

GOPIKA MADHU

CONTACT INFORMATION

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EDUCATION

- **PhD in Physics** (2022-present)
Department of Physics,
University of Miami, Florida, US
Advisor: Professor Vivek N. Prakash (UM,
Florida, USA)
CGPA: 3.85/4
- **BS-MS Dual Degree in Science, Major in Physics** (2016-2021)
Indian Institute of Science Education and Research -
Pune (IISER Pune), India
Dissertation Title: Devising techniques to probe the
mechanical response of axons.
Advisor: Dr Pramod A. Pullarkat (RRI, Bangalore, India)

RESEARCH INTERESTS

Biophysics, Tissue Mechanics, Cell rearrangement, Microscopy

GRADUATE COURSEWORK

(At University of Miami, August 2022 -May 2024)

- **Semester I**
 - Biological Physics
 - Quantum Physics I
 - Classical Mechanics II
- **Semester II**
 - Introduction to Astrophysics
 - Quantum Mechanics II
 - Directed Reading or Research
- **Semester III**
 - Statistical Physics I
 - Electromagnetic Theory I
 - Directed Reading or Research
- **Semester IV**
 - Quantum Computation
 - Electromagnetic Theory II
 - Graduate Seminar
- **Semester V**
 - Quantum Theory I
 - Pre-Candidacy Doctoral Research
- **Semester VI**
 - Elementary Particle Physics
 - Graduate Seminar
 - Post-Candidacy Doctoral Research

TEACHING

- **PHY106: College Physics Laboratory I**
 - Fall 2022
- **PHY108: College Physics Laboratory II**
 - Spring 2024
 - Fall 2024
- **PHY224: University Physics Laboratory II**
 - Fall 2022
 - Spring 2023
 - Fall 2023

SCHOLARSHIPS

- **KVPY Scholarship (2016 to 2021)**, All India Rank - 445
- **Summer Doctoral Micro-Grant (2025)**

PUBLICATIONS

- Setareh Gooshvar, Gopika Madhu, Melissa Rusczyk, Vivek N Prakash, Non-Bilaterians as Model Systems for Tissue Mechanics, Integrative and Comparative Biology, Volume 63, Issue 6, December 2023, Pages 1442-1454, <https://doi.org/10.1093/icb/icad074>
- Juyeon Hong, Chanjae Lee, Gopika Madhu, Ophelia Papoulas, Ece Atayeter, Garbiel Hoogerbrugge, Jiehong Pan, Maki Takagishi, Nadia Manzi, Daniel J. Dickinson, Amjad Horani, Steven L. Brody, Edward Marcotte, Vivek N. Prakash, Tae Joo Park, John B. Wallingford, A protein complex in the extreme distal tip of

PRESENTATIONS & WORKSHOPS

- Graduate and Postdoctoral Research Symposium 2025, University of Miami
- APS March Meeting 2024, Minneapolis
- IPoLS Scientific Programming in Python Bootcamp 2025, Emory University
- Evaluator at RCIF 2025, University of Miami

RESEARCH PROJECTS

- **Quantifying Ductile-Brittle deformations in a Novel Epithelial System, *Trichoplax adhaerens*.** (PhD directed research – 2023)
Supervisor: Dr Vivek N. Prakash, Prakash Lab, Department of Physics, University of Miami, Florida, USA
Summary: This project involves experimental investigation and modelling of tissue fracture mechanics and cellular rearrangement observed in the placozoan *Trichoplax adhaerens*.
- **Devising techniques to probe the mechanical response of axons.** (MS Thesis – 2021)
Place: Cellular Biophysics Lab, Raman Research Institute, Bangalore, India
Thesis Advisory Committee: Dr Pramod A. Pullarkat (RRI, Bangalore), Dr G. V. Pavan Kumar (IISER Pune)
Summary: Designing, fabricating and characterizing Polydimethylsiloxane (PDMS) based stretcher device to observe the membrane periodic skeleton under stretch deformation using super-resolution imaging.
- **Nitrogen-Vacancy Centers in Diamonds.** (August-November 2019)
Supervisor: Dr T. S. Mahesh, NV Center Lab, IISER Pune, India
Summary: Familiarization with NV Centre set up to obtain ODMR signals from NV centers in diamonds.
- **Photon Entanglement via Spontaneous Parametric Down Conversion (SPDC).** (July 2019)
Supervisor: Dr. Raghavan, Indira Gandhi Centre of Atomic Research, Kalpakkam, India
Summary: Familiarization with the production of entangled photons via SPDC using beta barium borate crystal.
- **Surface Enhanced Raman Spectroscopy (SERS) in nanorods.** (January-April & May-June 2019)
Supervisor: Dr G. V. Pavan Kumar, Plasmonics Lab, IISER Pune, India
Summary: Familiarization with SERS, back focal plane imaging, and literature survey on liquid crystals.
- **Determining refractive index of Nanomaterials.** (May-June 2018)
Supervisor: Dr C. V. Krishnamurthy, Indian Institute of Technology Madras, India
Summary: TiO₂ microspheres were synthesized and characterized. This was followed by obtaining diffraction pattern images of the sample, which was then compared to various Me_n plots of varying refractive indices to obtain an optimal fit for the graphs.
- **Synthesis and Characterization of Layered Magnetic Oxides by Hydrothermal Route.** (May-June 2017)
Supervisor: Dr Ashna Bajpai, IISER Pune, India
Summary: YFeO₃ particles were synthesized by successive hydrothermal processing and high-temperature calcination. This was followed by characterization using X-ray diffraction.

TECHNICAL SKILLS

- **Computational Skills:** Mathematica, Origin, Image J, MATLAB, Python, LabVIEW(beginner), COMSOL (beginner), Qiskit(beginner) & MESA (beginner).
- **Experimental Skills:** Basic XRD, Fluorescence Microscopy, NV Centre set up, production of entangled photons using BBO crystal, Chick embryo dissection & culturing.

REFERENCES

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