CURRICULUM VITAE OF BRIAN STRAUGHAN

Address: Department of Mathematical Sciences, University of Durham, DH1 3LE, U.K.

email: Brian.Straughan@durham.ac.uk

internet: http://www.maths.dur.ac.uk/∼dma0bs/

Telephone Numbers. Work 0191 334 3102, Mobile 07799226609.

Degrees. B.Sc., Mathematics, 1970, M.Sc., Fluid Mechanics and Mathematical Techniques, University of Newcastle upon Tyne, 1971. Ph.D. in Mathematics, Heriot-Watt University, 1974.

Present Position. Leverhulme Emeritus Fellow and Emeritus Professor of Numerical Analysis in the University of Durham.

Prizes/Awards/Honours.

Stirling-Newall Exhibition, Durham County Education Authority, 1966.

Elected a Fellow of the Royal Society of Edinburgh, March 1986.

Awarded a Max Planck Research Prize by the Alexander von Humboldt Foundation, for outstanding achievements in Applied Mathematics (their words, not mine!), 1994.

Elected a Foreign Member of the Accademia di Scienze, Fisiche e Matematiche di Napoli, 3rd June, 1995.

Received a Durham University Vice Chancellor's Award for Excellence in Doctoral Supervision, May 2005.

Nominated a top referee for 2010 and for 2012 by Proceedings A of the Royal Society of London.

Honoured with an international conference for my 60th birthday, in Vietri, Italy, February 28 - March 1, 2008. The proceedings may be found at:
New trends in fluid and solid models: Proceedings of the international conference in honour of Brian Straughan, eds. M. Ciarletta, M. Fabrizio, A. Morro & S. Rionero, World Scientific, 2010.

Honoured with an international conference for my 70th birthday, in Vietri, Italy, January 30 - February 1, 2018.

Awarded a Leverhulme Emeritus Fellowship from September 2019.

Career Details.

Oct. 1966 – Sept. 1967: Chemist with Procter and Gamble Ltd., Newcastle upon Tyne.

Oct. 1971 – Sept. 1972: Research Assistant, Dept. Electrical Engng., Liverpool Univ.

Nov. 1974 – Sept. 1975: SERC Research Associate, Mathematics, Heriot-Watt University.

Oct. 1975 – Sept. 1978: University Research Fellow, Mathematics, Glasgow University.

Oct. 1978 – Sept. 1986: Lecturer; Oct. 1986 – Sept. 1987: Senior Lecturer; Glasgow University.

Aug. 1984 – Aug. 1985: Visiting Associate Professor; University of Wyoming, and University of California at Berkeley.

Oct. 1987 – Nov. 1991: Titular Professor (Personal Chair); Mathematics, Glasgow University.

Aug. 1988 – Aug. 1989: Visiting Professor; University of South Carolina.

December 1991 – August 2000: Simson Professor of Mathematics in the University of Glasgow.
I was appointed to the Simson Chair (formerly occupied by Professor I.N. Sneddon, F.R.S.) on 1st December 1991. This is the only Chair of Mathematics in the University of Glasgow which is financed by a private endowment.

Aug. 1994 – Aug. 1995: Research Professor; University of Tennessee and Oak Ridge National Laboratory.

September 2000 – November 2015 : Professor of Numerical Analysis in the University of Durham. I was Chairman of the Board of Examiners, thus responsible for all examinations and results in Mathematics, from 2004 – 2007.

November 2015 – : Emeritus Professor and Leverhulme Emeritus Fellow in the University of Durham.

Grants

I have been principal investigator or co-investigator on many grants from SERC, EPSRC, NATO, Britoil, Scottish Enterprise, Royal Society of London, British Council, European Community, Scottish Higher Education Funding Council, and the Leverhulme Trust, totalling approximately £3 million

Lecturing/Teaching Experience.

I have extensive lecturing experience having given courses on Calculus of Variations, Continuum Mechanics, Fluid Mechanics, Hydrodynamic Stability, Lagrangian Dynamics, Mathematical Biology, Mathematical Modelling, Newtonian Mechanics, Numerical Analysis, Ordinary Differential Equations, Partial Differential Equations, and Vector Calculus, to Mathematics, Physics, Biology, Geology, and Engineering students.

Research Interests.

My field of research is partial differential equations, scientific computing, and their applications to problems in the real world.

Research Students.

