

Qualifications

- B.Sc. Mathematics & Computer Science, Murdoch University, awarded March 1992. University Medal in Science.
- B.Sc. Hons (1st class). Applied Mathematics, University of Adelaide, awarded May 1995.
- Ph.D. Applied Mathematics, University of Adelaide, October 1998, awarded April 1999.

Professional Affiliations

Memberships:

- Australian Mathematical Society and ANZIAM Division.
- Society for Industrial & Applied Mathematics (SIAM).
- American Physical Society (APS) and Division of Fluid Dynamics.
- Society for Mathematical Biology (SMB).

Positions held:

- ANZIAM Executive Committee, elected ordinary member, 2005 – 2006.
- Secretary, ANZIAM SA branch, 1999 – present.
- Evaluator/Setter, SSABSA Year 12 Mathematics, 1999 – 2004.
- Organising Committee Member, Maths-In-Industry Study Group, 1999 – 2003.
- Associate Editor, The ANZIAM Journal (formerly J. Aust. Math. Soc. Series B), 1998 – 2002.

Employment History

- January 2005 – present: Senior Lecturer, School of Mathematical Sciences, University of Adelaide.
- March 2002 – December 2004: Lecturer, School of Applied Mathematics, University of Adelaide.
- July 2000 – February 2002: ARC Postdoctoral Fellow, Dept. Applied Mathematics, University of Adelaide.
- March 1999 – June 2000: Associate Lecturer, Dept. Applied Mathematics, University of Adelaide.
- August 1998 – February 1999: Research Assistant, Dept. Applied Mathematics, University of Adelaide.
- 1982 – February 1999: Applied Scientist & Draftsperson, Roger Stokes & Associates Consulting Engineers.

Research Interests

- Fluid mechanics, especially very viscous fluid flows, free-surface flows, computational fluid dynamics.
- Industrial mathematics, especially involving heat and mass transfer.
- Mathematical modelling in the biological and medical sciences.

Research Grants

- University of Adelaide ECMS Grant Improvement Scheme 2008, “Viscous flow for manufacture of optical fibres”. Y.M. Stokes & E.O. Tuck.
- ARC Discovery Grant 2004–6, “Viscous extensional flow and drop breakoff”. Y.M. Stokes & E.O. Tuck.
- ARC Research Networks 2003, “ARC Network for Mathematics in Science and Society”. P.G. Howlett et al. including Y.M. Stokes.
- University of Adelaide ECMS Small Grant 2003, “3D geomechanical modelling of salt diapirism”. S. Hunt & Y.M. Stokes.
- University of Adelaide Small Grant 2002, “Computational modelling of destratification of shallow lakes”. Y.M. Stokes.
- ARC Small Grant 2000, “High order B-splines for numerical differentiation of noisy data”. Y.M. Stokes.
- ARC Postdoctoral Fellowship 2000–2, “Fluid flow in open helical channels with application to spiral particle separators”. Y.M. Stokes

Selected Research Collaborations

(For further information see <http://internal.maths.adelaide.edu.au/people/ystokes/research.html>)

- Viscous extensional flow and drop breakoff. With E.O. Tuck, Appl. Math., University of Adelaide.
- Oxygen and nutrient diffusion to mammalian oocytes and embryos. With J.G. Thompson, Obstetrics and Gynaecology, University of Adelaide.
- Inverse modelling of forming processes. With Y. Agnon, Civil & Environ. Eng., Technion, Haifa, Israel.
- Flows in spiral channels. With S.K. Wilson and B.R. Duffy, Dept. Math., University of Strathclyde at Glasgow, UK.
- Penalty formulations of stick-slip boundary conditions. With G.F. Carey, Aerospace Eng. & Eng. Mech., University of Texas at Austin, USA.

