

Samhita P. Banavar
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Experience

- April 2022 - Postdoctoral Scholar
Princeton University
Department of Chemical and Biological Engineering
Advisor: Celeste M. Nelson
- January 2020 – March 2022 Postdoctoral Scholar
Stanford University
Department of Bioengineering
Advisor: Manu Prakash

Education

- December 2019 **Ph.D., Physics**
University of California – Santa Barbara, Santa Barbara, CA
NSF Graduate Research Fellow
Advisor: Otger Campàs, Thesis: “Physical aspects of cell and tissue elongation”
- May 2017 **EMBO Lecture Course on Experimental and Theoretical approaches to cell mechanics**
Bangalore, India
- May 2013 **B.S. Physics**
B.S Mathematics
The Pennsylvania State University – Schreyer’s Honors College, University Park, PA
Advisor: Moses H.W. Chan, Thesis: “One Dimensional behavior in superfluid helium”
- Fall 2011 **St. Catherine’s College IES Study Abroad Program**
Oxford University, Oxford, United Kingdom
- Summer 2011 **RISE DAAD Internship**
TU München, Experiments on magnetic properties of materials

Awards and Fellowships

- 2023 Life Science Research Fellowship (LSRF)
- 2022 Mistletoe Postdoctoral Research Fellowship, Momental Foundation
- 2019 ELBE Postdoctoral Fellowship at Center for Systems Biology Dresden (Declined)
- 2017 Mellichamp Fellowship in Systems Biology and Bioengineering
- 2014 UCSB Department of Physics Outstanding TA Award

2013 Herbert P. Broida Fellowship
2013 National Science Foundation Graduate Research Fellowship
2013 Phi Beta Kappa
2013 PSU Department of Physics David Bohm Award
2009 Robert C. Byrd Honors Scholarship

Publications

Samhita P. Banavar, Celeste M. Nelson. Mechanical properties pattern the skin. *Science*, 382, 880 (2023)

Carolina Parada, Samhita P. Banavar, Parisa Khalilian, Stephane Rigaud, Arthur Michaut, Yucen Liu, Dennis Manjaly Joshy, Otger Campàs, & Jerome Gros. “Mechanical feedback defines organizing centers to drive digit emergence” *Developmental Cell*, 57, 854–866 (2022)

Anton Molina, Pranav Vyas, Nikita Khlystov, Shailabh Kumar, Anesta Kothari, Dave Deriso, Zhiru Liu, Samhita P. Banavar, Elliott M. Flaum, Manu Prakash. “Low cost centrifugal melt spinning for distributed manufacturing of non-woven media” *PloS One*, 17(4): e0264933 (2022)

Samhita P. Banavar*, Emmet Carn*, Payam Rowghanian, Georgina Stooke-Vaughn, Sangwoo Kim, Otger Campàs. “Mechanical control of tissue shape and morphogenetic flows during vertebrate body axis elongation” *Scientific Reports* 11, 8591 (2021) *co-first authors

Samhita P. Banavar*, Michael Trogdon*, Brian Drawert, Tau-Mu Yi, Linda Petzold, Otger Campàs. “Coordinating cell polarization and morphogenesis through mechanical feedback” *PLOS Computational Biology*, 14(1): e1005940 (2021) *co-first authors

Siddharth Doshi, Samhita P. Banavar, Elliott M. Flaum, Shailabh Kumar, Tyler Chen, Manu Prakash. “Applying Heat and Humidity using Stove Boiled Water for Decontamination of N95 Respirators in Low Resource Settings” *PloS One* 16(9), e0255338 (2021)

Laurel Kroo, Anesta Kothari, Melanie Hannebelle, George Herring, Thibaut Pollina, Ray Chang MD, Samhita P. Banavar, et.al. “Modified full-face snorkel masks as reusable personal protective equipment for hospital personnel” *PloS One* 16(1), e0244422 (2021)

Michael Trogdon, Brian Drawert, Carlos Gomez, Samhita P. Banavar, Tau-Mu Yi, Otger Campàs, Linda Petzold. “The effect of cell geometry on polarization in budding yeast” *PLOS Computational Biology*, 14, e1006241–22 (2018)

Samhita P. Banavar, Carlos Gomez, Michael Trogdon, Linda Petzold, Tau-Mu Yi, Otger Campàs. “Mechanical feedback coordinates cell wall expansion and assembly in yeast mating morphogenesis” *PLOS Computational Biology*, 14, e1005940–19 (2018)

Selected Presentations

- July 2023 “Quantifying the fractal pattern formation of the lung” Society of Developmental Biology Annual Meeting, Chicago IL (Poster presented as co-author)
- July 2023 “Uncovering the effects of transmural pressure on pulmonary neuroendocrine cells in the developing lung” Vermont Stem Cells, Cell Therapies, and Bioengineering in Lung Biology and Diseases, Burlington VT (Poster presented as co-author)
- March 2022 “Hydraulics of cellular extension and contraction in *Lacrymaria olor*” American Physical Society March Meeting, Chicago IL
- March 2021 “Physical aspects of cell and tissue elongation” American Physical Society March Meeting, Virtual (Invited talk)
- January 2020 “Stabilization of cell morphogenesis and polarity through mechanical feedback” Conference on New Physical Models for Cell Growth Aspen Center for Physics, Aspen CO
- March 2019 “Mechanical feedback maintains polarization in budding yeast mating projection growth” American Physical Society March Meeting, Boston MA
- December 2018 “Mechanical feedback coordinates cell wall expansion and assembly in yeast mating morphogenesis” ASCB/EMBO Conference, San Diego CA (Poster)
- August 2018 “Mechanical feedback coordinates cell wall expansion and assembly in yeast mating morphogenesis” Plant and Microbial Gordon Research Conference, Andover NH (Poster)
- March 2018 “Mechanical feedback coordinates cell wall expansion and assembly in yeast mating morphogenesis” American Physical Society March Meeting, Los Angeles CA
- February 2018 “Mechanical feedback coordinates cell wall expansion and assembly in yeast mating morphogenesis.” 62nd Annual Biophysical Society, San Francisco CA (Invited flash talk – one minute talk and Poster)
- March 2016 “Mechanical feedback stabilizes budding yeast morphogenesis” American Physical Society March Meeting, Baltimore MD
- May 2015 “What Determines Cell Shape? Searching for Answers by Studying Shmoos!” STEMposium, STEM conference at University of California - Santa Barbara

January 2013 “One Dimensional Behavior in Superfluid Helium” Northeast Conference for Undergraduate Women in Physics at Cornell, Ithaca, NY

Mentorship

Trishala Kumar Undergraduate, Department of Physics, Princeton University, *Exploring the fractal properties of embryonic mouse lungs*

Jake Klimek Undergraduate, Department of Chemical and Biological Engineering, Princeton University, *The Mechanical Basis for Elongation of the Airway Epithelium in the Developing Mammalian Lung*

Sonia Hasko Undergraduate, Department of Chemical and Biological Engineering, Princeton University, *Epithelial Permeability in the Embryonic Mouse Lung*

Tevyur Mosley Research specialist, Department of Chemical and Biological Engineering, Princeton University, *Uncovering the effects of transmural pressure on pulmonary neuroendocrine cells in the developing lung*

Anna Liu Research specialist, Department of Chemical and Biological Engineering, Princeton University, *Uncovering the effects of transmural pressure on pulmonary neuroendocrine cells in the developing lung*

Service

February 2023 Co-organizer of an international workshop at the Princeton Center for Theoretical Sciences on the Biophysics of Organoids

May 2023 – Webmaster of Women in Chemical and Biological Engineering at Princeton group