Prof. Christopher John Budd OBE, FIMA, C.Math, NTF

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Present appointments

Professor in Applied Mathematics, University of Bath, from September 1995.
Chair of the Centre for Nonlinear Mechanics, 2000-
Deputy Director of the Institute for Mathematical Innovation, Aug 2016-
Chair of Mathematics at the Royal Institution of Great Britain, from May 2000.
Professor of the Public Understanding of Mathematics, ICMS, Edinburgh, April 2015-
Gresham Professor of Geometry, Sept 2016-

Previous appointments

2004-2010 Director of the Bath Institute for Complex Systems.
1989-1995, Lecturer/Reader in numerical analysis, University of Bristol.
1986-1989, CEGB Research Fellow in numerical analysis, Hertford College Oxford.

Academic qualifications

D. Phil. in Mathematics, Oxford University, 1983-1986.
Part 3, Cambridge, 1982-1983, Distinction.
Mathematics M.A. Degree, Cambridge University, 1979-1982, First Class Honours

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.
ILT/HEA National Teaching Fellowship (NTFS), 2001
LMS Popular Lecturer in Mathematics, 2001
IOP Award for Outstanding Contributions to the Public Understanding of Physics, 2002.
British Science Association Prize for the Best Science Festival in NSEW, 2009.
Honorary Fellow of the British Science Association, 2011
University of Bath/Met Office Knowledge Transfer Award, 2012
Seelye Distinguished Fellowship, Auckland, 2015
IMA Distinguished Service Award, 2015
OBE for work in Maths and Science Education, Queen's Birthday Honours, June 2015
LMS Prize for Communicating Maths, November 2015
Joint Policy Board for Mathematics (AMS/MAA/SIAM) prize for communicating mathematics, January 2020.

Current University Responsibilities

Lecturing: MA10236 Mathematical Methods, MA30241 Communicating Mathematics.
Management Ctee for the AAPS CDT
Creator and then Director of the MSc Course *Modern Applications of Mathematics* and on the Ctee for the new MSc to replace this in 2021.
Impact Champion for Mathematics (with Chris Jennison)
Departmental Research Ctee.
Dept. Diversity and Equality Ctee.
Director of the *Bath Taps Into Science Festival*
Chair of the Bath Maths Masterclass Ctee.
University Disciplinary Ctee.

Significant positions external to the university

Executive board for V-KEMS, March 2020-
NERC College, Feb 2020-
Royal Society Newton Fellowship Ctee., 2018-
IMA Bond Task and Finish Committee, 2018-
Chair of the UKMT, 2016-2019 (now on a UKMT Board Committee)
European Maths Society Public Engagement Committee, 2016-
Dynamic Earth theme leader for the GW4+ NERC DTP, 2014-
LMS International Affairs Ctte, 2014-
NERC DTP Theme leader 2013-
Co-Director of the CliMathNet Network, 2013-
IMA vice-president for communication and director of the 50th anniversary 2012-2015
IMA Research Committee 2015-
REF panel member, 2011-2014
Member of the 'Vorderman Committee' on Mathematics Education, 2009-2011.
LMS Education Officer (elected post) , 2006-2011
Industry board for the MEI examination board, 2006-2013
Scientific board for MITACS (Canada), 2004-
Scientific Ctee for ESGI (study groups), 2004-
Council Member of the LMS, 2004-2011
Council Member of the IMA, 2003-2015
Chair of the advisory ctee for the MSOR 2002-2008

Editorships

Associate editor: SIAM News, SIAM Review
Co-editor of the Springer on-line journal MICS (Maths in Industry Case Studies)

