

## Publications

### (A) Book Chapters

3. Evans, J.D. (2005) "Multicylinder models for synaptic and gap-junctional integration". In Reeke, G.N., Poznanski, R.R., Lindsay, K.A., Rosenberg (FRS), J.R. and Sporns, O. (eds). *Modeling in the Neurosciences: From Biological Systems to Neuromimetic Robotics*. 2nd edn, Chapter 6. CRC Press, Boca Raton, FL, 117--177.

Reviews of this book:

"The more we learn about the brain, the more we are convinced that understanding its incomputability will be a key to unlocking its functions. Neuroscience is turning a corner, and this book is helping to usher in a new era. The Second Edition is essential reading for those interested in contemporary approaches to neural modeling."

-Paul Bach-y-Rita, M.D., Professor of Rehabilitation Medicine and Biomedical Engineering, University of Wisconsin, USA

"The brain is an integrative organ of adjustment from gene networks to neuronal networks. The vast complexity involved requires mathematical modeling. The Second Edition advances such an integrative approach, and is undoubtedly a mathematical tour de force. This book will radically change our perception of theoretical and computational neuroscience.

-Roman M. Borisjuk, D.Sc., Professor of Computational Neuroscience, Centre for Theoretical and Computational Neuroscience, UK

"Physiologically realistic and integrative models of the brain are the only way forward to lift us clear of the jungle of detail about the brain. The essence of brain function dynamics that they embody will serve as the fundamental fulcrum around which new details (parameters) can be added and tested across scale. This book exemplifies a realistic way forward for an explicit 'integrative neuroscience'."

-Evian Gordon, Ph.D., CEO, The Brain Resource Company, and Scientific Chair (and Founding Director), The Brain Dynamic Centre, Westmead Hospital, Australia.

2. Evans, J.D. (1999) "Analysis of a multiple equivalent cylinder model". In "Mathematical modelling in the neurosciences", ed. R.R. Poznanski, Horwood Academic Press, Chapter 6 (1999).
1. Meinert, S. and Evans, J.D. (1996) "Nitrox technician & gas blenders handbook". Published by Scuba Technical And Training Services LTD.

### (B) Journal Publications

50. Alvarez-Caudevilla, P., Evans, J.D and Galaktionov, V.A. (2015), "Towards optimal regularity for the fourth-order thin film equation in RN: Gravelleau-type focusing self-similarity. *J. Math. Anal and Applics.* (In press).
49. Alvarez-Caudevilla, P., Evans, J.D and Galaktionov, V.A. (2015), "The Cauchy problem for a tenth-order thin film equation II. Oscillatory source-type fundamental similarity solutions". *Disc. Cont. Dyn. Sys. A*, 35, pp. 807-827.
48. Evans, J.D. (2015), "Stick-slip singularity of the Giesekus fluid". *J. Non-Newtonian Fluid Mechanics*, 222, pp. 24-33. <http://dx.doi.org/10.1016/j.jnnfm.2014.08.012>
47. Evans, J.D. (2013), "Stick-slip and slip-stick singularities of the Phan-Thien—Tanner fluid". *J. Non-Newtonian Fluid Mechanics*, 199, pp. 12-19.
46. Alvarez-Caudevilla, P., Evans, J.D and Galaktionov, V.A. (2013), "The Cauchy problem for a tenth-order thin film equation I. Bifurcation of oscillatory fundamental solutions". *Med. J. Math.*, 10, pp. 1761-1792.
45. Evans, J.D., Fernandez, A. and Muntean, A. (2012) "Single and two-scale sharp-interface models for concrete carbonation -- Asymptotics and numerical approximation". *SIAM J Multi. Model. Simulation*, 10, pp. 874-905.
44. Evans, J.D. and V.A. Galaktionov (2011) "On continuous branches of very singular similarity solutions of the fourth-order stable thin film equation – I. The Cauchy Problem". *Euro. J. Appl. Math.*, 22, pp. 217-243.
43. Evans, J.D. and V.A. Galaktionov (2011) "On continuous branches of very singular similarity solutions of the fourth-order stable thin film equation – II. Free-Boundary Problems". *Euro. J. Appl. Math.*, 22, pp. 245-265.