Carol McTaggart (Ph.D. 1983), *Senior lecturer in a University in Birmingham*, **Maria Antonietta Garofalo (M.Sc. 1984)**, *Industry in Napoli*, **Anne Connell (Ph.D. 1986)**, *banking England*, **Geoffrey McKay (Ph.D. 1992)**, *Senior lecturer University of Strathcylde*, **Lorna Richardson (Ph.D. 1993)**, *Industry Scotland*, **John Tracey (Ph.D. 1997)**, *Industry Scotland*, **Paula Budu (Ph.D. 2002)**, *went to Duke University*, **Magda Carr (Ph.D. 2003)**, *Senior Lecturer in Newcastle University*, **Antony Hill (Ph.D. 2005)**, *Senior Lecturer in the University of the West of England*, **Mark Webber (Ph.D. 2007)**, *Mathematics teacher in Yarm, England*, **Jiratchaya Jaisaardsuetrong (Ph.D. 2009)**,*Lecturer in Ubonratchathani University, Thailand*, **Nicola Scott (Ph.D. 2013)**, *Atomic Weapons Establishment, UK.* **Caroline Walters (Ph.D. 2014)**, *University of Oxford.* **Akil Harfash (Ph.D. 2014)**, *University of Basrah, Iraq*, **Shatha Haddad (Ph.D. 2014)**, *University of Basrah, Iraq*, **Bushra Al Sulaimi (PhD. 2017)**, *Ministry of Education in Oman.*

Postdoctoral Fellows.

Bruno Buonomo, *now Professor in University of Naples.*

Min Hsing Chang, *now Professor in Tatung University, Taipei.*

Antony Hill, *now in University of the West of England.*

Marianna Cerasuolo, *now in University of Portsmouth.*

John Bissell, *now in University of York.*

Membership of Editorial Boards.

Bolletino dell'Unione Matematica Italiana, Le Matematiche, Rendiconto dell'Accademia delle Scienze Fisiche e Matematiche: Napoli, Fluids.

Past Membership of Editorial Boards.

Acta Mechanica, Continuum Mechanics and Thermodynamics, Mathematical Methods in the Applied Sciences, Mathematical Models and Methods in Applied Sciences, Proceedings of the Royal Society of Edinburgh, Series A, Stability and Applied Analysis of Continuous Media, Proceedings of the Edinburgh Mathematical Society, Journal of Mathematical Analysis and Applications, International Journal of Computing Science and Mathematics, International Journal of Dynamical Systems and Differential Equatons, International Journal of Computational and Applied Mathematics, Meccanica, Ricerche di Matematica.

External Committees, Outreach.

Reviewer for the Department of Mathematical Physics, National University of Ireland, Galway; 20 times panellist for the Engineering and Physical Sciences Research Council of the U.K., and 5 times of those as chairman. Member of the appointing committee for the chair in Applied Mathematics in the University of Edinburgh; 3 times Member of Royal Society of Edinburgh Sectional Committee for election to Fellowship;

2 times Panellist/reviewer for the Mathematics panel of the Research Frontiers Programme 2008 of Science Foundation Ireland; External assessor for the Chair in Mathematical Biology, University of Dundee; 3 times External examiner and assessor for mathematics in Sultan Qaboos University, Muscat, Oman; 5 times external examiner for Mathematical Physics in the University of Galway; 4 times external examiner for Mathematics in the University of Edinburgh. Many times external examiner for PhDs in various places in the UK and throughout the world.