Publications

Refereed Journal Articles

1. E.O. Tuck, **Y.M. Stokes**, and L.W. Schwartz, Slow slumping of a very viscous liquid bridge. *Journal of Engineering Mathematics*, **32**, 1997, 31–44.
2. **Y.M. Stokes**, Flowing windowpanes: fact or fiction? *Royal Society Proceedings A: Mathematical, Physical and Engineering Sciences*, **455**, 1999, 2753–2758.
3. **Y.M. Stokes**, Very viscous flows driven by gravity with particular application to slumping of molten glass. Thesis abstract. *Bulletin of the Australian Mathematical Society*, **59**, 1999, 523–524.
4. **Y.M. Stokes**, E.O. Tuck, and L.W. Schwartz, Extensional fall of a very viscous fluid. *Quarterly Journal of Mechanics and Applied Mathematics*, **53**(4), 2000, 565–582.
5. **Y.M. Stokes**, Numerical design tools for thermal replication of optical-quality surfaces. *Computers and Fluids*, **29**, 2000, 401–414.
6. **Y.M. Stokes**, Flowing windowpanes: a comparison of Newtonian and Maxwell fluid models. *Royal Society Proceedings A: Mathematical, Physical and Engineering Sciences*, **456**, 2000, 1861–1864.
7. **Y.M. Stokes**, Determining rotational deformity in broken forearms, *The ANZIAM Journal*, **44**, 2003, 561–568.
8. **Y.M. Stokes** and E.O. Tuck, The role of inertia in the extensional fall of a viscous drop, *Journal of Fluid Mechanics*, **498**, 2004, 205–225.
9. Y. Agnon and **Y.M. Stokes**, An inverse modelling technique for glass forming by gravity sagging. *European Journal of Mechanics B; Fluids*, **24**, 2005, 275–287.
10. A.R. Clark, **Y.M. Stokes**, M. Lane and J.G. Thompson, Mathematical modelling of oxygen concentration in bovine and murine cumulus-oocyte complexes. *Reproduction*, **131**, 2006, 999–1006.
11. B.H. Bradshaw-Hajek, **Y.M. Stokes** and E.O. Tuck, Computation of extensional fall of slender viscous fluid drops by a one-dimensional eulerian model. *SIAM Journal on Applied Mathematics*, **67**, 2007, 1166–1182.
12. **Y.M. Stokes**, A.R. Clark and J.G. Thompson, Mathematical modelling of energy substrates towards successful in vitro maturation of mammalian oocytes. *Tissue Engineering*, **14**, 2008, 1539–1547.
13. **Y.M. Stokes**, Quantifying oxygen diffusion in paraffin oil used in oocyte and embryo culture. *Molecular Reproduction and Development*, accepted 24 June 2009.

Refereed Conference Papers

14. **Y.M. Stokes**, Creeping-flow computational modelling of optical quality free-surfaces formed by slumping of molten glass. In B.J. Noye, M.D. Teubner, and A.W. Gill (eds), *Computational Techniques and Applications: CTAC97*. World Scientific, Singapore, 1998, 671–678.
15. **Y.M. Stokes**, Thermal replication: a comparison of numerical and experimental results. In E.O. Tuck and J.A.K. Stott (eds), *Proceedings of the 3rd Biennial Engineering Mathematics and Applications Conference: EMAC98*, The Institution of Engineers, Australia, 1998, 471–474.
16. **Y.M. Stokes**, Flow in spiral channels of small curvature and torsion. In A.C. King and Y.D. Shickmurzaev (eds), *Fluid Mechanics and its Applications Vol. 62*, IUTAM Symposium of Free Surface Flows, Kluwer, 2001, 289–296.
17. **Y.M. Stokes**, Computing flow in a spiral particle separator, In B.B. Dally (ed), *Proceedings of the 14th Australasian Fluid Mechanics Conference*, Adelaide University, Australia, 10–14 December 2001, 677–680.
18. **Y.M. Stokes** and P. Pendleton, Drying and curing of stains and lacquers used in furniture finishing, In J. Hewitt (ed), *Proceedings of the 2001 Mathematics-in-Industry Study Group*, 2002, 99–123.
19. E.O. Tuck and **Y.M. Stokes**, Viscous extensional flow and drop break-off under gravity. In W. Gutkowski and T.A. Kowalewski (eds) *Proceedings of the 21st IUTAM International Congress for Theoretical and Applied Mechanics*, ISBN 1-4020-3559-4, 2004, Paper 11855.
20. **Y.M. Stokes**, S.K. Wilson and B.R. Duffy, Thin-film flow in open helically-wound channels, In M. Behnia, W. Lin and G.D. McBain (eds), *Proceedings of the 15th Australasian Fluid Mechanics Conference (CDROM)*, The University of Sydney, 2004, Paper AFMC00187.
21. G.C. Hocking, **Y.M. Stokes** and W.L. Sweatman, Implementing Lanier’s patents for stable, safe, economical ultra-short wing vacu- and para-planes. In G. Wake (ed), *Proceedings of the 2005 Mathematics-in-Industry Study Group*, 2005, 115–128.
22. **Y.M. Stokes** and G.F. Carey, On penalty approaches for Navier-slip and other boundary conditions in viscous flow. In J. Denier, M. Finn and T. Mattner (eds) *Proceedings of the 22nd IUTAM International Congress for Theoretical and Applied Mechanics (CD-ROM)*, ISBN 978-0-9805142-1-6, 2008, Paper 11426.