42. Evans, J.D. and Sibley, D.N. (2010) "The UCM limit of the PTT equations at a re-entrant corner". *J. Non-Newtonian Fluid Mechanics*, 165, pp. 1543-1549.
41. Evans, J.D. (2010) "Re-entrant corner flow of PTT fluids with a solvent viscosity". *J. Non-Newtonian Fluid Mechanics*, 165, pp 527-537.
40. Evans, J.D. (2010) "Re-entrant corner flows of Giesekus fluids with a solvent viscosity". *J. Non-Newtonian Fluid Mechanics*, 165, pp. 538-543.
39. Evans, J.D. and Sibley, D.N. (2009) "Re-entrant corner flows of PTT fluids in the natural stress basis". *J. Non-Newtonian Fluid Mechanics*, 157, pp. 79-91.
38. Evans, J.D., Hall, L.M.H and Caillol, P. (2008) "Standard cosmological evolution in a wide range of  $f(R)$  models". *Physical Review D*, 77, arXiv:0711.3695v2.
37. Evans, J.D. and Hagen, T. (2008) "Viscoelastic sink flow in a wedge for UCM and Oldroyd-B models". *J. Non-Newtonian Fluid Mechanics*, 154, pp. 39-46.
36. Evans, J.D. and Sibley, D.N. (2008) "Re-entrant corner flows of PTT fluids in the Cartesian stress basis". *J. Non-Newtonian Fluid Mechanics*, 153, 12-24.
35. Evans, J.D., Henderson, V and Hobson, D. (2008) "Optimal timing for an indivisible asset sale". *J. Math. Finance*, 18, pp. 545-567.
34. Evans, J.D. (2008) "Re-entrant corner flows of UCM fluids: The Cartesian stress basis". *J. Non-Newtonian Fluid Mechanics*, 150, 116-138.
33. Evans, J.D. (2008) "Re-entrant corner flows of UCM fluids: The natural stress basis". *J. Non-Newtonian Fluid Mechanics*, 150, 139-153.
32. Evans, J.D., Galaktionov, V.A. and King, J.R. (2007) "Global similarity patters for the unstable sixth-order thin film equation". *Nonlinearity*, 20, 1843-1881.
31. Evans, J.D., Galaktionov, V.A. and King, J.R. (2007) "Blow-up for the unstable sixth-order thin film equation". *Nonlinearity*, 20, 1799-1841.
30. Evans, J.D., Galaktionov, V.A. and King, J.R. (2007) "Source-type solutions of the unstable fourth-order thin film equation". *EJAM*, 18, 273-321.
29. Evans, J.D., Galaktionov, V.A. and King, J.R. (2007) "Blow-up for the unstable fourth-order thin film equation". *EJAM*, 18, 195-231.
28. Evans, J.D. (2006) "Re-entrant corner flows of UCM fluids: The small and large Weissenberg limits". *Proc. Roy. Soc. A*, 462, 3749-3774.
27. Evans, J.D., Galaktionov, V.A. and Williams, J.F. (2006) "Blow-up and global asymptotics of the unstable Cahn-Hilliard equation with a homogeneous nonlinearity". *SIAM J. Math. Anal.*, 38 (1), 64--102.
26. Evans, J.D. (2005) "Re-entrant corner flows of UCM fluids: The initial formation of lip vortices". *Proc. Roy. Soc. A*, 461, 3169-3181.
25. Evans, J.D. (2005) "Re-entrant corner flows of Oldroyd-B fluids". *Proc. Roy. Soc. A*, 461, 2573-2603.
24. Evans, J.D. (2005) "Re-entrant corner flows of Upper convected Maxwell fluids". *Proc. Roy. Soc. A*, 461, 117-142.
23. King, J.R. and Evans, J.D. (2005) "Regularization by kinetic undercooling of blow-up in the ill-posed Stefan problem". *SIAM J. Appl. Math.*, 65(5), 1677-1707.
22. Evans, J.D. (2005) "Analytical solution to the cable equation with synaptic reversal potentials for passive neurons with tip-to-tip dendro-dendritic coupling." *Math. Biosci.*, 196(2), 125-152.
21. Evans, J.D. (2005) "A cable model for coupled neurons with somatic gap-junctions". *Biol. Cybernetics*, 92(3), 164-176.
20. Evans, J.D. and King, J.R. (2003) "The Stefan problem with nonlinear kinetic undercooling". *Quart. J. Mech. Appl. Math.* 56(1), pp. 139-161.
19. Evans, J.D., Kuske, R.A. and Keller, J.B. (2002) "Behaviour near expiry of American options with dividends". *J. Math. Finance*, 12 (3) , pp. 219-237.
18. Evans, J.D. and King, J.R. (2000) "On the derivation of heterogeneous reaction kinetics from a homogeneous reaction model". *SIAM J. Appl. Math.*, Vol. 60(6), pp. 1977-1996.
17. Evans, J.D. and King, J.R. (2000) "Asymptotic results of the Stefan problem with kinetic undercooling". *Quart. J. Mech. Appl. Math.*, Vol. 53(3), pp. 449-473.
16. Evans, J.D., Vynnycky, M. and Ferro, S.P. (2000) "Oxidation-induced stresses in the isolation oxidation of silicon". *J. Engng. Math.*, Vol 38, pp. 191-218.
15. Kember, G., Fowler, A.C., Evans, J.D. and O'Brian, S.G.D. (2000) "Exponential asymptotics with a small exponent". *Quart. Appl. Math.*, Vol. 58(3), pp. 561-576.
14. Evans, J.D. (2000) "A multiple equivalent cylinder model with generalized taper". *IMA J. Maths. Appl. Med. & Biol.*, Vol. 17, pp. 347-377
13. Evans, J.D. and Featherstone, W.E. (2000) "Improved convergence rates for the truncation error in gravimetric geoid determination". *J. Geodesy*, Vol. 74(2), pp. 239-248.

