

JOHN S. BIGGINS

Contact Address: Trinity Hall Cambridge CB2 1TJ United Kingdom	Email: jsb56@cam.ac.uk Web: www.johnbiggins.co.uk Telephone: +44 1223 337 360 +44 7849 640 810
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EMPLOYMENT

- 2014-2018 Lecturer (\approx assistant professor) at the Cambridge University Physics Department.
- 2012-2015 Research fellow at Trinity Hall Cambridge, working in the Cavendish Laboratory's Theory of Condensed Matter Group.
- 2010-2012 Royal Commission for the Exhibition of 1851 research fellowship held at Harvard University School of Engineering and Applied Science working with Prof. L. Mahadevan.

EDUCATION

- 2007-2010 University of Cambridge, Corpus Christi College
Ph.D. in theoretical condensed matter physics. Title: "Soft and Hard Elasticity of Liquid Crystal Elastomers", supervised by Prof. Mark Warner FRS. Included six month visit to the California Institute of Technology to collaborate with Prof. Kaushik Bhattacharya.
- 2006-2007 University of Cambridge, Corpus Christi College
M.Sci. in experimental and theoretical physics
Class: I, Rank: 1/93 students.
- 2003-2006 University of Cambridge, Corpus Christi College
B.A. in natural science, specializing in physics
Class: I, Ranks: 1/121 (3rd year), 1/580 (2nd year), 23/598 (1st year).
- 1997-2003 Tapton Comprehensive School
A-levels: 6 As (maths, further maths, physics, chemistry, economics and general studies) GCSEs: 9.5 A* and an A.

TEACHING

- 2016 Summer course on oscillations at the University of Electronic Science and Technology of China in Chengdu.
- 2016 Cambridge 1st year physics, examiner, class of 450.
- 2014-present Cambridge 1st year course on oscillations: lecturer, class of 450.
- 2014-present Cambridge 3rd year theory course on classical fields: head of examples classes and co-examiner, class of 100.
- 2014-present Supervise fourth year undergraduate research projects.

2014-present	Teach courses on special relativity and sustainable energy at the Cambridge University Summer School in Hong Kong.
2014	Used chain fountain research to publicize and prepare material for the Cambridge Rutherford Schools Physics Partnership.
2010-present	Teach British Physics Olympiad Team electromagnetism and relativity.
2010-2013	Wrote and taught numerous courses on special relativity to groups of gifted sixth formers, including lecturing at the Cavendish's Senior Physics Challenge.
2008-present	Supervise 2 nd year Cambridge courses on electromagnetism, classical dynamics, fluids, thermodynamics and statistical mechanics.

RESEARCH GROUP

2014-present	Post-doctoral researcher Chen Xuan. Project: Surface tension driven elastic instabilities.
2015-present	PhD student Nontawit Cheewaruangroj. Project: Buckling as a mechanism for pattern formation.
2015-2016	Undergraduate James Darby. Project: Shape of a rotating string or chain loop.
2014-2015	Undergraduate Cameron Lemon. Project: Gravitational instability in soft solids.

MEDIA

2014	Explanatory video of the Chain fountain secures 100K views. The research is reported in Nature, Science, the Daily Mail and the New York Times, and in the BBC's QI Christmas Special.
2015	Appear with chain fountain on prime time BBC TV "the One Show".
2015	Calculations of forces in a rugby tackle appear in New Zealand Herald.

COMMITTEES

2016-Present	Board of Scrutiny for Cambridge and Counties Bank (£1bn loan book)
2014-Present	Cavendish Theory of Condensed Matter Staff Committee
2012-Present	Governing Body of Trinity Hall
2012-2014	Cavendish Research Staff Committee
2009-2010	Corpus Christi MCR Treasurer

ADDITIONAL SKILLS

Driving	Full clean license since 2004
Music	ABRSM grade eight distinction on trumpet and recorder

Computing Computer literate, with experience of Linux, OSX, Windows, Mathematica, MATLAB, Fortran, LaTeX, Office, C++, html and ruby

GRANTS, SCHOLARSHIPS & PRIZES

2010 Trinity Hall Research Fellowship, three years, £100,000
2010 1851 Royal Commission Research Fellowship, three years, £100,000
2010 Lindemann Trust Fellowship, one year, \$30,000 (declined)
2007-2010 Sims Scholarship – University of Cambridge, best internal Ph.D. applicant in physics or chemistry, ~£60,000
2007 Nevill Mott Prize, Cavendish Laboratory, best research project, ~£500
2006 Hartree-Clerk Maxwell Prize, Cavendish Laboratory, best third year examination result, ~£500
2005-2007 Bishop Green Cup, Corpus Christi College, best examination result
2005- 2007 Beldam Prize, Corpus Christi College, any student ranked 1st in their examinations, ~£500 (each year)
2005, 2006 Foundation Scholarship, Corpus Christi College, ~£500
2004, 2007 Caldwell Taylor Scholarship, Corpus Christi College, ~£25