Postgraduate supervision

PhD Students: 32 completed, 9 current, 14 Post Doctoral Research Assistants

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
Dr. T. Dodwell, 2008–2012 (Jointly with Prof. G. Hunt)
Dr. P. Browne, 2008–2013 (jointly with Dr. H.A. Kim)
Miss V. Stewart, 2009-2010 (MPhil)
Dr. K. Mora, 2010-2014
Miss Leire GG (ESR), 2010-2011
Dr S. Jenkins, 2010-2015 (jointly with Drs. M. Freitag and N. Smith)
Dr. S. Cook, 2011–2016
Mr A. Chackchouck (ESR), 2011-2012
Mr Zhipeng Zhang, 2013-2017 (jointly with Prof F. Li)
Dr H. Kocak, 2011-2015
Mrs. S.K. Morupisi, 2015-2020
Mr S. Shataer, 2016-
Miss K. Powers (with Chris Brace and Paul Milewski) , 2016-
Mr M. Griffith (with Nick Mitchell), 2016-
Miss H. Wragg, 2016-
Mr G. Jimenez (with Phillipe Blondel), 2016-
Miss Y Zhou, 2019-
Mr S. Appela, 2019-
Mr. T. Babasola, 2019-
Mr. G. Audone (with Matt Nunes and Phillipe Blondel), 2020-

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.
Dr. E. Walsh, 2010– 2011
Dr. P. Browne, 2012-2012
Dr. A. McRae, 2015-2017

Grants

Principal Investigator on research grants totaling over £3.5M including a £1M EPSRC Critical mass grant on Complexity for 8 PDRAs (2004), a Marie-Curie ITN Grant on PDES for 39 PhD students (2009), and a NERC grant for 4 PDRAs on moving mesh methods (2015).

Principal investigator on public understanding of science grants totaling over £200k including Bath Taps Into Science and the 2010 Royal Society Summer Exhibition.

1990 £500 from the London Mathematical Society to organise a conference on Nonlinearity.
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 £1500 LMS Conference grant (4th Order PDEs)
2001 £50 000 ILT Teaching Fellowship
2002 £2000 EPSRC Visiting Fellowship grant for Prof. K. Promislow (SFU).
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.
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 Euro across eight countries)
2010 £15 000, EPSRC, HE-STEM, IMA to organise the RSSE summer exhibition
2010 £14 748 EPSRC Knowledge Transfer Grant to work with the Met Office
2011 £30 000 HE-STEM Maths Communicators
2011 £92 000 EPSRC Case with the Met Office
2012 £40 000 EPSRC KT grant with the Met Office
2012 £300 000 RCUK Catalysts for public engagement (Co-investigator)
2012 £500 000 EPSRC Network for out of equilibrium thermodynamics (one of 50 co-investigators)
2012 £250 000 EPSRC Climate Network Grant CliMathNet Co-I
2013 £215 000 KTP grant, Seiche Measurements
2014 £15.5M NERC DTP (one of many co-applicants)
2014 £300 000 EPSRC Climate Network grant ReCover Co-I
2015 £225 637 NERC Adaptive Methods for Atmospheric Flows PI
2015 £80 000 Smith Institute i-CASE studentship
2016 £80 000 NERC DTP studentship
2017 £1500 LMS undergraduate research bursary

2018 £1500 LMS undergraduate research bursary
2018 £4500 ISAF grant for ESGI138
2018 £15 000 Innovate UK grant for ESGI138
2018 £6 225 854 CO-I for the AAPS CDT
2019 £3 000 LMS grant for attending ICME 2020
2019 £6 000 LMS grant for running the BAMC
2019 £40 000 two projects with PepsiCo
2020 £207 000, MIVOR grant from the National Grid

Invited presentations and conference organisation

Frequent key note talks to meetings all over the world. Recent highlights include:

Keynote speaker on mathematical modelling, ICIAM (Vancouver), July 2011
Invited speaker on non-smooth dynamics, Tokyo, July 2012
Invited speaker, ITN meeting on PDEs, Jerusalem, September 2012
Plenary speaker Maths for Planet Earth, Melbourne, July 2013
Keynote speaker at the 100th Industrial Study Group, Oxford, April 2014
Plenary Speaker at CAIMS, Waterloo, Canada, June 2015
Seeley Fellow prize lecture on Climate Change, Auckland, August, 2015
Keynote speaker on the Nordic conference on maths in industry, September 2016
Keynote speaker at the New York Museum of Maths, June 2017
Organiser and speaker at the Banff workshop on Moving Mesh Methods, June 2018
Two week visiting Professor/lectureship at the Fields Institute, November 2018
Keynote speaker at the Heidelberg Luareate Forum, September, 2019
Principal research visitor at the INI programme in numerical analysis, July-Dec, 2019.
Keynote speaker at the JMM meeting, Denver, January 2020

I have been the lead organiser, or on the executive committee of many conferences, including:

2015 CliMathNet (100 particpants), 2016 Moving Mesh Methods (100 participants), 2017 SciCADE (400 participants), 2018 ESGI (80 participants), 2019 BAMC (350 participants), 2020 Mathematical Models for Weather and Climate Prediction (160 participants).

