

# Shiladitya Banerjee, Ph.D.

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CONTACT INFORMATION	Department of Physics and Astronomy University College London Gower Street London WC1E 6BT, UK	Phone (Office): (+44) 020 7679 7209 E-mail: <a href="mailto:shiladitya.banerjee@ucl.ac.uk">shiladitya.banerjee@ucl.ac.uk</a> Web: <a href="http://shiladitya-banerjee.com">http://shiladitya-banerjee.com</a>
EMPLOYMENT	<b>University College London, Department of Physics &amp; Astronomy Institute for the Physics of Living Systems</b> Junior Group Leader (Principal Investigator)	2016 - present
	<b>University of Chicago, James Franck Institute</b> Postdoctoral Scholar	2013 - 2016
	<b>Syracuse University, Department of Physics</b> Research Assistant	2009 - 2013
EDUCATION	<b>Syracuse University</b> , Syracuse, NY, USA Ph.D., Physics, 2013 Thesis: "Cell Mechanics: From cytoskeletal dynamics to tissue-scale mechanical phenomena" Advisor: <a href="#">M. Cristina Marchetti</a> Area: Soft Matter Theory and Biological Physics	2008 - 2013
	<b>Chennai Mathematical Institute</b> , Chennai, India B.Sc. (Honors), Physics, 2008	2005 - 2008
HONORS AND AWARDS	<ul style="list-style-type: none"><li>• Strategic Fellowship, Institute for the Physics of Living Systems, University College London (2016-2019).</li><li>• Kharasch Travel Award for Postdoctoral Scholars, Department of Chemistry, University of Chicago (2016).</li><li>• American Physical Society Prize for Outstanding Doctoral Thesis Research in Biological Physics (2013).</li><li>• Kadanoff-Rice Postdoctoral Fellowship, University of Chicago, NSF Materials Research Science and Engineering Center (2013-2015).</li><li>• All-University Doctoral Prize, The College of Arts and Sciences, Syracuse University (2013).</li><li>• American Physical Society March Meeting, Group on Statistical and Nonlinear Physics, best five student speakers (2012).</li><li>• I2CAM Junior Travel Award (2010).</li><li>• Gold Medal for Excellence in Physics, Chennai Mathematical Institute (2008).</li></ul>	
RESEARCH	<ul style="list-style-type: none"><li>• Active Soft Matter</li><li>• Actin Cytoskeleton</li><li>• Bacterial Biophysics</li><li>• Cell Mechanics and Cell Motility</li><li>• Tissue Mechanics</li></ul>	