Refereed Conference Abstracts

23. **Y.M. Stokes** and E.O. Tuck, Creeping-flow computational modelling of optical quality free surfaces formed by slumping of molten glass. *2nd SIAM Conference on Mathematical Aspects of Material Science*, Philadelphia USA, 12–14 May 1997, Final Program and Abstracts, p. 36.
24. **Y.M. Stokes** and E.O. Tuck, Inertial effects in extensional fall of a viscous drop. *Bulletin of the American Physical Society, Program of the 54th Annual Meeting of the Division of Fluid Dynamics*, Vol. 46 No. 10, November 2001, 35–36.
25. **Y.M. Stokes** and Y. Agnon, Free-surface forming by gravity sagging; an inverse problem. *5th International Congress on Industrial and Applied Mathematics (ICIAM 2003)*, Sydney, Australia, 7–11 July 2003, Book of Abstracts, p. 239.
26. **Y.M. Stokes** and E.O. Tuck, Gravity-driven stretching of viscous fluids. *5th International Congress on Industrial and Applied Mathematics (ICIAM 2003)*, Sydney, Australia, 7–11 July 2003, Book of Abstracts, p. 270.
27. **Y.M. Stokes** and G.F. Carey, Computing a Free Surface with Wall Contact using a Quasi Moving Contact Technique. *Free Boundary Problems in Fluid Mechanics*, The University of Nottingham, 15–18 September 2003, Programme and Abstracts, p. 19.
28. **Y.M. Stokes**, S.K. Wilson and B.R. Duffy, Shallow flows in spiral channels. *Bulletin of the American Physical Society, Program of the 57th Annual Meeting of the Division of Fluid Dynamics*, Vol. 49 No. 9, November 2004, 180.
29. **Y.M. Stokes**, B.H. Bradshaw-Hajek and E.O. Tuck, A one dimensional Eulerian method for a viscous dripping flow. *US Congress on Theoretical and Applied Mechanics*, 25-30 June 2006, Boulder, Colorado USA.
30. **Y.M. Stokes**, A.R. Clark, S.M. Cox, M. Lane and J.G. Thompson, Determining environmental conditions for successful in-vitro maturation of mammalian oocytes. *2006 SIAM Annual Meeting*, 10-14 July 2006, Boston, MA USA, Final Program and Abstracts, p. 136.
31. **Y.M. Stokes**, E.O. Tuck, C. Voyce and B.H. Bradshaw-Hajek, 1D modelling of very viscous dripping flows with surface tension. *Bulletin of the American Physical Society, Program of the 60th Annual Meeting of the Division of Fluid Dynamics*, Vol. 52 No. 17, November 2007, 151.