Books and significant reports

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, (2009), ISBN 978-1-84628-039-9.
C. Budd, A. Champneys, M. Freiberger, P. Glendinning, S. Humble, R. Thomas, A. Wadee, *50 visions of mathematics*, OUP, (2014) ISBN: 9780198701811
C. Vorderman, R. Porkess, C. Budd, R. Dunne, *A Mathematics education for all our young people* (the *Vorderman Report*), (2011).

Academic Journal Papers

[1] C. Budd, 'Semilinear elliptic equations with near critical growth', Proc. Roy. Soc. Edinb., **107a**, (1987), 249–270.
[2] C. Budd & J. Norbury, 'Semilinear elliptic equations and supercritical growth', J. Diff. Eqns., **68**, (1987), 169–197.
[3] C. Budd, 'Comparison theorems for semilinear elliptic equations', J. Diff. Eqns., **70**, (1988), 338–359.
[4] C. Budd & A. Wheeler, 'A new approach to the space charge problem', Proc. Roy. Soc. Lond., **417A**, (1988), 389–415.
[5] C. Budd & A. Wheeler, 'Exact solutions of the space charge problem using the hodograph method', IMA J. Appl. Maths., **40**, (1988), 1–14.
[6] C. Budd, 'Symmetry breaking and semilinear elliptic equations', J. Comp. Appl. Math., **26**, (1989), 79–96.
[7] C. Budd, 'Applications of Shilnikov theory to semilinear elliptic partial differential equations', SIAM J. Anal., **20**, (1989), 1069–1080.
[8] C. Budd & Y.-W. Qi, 'The existence of bounded solutions of a semilinear elliptic equation', J. Diff. Eqns., **82**, (1989), 207–218.
[9] C. Budd & Y.-W. Qi, 'The asymptotic behaviour of the solutions of the Kassoy problem with a modified source term', Proc. Roy. Soc. Edinb., **113A**, (1989), 347–356.
[10] C. Budd, A. Friedman, J. McLeod & A. Wheeler, 'The space charge problem', SIAM J. Appl. Math., **50**, (1990), 181–198.
[11] C. Budd, 'Coronas and the space charge problem', Euro. J. Appl. Maths., **2**, (1991), 43–81.
[12] C. Budd, M. Knaap & L. Peletier, 'Asymptotic behaviour of elliptic equations with critical exponents and Neumann boundary conditions', Proc. Roy. Soc. Edinb., **117A**, (1991), 225–250.
[13] C. Budd & A. Wheeler, 'Solution of the space charge equations in multiply connected regions', J. Comput. Phys., **97**, (1991), 1–29.
[14] T. Murdoch & C. Budd, 'Convergent and spurious solutions of nonlinear elliptic equations', IMA J. Num. Anal., **12**, (1992), 365–386.
[15] C. Budd, S. McKee & D. Swailes, 'Modelling H^+ and K^+ transport across cell membranes', Appl. Math. Comput., **50**, (1992), 33–44.
[16] C. Budd & L. Peletier, 'Asymptotics for semilinear elliptic equations in annular domains', J. Asymptotic Analysis, **6**, (1993), 219–239.
[17] G. Vickers, V. Hutson & C. Budd, 'Spatial patterns in population conflicts', J. Math. Biol., **31**, (1993), 411–430.
[18] R. Hare, R. Hill & C. Budd, 'Modelling charge injection and motion in solid dielectrics under high electric field', J. Physics D: Appl. Phys., **26**, (1993), 1084–1093.
[19] C. Budd, J. Dold & A. Stuart, 'Blow-up in a partial differential equation with constrained first integral', SIAM J. Appl. Math., **53**, (1993), 718–742.
[20] C. Budd & R. Hare, 'A comparison of the injection laws for the space charge equation', Proc. Roy. Soc. Lond. A., **443**, (1993), 517–546.
[21] C. Budd, C. Harris & J. Vickers, 'Dynamic models for the competition between two companies seeking a monopoly', Rev. Economic Studies **60**, (1993), 543–573.