## PUBLICATIONS

23. S. Karki, **S. Banerjee**, M. Maienschein-Cline, H. Xu, E. Davis, P. Collins, M. Mandal, C. Labno, S.E. Powers, E. Oltz, H. Singh, M.M. Le Beau, A.R. Dinner and M.R. Clark, "Stochastic capture of chromatin topological domains by nuclear matrix RNA pol II diversifies  $V_{\kappa}$  repertoire and directs monogenic choice", *submitted* (2017).
22. S.L. Freedman, **S. Banerjee**, G.M. Hocky and A.R. Dinner, "A versatile framework for simulating the dynamic mechanical structure of cytoskeletal networks", *under revision*, [arXiv:1609.05202](https://arxiv.org/abs/1609.05202) (2017).
21. **S. Banerjee**, K. Lo, M. Daddysman, A. Selewa, T. Kuntz, A.R. Dinner and N.F. Scherer, "Crossover in the dynamics of cell growth controls *Caulobacter* division times", *under revision*, [bioRxiv:047589](https://arxiv.org/abs/1609.05202) (2017).
20. K.L. Weirich, **S. Banerjee**, K. Dasbiswas, T.A. Witten, S. Vaikuntanathan and M.L. Gardel, "Liquid behavior of cross-linked actin bundles", *Proc. Natl. Acad. Sci. U.S.A* **114**, 2131 (2017).
19. I. Linsmeier, **S. Banerjee**, P.W. Oakes, W. Jung, T.Y. Kim and M.P. Murrell, "Disordered Actomyosin Networks are Sufficient to Produce Cooperative and Telescopic Contractility", *Nature Communications* **7**, 12615 (2016).
18. J. Notbohm\*, **S. Banerjee\***, K.J.C. Utuje, B. Gweon, H. Jang, Y. Park, J. Shin, J. Butler, J.J. Fredberg and M.C. Marchetti, "Cellular contraction and polarization drive collective cellular motions", *Biophysical Journal* **110**, 2729 (2016). \* equal contribution
17. W.G. Liang, C. Triandafillou, D.Y. Hwang, M.M.L. Zulueta, **S. Banerjee**, A.R. Dinner, S.C. Hung and W.J. Tang, "Structural basis for oligomerization and glycosaminoglycan binding of CCL5 and CCL3", *Proc. Natl. Acad. Sci. U.S.A* **113**, 5000 (2016).
16. **S. Banerjee**, N.F. Scherer and A.R. Dinner, "Shape dynamics of growing cell walls", *Soft Matter* **12**, 3442 (2016).
15. **S. Banerjee**, K.J.C. Utuje and M.C. Marchetti, "Propagating Stress Waves During Epithelial Expansion", *Physical Review Letters* **114**, 228101 (2015). Featured in **Editor's suggestions**.
14. C.S. Wright\*, **S. Banerjee\***, S. Iyer-Biswas, S. Crosson, A.R. Dinner and N.F. Scherer, "Intergenerational continuity of cell shape dynamics in *Caulobacter crescentus*", *Scientific Reports* **5**, 9155 (2015). \* equal contribution
13. E.J. Hemingway, A. Maitra, **S. Banerjee**, M.C. Marchetti, S. Ramaswamy, S.M. Fielding and M.E. Cates, "Active Viscoelastic Matter: from Bacterial Drag Reduction to Turbulent Solids", *Physical Review Letters* **114**, 098302 (2015).
12. P.W. Oakes, **S. Banerjee**, M.C. Marchetti and M.L. Gardel, "Geometry regulates traction stresses in adherent cells", *Biophysical Journal* **107**, 825 (2014). **Journal cover article**; Featured in **New and Notable**.
11. **S. Banerjee**, R. Sknepnek and M.C. Marchetti, "Optimal shapes and stresses in adherent cells on patterned substrates", *Soft Matter* **10**, 2424 (2014).
10. **S. Banerjee** and L. Giomi, "Polymorphism and bistability in adherent cells", *Soft Matter* **9**, 5251 (2013).
9. **S. Banerjee** and M.C. Marchetti, "Controlling cell-matrix traction forces by extracellular geometry", *New Journal of Physics* **15**, 035015 (2013). Featured in **Highlights of 2013**.

8. A.F. Mertz, Y. Che, **S. Banerjee**, J. Goldstein, S. Revilla, C. Niessen, M.C. Marchetti, E.R. Dufresne and V. Horsley, "Cadherin-Based Intercellular Adhesions Organize Epithelial Cell-Matrix Traction Forces", *Proc. Natl. Acad. Sci. U.S.A* **110**, 842 (2013). Recommended by **F1000 Prime**.
7. **S. Banerjee** and M.C. Marchetti, "Contractile Stresses in Cohesive Cell Layers on Finite-Thickness Substrates", *Physical Review Letters* **109**, 108101 (2012).
6. G.K. German, W.C. Engl, E. Pashkovski, **S. Banerjee**, Y. Xu, A.F. Mertz, C. Hyland and E.R. Dufresne, "Heterogeneous Drying Stresses in *Stratum Corneum*", *Biophysical Journal* **102**, 2424 (2012).
5. A.F. Mertz, **S. Banerjee**, Y. Che, G. German, Y. Xu, C. Hyland, M.C. Marchetti, V. Horsley and E.R. Dufresne, "Scaling of Traction Forces with the Size of Cohesive Cell Colonies", *Physical Review Letters* **108**, 198101 (2012). Featured in **Editor's suggestions**.
4. **S. Banerjee**, T.B. Liverpool and M.C. Marchetti, "Generic phases of cross-linked active gels: Relaxation, oscillation and contractility", *Europhysics Letters* **96**, 58004 (2011).
3. **S. Banerjee** and M.C. Marchetti, "Substrate rigidity deforms and polarizes active gels", *Europhysics Letters* **96**, 28003 (2011).
2. **S. Banerjee**, M.C. Marchetti and K.K. Müller-Nedebock, "Motor-driven dynamics of cytoskeletal filaments in motility assays", *Physical Review E* **84**, 011914 (2011).
1. **S. Banerjee** and M.C. Marchetti, "Instabilities and oscillations in isotropic active gels", *Soft Matter* **7**, 463 (2011).

ADDITIONAL  
PUBLICATIONS

1. **S. Banerjee**, "Cell Mechanics : From cytoskeletal dynamics to tissue-scale mechanical phenomena", *Physics - Doctoral Dissertations*, Paper 131, Syracuse University (2013).

