

Manu Mannattil

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Research Interests

Broad interests in theoretical soft matter physics, statistical mechanics, and applied mathematics. Recent studies address problems in phase separation, elasticity theory, wave mechanics, WKB theory, the geometry of soft materials, free-energy landscapes, and nonlinear dynamics.

Personal Information

Born on August 13, 1991 in Palakkad, Kerala; Indian citizen.
Name in Malayalam: മനു മന്നാറ്റിൽ, and in Devanagari: मनु मन्नाटिल.

Education

Syracuse University, Syracuse, New York, USA; August 2017–August 2023.
Ph.D. in Physics, August 2023; Dissertation: *Asymptotics, Geometry, and Soft Matter*.
Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India; July 2009–July 2014.
Integrated M.Sc. in Physics, February 2015.

Employment History

Postdoctoral Fellow in Applied Mathematics, School of Engineering and Applied Sciences,
Harvard University; November 2025–.
Postdoctoral Fellow, School of Chemistry and School of Physics and Astronomy,
Tel Aviv University; October 2023–September 2025.
Research Assistant, Department of Physics, Syracuse University; May 2019–August 2023.
Teaching Assistant, Department of Physics, Syracuse University; August 2017–May 2022.
Project Associate, Department of Physics, Indian Institute of Technology Kanpur;
September 2014–October 2015.

Publications*Works in progress*

2. Manu Mannattil, Haim Diamant, and David Andelman, “Anisotropic effects in elastic microphase separation”, forthcoming.
1. Manu Mannattil, “Energy and free-energy landscapes of soft few-body systems with singular constraints”, forthcoming.

Papers

7. Manu Mannattil, Haim Diamant, and David Andelman, “Theory of Microphase Separation in Elastomers”, *Phys. Rev. Lett.* **135**, 108101 (2025), arXiv:2412.05910 [cond-mat.soft].

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6. Manu Mannattil and Christian D. Santangelo, "Geometric localization of waves on thin elastic structures", *Phys. Rev. E* **109**, 035001 (2024), arXiv:2306.07213 [cond-mat.soft].
5. Manu Mannattil, J. M. Schwarz, and Christian D. Santangelo, "Thermal Fluctuations of Singular Bar-Joint Mechanisms", *Phys. Rev. Lett.* **128**, 208005 (2022), arXiv:2112.04279 [cond-mat.soft].
4. Manu Mannattil, Ambrish Pandey, Mahendra K. Verma, and Sagar Chakraborty, "On the applicability of low-dimensional models for convective flow reversals at extreme Prandtl numbers", *Eur. Phys. J. B* **90**, 259 (2017), arXiv:1711.01510 [physics.flu-dyn].
3. Manu Mannattil, Himanshu Gupta, and Sagar Chakraborty, "Revisiting Evidence of Chaos in X-ray Light Curves: The Case of GRS 1915+105," *Astrophys. J.* **833**, 208 (2016), arXiv:1611.02264 [astro-ph.HE].
2. Aditya Tandon, Malte Schröder, Manu Mannattil, Marc Timme, and Sagar Chakraborty, "Synchronizing noisy nonidentical oscillators by transient uncoupling", *Chaos* **26**, 094817 (2016), arXiv:1611.02298 [nlin.CD].
1. Malte Schröder, Manu Mannattil, Debabrata Dutta, Sagar Chakraborty, and Marc Timme, "Transient Uncoupling Induces Synchronization", *Phys. Rev. Lett.* **115**, 054101 (2015), arXiv:1508.06545 [nlin.CD].

Scientific software

- **NoLiTSA** – a Python module for nonlinear time series analysis (2017)
This module implements several standard algorithms in nonlinear time series analysis for computing the correlation dimension and Lyapunov exponent, surrogate analysis, noise reduction, embedding delay/dimension estimation, etc. It has now been used in over 20 scientific publications across various disciplines.

Awards and Honors

Bloomfield Postdoctoral Fellowship, Tel Aviv University, October 2023.

College of Arts & Sciences Award, Syracuse University, May 2020.

Henry Levinstein Fellowship, Department of Physics, Syracuse University, April 2018.

Kishore Vaigyanik Protsahan Yojana, Department of Science and Technology, Government of India, March 2011.

Invited Talks

Theory of Microphase Separation in Elastomers

Max Planck Institute for the Physics of Complex Systems, May 2025.

Bar-Ilan University, January 2025.

Geometric Localization of Waves on Thin Elastic Structures

Nottingham University, February 2025.

The Technion – Israel Institute of Technology, August 2024.

Tel Aviv University, February 2024.

Asymptotics, Geometry, and Soft Matter

Tel Aviv University, March 2023.

Georgia Institute of Technology, March 2023.

Université Paris-Saclay, March 2023.

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Contributed Talks and Posters

Theory of Microphase Separation in Elastomers

StatPhys 29, Florence, July 2025.

StatPoly, Venice, July 2025.

A Linear Model for Elastic Phase Separation

BioSoft Day, Tel Aviv University, June 2024.

Can One Hear the Shape of a Filament?

APS March Meeting '23, Las Vegas.

Thermal Fluctuations of Singular Bar-Joint Mechanisms

Simons Center for Geometry and Physics, Stony Brook University, May 2022.

APS March Meeting '22, Chicago.

Thermal Fluctuations of Singular Networks

APS March Meeting '21, Virtual.

Service to Profession

Manuscript reviewer for *Journal of Applied Physics* and *Physics of Fluids*.

Teaching Experience

Syracuse University

Grader, PHY 741: Graduate Statistical Mechanics	<i>Spring 2022</i>
Teaching Assistant, PHY 212: General Physics II (Electricity & Magnetism)	<i>Spring 2020</i>
Teaching Assistant, AST 101: Our Corner of the Universe	<i>Fall 2019</i>
Course Instructor, PHY 212: General Physics II (Electricity & Magnetism)	<i>Summer 2019</i>
Teaching Assistant, PHY 222: General Physics II Lab (Electricity & Magnetism)	<i>Spring 2019</i>
Teaching Assistant, PHY 211: General Physics I (Mechanics)	<i>Fall 2018</i>
Teaching Assistant, PHY 215: General Physics I for Majors (Mechanics)	<i>Fall 2018</i>
Teaching Assistant, AST 101: Our Corner in the Universe	<i>Summer 2018</i>
Teaching Assistant, PHY 212: General Physics II (Electricity & Magnetism)	<i>Spring 2018</i>
Teaching Assistant, AST 101: Our Corner in the Universe	<i>Fall 2017</i>

Miscellaneous

Languages. English (fluent), Hindi (basic), and Malayalam (native).

Computer skills. Experience writing well-documented and modular software in Python, C++, Mathematica, Vim script, AWK, and various shells (Bash, POSIX sh, etc.); seasoned user of Unix-like operating systems and related software.

Git commit [9350de0](#); Sat, 8 Nov 2025 09:30:27 -0500.