Other

32. **Y.M. Stokes**, Very viscous flows driven by gravity with particular application to slumping of molten glass. Ph.D. Thesis, University of Adelaide, July 1998.
33. **Y.M. Stokes**, Hydrodynamic stability of plane and pipe Poiseuille flows. Honours Thesis, University of Adelaide, 1994.
34. **Y.M. Stokes** and E.O. Tuck, Stability of pipe Poiseuille flow and UV disinfection of fluids. *31st Applied Mathematics Conference “ANZIAM 95”*, Busselton WA, 5–9 February 1995, Book of Abstracts.
35. **Y.M. Stokes**, E.O. Tuck and L.W. Schwartz, Modelling high viscosity flows. *32nd Applied Mathematics Conference “ANZIAM 96”*, Masterton NZ, 4–8 February 1996, Book of Abstracts.
36. **Y.M. Stokes**, Does windowpane glass flow? *34th Applied Mathematics Conference “ANZIAM 98”*, Coolangatta QLD, 7–11 February 1998, Book of Abstracts, p. 57.
37. **Y.M. Stokes**, Water slides and other spiral flows. *36th Applied Mathematics Conference “ANZIAM 2000”*, Waitangi NZ, 8–12 February 2000, Book of Abstracts, p. 56.
38. **Y.M. Stokes**, Flow in spiral channels. *IUTAM Symposium on Free Surface Flows*, Birmingham, UK, 10–14 July 2000, Book of Abstracts.
39. **Y.M. Stokes**, Determining rotational deformity in broken forearms. *37th Applied Mathematics Conference “ANZIAM 2001”*, Barossa Valley SA, 3–7 February 2001, Book of Abstracts, p. 50.
40. **Y.M. Stokes**, Mathematics for Real-World Problems. A presentation to secondary school Science and Mathematics teachers, The University of Adelaide, 1 August 2001.
41. **Y.M. Stokes**, Modelling of glass moulding by slumping. *European Consortium on Mathematics in Industry “Glass Days”*, Kaiserslautern, Germany, 4–5 October 2001.
42. **Y.M. Stokes**, Maths and broken arms. A presentation to Years 11 & 12 students, The University of Adelaide, 23 September 2002.
43. **Y.M. Stokes**, Can we improve your glasses? *Tuck Symposium* honouring the retirement of Professor E.O. Tuck, University of Adelaide, 31 January 2003.
44. **Y.M. Stokes**, Applications of Mathematics. Mathematics Association of South Australia (MASA), Annual Conference, Scotch College, 14–15 April 2003.
45. **Y.M. Stokes**, S.K. Wilson and B.R. Duffy, Thin-film flow in open spiral channels. *41st Applied Mathematics Conference “ANZIAM 2005”*, Napier NZ, 30 January–3 February 2005, Book of Abstracts, p. 59.

46. **Y.M. Stokes**, B.H. Bradshaw-Hajek and E.O. Tuck, Dripping viscous fluids: an Eulerian approach. *42nd Applied Mathematics Conference "ANZIAM 2006"*, Mansfield, Vic, 5–9 February 2006, Book of Abstracts, p. 57.
47. A.R. Clark, **Y.M. Stokes**, S.M. Cox and J.G. Thompson, Determining a suitable in-vitro maturation environment, *42nd Applied Mathematics Conference "ANZIAM 2006"*, Mansfield, Vic, 5–9 February 2006, Book of Abstracts, p. 67.
48. **Y.M. Stokes**, Determining oxygen requirements of mammalian oocytes and embryos. *43rd Applied Mathematics Conference "ANZIAM 2007"*, Fremantle, WA, 28 January – 1 February 2007, Book of Abstracts, p. 54.
49. E.O. Tuck, B.H. Bradshaw-Hajek and **Y.M. Stokes**, Slender viscous drops and filaments. *43rd Applied Mathematics Conference "ANZIAM 2007"*, Fremantle, WA, 28 January - 1 February 2007, Book of Abstracts, p. 56.
50. Y.M. Stokes, The Tuck Symposium, School of Applied Mathematics, 31 January 2003. Commemorative CD, published September 2007.
51. Y.M. Stokes, A mathematical perspective on dripping honey. Invited plenary lecture. *44th Applied Mathematics Conference "ANZIAM 2008"*, Katoomba, NSW, 3–7 February 2008, Book of Abstracts, p. 27.

Invited Conference Presentations

1. Creeping-flow computational modelling of optical quality free surfaces formed by slumping of molten glass. Mathematics in the Glass Industry Minisymposium, 2nd SIAM Conference on Mathematical Aspects of Material Science, Philadelphia USA, 12–14 May 1997.
2. Thermal replication for manufacture of optical components, "Glass Week", Free Boundary Problems in Industry, Isaac Newton Institute, Cambridge University, UK, 17 July – 4 August 2000.
3. Modelling of glass moulding by slumping. Invited speaker at the European Consortium on Mathematics in Industry "Glass Days", Kaiserslautern, Germany, 4–5 October 2001.
4. Gravity-driven stretching of viscous fluids. Complex Fluids Minisymposium, 5th International Congress on Industrial and Applied Mathematics (ICIAM 2003), Sydney, Australia, 7–11 July 2003.
5. Computing a free surface with wall contact using a quasi moving contact technique. Free Boundary Problems in Fluid Mechanics, University of Nottingham, UK, 15–18 September 2003.
6. Mathematical modelling towards successful in vitro maturation of mammalian oocytes. Workshop on Cell and Tissue Engineering, Mathematical Biosciences Institute, The Ohio State University, 22-24 October 2007.
7. A mathematical perspective on dripping honey. Invited plenary lecture, *44th Applied Mathematics Conference "ANZIAM 2008"*, Katoomba, NSW, 3–7 February 2008.

