

# Tapomoy Bhattacharjee

Postdoctoral Research Associate, Princeton University

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<b>Contact Information</b>	<b>Work Address:</b> Andlinger Center for Energy and the Environment Princeton University Princeton, NJ-08540, USA	<b>mobile:</b> (352)-870-7568 <b>email:</b> tapomoyb@princeton.edu
<b>Education</b>	University of Florida <b>Ph.D., Mechanical Engineering</b> <b>Thesis:</b> <i>Cells in Microgels: 3D Printed Microtissues and Single Cell Migration</i> <b>Advisor:</b> Prof. Thomas E. Angelini	2014 – 2018
	University of Florida <b>Master of Science, Mechanical Engineering</b>	2014 – 2015
	University of Florida <b>Master of Science (Thesis), Chemical Engineering</b> <b>Thesis:</b> <i>Activity Measurements of Enzymes Conjugated to Superparamagnetic Iron Oxide Nanoparticles Under an Alternating Magnetic Field.</i> <b>Advisor:</b> Prof. Carlos Rinaldi	2012 – 2014
	Jadavpur University <b>Bachelor of Engineering, Chemical Engineering</b>	2008 – 2012
<b>Awards</b>	<b>2018:</b> Best Poster Award, Andlinger Center Annual Meeting, Princeton University <b>2018-2020:</b> Distinguished Postdoctoral Research Associate fellowship, Andlinger Center for Energy and the Environment, Princeton University <b>2018:</b> American Physical Society Travel Award (GSOFT division) <b>2017:</b> Outstanding International Student Award, University of Florida <b>2016:</b> ACS Editors' Choice award for 'Liquid-like Solids Support Cells in 3D' Attributes of a Gator Engineer: Creativity Award, University of Florida Best Presentation, Annual Symposium, Institute for Cell & Tissue Science and Engineering, University of Florida <b>2015:</b> University of Florida Technology Innovator Award <b>2008 - 2012:</b> National Merit Scholarship Award, Govt. of India	
<b>Professional Experience</b>	<b>Postdoctoral Research Associate:</b> Princeton University, June 2018 – present Advisor: Prof. Sujit S. Datta  <b>Session Chair:</b> APS March Meeting, Boston, Massachusetts, 2019 Princeton Research Day, Princeton, 2019  <b>Reviewer:</b> Biofabrication, 2017 - present Biomedical Physics & Engineering Express, 2018 - present 3D Printing and Additive Manufacturing, 2018 – present	

**Mentor:** Student Science Training Program, University of Florida, 2016  
Student Science Training Program, University of Florida, 2015  
Student Science Training Program, University of Florida, 2014

**Early Career Member:** American Physical Society, 2018 – present

**Student Member:** American Physical Society, 2014 – 2018  
Society of Tribologists and Lubrication Engineers, 2016 – 2017  
Indian Institute of Chemical Engineers, 2009 – 2012

**Summer Intern:** Indian Oil Corporation Ltd., 2011  
South Asian Petrochem Ltd., 2010

## Publications

### Highlighted Publications:

1. **T. Bhattacharjee**, S. M. Zehnder, K. G. Rowe, S. Jain, R. M. Nixon, W. G. Sawyer, and T. E. Angelini. *Writing in the granular gel medium*. Science Advances, 2015
2. **T. Bhattacharjee**, and S. S. Datta. *Bacterial hopping and trapping in porous media*. Nature Communications, 2019
3. **T. Bhattacharjee**, C. J. Gil, S. L. Marshall, J. M. Urueña, C. S. O'Bryan, M. Carstens, B. Keselowsky, G. Palmer, S. Ghivizzani, P. Gibbs, W. G. Sawyer, and T. E. Angelini. *Liquid Like Solids Support Cells in 3D*. ACS Biomaterials Science & Engineering, 2016
4. **T. Bhattacharjee**, C. P. Kabb, C. S. O'Bryan, J. M. Urueña, B. S. Sumerlin, W. G. Sawyer, and T. E. Angelini. *Polymer Physics Scaling Laws in Yielding of Jammed Microgels*. Soft Matter, 2018
5. **T. Bhattacharjee** and, T. E. Angelini, *3D T Cell Migration in Jammed Microgels*, Journal of Physics D, 2018
6. C. S. O'Bryan, **T. Bhattacharjee**, S. Hart, C. P. Kabb, K. D. Schulze, I. R. Chilakala, B. S. Sumerlin, W. G. Sawyer, and T. E. Angelini. *Jammed Micro-Organogels for 3D Printing Silicone Structures*. Science Advances, 2017