PUBLICATIONS

- 1) *Semisoft elastic response of nematic elastomers to complex deformations* – Biggins Terentjev and Warner, Phys. Rev. E 78, 041704, (2008), doi:10.1103/PhysRevE.78.041704
- 2) *Strain-induced polarization in non-ideal chiral nematic elastomers* – Biggins, Proc. R. Soc. A 465:1361-1376, (2009), doi:10.1098/rspa.2008.045
- 3) *Characterization of soft stripe-domain deformations in Sm-C and Sm-C* liquid-crystal elastomers* – Biggins and Bhattacharya, Phys. Rev. E 79, 061705 (2009), doi:10.1103/PhysRevE.79.061705.
- 4) *Textured deformations in liquid crystal elastomers* - Biggins, Liquid Crystals, 0267-8292, (2009), doi:10.1080/02678290902879224 (invited article for de Gennes memorial edition)
- 5) *Supersoft Elasticity in Polydomain Nematic Elastomers* – Biggins, Bhattacharya and Warner, Phys. Rev. Lett. 103, 037802 (2009), doi:10.1103/PhysRevLett.103.037802
- 6) *Mechanical bistability in liquid crystal elastomer-wire composite actuators*, Huang, Biggins and Terentjev, J. Appl. Phys. 107, 083515 (2010) doi:10.1063/1.3374474
- 7) *Elasticity of Polydomain Liquid Crystal Elastomers*, Biggins, Bhattacharya and Warner, J. Mech. Phys. Solids 60.4 573-590, (2012) doi:10.1016/j.jmps.2012.01.008
- 8) *Surface Sulci in Squeezed Soft Solids*, Tallinen, Biggins, and Mahadevan. Phys. Rev. Lett. 110.2 024302 (2013) doi:10.1103/PhysRevLett.110.024302
- 9) *Digital instability of a confined elastic meniscus*, Biggins, Saintyves, Wei, Bouchaud and Mahadevan, Proc. Natl. Acad. Sci. 110.31 (2013) 12545-12548 doi:10.1073/pnas.1302269110
- 10) *Understanding the Chain Fountain*, Biggins and Warner, Proc. Roy. Soc. A 470.2163 (2014) doi:10.1098/rspa.2013.0689

- 11) *Isochoric elastic Green's functions for soft solids*, Biggins and Mahadevan, Europhys. Lett. (2014), doi:10.1209/0295-5075/108/64001
- 12) *Limited predictive value of blastomere angle of division in trophectoderm and inner cell mass specification*, Watanabe, Biggins, Bala and Srinivas, Development (2014), doi:10.1242/dev.103267
- 13) *Shape and Growth of a Chain Fountain*, Biggins, Europhys. Lett. (2014) doi:10.1209/0295-5075/106/44001, Editors Choice
- 14) *Gyrification from constrained cortical expansion*, Tallinen, Chung, Biggins and Mahadevan, Proc. Natl. Acad. Sci. (2014) doi:10.1073/pnas.1406015111
- 15) *Fingering when a fluid invades a highly elastic layer*, Biggins Wei and Mahadevan, Europhys. Lett. (2015) doi:10.1209/0295-5075/110/34001
- 16) *Mechanics of invagination and folding: Hybridized instabilities when one soft tissue grows on another*, Tallinen and Biggins, Phys. Rev. E, (2015), doi:10.1103/PhysRevE.92.022720
- 17) *Towards understanding the roles of position and geometry on cell fate decisions during preimplantation development*. Biggins, Royer, Watanabe and Srinivas. Semin. Cell Dev. Biol. (2015) doi:10.1016/j.semcdb.2015.09.006
- 18) *Localizing Soft Elasticity in Liquid Crystal Elastomers*, Ware, Biggins, Shick, Warner and White, Nat. Commun. (2015) doi:10.1038/ncomms10781
- 19) *Finite-wavelength surface-tension-driven instabilities in soft solids, including instability in a cylindrical channel through an elastic solid*, Xuan and Biggins, Phys. Rev. E (2016) doi: 10.1103/PhysRevE.94.023107
- 20) *The Rayleigh Plateau instability in solid cylinders is a simple phase separation*, Xuan and Biggins, in preparation