEARCH GRANTS

1990 £500 from the London Mathematical Society to organise a conference.
1991 £4000 Visiting Fellowship grant from the Royal Society,
1991 £500 Fellowship grant from the EC Initiative in Nonlinear Diffusion.
1992 £1000 from the London Mathematical Society to organise a conference,
1992 £600 Travel grant from the Nuffield Foundation,
1992 £250 Travel grant from the British Council,
1992 £600 Travel grant from the Royal Society,
1993 £78000 SERC grant GR/H63456 (with Dr. A. Wathen)
1993 SERC Earmarked PhD. grant,
1993 £1200 SERC travel grant,
1993 £4000 SERC visiting fellow grant,
1994 SERC Earmarked PhD. grant,
1994 £40000 SERC Grant GR/J75258 (with Dr. A. Wathen),
1995 Royal Society/NSERC Travel Grant to Canada,
1996 £104 766 EPSRC Grant GR/L17177 (with Prof. G. Hunt),
1996 EPSRC PhD. CASE award,
1997 £4300 British Council-DAAD Grant,
1997 Royal Society Travel Grant to Canada,
1997 1.1 MEcu TMR Grant with six other centres,
1997 £16000 Marie Curie PhD. Studentship grant.
1997 £70000 INTAS grant,
1997 ORS PhD. studentship award for Mr. C. Coman.
1998 £2500 LMS Conference grant for the BAMC 1999
1998 £59110 EPSRC Grant GR/M29863 (with Dr. A. Iserles and Dr. E. Mansfield)
1998 £15000 LMS grant (joint with Dr. A. Iserles) to organise an LMS Durham symposium.
1999 £1000 LMS grant for the visit of Prof. Dorodnitsyn
2000 £1200 LMS grant for the Centre for Nonlinear Mechanics
2000 £640 000 EPSRC grant to run an MSc in 'Modern Applications of Mathematics'.
2001 £?? Royal Society travel grant
2001 £1500 LMS Conference grant (4th Order PDEs)
2001 £50 000 ILT Teaching Fellowship
2002 £2000 EPSRC Visiting Fellowship grant for Prof. K. Promislow (SFU).
?? SICONOS
2002 Faraday CASE award
2002 Faraday PDRA award, joint with K. Parrott
2002 £2000 EPSRC to run meeting on Bioinformatics.
2003 £800 LMS to run a 'Structural geology workshop'.
2003 £95000 EPSRC grant, joint with A. Kim Mech. Eng.
2003 £60000 EPSRC Network Grant on Novel Computation, joint with Prof. A. Champneys (Bristol)
2004 £1000000 EPSRC Critical Mass Grant

2004 £35600 EPSRC PPA Bath Taps Grant
2004 £6000, EPSRC VF Grant for Prof. R. Russell.
2004 INTAS grant
2005 £35000 EPSRC Complex systems summer school
2005 £60000 (joint with J. Ockendon) ESGI grant.
2006 £500 000 Wolfson Foundation (for BICS)
2006 £3 300 000 HEFCE (part of the More Maths Grads team which put together this maths education proposal).
2006 £130 000 Great Western Research Fellowship grant in Data Assimilation.
2006 £65 000, EPSRC CASE (with Met Office)
2008 £800, Royal Academy of Engineering, Travel Grant
2008 £65 000, EPSRC CASE (with RAL)
2010 £730 Royal Society Travel Grant
2010 £374 905, EU FP-7 ITN Grant (in a grant totalling 4M across eight countries)
2010 £15 000, EPSRC, HE-STEM, IMA to oreganise the RSSE summer exhibition
2010 £14 748 EPSRC Knowledge Transfer Grant to work with the Met Office
2011 £30 000 HE-STEM Maths Communicators