12. Featherstone, W.E., Evans, J.D. and Olliver, J.G. (1998) "A Meissl-modified Vanicek and Kleusberg kernel to reduce truncation error in geometric geoid computations". *J. Geodesy*, Vol. 72(3), pp. 154-160.
11. Evans, J.D. and Kember, G. (1998) "Analytical solutions to a tapering multi-cylinder somatic shunt cable model for passive neurones". *Math. Biosci.*, Vol. 149(2), pp. 137-165.
10. Evans, J.D., King, J.R. and Tayler, A.B. (1997) "Finite length mask effects in the isolation oxidation of silicon". *IMA J. Appl. Math.*, Vol. 58, pp. 121-146.
9. Dasso, S.R., Gnani, G. and Evans, J.D. (1996) "Oxidation process modelling in semiconductor fabrication". *Anales de la Asociacion Quimica Argentina*, Vol. 84(1), pp. 61-66.
8. Evans, J.D. and Ferro, S. (1996) "Numerical schemes for the isolation oxidation of silicon with finite length masks". *Anales de la Asociacion Quimica Argentina*, Vol. 84(1), pp. 79-86.
7. Evans, J.D., Kember, G. and Major, G. (1995) "Techniques for the application of the analytical solution to the multi-cylinder somatic shunt cable model for passive neurones". *Math. Biosci.*, Vol. 125, pp. 1-50.
6. Kember, G. and Evans, J.D. (1995) "Analytical solutions to the multi-cylinder somatic shunt cable model for passive neurones with spines". *IMA J. Maths. Appl. Med. & Biol.*, Vol. 12, pp. 137-157.
5. Major, G. and Evans, J.D. (1994) "Solutions for transients in arbitrarily branching cables with non-uniform electrical parameters". *Biophys. J.*, Vol. 66, pp. 615-634.
4. Evans, J.D. and Kember, G. (1994) "Analytical solutions to the multi-cylinder somatic shunt cable model for passive neurones with non-uniform electrical parameters". *Biol. Cybern.*, Vol. 71, pp. 547-557.
3. Major, G., Evans, J.D. and Jack, J. (1993a) "Solutions for transients in arbitrarily branching cables: I. Voltage recording with a somatic shunt". *Biophys. J.*, Vol. 65, pp. 423-449.
2. Major, G., Evans, J.D. and Jack, J. (1993b) "Solutions for transients in arbitrarily branching cables: II. Voltage clamp theory". *Biophys. J.*, Vol. 65, pp. 450-468.