Invited Seminars

1. Numerical modelling of glass slumping. Seminar, Computational Fluid Dynamics Laboratory, University of Texas at Austin, June 1999.
2. Modelling of glass moulding by slumping. Seminar, Scientific Computing Group, Technical University Eindhoven, The Netherlands, 26 September 2001.
3. Inertial effects in the extensional fall of a viscous drop. Seminar, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK, 16 October 2001.
4. Computing flow in a spiral particle separator. Seminar, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK, 30 October 2001.
5. Inertial effects in the extensional fall of a viscous drop. Seminar, Oxford Centre for Industrial and Applied Mathematics, University of Oxford, UK, 25 October 2001.
6. Inertial effects in the extensional fall of a viscous drop. Seminar, Department of Mathematics, University of Wales, Aberystwyth, UK, 1 November 2001.
7. Modelling of glass moulding by slumping. Seminar, Department of Mathematics, University of Wales, Aberystwyth, UK, 2 November 2001.
8. Inertial effects in the extensional fall of a viscous drop. Seminar, Department of Mathematics, University of Strathclyde, Glasgow, UK, 7 November 2001.
9. Growth and compression of the ocular lens. Seminar, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK, 12 November 2001.
10. Inertial effects in the extensional fall of a viscous drop. Seminar, Division of Engineering and Applied Sciences, Harvard University, USA, 14 November 2001.
11. Inertial effects in the extensional fall of a viscous drop. Seminar, Computational Fluid Dynamics Laboratory, University of Texas at Austin, USA, 27 November 2001

12. Helical channel flow. Seminar, Department of Mathematics, The University of Strathclyde, Glasgow, UK, 8 October 2003.
13. Dripping honey, slumping glass and cathedral windowpanes: some very viscous flow problems. Seminar, Faculty of Civil and Environmental Engineering, Technion, Israel, 17 November 2003.
14. Applied mathematics in medicine and biology, School of Paediatrics and Reproductive Health, The University of Adelaide, 13 April 2007.
15. A mathematical look at dripping honey, Colloquium, School of Mathematical Sciences, The University of Adelaide, 4 May 2007.

Reviewer For

- Journal of Fluid Mechanics.
- SIAM Journal on Applied Mathematics.
- Journal of Engineering Mathematics.
- IMA Journal of Applied Mathematics.
- Reproduction.
- Reproductive BioMedicine Online.

Conference Organisation

- Mathematics-in-Industry Study Group, University of South Australia, Adelaide, Australia: 31 January – 4 February, 2000; 29 January – 2 February, 2001; 11–15 February, 2002; 3–7 February, 2003.
- 37th Applied Mathematics Conference “ANZIAM 2001”, Barossa Valley SA, 3–7 February 2001.
- Tuck Symposium, University of Adelaide, 31 January 2003. To mark the retirement of Prof. E.O. Tuck.
- Mathematics in the glass industry: progress and challenges, Minisymposium at the 5th International Congress on Industrial and Applied Mathematics (ICIAM 2003), Sydney, 7–11 July 2003.

Workshop Participation

- Maths-in-Industry Study Groups, 1996, 1998, 2000, 2001, 2002, 2003, 2005.
- Free Boundary Problems in Industry, 17 July – 4 August 2000, Isaac Newton Institute, Cambridge University.
- Endocrine Physiology, 21–25 May 2007, Mathematical Biology Institute, The Ohio State University (invited).
- Cell and tissue engineering, 22–26 October 2007, Mathematical Biology Institute, The Ohio State University (invited).
- Microfluids, 12–14 November 2007, Mathematical Biology Institute, The Ohio State University (invited).