[22] C. Budd, J. Dold & A. Stuart, 'Blow-up in a parabolic system with convection', SIAM J. Appl. Math., **54**, (1994), 610–640.
[23] C. Budd & F. Dux, 'Chattering and related behaviour in impacting oscillators', Phil. Trans Roy. Soc., **347**, (1994), 365–389.
[24] C. Budd & F. Dux, 'Intermittency in impact oscillators close to resonance', Nonlinearity, **7**, (1994), 1191–1224.
[25] H. Lamba & C. Budd, 'Scaling of Lyapunov exponents at non-smooth bifurcations', Phys. Rev. Lett., **50**, (1994), 89–94.
[26] C. Budd, K.A. Cliffe & F. Dux, 'The effect of frequency and clearance variations on a single degree of freedom impact oscillator', J. Sound and Vibration, **184**, (1995), 475–502
[27] C. Budd & G. Lee, 'Double impact orbits of periodically forced impact oscillators' Proc. Roy. Soc. A, **452**, (1996), 2719–2750.
[28] C. Budd & V.Galaktionov, 'Critical diffusion exponents for self-similar blow-up solutions of a quasilinear parabolic equation with an exponential source', Proc. Roy. Soc. Edinb. **126A**, (1996), 413–441.
[29] C. Budd, W. Huang & R. Russell, 'Moving mesh methods for problems with blow-up', SIAM J. Sci. Comp., **17**, (1996), 305–327.
[30] C. Budd, J. Dold & V. Galaktionov, 'Self-similar blow-up for a quasilinear parabolic equation with gradient diffusion and exponential source', Advances in Differential Equations, **2**, (1997), 85–124.
[31] C. Budd & G. Collins, 'An invariant moving mesh scheme for the nonlinear diffusion equation', Applied Numerical Mathematics, **26**, (1998), 23–39.
[32] C. Budd & A. Humphries, 'Adaptive methods for semi-linear elliptic equations with critical exponents and interior singularites', Applied Numerical Mathematics, **26**, (1998), 227–240.
[33] C. Budd & A. Humphries, 'Weak finite dimensional approximations of semi-linear elliptic PDEs with near critical exponents', Asymptotic Analysis, **17**, (1998), 185–220.
[34] M. di Bernardo, C. Budd & A. Champneys 'Grazing, skipping and sliding: analysis of the non-smooth dynamics of the DC/DC buck converter', Nonlinearity, **11**, (1998), 859–890.
[35] C. Budd, G. Collins and V. Galaktionov, 'An asymptotic and numerical description of self-similar blow-up in quasilinear parabolic equations', J. Computational and Applied Mathematics, **97**, (1998), 51–80.
[36] C. Budd & V. Galaktionov, 'Stability and spectra of blow-up in problems with quasilinear gradient diffusivity', Proc.Roy. Soc. A, **454**, (1998), 2371–2407.
[37] C. Budd, V. Galaktionov and J. Chen, 'Focusing blow-up for quasilinear parabolic equations', Proc. Roy. Soc. Edinb., **128A**, (1998), 965–992.
[38] C. Budd, G. Koomullil & A. Stuart, 'On the solution of convection-diffusion boundary-value problems using equidistributed grids', SIAM J. Sci. Comp., **20**, (1998), 591–618.
[39] C. Budd, A. Humphries & A. Wathen, 'The finite element approximation of semilinear elliptic PDEs with critical exponents in the cube', SIAM J. Sci. Comp., **20**, (1999), 1875–1904.
[40] C. Budd, G. Collins, W.-Z. Huang and R. Russell, 'Adaptive methods for the porous medium equation inheriting group invariance', Phil. Trans. Roy. Soc. Lond. A, **357**, (1999), 1047–1077.