INVITED PRESENTATIONS AT CONFERENCES

- The annual conference of the UK Simulation Society, Sussex, 1990. *An introduction to chaotic dynamical systems*
- The annual meeting of the Irish Mathematical Society, Dublin, 1990. *The Space Charge Problem.*
- The Warwick Study Group with Industry, Warwick, September 1990. *The Dynamics of Numerics and the Numerics of Dynamics*
- The 28th. Dutch Mathematical Congree, Delft, April 1992. *Blow-up in parabolic equations with contraints*
- The Bangalore Conference on Nonlinear Diffusion, Bangalore, Dec. 1992. *The Kassoy problem and its generalisations*
- The NATO Summer school on Real and Complex Dynamical Systems, Hillerod, July 1993. *I. An introduction to impact oscillators,II The grazing bifurcation and its applications*
- Spanish Summer School on Partial Differential Equations, Santander, Spain, July 1994, *Blow-up in constrained parabolic equations*
- Scottish Computational Mathematics Conferenece, University of Strathclyde, October 1994, *Symmetry in numerical methods*
- Analysis of non-smooth dynamical systems, Bad Honnef, Germany, March 1995, *The grazing bifurcation and its applications*

- EPSRC Spring School in Nonlinear Systems, University of Surrey, April 1995, *Non-smooth dynamical systems*
- Canadian Applied Mathematics Society Meeting, St. John's Newfoundland, May 31st-Junes 3rd., 1995, *Self-similar blow-up in quasi-linear parabolic equations*
- Annual meeting of the Irish Mathematical Society, University of Limerick, September 1995, *Non-smooth dynamical systems*
- EPSRC Spring School in Nonlinear Systems, University of Bristol, April 1996, *Nonlinear methods in time series analysis*
- Annual meeting of the Welsh Mathematical Society, Gregynog, May 1996 *Non-smooth dynamical systems: I Theory, II Applications*
- Nonlinear Day, University of Leeds, November 1996, *The grazing bifurcation*
- Functional Analytic methods in Differential Equations, University of Surrey, June 1997, *Self-similar and approximately self-similar blow-up in parabolic PDEs*
- Biennial Numerical Analysis Conference, Dundee; June 22-24th. 1997, *Symmetry based discretisations of partial differential equations*
- SciCADE 97, Scientific Computing and Differential Equations, University of Trieste, September 15-19 1997, *Reduced basis methods for semilinear partial differential equations*
- Invited speaker at the UK SIAM meeting, Manchester, 5th. Jan. 1998
- Invited speaker at the Oppdal meeting on Symmetry methods in differential equations, 'Symmetry invariant methods for partial differential equations', 7th.-11th. Jan., 1998.
- Invited speaker at the meeting in honour of the 60th. birthday of L.A. Peletier. 'Finite dimensional approximations of critical exponent problems', Paris, 2nd.-4th. March, 1998.
- Invited speaker at 'Non-smooth dynamical systems', 'Discontinuous dynamics of the DC-DC buck convertor', Bad-Honef, 4th.-8th. May, 1998.
- Invited speaker at Thermophysical properties awareness club' annual meeting, May 11th.-12th. 1998, *Microwaving foodstuffs.*
- Invited industrial mathematics expert at the industrial mathematics meeting of PIMS, Calgary, 1st-5th June, 1999.
- Key Senior Scientist at the MSRI meeting on the 'Foundations of computational mathematics', Berkeley, August-Dec. 1998
- Invited speaker at the Gregynog meeting on 'Spectral theory for partial differential equations', 5-9th July, 1999

- Invited speaker at the Lorentz Centre meeting on 'Pattern formation in physics', 18-20th August, 1999
- Invited speaker ECMWF workshop 5-7th June 2000
- Invited industrial mathematics expert at the Prairies Industrial Mathematics meeting, Winnipeg 7-11th August 2000
- Invited speaker at Cambridge IMECT educational meeting 6th-8th July 2000
- Invited speaker in Sheffield January 2001
- Invited speaker at SCICADE July, 2001, Vancouver
- Invited speaker at the Dublin Differential Equations Meeting, 10-12th Sept, 2001
- Invited industrial mathematics expert at the industrial mathematics workshop at Amsterdam, Feb, 2002.
- Invited industrial mathematics expert at the industrial mathematics modelling workshop of PIMS, SFU, May, 2002.
- Invited speaker at Cambridge IMECT educational meeting 6th-8th July 2002
- Invited speaker at ICCAM, Leuven, 22-25th July, 2002
- Invited speaker at CWI November, 2002
- Invited industrial maths expert at Leiden study group, Feb 2003
- Invited speaker at J.M.Thompson retirement meeting, UCL, 2003
- Invited speaker at Oslo workshop on geometric integration, May, 2003
- Keynote speaker at the MEI conference July 2003
- Invited speaker at ANODE, Auckland, July 2003
- Invited speaker BIRS, Adaptive Grids, August 2003
- Invited speaker at the UMTC, Birmingham, Sept 2003
- Invited speaker ICME, Copenhagen, July, 2004
- PIMS Distinguished Professor visits to Vancouver, August 2004 and November 2004.
- Invited speaker Pan African Maths Congress, Tunis, Sept. 2004
- Invited speaker at the TTA, 2004
- Invited speaker at Bristol meeting on Non-smooth dynamics, Sept. 2004.
- Invited speaker at Disneyland Paris, Jan 2005