### Complete List of Publications:

1. C. Morley, S. Ellison, **T. Bhattacharjee**, K. Schulze, C. O'Bryan, K. Smith, C. Kabb, S. Niemi, G. Moore, C. Flores, D. Tran, B. Sumerlin, W. Sawyer, D. Mitchell, and T. E. Angelini. *Cell Generated Forces in Unstable 3D Printed Structural Elements*. (in review)
2. **T. Bhattacharjee**, and S. S. Datta. *Bacterial hopping and trapping in porous media*. Nature Communications, 2019
3. C. S. O'Bryan, **T. Bhattacharjee**, S. L. Marshall, W. G. Sawyer, and T. E. Angelini. *Commercially Available Microgels for 3D Bioprinting*. Bioprinting, 2018
4. **T. Bhattacharjee** and, T. E. Angelini, *3D T Cell Migration in Jammed Microgels*, Journal of Physics D, 2018

5. A. A. Pitenis, J. M. Urueña, T. T. Hormel, **T. Bhattacharjee**, K. D. Schulze, T. E. Angelini, and W. G. Sawyer, *In vitro lubricity experiments on corneal cells*, Contact Lens and Anterior Eye, 2018
6. **T. Bhattacharjee**, C. P. Kabb, C. S. O'Bryan, J. M. Urueña, B. S. Sumerlin, W. G. Sawyer, and T. E. Angelini. *Polymer Physics Scaling Laws in Yielding of Jammed Microgels*. Soft Matter, 2018
7. E. O. McGhee, A. A. Pitenis, J. M. Urueña, K. D. Schulze, A. J. McGhee, C. S. O'Bryan, **T. Bhattacharjee**, T. E. Angelini, and W. Gregory Sawyer. *In Situ Measurements of Contact Dynamics in Speed-Dependent Hydrogel Friction*. Biotribology, 2017
8. D. M. Garcia, K. D. Schulze, C. S. O'Bryan, **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Eliminating the Surface Location from Soft Matter Contact Mechanics Measurements*. Tribology - Materials, Surfaces & Interfaces, 2017
9. C. S. O'Bryan, **T. Bhattacharjee**, S. R. Niemi, S. Balachandar, N. Baldwin, S. V. Ellison, C. Taylor, W. G. Sawyer, and T. E. Angelini. *Three-dimensional Printing with Sacrificial Materials for Soft Matter Manufacturing*. MRS Bulletin, 2017
10. A. A. Pitenis, J. M. Urueña, T. Hormel, **T. Bhattacharjee**, S. L. Marshall, S. M. Hart, K. D. Schulze, T. E. Angelini, and W. G. Sawyer. *Hydrogel Friction on Corneal Epithelial Cells In Vitro*. Biotribology, 2017
11. T. Hormel, **T. Bhattacharjee**, A. A. Pitenis, J. M. Urueña, W. G. Sawyer, and T. E. Angelini. *A confocal fluorescence microscopy method for measuring mucous layer growth on living corneal epithelia*. Biotribology, 2017
12. C. S. O'Bryan, **T. Bhattacharjee**, S. Hart, C. P. Kabb, K. D. Schulze, I. R. Chilakala, B. S. Sumerlin, W. G. Sawyer, and T. E. Angelini. *Jammed Micro-Organogels for 3D Printing Silicone Structures*. Science Advances, 2017
13. K. D. Schulze, S. M. Zehnder, J. M. Urueña, **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Elastic Modulus and Hydraulic Permeability of MDCK Monolayers*. Journal of Biomechanics, 2017
14. Y. Jin, A. Compaan, **T. Bhattacharjee** and Y. Huang. *Granular gel support-enabled extrusion of three-dimensional alginate and cellular structures*. Biofabrication, 2016
15. **T. Bhattacharjee**, C. J. Gil, S. L. Marshall, J. M. Urueña, C. S. O'Bryan, M. Carstens, B. Keselowsky, G. Palmer, S. Ghivizzani, P. Gibbs, W. G. Sawyer, and T. E. Angelini. *Liquid Like Solids Support Cells in 3D*. ACS Biomaterials Science & Engineering, 2016
16. A. Pitenis, J. M. Urueña, R. M. Nixon, **T. Bhattacharjee**, B. A. Krick, A. C. Dunn, T. Angelini, and W. G. Sawyer. *Lubricity from Polymer Entangled Networks on Hydrogels*. Journal of Tribology, 2016
17. **T. Bhattacharjee**, S. M. Zehnder, K. G. Rowe, S. Jain, R. M. Nixon, W. G. Sawyer, and T. E. Angelini. *Writing in the granular gel medium*. Science Advances, 2015