Publications [2,3] are accompanied with the introductory article: Rall, W. (1993) "Transients in neuron with arbitrary dendritic branching and shunted soma". *Biophys. J.*, Vol. 65, pp. 15-16, invited by the *Biophys* journal editor to mark their importance.

1. Evans, J.D., Kember, G. and Major, G. (1992) "Techniques for obtaining analytical solutions to the multi-cylinder somatic shunt cable model for passive neurones". *Biophys. J.*, Vol. 63, pp. 350-365.

#### **Journal Publications: Submitted**

1. Evans, J.D. and King, J.R. "Stress dependent local oxidation of silicon". To be submitted to *SIAM J. Appl. Math.*
2. Alvarez-Caudevilla, P., Evans, J.D. and Galaktionov, V.A., "Gradient blow-up for a fourth-order quasilinear Boussinesq-type equation". Submitted to *Disc. Cont. Dyn. Sys. A*.
3. Alvarez-Caudevilla, P., Evans, J.D. and Galaktionov, V.A., "Countable families of solutions of a limit stationary semi-linear fourth-order Cahn-Hilliard I. Mountain pass and Lusternik Schnirel'man patterns in  $\mathbb{R}^N$ ". Submitted to *Advances in Differential Equations*.
4. Evans, J.D., "Corner flows of UCM fluids". Submitted to *ZAMM*.

#### **Journal Publications: In preparation (or under revision)**

5. Evans, J.D., Fernandez, A. "Single and two-scale sharp-interface models for concrete carbonation -- Asymptotics and numerical approximation" Submitted to *SIAM J. Multiscale Modelling and Simulation*.
6. Evans, J.D. "High Weissenberg number boundary layer structures for UCM fluids". To be submitted to *Intl. J. Pure and Applied Math.*
7. Evans, J.D. "High Weissenberg number boundary layer structures for PTT fluids". To be submitted to *J. Non-Newtonian Fluid Mechanics*.
8. Evans, J.D., Henderson, V and Hobson, D. "The curious incident of the market in the background". Submitted to *J. Finance*.
9. Kember, K., Evans, J.D. and King, J.R. "Exponential asymptotics for the Ackerberg-O'Malley resonance problem". To be submitted to *Quart. Appl. Math.*
10. Evans, J.D. "The Oxidation of U-groove isolation structures". To be submitted to *J. Eng. Math.*
11. Evans, J.D. "UCM high Weissenberg number boundary layers: A general class of self-similar solutions".
12. Evans, J.D. "High Weissenberg number boundary layer structures for Oldroyd-B fluids".
13. Evans, J.D. and Hagen, T. "Non-isothermal channel flow of Maxwell-type fluids". To be submitted to *J. Non-Newtonian Fluid Mechanics*.
14. Evans, J.D., Kuske, R and Keller, J.B. "The behaviour near expiry of American barrier options with dividends and rebates".

15. Evans, J.D., Rogers, L.C.G. and Singh, S. "The Merton problem in an illiquid market".
16. Evans, J.D. and D.A. Rees. "The Graetz problem in a porous channel with temperature-dependent viscosity and diffusivity". To be submitted to Physics of fluids.
17. Evans, J.D. and D.A. Rees. "The Blasius boundary layer flow of a Bingham fluid". To be submitted to Physics of fluids.
18. Evans, J.D., Benbow, S. and Fairbairn, J. "Charge conservation in transport problems with species-dependent diffusion coefficients". To be submitted to J. Eng. Math.
19. Evans, J.D., Smith, J. and Fair, R. "A two-dimensional model for pollutant dispersion in natural rivers". To be submitted to J. of Hydrology.
20. Evans, J.D. and Harwin, D.A. "Two dimensional channel flow of a temperature dependent viscous fluid: The single porous wall case".
21. Evans, J.D. and Harwin, D.A. "Two dimensional channel flow of a power law fluid: The single porous wall case".