[41] C. Budd, G. W. Hunt, and M. A. Peletier, 'Self-similar Fold Evolution under Prescribed End-Shortening', Journal of Mathematical Geology, **31**, (1999), 989–1005.
[42] C.J. Budd and A. Iserles, 'Geometric integration - the numerical solution of differential equations on manifolds', Phil. Trans. Roy. Soc. Lond. A., **357**, (1999), 945–956.
[43] C.J. Budd, S. Chen and R. Russell, 'New self-similar solutions of the nonlinear Schrödinger equation, with moving mesh computations', J. Comp. Phys., **152**, (1999), 756–789.
[44] C.J. Budd and M. Peletier, 'Approximate self-similarity in models of rock folding', SIAM J. Appl. Math., **60**, (2000), 990-1016
[45] G.W. Hunt, M.A. Peletier, A.R.Champneys, A. R., P. D. Woods, M.A. Wadee, C.J. Budd and G.L. Lord, G. L., 'Cellular Buckling in Long Structures', Nonlinear Dynamics', **21**, (2000), 3–29
[46] C.J. Budd, B. Leimkuhler and M. Piggott, 'Scaling invariance and adaptivity', Appl. Num. Math., **39**, (2001), 261–288.
[47] C.J. Budd and M. Piggott, 'The geometric integration of scale invariant ordinary and partial differential equations', J. Comp. Appl. Math., **128**, (2001), 399-422.
[48] M. di Bernardo, C.J. Budd and A. Champneys, 'Normal form maps for grazing bifurcations in n-dimensional piecewise-smooth dynamical systems'. Phys. D 160 (2001), no. 3-4, 222–254.
[49] M. di Bernardo, C.J. Budd and A. Champneys, 'Grazing and border collision in piecewise smooth systems: a unified analytical framework', Phys. Rev. Lett., Phys. Rev. Lett. 86, (2001), 2553–2556.
[50] M. di Bernardo, C.J. Budd and A. Champneys, 'Corner collision implies border-collision bifurcation', Phys. D, **154**, (2001), 171–194.
[51] C.J. Budd, 'Asymptotics of new self-similar blow-up solutions of the nonlinear Schrödinger equation, SIAM J. Appl. Math., **62**, (2001), 801–830.
[52] C.J. Budd, G. Hunt and R. Kuske, 'Asymptotics of cellular buckling close to the Maxwell load', Proc. Roy. Soc. Lond. A, **457**, (2001), 2935–2964.
[53] C.J. Budd and V. Dorodnitsyn, 'Symmetry-adapted moving mesh schemes for the nonlinear Schrödinger equation', J. Phys A:Math. Gen., **34**, (2001), 1–14.
[54] C.J. Budd and J. Wilson, 'Bogdanov-Takens points and Silnikov homoclinicity in a simple power system model of voltage collapse', IEEE Trans. on Circuits and Systems, **49**, (2002), 575–590.
[55] C.J. Budd, H. Huang and R.D. Russell, 'Mesh selection for a nearly singular boundary value problem', J. Scientific Computing, **16**, (2002), 525–552.
[56] C.J. Budd and M. Piggott, 'Geometric integration and its applications', in 'Foundations of Computational Mathematics XI', ed. F. Cucker. Elsevier, (2003), 35–139.
[57] C.J. Budd and A. Humphries, 'Numerical and analytical estimates of existence regions for semi-linear elliptic equations with critical Sobolvev exponents in cuboid and cylindrical domains', J. Comp. Appl. Math., **151**, (2003), 59–84.
[58] C.J. Budd, R. Edmunds and G.W.Hunt, A nonlinear model for parallel folding with friction' Proc. Roy. Soc. Lond A, 459, (2003), 2097–2117
[59] C.J. Budd, V.A.Galaktionov and J.F. Williams, 'Self-similar blow-up in higher order semilinear parabolic equations', SIAM J Appl. Math **64** (5) (2004), 1775–1809.