## Talks

### Invited Talks:

1. **T. Bhattacharjee.** Cells in Gels: Probing and Controlling Bacteria in 3D Porous Media. PRISM Annual Research Symposium, Princeton University, USA, 2019
2. **T. Bhattacharjee.** Bacterial hopping and trapping in porous media. Bio-Engineering colloquium, Princeton University, USA, 2019
3. **T. Bhattacharjee.** *Soft Matter Engineering: Applications and Future.* Indian Institute of Technology, Hyderabad, India, 2017

### Contributed Talks:

4. **T. Bhattacharjee,** and S. Datta. *Bacteria Motility in Porous Media: Not a Random Walk.* APS March Meeting, Boston, Massachusetts, 2019
5. **T. Bhattacharjee,** and T. Angelini. *Cells in Microgels: 3D Printed Microtissues and Single Cell Migration.* Compflu, Roorkee, India, 2018
6. **T. Bhattacharjee,** and T. Angelini. *Interfacial and bulk effects in packed microgel yielding.* APS March Meeting, Los Angeles, California, 2018
7. **T. Bhattacharjee,** C. O'Bryan, S. Ellison, C. Morley, S. Marshall, and T. Angelini. *Soft Matter Manufacturing: 3D Printing with Cells, Gels, Elastomers and Colloids.* APS March Meeting, Los Angeles, California, 2018
8. C. Morley, S. Ellison, **T. Bhattacharjee,** T. Hormel, C. O'Bryan, S. Niemi, W. Sawyer, and T. Angelini. *Cell Driven Buckling of Active Collagen Microbeams.* APS March Meeting, Los Angeles, California, 2018
9. S. Ellison, C. Morley, **T. Bhattacharjee,** T. Hormel, S. Niemi, W. Sawyer, and T. Angelini. *Transition between Collective Mechanical Instabilities in 3D Printed Microtissues.* APS March Meeting, Los Angeles, California, 2018
10. T. Hormel, **T. Bhattacharjee,** C. O'Bryan, G. Sawyer, and T. Angelini. *Structural Evolution and Spatial Heterogeneity in Mucin Layers.* APS March Meeting, Los Angeles, California, 2018
11. A. A. Pitenis, J. M. Urueña, T. Hormel, **T. Bhattacharjee,** S. Hart, A. Bennett, K. Schulze, S. Marshall, E. McGhee, T. Angelini, and W. Sawyer. *Gels, Cells, and Mucin.* Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Atlanta, Georgia, 2017
12. J. M. Urueña, A. Pitenis, K. Schulze, **T. Bhattacharjee,** T. Hormel, S. Marshall, S. Hart, E. McGhee, A. Bennett, T. Angelini, and W. Sawyer. *Cell Friction.* Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Atlanta, Georgia, 2017
13. C. O'Bryan, T. Hormel, **T. Bhattacharjee,** W. G. Sawyer, and T. Angelini. | *Viability of Corneal Epithelial Cells at the Air-Gel Interface.* Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Atlanta, Georgia, 2017