- Invited speaker at Bristol meeting on multi-scale behaviour, April 2005
- Invited mini-symposium major session speaker, B(A)MC, Liverpool, April, 2005
- Invited speaker at Montreal Multi-scale meeting, May 2005
- Invited speaker at FOCM, Santander, June 2005
- (Two times) invited speaker at the Adaptive mesh Meeting, Vancouver, August, 2005
- Presidential address at the BA Meeting, Dublin, Sept 2005
- Invited participant, Geometric Integration workshop, Oberwolfach, March 2006
- MITACS and CAIMS invited speaker, Toronto, June 2006
- Presidential address at the BA Meeting, Norwich, September, 2006.
- Scotish Computational Maths Day, September, 2006.
- Keynote speaker, APICS conference, Cape Breton, October 2006
- INI invited participant (three weeks), Feb-March 2007
- IMA US, Distinguished Speaker on 'Making sense of a complex world', 2007
- Landscapes lecturer and British Council Public Lecturer, Tokyo, Japan 2007
- Invited public lecturer, Limerick, October 2007
- Invited public lecturer and mini-symposium speaker, BAMC 2008
- Keynote speaker on 'Confessions of an industrial mathematician', BMC, May Bristol, June 2008
- Presentation to the Queen at the Royal Institution, May 2008.
- Keynote speaker at the Specialist Schools Trust, June 2008, Bristol
- Invited speaker at the Further Maths Network annual meeting. Hertfordshire, 2008
- Invited session organiser on Adaptive Methods, FOCM Hong-Kong, May, 2008.
- SIAM Annual meeting, July 2008, Invited mini-symposium speaker on non-smooth dynamics and on 'Why Do Math'.
- Invited speaker at 'Symmetry based methods for PDEs', UBC, Sept. 2008.
- Invited mini-lecture course at the UK-Japan Winter school, Bath, Jan 2009
- Invited speaker at the Strathclyde workshop on Complex Networks, and popular speaker at the Glasgow Science Centre, January 2009.

- Keynote speaker on GI Methods for PDES, Tokyo, Japan, March 2009
- Maths Association, Keynote speaker, 14th April 2009
- MIni-symposium organiser, Snowbird, May 2009.
- Limerick, key note speaker at ESGI, June 2009
- Keynote speaker at A4A6, Ambleside, Sept. 2009.
- Keynote speaker at the Los Alamos meeting on Optimal Transport, Oct 2009
- Keynote speaker at the Tokyo Industrial Mathematics Conference, Feb 2010.
- Invited participant at the LMS-Durham symposium on multi-scale methods, June 2010
- Invited session organiser at FOCM 2011

Media Appearences

- BBC4 'It's only a theory', Dec. 2008 and March 2009, broadcast Oct 2009.
- BBC1 'The One Show', March 2009.

MAJOR CONFERENCES ORGANISED

- Local organiser of 'NONLINEARITY', Bristol, April 1990, two days.
- Local organiser of 'The IMA Conference on the Numerics of Dynamics and the Dynamics of Numerics', Bristol, July 1990, five days.
- Secretary of the committee for 'The 25th. European Study Group with Industry', Bristol, 5-11th. April 1992.
- Committee member for the IMA meeting on Signal Processing, Warwick, December 1992.
- Joint organiser of 'The mathematics of impact', Bristol September 1994, one day.
- Organiser of the European HCM meeting on 'Singularities and interfaces in partial differential equations', Bristol, October 1994, three days.
- Committee member for the IMA meeting on Signal Processing, Warwick, 10-15th, December, 1996
- Chairman of the committee for 'The 30th. European Study Group with Industry', Bath, 4-10th. April 1997