Some Invited Lectures

2005. Invited Plenary Talk, GAMM annual conference, University of Luxemburg.
2007. Keynote speaker, Int. Assocn. for Mathematics and Computers in Simulation conf., "Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory" Athens, Georgia, USA.
2008. Invited plenary lecture, Int. Conf. Numerical Analysis and Applied Mathematics, Psalidi, Kos, Greece.
2009. "VIIIth Workshop on Partial Differential Equations", Rio de Janeiro.
2009. "Coupled models in energy, hydrological and climate research", Weierstrass Institute for Analysis and Stochastics, Berlin.
2010. "IXth Workshop on Partial Differential Equations", Rio de Janeiro.
2011. "2nd Int. Conf. Numerical Analysis and Optimization", Sultan Qaboos University, Muscat, Oman.
2011. Distinguished Lecturer in the Interdisciplinary Mathematics Institute, University of South Carolina. Columbia, SC, USA. SIAM lecture, "Modelling binge drinking".
2011. Distinguished Lecturer in the Interdisciplinary Mathematics Institute, University of South Carolina. Columbia, SC, USA. Lecture, "Thermal convection in nanofluids".
2011. IMACS conf. Athens, Georgia, USA.
2011. 16th International Conference on Waves and Stability in Continuous Media, Brindisi, Italy.
2012. "Mathematical Models and Analytical Problems in Special Materials", Rome.
2013. "4th Int. Conf. on New Trends in Fluid and Solid Models", Vietri sul Mare, Italy.
2013. 17th Int. Conf. on Waves and Stability in Continuous Media, Levico Terme, Italy.
2013. Plenary speaker at "The Third International Conference on New Trends in Fluid and Solid Models", Vietri sul Mare, Italy.
2014. Invited keynote speaker at STAMM conference, Poitiers.
2014. Invited speaker at workshop, Bressanone.
2015 18th International Conference on Waves and Stability in Continuous Media, Cetraro, Italy.
2016. International Conference on Thermal Stresses, Salerno, Italy.
2016. International Conference on New Frontiers in Continuum Mechanics, Accademmia Nazionale dei Lincei, Rome, Italy.
2017. International Conference on Continuum Mechanics, Brescia, Italy.
2017. 19th International Conference on Waves and Stability in Continuous Media, Bologna, Italy.
2018. 5th International Conference on New Trends inFluid and Solid Mechanics, Vietri, Italy.
2019. Invited speaker, conference on Industrial Mathematics and Engineering, Accademmia delle Scienze, Bologna.
2022. Invited speaker, Koc University, Istanbul, April.
2022. Invited speaker, University of Naples, May.
2022. Invited speaker, conference on Mathematical Biology, Cinisi, Sicily, June.
2022. Invited speaker, University of Durham, November.
2022. Invited speaker, Universitá Cattolica, Brescia, December.
2023. Invited speaker, WASCOM conference, Bari, June 5–9.
2023. Invited speaker, 17th Joint European Thermodynamics Conference, Salerno, June 12–17.

Other Invited Colloquia.

I have given approximately 160 other colloquium/international conference lectures.

Selected Publications

Uniqueness and stability for the conduction-diffusion solution to the Boussinesq equations backward in time. Proc. Roy. Soc. London A, **347** *(1975), 453–446.*

Acceleration waves and second sound in a perfect fluid (with K.A.Lindsay). Arch. Rational Mech. Anal., **68** *(1978), 53–87.*

A thermodynamic interface theory and associated stability problems(with K.A. Lindsay). Arch. Rational Mech. Anal., **71** *(1979), 307–326.*

Backward uniqueness and unique continuation for solutions to the Navier-Stokes equations on an exterior domain. J. Math. Pures et Appl., **62** *(1983), 49–62.*

Exchange of stabilities, symmetry and nonlinear stability (with G.P.Galdi). Arch. Rational Mech. Anal., **89** *(1985), 211–228.*

A nonlinear analysis of the stabilizing effect of rotation in the Bénard problem (with G.P.Galdi). Proc. Roy. Soc. London A, **402** *(1985), 257–283.*

Convection in thawing subsea permafrost (with G.P.Galdi, L.E.Payne & M.R.E. Proctor). Proc. Roy. Soc. London A, **414** *(1987), 83–102.*

Stability of solutions to the Navier-Stokes equations backward in time (with G.P. Galdi). Arch. Rational Mech. Anal., **101** *(1988), 107–114.*

Spatial decay estimates and continuous dependence on modelling for an equation from dynamo theory (with F. Franchi). Proc. Roy. Soc. London A, **445** *(1994), 437–451.*

Effects of errors in the initial - time geometry on the solution of an equation from dynamo theory in an exterior domain (with F. Franchi). Proc. Roy. Soc. London A, **450** *(1995), 109–121.*

Stability in the initial-time geometry problem for the Brinkman and Darcy equations of flow in porous media (with L.E. Payne) J. Math. Pures et Appl., **75** *(1996), 225–271.*

Anisotropic porous penetrative convection (with D.W. Walker). Proc. Roy. Soc. London A, **452** *(1996), 97–115.*

Chebyshev tau - QZ algorithm methods for calculating spectra of hydrodynamic stability problems (with J.J. Dongarra and D.W. Walker). Appl. Numer. Math. **22** *(1996), 399–435.*