Research Visits

Study visits

- 14 June – 16 July 1999: Computational Fluid Dynamics Laboratory, University of Texas at Austin, USA.
- 12–30 March 2001: Department of Mathematics and Statistics, University of Melbourne, Australia.
- 20 September – 13 October 2001: Scientific Computing Group, Technical University Eindhoven, The Netherlands.
- 14 October – 13 November 2001: Department of Applied Mathematics and Theoretical Physics, University of Cambridge, UK.
- 22 September – 18 October 2003: EPSCR Visiting Fellow, Department of Mathematics, Strathclyde University, Glasgow, UK.
- 19 October 2003 – 27 January 2004: Visiting Scientist, Faculty of Civil and Environmental Engineering, The Technion, Haifa, Israel.
- 1–20 October 2007: J.T. Oden Faculty Research Fellow, Institute for Computational Engineering and Sciences, University of Texas at Austin, USA.
- 21 October – 17 November 2007: Long-Term Visitor, Mathematical Biosciences Institute, The Ohio State University, Columbus, Ohio, USA.

Short visits

- 25–26 October 2001: Oxford Centre for Industrial and Applied Mathematics (OCIAM), University of Oxford, UK.
- 1–2 November 2001: Department of Mathematics, University of Wales, Aberystwyth, UK.
- 7–8 November 2001: Department of Mathematics, Strathclyde University, Glasgow, UK.
- 14–15 November 2001: Division of Engineering & Applied Sciences, Harvard University, USA.

- 26–28 November 2001: Computational Fluid Dynamics Laboratory, University of Texas at Austin, USA.
- 3–7 July 2006: Departments of Mechanical Engineering and Mathematical Sciences, University of Delaware, USA

Student Supervision

- Mr Christian Hanna, 2000 (With E.O. Tuck). 1st Class Honours.
- Mr Miguel Garcia-Blanco, 2003 (With D.C. Scullen). 2nd Class Honours.
- Ms Alys Clark, 2004. Masters by Coursework.
- Ms Alys Clark, April 2005 – October 2009 (with D. Clements & J.G. Thompson). PhD (qualified 1 July 2009).
- Ms Kylie Hogan, 2006 (With A. Wolff). 1st Class Honours.
- Ms Adela Tashkent, 2007–8 (With D. Clements). 1st Class Honours.
- Mr Denny Argueta, 2009, Graduate Diploma in Mathematical Sciences.

Awards & Prizes

- J.H. Michell Medal 2007 (ANZIAM award for outstanding new researchers).
- Australian Postdoctoral Fellowship, University of Adelaide, 2000-2002.
- Australian Postgraduate Award (Industry), University of Adelaide 1995 – 1998.
- 3rd Biennial Engineering Mathematics and Applications Conference EMAC98, Adelaide SA, July 1998. Student Prize.
- 34th Australasian Applied Mathematics Conference “ANZIAM 98”, Coolangatta QLD, February 1998. Highly commended student presentation. Reported in the Australian Mathematics Society Gazette 25(1), April 1998, p.44.
- 32nd Australasian Applied Mathematics Conference “ANZIAM 96”, Masterton NZ, February 1996. Highly commended student presentation. Reported in the Australian Mathematics Society Gazette 23(1), April 1996, p.28.
- University Medal in Science, Murdoch 1991.
- School of Maths and Physical Sciences Prize in Computer Applications, Murdoch 1991.

Media Reports on Research

- *Honey on Toast*, The University of Adelaide, Campus Review, December 1996, p. 7.
- *Money in Dripping Honey*, The Australian, January 29 1997, p. 23.
- *Non-dribbling glasses*, The Economist, June 19-25 1999, p. 123.
- *Getting to the heart of glass*, The Australian, June 23 1999, p. 35.
- *Glass flow myth is seen through*, The Weekend Australian, June 26-27 1999, p. 14.
- *The mysterious bulge in old window panes*, The Times, Science Briefing, July 7 1999, p. 18.
- *The Physics of . . . Glass*, Discover, Vol. 20 No. 10, October 1999.
- *How a passion for numbers is assisting fertility*, The University of Adelaide, University News & Events Media Release, 13 September 2006, <http://www.adelaide.edu.au/news/news10801.html>