- Co-organiser of the LMS meeting 'Symmetries in differential and difference equations', Surrey, 27-28th. May 1997.
- Chairman of the committee for the 1999 BAMC at Bath, 12-15th. April, 1999.
- Committee member for FOCM at Oxford, 16-27th August, 1999
- Treasurer for 2000 LMS Durham Symposium on Geometric Integration.
- J.B. Mcleod Birthday meeting, Oxford, 2001
- Committee member for FOCM at the IMA Minnesota, 2002.
- Chairman for the 'TMR Meeting on Fourth Order PDEs', Bath, January, 2002.
- LMS/EPSRC Spring school on numerical methods, Cambridge, 2002.
- Committee memeber for ESGI 46, Bristol, 2003
- 25 major international meetings as part of BICS meetings.

PROFESSIONAL ACTIVITIES OUTSIDE THE UNIVERSITY

EPSRC

- Member of the EPSRC college from 1994,
- Member of the Applied Mathematics and ROPA panels,
- Chairman of the EPSRC initiative in Computational Partial Differential Equations, from 1997. Panel member from 1999.
- Member of the Public Understanding of Science Panel, from 2000.

Consultancies Consultant to AEA Technology from 1989, Consultant to National Power from 1990. Consultant to Quantisci from 1998.

External examining

- External examiner for the mathematics degree at UMIST 1996-1999.
- External examiner for the mathematics degree at Imperial College 1999-2001
- External examiner for the MRes degree at Oxford 2003-
- External examiner for the mathematics degree at Kent 2004-

  External examiner for PhD students at many institutions both in the UK and overseas.

Offices in learned societies

- Since 1991 I have been a member of the Institute of Mathematics and its Applications' committee on Signal Processing and chairman of its subcommittee on Nonlinear Methods in Signal Processing.
- Commonwealth Scholarships commission, 1999–2006.
- Mathematics Education board of the Royal Institution, since 1999.
- Education Committee of the London Mathematical Society, from 2001. LMS Education Officer (elected post) , 2006- , LMS Council Member 2006-
- UKMT Council Member, 2010 -
- Chair of the advisory ctee for the MSOR 2002-2008
- Council of the IMA, 2003-
- Council of the LMS, 2004-
- CMS Maths Careers committee, 2003-
- CMS More Maths Grads Committee, 2006-
- CMS Maths Careers Committee, 2004-
- SIAM 'Why do math' Committee, 2008-

Refereeing I regularly act as a referee for EPSRC, NSERC and a large number of journals, including the SIAM Journal of Applied Mathematics, Proc. Roy. Soc. Edinb., Proc. Roy. Soc. Lond., Nonlinearity and journals published by the Institute of Mathematics and the Institute of Physics.

PUBLICATIONS

Books

C. Budd and C. Sangwin, *Mathematics Galore!*, (2001), OUP. ISBN 0-19-850769-0

M. di Bernardo, C. Budd, A. Champneys and P. Kowalczyk, 'Piecewise-smooth dynamical systems: theory and applications', Applied Mathematical Sciences, 163, Springer, (2007), ISBN 978-1-84628-039-9.

Edited works

[1] Proc. 1992 European Study Group with Industry, eds. C. Budd, J. Dold, M. Grinfeld, A. Richardson & D. Riley.

[2] Proc. 1997 European Study Group with Industry, eds. C. Budd, M.Peletier, G. Hunt.

Refereed Conference Contributions

[3] C. Budd, 'Bifurcation in elliptic systems', in Bifurcation: Analysis Algorithms and Applications., ed. T. Kupper, 1987, pp. 9-17.
[4] C. Budd & J. Norbury, 'Symmetry breaking in elliptic systems with critical growth rates', in Nonlinear Diffusion Equations and Their Equilibrium States II, Ed. W.-M. Ni, 1988, pp. 191-215.

[5] C. Budd & A. Wheeler, 'Modelling coronas and space charge phenomena', Proc. of the Third European Conference on Mathematics in Industry', ed. S. McKee, 1990, pp. 173-195.