INVITED TALKS

- Biophysics Seminar, University of Sheffield 2016
- Computational Biology Seminar, University of Dundee 2016
- LMCB seminar, University College London 2016
- *Quantitative Biology of Cytoskeletal Mechanics* Workshop, Chicago, USA. 2015
- University College London, MRC Laboratory for Molecular Cell Biology. 2015
- University of Bristol, Department of Applied Mathematics, Bristol, UK. 2015
- *Computations in Science* seminar, University of Chicago, Chicago, IL, USA. 2015
- Chennai Mathematical Institute Alumni Conference, Chennai, India. 2015
- APS March Meeting, Denver, CO, USA 2014  
Symposium on *Active Matter and the cytoskeleton*.
- Program on *Active Matter: Cytoskeleton, cells, tissues and flocks* 2014  
Kavli Institute of Theoretical Physics, Santa Barbara, CA, USA.
- *Dynamics of suspensions, gels, cells and tissues*, 2013  
Isaac Newton Institute for Mathematical Sciences, Cambridge, UK.
- APS March Meeting, Baltimore, MD, USA. 2013  
Symposium on *From cells to tissues: the material properties of living matter*.
- Squishy Physics Seminar, Harvard University, USA. 2013
- Biophysics Seminar, Lewis-Sigler Institute, Princeton University, USA. 2012
- Seminar, TIFR Center for Interdisciplinary Sciences, Hyderabad, India. 2012
- GSNP Student Speaker Award talk, APS March Meeting, Boston, MA, USA. 2012

- Condensed Matter and Biological Physics Seminar, Syracuse University, USA. 2011
  - Theoretical Physics Seminar, Stellenbosch University, South Africa. 2010
- CONTRIBUTED PRESENTATIONS
- International conference on Active and Smart Matter, Syracuse, NY (Talk). 2016
  - Gordon Research Conference on *Self Assembly and Active Matter*, New London, NH, USA. (Poster) 2015
  - Workshop on Soft|Meta matter, University of Chicago, USA. 2014
  - APS March Meeting, Baltimore, MD, USA. (Talk) 2013
  - 13th New York Complex Matter Workshop, Syracuse University, USA. (Talk) 2012
  - APS March Meeting, Boston, MA, USA. (Talk) 2012
  - Gordon Research Conference, New London , NH, USA. (Poster) *Soft Matter Far from Equilibrium* 2011
  - 11th New York Complex Matter Workshop, Syracuse University, USA. (Talk) 2011
  - APS March Meeting, Dallas, TX, USA. (Talk) 2011
  - Workshop on Active Materials, Stellenbosch, South Africa. (Talk) 2010
  - 10th New York Complex Matter Workshop, Cornell University, USA. (Talk) 2010
  - 9th New York Complex Matter Workshop, RIT, Rochester, USA. (Talk) 2009
  - Boulder School for Condensed Matter Physics, UC Boulder, USA. (Poster) 2009
  - Summer school on *Soft Solids and Complex Fluids*, UMass Amherst, USA. 2009
  - ICAM Conference on Soft Active Materials, Syracuse University, USA. (Talk) 2009
- TEACHING
- University College London**
- PHASM800/PHASG800: Molecular Biophysics Spring 2017
- Syracuse University**
- PHY 531: Thermodynamics and Statistical Mechanics Spring 2013
  - PHY 360: Vibrations, Waves and Optics Fall 2012
  - PHY 305: Solar Energy Science and Architecture Fall 2012
  - PHY 312: Relativity, Cosmology and Beyond Spring 2011, 2012
  - PHY 221: General Physics I: Mechanics Spring 2009
  - PHY 222: General Physics II: Electricity, Magnetism and Light Fall 2008
- SERVICE
- **Editorial Board Member**, Nature Scientific Reports (2017 - present).
  - **Manuscript Referee**: Nature Communications, PNAS, Physical Review Letters, Physical Review E, Biophysical Journal, New Journal of Physics, Physical Biology, Nature Scientific Reports, Europhysics Letters, European Physical Journal E, BBA Molecular Cell Research.
  - **Outreach**: School Science Lecture, Science Cafe @ North London Collegiate School, London, UK.
  - **Organizer**, *Computations in Science Seminar*, The University of Chicago (2014-2016).
  - **Organizer and chair**, APS March Meeting 2015 invited symposium: *From bacteria to eukaryotes: shape organization in living matter*.