

Niranjan Sarpangala

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EDUCATION

- **University of California Merced**, Ph.D. in Physics, GPA: 4.0/4.0 2023
- **Indian Institute of Technology Bombay**, M.Sc. in Physics, CPI: 8.9/10 2016
- **Mangalore University**, B.Sc. in Phys, Chem, & Math, 96.42% (Second rank) 2014
- **JNCASR Bangalore**, Diploma in Chemistry 2014

CERTIFICATIONS

- **IBM AI Engineering Professional Certificate** In progress
Covers deep learning, CNNs, RNNs, autoencoders, generative models, and LLMs.

RESEARCH AND TECHNICAL EXPERIENCE

Postdoctoral Researcher, University of Pennsylvania 2023 - Present
Advisor: Prof. Eleni Katifori

- Developed scalable graph based methods for simulating elastic networks, outperforming FEM in speed, resulting in a manuscript.
- Conducted independent research, applied optimization techniques to tailor network topology for novel mechanical energy dissipation properties (relevant for biomimetic devices and softrobotics applications).
- Conducted collaborative research with experimentalists, integrating physical modeling with experimental data for a nonlinear mechanical material.

Graduate Researcher, University of California, Merced 2017 - 2023
Advisor: Prof. Ajay Gopinathan

- Developed Brownian dynamics models of multi-motor intracellular transport, validated with experimental data.
- Investigated how enclosing fluid membranes impact coordination between molecular motors.
- Produced testable predictions with implications for neurodegeneration and Alzheimer's.

- **Microscopy Image Analysis:** Used FIJI and MATLAB to process time-lapse microscopy images of molecular motor based transport, and extracted biophysically relevant insights leading to publications in *PNAS* and *Euro. Phys. J. E*.

Selected Additional Research Experiences

- Modeled thin film phase separation using Cahn-Hilliard-Cook equation.
- Studied nanoparticle self-assembly facilitated by liquid crystal transitions.
- Conducted Potts model simulations to explore phase transitions.
- Investigated coherent population trapping in ^{87}Rb using quantum optics setups.

PUBLICATIONS

1. Memarian, F. L., Lopes, J. D., **Sarpangala, N.**, et al. Active nematic order and dynamic lane formation of microtubules driven by membrane-bound diffusing motors. *PNAS*, 2021.
2. **Sarpangala, N.** & Gopinathan, A. Cargo surface fluidity can reduce inter-motor mechanical interference, promote load-sharing and enhance processivity in teams of molecular motors. *PLOS Comp. Bio.*, 2022.
3. Krishnan, N., **Sarpangala, N.**, et al. Effects of cytoskeletal network mesh size on cargo transport. *Eur. Phys. J. E*, 2023.
4. **Sarpangala, N.**, et al. Tunable intracellular transport on converging microtubule morphologies. *Biophysical Reports*, 2024.

SELECTED PRESENTATIONS

- Poster, Center for Soft and Living Matter, University of Pennsylvania (2024)
- Lightning talk, 125th Statistical Mechanics Conference, Rutgers University (2023)
- Oral presentations, APS March Meeting (2019 - 2023, 2025)
- Selected talk, Physics of Life Symposium, CZ Biohub (2023)
- Poster, CEMB Retreat, University of Pennsylvania (2022)

TECHNICAL SKILLS

- **Programming:** Python, MATLAB, Bash, R
- **Libraries:** JAX, NumPy, Pandas, scikit-learn
- **Tools:** Git, Jupyter, FIJI, HPC/SLURM, Fipy

AWARDS AND FELLOWSHIPS

- Graduate Dean's Dissertation Fellowship that provided funding support for a semester. (2023)
- UC Merced Graduate Opportunity Fellowship that provided funding support for a year. (2019 - 2020)
- Outstanding Outreach and Service Award (2021)
- Best Academic Performance Award, UC Merced Physics (2018)

TEACHING AND OUTREACH

- Teaching Assistant for physics and math courses at UC Merced.
- Founder of Biophysics Graduate Club; co-organizer of Soft Matter seminar series (SLAAM seminars, APS DBIO).
- Volunteer science educator for eVidyaloka (remote Indian schools).

Last updated: May 16, 2025