[6] C. Budd & R. Hare, 'A time dependent model for the space charge distribution in solid dielectrics under high electric field', Proc. of the Fourth European Conference on Mathematics in Industry, ed. M. Heilio, (1991), 167–176.

[7] C. Budd, J. Dold & A. Stuart, 'Blow-up in a parabolic model with constraints', Proc. 4th. Workshop on Nonlinear Diffusion, ed. L. Peletier, (1991), 4–5.

[8] A. Humphries, C. Budd and A. Wathen, 'Finite element methods for semi-linear elliptic PDEs with critical Sobolev exponents on non-spherical 3D domains', in 'International Conference on Differential Equations - Equadiff 95, Lisbon', eds. L.T. Magalhães, C. Rocha and L. Sanchez, (1997), World Scientific.

[9] M. Oestreich, N. Hinrichs, K. Popp & C. Budd, 'Analytical and experimental investigation of an impact oscillator', Proc. of DETC'97, 1997 ASME Design Engineering Technical Conferences, (1997).

[10] M. di Bernardo, A.R. Champneys, C.J. Budd and F. Vasca, 'Sliding orbits and double spiral bifurcation diagrams in power electronic DC/DC converters', Proc. IEEE ISCAS 99, (1999)

Other conference contributions

[11] C. Budd, 'Applications of corona models', ECMI Review, 1989, pp. 11-12.

[12] C. Budd, 'Current zeros in electric arcs', Proc. 1990 European Study Group in Industry, ed. J. Blake, 45–47.

[13] C. Budd, 'Spectral analysis of electric arcs', Proc. Warwick Conference on Mathematics in Industry, ed. I. Stewart, (1990), 16–47.

[14] C. Budd, 'The numerics of dynamics and the dynamics of numerics', Proc. Warwick Conference on Mathematics in Industry, ed. I. Stewart, (1990), 126–141.

[15] C. Budd, 'Time series analysis of dynamical systems', Proc. 1992 European Study Group with Industry, ed. C. Budd et. al.

[16] C. Budd, 'Inverse problems in electric arcs', Proc. 1992 European Study Group with

Industry, ed. C. Budd et. al.

[17] R. Hare & C. Budd, 'Modelling of space charge and field in solid dielectrics', Proc. 6th. IEE conference on dielectric materials, DMMA-6, (1992), 81–84.

[18] C. Budd & V. Galaktionov, 'The Kassoy problem and its generalisations', in *Nonlinear diffusion phenomenon* eds. P. Sachdev and R. Grundy, (1994), Narosa, 10–23. to appear, 14 pages.

[19] C. Budd, 'The global behaviour of impacting oscillators', in 'Real and Complex Dynamical Systems', eds. B. Branner & P. Hjorth, (1995), Kluwer Academic Publishers, 27–46.

[20] C. Budd, 'Grazing in impact oscillators', in 'Real and Complex Dynamical Systems', eds. B. Branner and P. Hjorth, (1995), Kluwer Academic Publishers, 47–64.

[21] C. Budd, 'Micro-droplet formation in high current electric arcs', Proc. 1993 European Study Group with Industry, eds. J. King & R. Tew.

[22] C. Budd, J. Chen, W. Huang and R. Russell, 'Moving mesh methods with applications to blow-up problems for PDEs', Proc. 1995 Dundee Conference on Numerical Analysis, Ed. D. Griffiths & G. Watson, (1996), Pitman, 1–18.

[23] C.Budd, 'Non-smooth dynamical systems and the grazing bifurcation', in *Nonlinear mathematics and its applications*, ed. P. Aston, (1996), CUP, 219–236.

[24] C. Budd and G. Collins, 'Symmetry based numerical methods for partial differential equations', Proc. 1997 conference on Numerical Analysis, eds. D. Griffiths, D. Higham and G. Watson, (1998), Pitman, 16–36.

[25] C. Budd and J. Stockie, 'Trip wire detection for land mines', Proc. PIMS Industrial Problem Solving Workshop, ed. M. Lamoureux, (1998), 49–62.

[26] C. Budd, 'Microwave cooking and safety', TPAC news, **9**, (1999), 10–11.

Editorship: Journals

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