### **(C) Conference Papers: Refereed**

1. Evans, J.D. and Fernandez, A. (2012) "Sharp-interface models for concrete carbonation". AIP Conference Proc., (accepted). ICNAAM 2012: International Conference of Numerical Analysis and Applied Mathematics 2012.
2. Evans, J.D. (2010) "Re-entrant corner singularity of the PTT fluid". AIP Conference Proc., Volume 1281, pp. 1676-1679.
3. Evans, J.D. and D.N. Sibley (2010) "The asymptotic behaviour at a re-entrant corner for a PTT fluid in the limit of small  $k$ ". AIP Conference Proc., Volume 1281, pp. 1680-1683.
4. Evans, J.D. (2009) "Re-entrant corner singularity of the Giesekus fluid". AIP Conference Proc., Volume 1168, pp. 1263-1266.
5. Evans, J.D. and Sibley, D.N. (2008) "Re-entrant corner flows of Phan-Thien-Tanner fluids". AIP Conf. Proc., Volume 1027, pp 288-290. The XV International Congress on Rheology: The Society of Rheology 80<sup>th</sup> Annual Meeting; doi: 10.1063/1.2964666.
6. Evans, J.D. "Re-entrant corner flows of UCM fluids using the natural stress basis". International Conference of Numerical Analysis and Applied Mathematics, Crete, Greece, Sept. 2006. Extended abstracts, ICNAAM 2006 Proceedings, Wiley-VCH. ISBN 3-527-40743-X. (Full paper submitted to the Journal of Numerical Analysis, Industrial and Applied Mathematics).
7. Evans, J.D. "High Weissenberg number boundary layer structures for UCM fluids". Third International Conference on Applied Mathematics, Plovdiv, Bulgaria, Aug. 2006. Paper accepted for publication in Intl. J. Pure and Applied Math.
8. Evans, J.D., Henderson, V and Hobson, D. "The curious incident of the market in the background: Real options and a fair gamble". Accepted for the American Finance Association conference in Jan. 2006. The American Finance Association defines itself as the premier organisation devoted to financial economics. This prestigious finance conference had 1073 papers submitted and accepted only 160.

### **(D) Conference Papers: Not Refereed**

1. R. Carter, J. D. Evans and G. Richardson (2006) "Wax depositions in pipelines". European Consortium for Mathematics in Industry (ECMI) Study Group report on a problem presented by Norsk Hydro ASA, Norway.
2. Evans, J.D., Tayler, A.B. and Jones, S. (1989) "Asymptotic methods applied to 2-D oxidation problems". Presented at the Alvey Club Meeting, Process and Device Modelling, Univ. of Wales Swansea, Sept. 1989.

### **(E) University of Bath Preprint Series**

Articles marked with \* contain additional material to that in the corresponding Journal publication of the article.

1. \*Evans, J.D. and Sibley, D.N. (2007) "Re-entrant corner flows of PTT fluids in the Cartesian stress basis". BICS Preprint Series, 15/07, <http://www.bath.ac.uk/math-sci/bics/preprints>.
2. Evans, J.D. "Re-entrant corner flows of UCM fluids: The natural stress basis". Dept. of Math. Sciences, University of Bath, Preprint Series, math0604, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.

3. Evans, J.D. "Re-entrant corner flows of UCM fluids: The Cartesian stress basis". Dept. of Math. Sciences, University of Bath, Preprint Series, math0603, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.
4. Evans, J.D. "High Weissenberg number boundary layer structures for PTT fluids". Dept. of Math. Sciences, University of Bath, Preprint Series, math0602, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.
5. Evans, J.D. "High Weissenberg number boundary layer structures for UCM fluids". Dept. of Math. Sciences, University of Bath, Preprint Series, math0601, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.
6. \*Evans, J.D., Henderson, V and Hobson, D. (2005) "Optimal timing for an asset sale in an incomplete market". Dept. of Math. Sciences, University of Bath, Preprint Series, math0508, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.
7. \*Evans, J.D., Galaktionov, V.A. and Williams, J.F. (2004) "Blow-up and global asymptotics of the unstable Cahn-Hilliard equation with a homogeneous nonlinearity". Dept. of Math. Sciences, University of Bath, Preprint Series, math0414, <http://www.maths.bath.ac.uk/MATHEMATICS/preprints.html>.