Analysis of the boundary condition at the interface between a viscous fluid and a porous medium and related modeling questions (with L.E. Payne). J. Math. Pures et Appl., **77** *(1998), 317–354.*

Structural stability for the Darcy equations of flow in porous media (with L.E. Payne). Proc. Roy. Soc. London A, **454** *(1998), 1691–1698.*

A priori bounds and structural stability for double diffusive convection incorporating the Soret effect (with K. Hutter). Proc. Roy. Soc. London A, **455** *(1999), 767–777.*

Continuous dependence and convergence results for Brinkman and Forchheimer models with variable viscosity (with L.E. Payne and J.C. Song). Proc. Roy. Soc. London A, **455** *(1999), 2173–2190.*

Effect of errors in the spatial geometry for temperature dependent Stokes flow (with L.E. Payne). J. Math. Pures et Appl., **78** *(1999), 609–632.*

Growth and uniqueness in thermoelasticity. (with R. Quintanilla). Proc. Roy. Soc. London A, **456** *(2000), 1419–1429.*

A sharp nonlinear stability threshold in rotating porous convection. Proc. Roy. Soc. London A, **457** *(2001), 87–93.*

Sharp global nonlinear stability for temperature dependent viscosity convection. Proc. Roy. Soc. London A, **458** *(2002), 1773-1782.*

Explosive instabilities in heat transmission (with R. Quintanilla). Proc. Roy. Soc. London A, **458** *(2002), 2833–2837.*

Continuous dependence and decay for the Forchheimer equations (with F. Franchi). Proc. Roy. Soc. London A, **459** *(2003), 3195–3202.*

Discontinuity waves in type III thermoelasticity (with R. Quintanilla). Proc. Roy. Soc. London A, **460** *(2004), 1169–1175.*

Resonant porous penetrative convection. Proc. Roy. Soc. London A, **460** *(2004), 2913–2927.*

Energy bounds for some non-standard problems in thermoelasticity (with R. Quintanilla). Proc. Roy. Soc. London A, **461** *(2005), 1147–1162.*

Decay bounds in a model for aggregation of microglia: application to Alzheimer's disease senile plaques (with R.A. Quinlan). Proc. Roy. Soc. London A, **461** *(2005), 2887–2897.*

Bounds for some non-standard problems in porous flow and viscous Green-Naghdi fluids (with R. Quintanilla). Proc. Roy. Soc. London A, **461** *(2005), 3159–3168.*

Global nonlinear stability in porous convection with a thermal non-equilibrium model. Proc. Roy. Soc. London A, **462** *(2006), 409–418.*

Instability of Poiseuille flow in a fluid overlying a porous layer (with M.H. Chang and F. Chen). J. Fluid Mech., **564** *(2006), 287–303.*

Structural stability in porous elasticity (with S. Chirita and M. Ciarletta). Proc. Roy. Soc. London A, **462** *(2006), 2593–2605.*

Poroacoustic acceleration waves (with M. Ciarletta). Proc. Roy. Soc. London A, **462** *(2006), 3493–3499.*

Acoustic acceleration waves in homentropic Green and Naghdi gases (with P.M. Jordan). Proc. Roy. Soc. London A, **462** *(2006), 3601–3611.*

Poiseuille flow in a fluid overlying a porous medium (with A.A. Hill). J. Fluid Mech., **603** *(2008), 137–149.*

Global stability for thermal convection in a fluid overlying a highly porous material (with A.A. Hill). Proc. Roy. Soc. London A, **465** *(2009), 207–217.*

Decay for a Keller-Segel chemotaxis model (with L.E. Payne). Studies in Applied Mathematics, **123** *(2009), 337–360.*

Green-Naghdi fluid with non-thermal equilibrium effects. Proc. Roy. Soc. London A, **466** *(2010), 2021–2032.*

Tipping points in Cattaneo-Christov thermohaline convection. Proc. Roy. Soc. London A, **467** *(2011), 7–18.*

Triply resonant penetrative convection. Proc. Roy. Soc. London A, **468** *(2012), 3804-3823.*

Porous convection with local thermal non-equilibrium effects and Cattaneo effects in the solid. Proc. Roy. Soc. London A, **469** *(2013), 20130187.*

