

SURAJ KUMAR SAHU

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EDUCATION

University of California Merced Jan 2021 – Present
PhD Candidate, Physics | Advisor: Prof. Ajay Gopinathan GPA: 3.84/4.00

National Institute of Technology Rourkela Aug 2017 – May 2019
Master of Science in Physics

D.R. Nayapalli College, Utkal University Jul 2014 – Jun 2017
Bachelor of Science (Honors in Physics)

SKILLS

- **Computational Modeling:** Agent-Based Modeling, Numerical Simulations, Particle-Based Simulations, Reaction-Diffusion Systems, Network Dynamics
- **AI & Agentic Tools:** Context and Prompt Engineering, MCP, Skills, Agentic Workflows
- **Data Science & Visualization:** Data Analysis and Modeling, Scientific Visualization, Image Analysis, NumPy, SciPy, NetworkX
- **Programming Languages and Tools:** Python, Julia, L^AT_EX, Git, VS Code, Claude Code, Cursor, SLURM

PUBLICATIONS

Sahu, S., M. Biswas, “**Modeling protein association from homogeneous to mixed environments: A reaction-diffusion dynamics approach.**”, *Journal of Molecular Graphics and Modeling*, vol. 107, pp. 107936 (2021).

PROFESSIONAL EXPERIENCE

Graduate Research Assistant | Gopinathan Group, UC Merced Jan 2021 – Present

- Developed computational model of collagen matrix compaction in collaboration with **Dasbiswas Lab**. *In preparation.*
- Developed an Active Gel Model of Cell Junction Mechanics: adhesion dynamics, contact formation, actin dynamics, cadherin pattern formation, and cell junction stability and rupture kinetics. *In preparation.*
- Agent-based Model of Vascular Network Formation: cell migration, multicellular network formation, and remodeling; quantified network functionality, resilience, and adaptability. Collaboration with **Sindi Lab & McCloskey Lab**.
- Built 🐙 **Cellpose-MCP** (Jan 2026): MCP server enabling AI assistants (Claude, Cursor) to perform 2D/3D cell segmentation, batch processing, image restoration, and Napari visualization.

Graduate Teaching Assistant | Department of Physics, UC Merced Jan 2021 – Present

- Led experimental labs and discussions for introductory physics courses; served as teaching assistant for upper-division course.

Graduate Student Researcher | Computational Biophysics Group, NIT Rourkela Aug 2017 – May 2019

- Coarse-grained reaction-diffusion (ReaDDy) modeling of macromolecular crowding effects on protein association; showed crowder size dominates over shape in stabilizing products; characterized additivity rules in mixed-crowder systems. Published in *J. Mol. Graph. Model.* (2021).
- Developed nonlinear dynamical models of language competition among endangered scheduled Indian languages and estimated missing demographic data.

CONFERENCES & WORKSHOPS

Organizer & Instructor

- 🐙 **Graduate Division Workshop on AI Tools for Research and Data Analysis:** context engineering and agentic workflows applied to scientific data analysis and image analysis pipelines; attended by graduate students.
- Led research project and instructed graduate trainees during the Center for Engineering and Mechanobiology annual bootcamp

Selected Oral Presentations:

- **BPS 2026**, San Francisco — “Collective Cell Motility of Fibroblasts Driven by Contractile Multicellular Network Formation”

- **APS March Meeting 2025**, Los Angeles — “Stability of Cell-Cell Junctions: Balancing Cortical Tension and Cadherin Aggregation”
- **Cell Bio 2024, ASCB/EMBO**, San Diego — “Balancing Cortical Tension and Adhesive Force for Stable Cell Junctions”
- **APS March Meeting 2024**, Minneapolis – “Modeling Cell-Cell Junction Mechanics in Vascular Networks”
- **APS March Meeting 2023**, Las Vegas – “Assembly and Mechanical Remodeling of Vascular Networks”
- **APS March Meeting 2022**, Chicago – “Agent-Based Simulation of Vasculogenesis”

AWARDS & ACHIEVEMENTS

- **2025**: CEMB Summer Research Fellowship; CCBM Travel Award; Physics Graduate Group Travel Fellowship
- **2024**: GradExcel Peer Mentor Award; Physics Graduate Group Travel Fellowship
- **2023**: CCBM Outreach Fellowship; CCBM Travel Fellowship; Physics Graduate Group Travel Fellowship
- **2022**: Bobcat Summer STEM Academy Fellowship; Physics Graduate Group Travel Fellowship

LEADERSHIP, OUTREACH & COMMUNITY ENGAGEMENT

Trainee Leadership Council | Center for Engineering and Mechanobiology (CEMB) *Aug 2023 – Aug 2025*

- Planned and organized tutorials, research presentations, and professional development workshops for CEMB graduate trainees across multiple institutions.

President | Graduate Biophysics Club, UC Merced *Jun 2021 – Jun 2023*

- Led biophysics journal club, organized science outreach events and workshops, and coordinated professional development and networking opportunities for graduate students.

GradExcel Peer Mentor | UC Merced Graduate Division *Aug 2024 – Aug 2025*

- Mentored incoming graduate students on personal well-being, academic success, and professional development; recognized with GradExcel Peer Mentor Award (2024).

Science Outreach Highlights:

- APS DSOFTE Grad School Panel Panelist (2025); Bahujan Scholars Network Panelist (Sep 2024); Foldscope workshop at Digital Nalanda, Wardha, India (Jan 2024); CEMB Science Outreach Presenter demonstrating mechanobiology tools for high school teachers (Aug 2023); Bobcat Summer STEM Academy Instructor (Jul 2022); The Franklin Institute mobile museum exhibit planning (Aug 2022, with Dr. Jayatri Das); CCBM Science Outreach Organizer (Jul 2023, Jun 2022) for CellPaint coronavirus outreach and Foldscope microorganism exploration; Mother/Daughter Science Camp Volunteer (Fall 2021, AAUW, UC Merced).

REFERENCES

Prof. Ajay Gopinathan ✉
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