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[61] R. Beardmore, M.A. Peletier, C.J. Budd and M.A. Wadee, 'Bifurcations of periodic solutions satisfying the Zero-Hamiltonian Constraint in Reversible Differential Equations', SIAM J. Analysis, **36**, (2005), 1461–1488.
[62] S. Blanes and C.J.Budd, 'Adaptive geometric integrators for Hamiltonian problems with approximate scale invariance', SIAM J. Sci. Comp., **26**, (2005), 1089–1113.
[63] C.J.Budd, R. Carretero and R.D. Russell, ' Precise computations of chemotactic collapse using moving mesh methods', J. Comp. Phys. 202 (2), (2005) 463–487.
[64] C.J. Budd, V. Rothschafer and J. F. Williams, *Multi-bump self-similar solutions of the Complex Ginsburg Landau Eqautions*, SIAM J. Dyn Sys, **4**, (2005), 649–678.
[65] C.J. Budd and R. Kuske, *Localised periodic patterns for the non-symmetric generalized Swift-Hohenberg equation*, Physica D, **208**, (2005), 73–95
[66] C.J. Budd, R. Edmunds and G. Hunt *Serial parallel folding with friction: a primitive model using cubic B-splines*, Journal of Structural Geology, **28**, (2006), 444–455.
[67] C.J. Budd, O. Koch and E. Weinmuller, *Computation of self-simliar solution profiles for the Nonlinear Schrodinger equation*, Computing **77**, (2006), 335–346
[68] C.J. Budd and J.F. Williams, *Parabolic Monge-Ampère methods for blow-up problems in several spatial dimensions*, Journal of Physics A, **39**, (2006), 5425–5463.
[69] C.J. Budd, *Geometric integration and its applications*, EMS Newsletter, (2006), 15–18.
[70] C.J. Budd and P.T. Piiroinen, *Corner bifurcations in non-smoothly forced impact oscillators*, Physica D, 220, (2006), 127–145.
[71] C.S. Edwards, H.A. Kim and C.J. Budd, *Investigation on the validity of topology optimisation methods*, 47th AIAA/ASME/ASCE/AHS/ASC Structure, Structural Dynamics and Materials Conference; Newport RI, (2006), 1–15
[72] C.S. Edwards, H.A. Kim and C.J. Budd, *An evaluative study on ESO and SIMP for optimising a cantilever tie-beam*, Structural and multidisciplinary optimisation., 34, (2007), 403–414
[73] C.S. Edwards, H.A. Kim and C.J. Budd, *Smooth boundary based optimisation using a fixed grid*, 7th World Congress on structural and multidisciplinary optimisation, Korea, (2007)
[74] J.A. Boon, C.J. Budd and G.W. Hunt, *Level set methods for the displacement of layered materials*, Proc Roy Soc A., 463, (2007), 1447–1466.
[75] M. di Bernardo, C.J. Budd, A.R. Champneys, P. Kowalczyk, A.B. Nordmark, G. Olivar and P.T. Piiroinen, *Bifurcations in nonsmooth dynamical systems*, SIAM Review, **50**, (2008), 629–701.
[76] C. J. Budd, W-Z Huang and R.D.R. Russell, *Adaptivity with moving grids*, Acta Numerica, (2009), 1–131.
[77] C.J. Budd and J.F. Williams, *Parabolic Monge-Ampere methods for mesh generation in several dimensions*, SIAM J. Sci. Comput., **31**, (2009), 3438–3465
[78] C.J. Budd and J.F. Williams, *How to adaptively resolve evolutionary singularities in differential equations with symmetry*, J. Eng. Maths (2010), 217-236
[79] N. Smith, C.Mitchell and C.J. Budd, *Image-model coupling: a simple information theoretic perspective for image sequences*, (2009)

[80] N J McCullen, D P Almond, C J Budd and G W Hunt, *The robustness of the emergent scaling property of random RC network models of complex materials*, J. Phys D: Applied Physics, 42, (2009), 1–8

[81] S.R. Pring and C.J. Budd, *The dynamics of regularised discontinuous maps with applications to impacting systems*, SIAM J. Appl. Dyn. Syst. Volume 9, Issue 1, pp. 188-219 (2010)

[82] N.D. Smith, D. Pokhotelov, C.N. Mitchell, C.J. Budd, *Image-model coupling: application to an ionospheric storm*, Nonlinear Processes in Geophysics, **17**, (2010), 361–369.

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