Bidispersive inclined convection (with P. Falsaperla and G. Mulone). Proc. Roy. Soc. London A, **472** *(2016), 20160480.*

Bidispersive vertical convection (with M. Gentile). Proc. Roy. Soc. London A, **473** *(2017), 20170481.*

Continuous dependence on modelling stability for temperature dependent bidispersive flow (with F. Franchi and R. Nibbi). Proc. Roy. Soc. London A, **473** *(2017), 20170485.*

Horizontally isotropic bidispersive thermal convection. Proc. Roy. Soc. London A, **474** *(2018), 20180018.*

Horizontally isotropic double porosity convection. Proc. Roy. Soc. London A, **475** *(2019), 20180672.*

Anisotropic bidispersive convection. Proc. Roy. Soc. London A, **475** *(2019), 20190206.*

Bidispersive thermal convection with relatively large micropores. J. Fluid Mech., **898**, *(2020), A14.*

Thermosolutal convection with a Navier - Stokes - Voigt fluid. Appl. Math. Optimization, **84** *(2021), 2587–2599.*

Competitive double diffusive convection in a Kelvin - Voigt fluid of order one. Appl. Math. Optimization, **84** *(2021), 631–650.*

Effect of anisotropy and boundary conditions on Darcy and Brinkman porous penetrative convection. Environmental Fluid Mechanics, **22** *(2022), 1233–1252.*

Thermal convection in a higher gradient Navier - Stokes fluid. European Physical Journal Plus, **138** *(2023), 60.*

Effect of temperature upon double diffusive instability in Navier - Stokes - Voigt models with Kazhikov - Smagulov and Korteweg terms. Appl. Math. Optimization, **87** *(2023), 54.*

Nonlinear stability for convection with temperature dependent viscosity in a Navier - Stokes - Voigt fluid. European Physical Journal Plus, **138** *(2023), 438.*

Stabilization estimates for the Brinkman - Forchheimer - Kelvin - Voigt equation bakcward in time (with M. Gentile). Acta Mechanica, (2023), online May.

Dario Graffi e la sua influenza sulla Fisica Matematica (with F. Franchi). Volume of the Accademmia di Scienze Bologna, (2023), in the press.

Books.

1. Instability, nonexistence and weighted energy methods in fluid dynamics and related theories. Pitman Press (1982).

2. The energy method, stability, and nonlinear convection. Vol. **91**, *Appl. Math. Sci. Ser., Springer-Verlag (1992).*

3. Mathematical aspects of penetrative convection. Pitman Research Notes in Mathematics, Vol. **288**, *Longman Publishing Co. (1993).*

4. Non-standard and improperly posed problems. (With K.A. Ames.) Vol. **194** *Mathematics in Science and Engineering Series, Academic Press (1997). ISBN 0-12-056745-8*

5. Explosive instabilities in mechanics. Springer (1998). ISBN 3-540-63589-0

6. The energy method, stability, and nonlinear convection. Vol. **91**, *Second Edition. Appl. Math. Sci. Ser., Springer-Verlag (2004).*

7. Stability and wave motion in porous media. Vol. **165**, *Appl. Math. Sci. Ser., Springer, (2008). http://www.springer.com/math/dyn.+systems/book/978-0-387-76541-9*

8. Heat Waves. Vol. **177**, *Appl. Math. Sci. Ser., Springer, (2011).*
http://www.springer.com/mathematics/applications/book/978-1-4614-0492-7

9. Convection with local thermal non-equilibrium and microfluidic effects. Advances in Mechanics and Mathematics Series, vol. **32**, *Springer, 2015.*
http://www.springer.com/mathematics/dynamical+systems/book/978-3-319-13529-8

10. Mathematical aspects of multi-porosity continua. Advances in Mechanics and Mathematics Series, vol. **38**, *Springer, (2017).*
http://http://www.springer.com/gb/book/9783319701714

Books edited.

1. Energy stability and convection. (With G.P. Galdi). Chapman and Hall / CRC Research Notes in Mathematics (1988).

2. Continuum Mechanics and Applications in Geophysics and the Environment.(With R. Greve, H. Ehrentraut and Y. Wang.) Springer (2001).

3. Tipping Points: Modelling Social Problems and Health. (With J.J. Bissell, C.C.D.S. Caiado, S.E. Curtis and M. Goldstein.) Wiley Series in Computational and Quantitative Social Science (2014).
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-1118752759.html