14. T. Hormel, **T. Bhattacharjee**, A. Pitenis, J. M. Urueña, W. Sawyer, and T. Angelini. *Characterizing Membrane Dynamics at a Biological Interface*. Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Atlanta, Georgia, 2017
15. **T. Bhattacharjee**, W. Sawyer, and T. Angelini. *3d Cell Motion in Jammed Granular Microgels*. Biomaterials Day, University of Florida, 2017
16. **T. Bhattacharjee**, W. Sawyer, and T. Angelini. *Classifying and Analyzing 3d Cell Motion in Jammed Microgels*. APS March Meeting, New Orleans, Louisiana, 2017
17. C. O'Bryan, T. Hormel, **T. Bhattacharjee**, W. Sawyer, and T. Angelini. *Cells on Gels: Cell Behavior at the Air-Gel Interface*. APS March Meeting, New Orleans, Louisiana, 2017
18. S. Ellison, **T. Bhattacharjee**, C. Morley, W. Sawyer, and T. Angelini. *Collective cell behavior on basement membranes floating in space*. APS March Meeting, New Orleans, Louisiana, 2017
19. C. Morley, **T. Bhattacharjee**, S. Ellison, W. Sawyer, and T. Angelini. *Contractile recovery of microtissues after giant shear events*. APS March Meeting, New Orleans, Louisiana, 2017
20. T. Hormel, **T. Bhattacharjee**, A. Pitenis, W. Sawyer, and T. Angelini. *Mucin Production Dynamics at the Surface of Corneal Epithelial Cells*. APS March Meeting, New Orleans, Louisiana, 2017
21. J. Urueña, **T. Bhattacharjee**, A. Pitenis, J. Urueña, W. Sawyer, and T. Angelini. *Friction and Wear in Live Cell Mucin*. Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Las Vegas, Nevada, 2016
22. C. O'Bryan, **T. Bhattacharjee**, W. Sawyer, and T. Angelini. *Tribological Challenges in 3D Printing with Liquid-Like Solids and Complex Fluids*. Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Las Vegas, Nevada, 2016
23. **T. Bhattacharjee**, N. L. Baldwin, F. M. Zegers, J. M. Urueña, C. S. O'Bryan, A. A. Pitenis, W. G. Sawyer, and T. E. Angelini. *Friction and Yielding in Liquid-like Solids*. Society of Tribologists and Lubrication Engineers Annual Exhibition and Meeting, Las Vegas, Nevada, 2016
24. **T. Bhattacharjee**, C. J. Gil, S. L. Marshall, J. M. Urueña, C. S. O'Bryan, M. Carstens, B. Keselowsky, G. Palmer, S. Ghivizzani, W. G. Sawyer, and T. E. Angelini. *Liquid-like Solids as 3D Cell Growth Medium*. Institute of Cell and Tissue Science and Engineering, University of Florida, Gainesville, Florida, 2016
25. C. O'Bryan, **T. Bhattacharjee**, W. G. Sawyer, and T. Angelini. *The Sheet Trapped in a Plumber's Nightmare*. American Physical Society, Baltimore, Maryland, 2016
26. R. Nixon, **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Microfluidics of soft granular gels*. American Physical Society, Baltimore, Maryland, 2016
27. **T. Bhattacharjee**, G. Palmer, S. Ghivizzani, B. Keselowsky, W. G. Sawyer, and T. Angelini. *Three-Dimensional Cell Behavior in Microgels*. American Physical Society, Baltimore, Maryland, 2016
28. **T. Bhattacharjee**, C. J. Gil, S. L. Marshall, J. M. Urueña, C. S. O'Bryan, M. Carstens, B. Keselowsky, G. Palmer, S. Ghivizzani, W. G. Sawyer, and T. E. Angelini. *3D Cell Behavior in Liquid-like Solids*. Biomaterials Day, University of Florida, Gainesville, Florida, 2016

