

# Stanford

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## Rahul Chajwa

Basic Life Research Scientist

Bioengineering

 Curriculum Vitae available Online

### Bio

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#### BIO

My research integrates experiments and theory within the purview of soft matter and biological physics. I explore the principles governing self-assembly and transport in the ocean's biological pump, working alongside Manu Prakash. I earned my Ph.D. in Physics from the Tata Institute of Fundamental Research, India, under the mentorship of Sriram Ramaswamy, Narayanan Menon, and Rama Govindarajan.

At Stanford University, my research bridges biological oceanography and soft matter physics to develop predictive frameworks for ocean-based carbon sequestration, using table-top experiments conducted at sea. This complex system, which remains poorly understood, plays a crucial role in climate modeling and marine carbon dioxide removal technologies. In my pursuit of uncovering the principles governing non-equilibrium transport in ecosystems — spanning microbial to planetary scales — I am committed to cultivating a field-based approach to soft matter physics.

#### ACADEMIC APPOINTMENTS

- Basic Life Research Scientist, Bioengineering

#### HONORS AND AWARDS

- Stanford Bio-X Travel Award, Stanford University (2023)
- HFSP Cross Disciplinary Fellowship, Human Frontier Science Program (2021)
- TIFR Best Thesis Award in Physics, Tata Institute of Fundamental Research, Mumbai (2021)
- Infosys Foundation ICTS Excellence Grant, International Centre for Theoretical Sciences TIFR (2020)
- INSPIRE Scholarship, Department of Science and Technology, Govt. of India (2010)

#### PROFESSIONAL EDUCATION

- Doctor of Philosophy, Tata Institute of Fundamental Research , Physics (2020)
- Master of Science, Indian Institute of Science Education and Research Mohali , Physics (2015)
- Bachelor of Science, Indian Institute of Science Education and Research Mohali , Physics (2015)

### Research & Scholarship

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#### CURRENT RESEARCH AND SCHOLARLY INTERESTS

My HFSP project is focussed on understanding the birth, life and death of marine snow. A predictive understanding of the hydrodynamic, biotic, and non-equilibrium aspects of this sinking microbial ecosystem is a notoriously challenging and globally relevant problem and is the central theme of my

research at Stanford University. I'm applying my training as a physicist to shed light on the dynamical aspects of microbial life in the ocean, and to contribute insights that can help mitigate the negative impact of human activities on global climate; something I feel strongly about.

## Publications

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### PUBLICATIONS

- **Active caustics** *PHYSICAL REVIEW FLUIDS*  
Chajwa, R., Rajarshi, C., Govindarajan, R., Ramaswamy, S.  
2026; 11 (3)
- **Dynamics and clustering of sedimenting disc lattices** *JOURNAL OF FLUID MECHANICS*  
Joshi, H., Chajwa, R., Ramaswamy, S., Menon, N., Govindarajan, R.  
2025; 1017
- **Inflation-induced motility for long-distance vertical migration.** *Current biology : CB*  
Larson, A. G., Chajwa, R., Li, H., Prakash, M.  
2024
- **Hidden comet tails of marine snow impede ocean-based carbon sequestration.** *Science (New York, N.Y.)*  
Chajwa, R., Flaum, E., Bidle, K. D., Van Mooy, B., Prakash, M.  
2024; 386 (6718): ead15767
- **Waves, Algebraic Growth, and Clumping in Sedimenting Disk Arrays** *PHYSICAL REVIEW X*  
Chajwa, R., Menon, N., Ramaswamy, S., Govindarajan, R.  
2020; 10 (4)
- **Nonmutual torques and the unimportance of motility for long-range order in two-dimensional flocks.** *Physical review. E*  
Dadhichi, L. P., Kethapelli, J., Chajwa, R., Ramaswamy, S., Maitra, A.  
2020; 101 (5-1): 052601
- **Kepler Orbits in Pairs of Disks Settling in a Viscous Fluid.** *Physical review letters*  
Chajwa, R., Menon, N., Ramaswamy, S.  
2019; 122 (22): 224501