29. **T. Bhattacharjee**, K. Rowe, T. Angelini, and W. G. Sawyer. *Writing in the Granular Gel Medium*. Biomedical Engineering Society, Tampa, Florida, 2015
30. **T. Bhattacharjee**, K. Rowe, W. G. Sawyer, and T. Angelini. *Complex cellular manifolds in a granular gel*. Biomedical Engineering Society, Tampa, Florida, 2015
31. **T. Bhattacharjee**, K. G. Rowe, S. Jain, S. M. Zehnder, R. M. Nixon, W. G. Sawyer, and T. E. Angelini. *Complex multi-cellular manifolds*. American Physical Society, San Antonio, Texas, 2015

## Poster Presentations

1. **T. Bhattacharjee**, and S. S. Datta. *Bacterial Communities in Three-Dimensional Porous Media*. Andlinger Center Annual Meeting, Princeton University, 2018
2. **T. Bhattacharjee**, and S. S. Datta. *Bacterial Communities in Three-Dimensional Porous Media*. Soft Matter Symposium, University of Florida, 2018
3. **T. Bhattacharjee**, and T. E. Angelini. *Analyzing Active Cell Motion in 3D Jammed Microgels*. Gordon Research Conference on Soft Condensed Matter Physics, 2017
4. **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Polymer Physics Scaling Laws in Yielding of Jammed Microgels*. Society of Rheology Annual Meeting, 2017
5. **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Polymer Physics Scaling Laws in Yielding of Jammed Microgels*. Society of Rheology Annual Meeting, 2017
6. **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Cell Dynamics in 3D Microgel Media*. Annual Pruitt Research Day, University of Florida, 2016
7. **T. Bhattacharjee**, W. G. Sawyer, and T. E. Angelini. *Yielding in Liquid-like Solids*. Gordon Research Seminar- Tribology, 2016
8. N. L. Baldwin, **T. Bhattacharjee**, and T. E. Angelini. *The Yielding Volume in Local Unjamming*. Student Science Training Program, University of Florida, 2015
9. **T. Bhattacharjee**, J. M. Uruena, C. S. O'Bryan, A. A. Pitenis, W. G. Sawyer, and T. E. Angelini. *Friction and Yielding in Liquid-like Solids*. Soft Matter Symposium, University of Florida, Gainesville, Florida, 2015
10. S. Jain, **T. Bhattacharjee**, and T. E. Angelini. *3D Printing of Aqueous Ink in Aqueous Gel*. Student Science Training Program, University of Florida, 2014
11. **T. Bhattacharjee**, A. C. Bohorquez, L. Maldonado-Camargo, M. E. Hernandez, and C. Rinaldi. *High energy dissipation from iron oxide Superparamagnetic nanoparticles through optimization of their intrinsic loss power (ILP)*. NanoFlorida, Gainesville, Florida, 2013

## Patent Applications

1. J. Muse, M. Hughes, C. D. Crane, T. E. Angelini, K. D. Schulze, **T. Bhattacharjee**, W. G. Sawyer, C. Taylor. *Valve incorporating temporary phase change material*, US Patent App. 15/757,122, 2019

2. T. E. Angelini, W. G. Sawyer, K. G. Rowe, **T. Bhattacharjee**, A. Fernandez-Nieves, Y. Chang, S. M. Marquez. *High speed 3d printing system for wound and tissue replacement*, US Patent App. 15/549,083, 2018
3. W. G. Sawyer, T. E. Angelini, S. C. Ghivizzani, **T. Bhattacharjee**, G. D. Palmer. *Growth media for three-dimensional cell culture*, US Patent App. 15/571,866, 2018
4. T. E. Angelini, B. S. Sumerlin, C. S. O'bryan, W. G. Sawyer, **T. Bhattacharjee**. *Organic microgel system for 3d printing of silicone structures*, US Patent App. 15/693,389, 2018
5. B. G. Keselowsky, T. E. Angelini, W. G. Sawyer, **T. Bhattacharjee**. *Apparatus for culturing and interacting with a three-dimensional cell culture*, US Patent App. 15/759,587, 2018