SURAJ KUMAR SAHU

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EDUCATION

University of California Merced **Jan 21 – present**
PhD Candidate, Physics | Advisor: Prof. Ajay Gopinathan, GPA: 3.84/4.00 *Merced, CA*

National Institute of Technology Rourkela **Aug 17 – May 19**
Master of Science in Physics *Odisha, India*

D.R. Nayapalli College, Utkal University **Jul 14 – Jun 17**
Bachelor of Science (Honors in Physics) *Odisha, India*

SKILLS

Programming Languages: Python, Julia, LaTeX
Computation: Agent-Based Modeling, Numerical Simulations, Particle-Based Simulations, Reaction-Diffusion, Network Analysis, HPC
AI: AI-aided research workflow, Prompt and Context Management, Custom Agents, Skills, MCPs, Image Analysis Pipeline
Data Science:Data analysis, Visualization
Tools: NumPy, SciPy, NetworkX, ReaDDy, Git, GitHub,
Software: VS Code, Cursor, Copilot, Antigravity

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

Gopinathan Group, UC Merced **Jan 21 – present**
Graduate Research Assistant *Merced, CA*
- Agent-based modeling of vascular network formation and remodeling; mechanobiology of cell-cell junctions and ECM compaction (with Dasbiswas Lab).
- Developed Cellpose-MCP to connect AI agents (Claude, Cursor) to Cellpose for cell segmentation.
- Numerical and particle-based simulations; reaction-diffusion and spatial network models.

Department of Physics, UC Merced **Jan 21 – present**
Graduate Teaching Assistant *Merced, CA*
- Teaching assistant for introductory physics (labs, discussions) and upper-division courses.
- Organized workshops on AI tools for research and data analysis; advocate for ethical AI in pedagogy.

Computational Biophysics Group, NIT Rourkela **Aug 17 – May 19**
Graduate Student Researcher *Odisha, India*
- Coarse-grained reaction-diffusion (ReaDDy) modeling of macromolecular crowding effects on protein association.
- Dynamics of Indian languages and language competition using nonlinear dynamical models.

Cellpose-MCP | *Python, MCP, Cellpose* **Jan 21 – present**
- MCP server connecting AI agents (Claude, Cursor) to Cellpose for cell segmentation; enables agentic image analysis workflows.

Agent-based modeling of Vasculogenesis | *Julia, Python (with Sindi Lab, McCloskey Lab)* **Jan 21 – present**
- Agent-based network dynamics model for vascular network formation and remodeling; quantifying functionality, resilience and adaptability of transport networks.

Compaction of ECM by Multicellular Networks | *Python (with Dasbiswas Lab)* **Oct 24 – present**
- Computational modeling of collagen matrix compaction and remodeling due to contractile forces by fibroblast networks.

LEADERSHIP & CAMPUS INVOLVEMENT

Trainee Leadership Council, CEMB **Aug 23 – Aug 25**
Member
- Planning and organizing tutorials, research presentations, and professional development workshops for graduate students.

Graduate Biophysics Club **Jun 21 – Jun 23**
President
- Led science outreach events, journal club discussions in biophysics, and professional development workshops.

GradExcel Peer Mentor **Aug 24 – Aug 25**
Peer Mentor
- Mentored graduate students on personal well-being and professional development.

RELEVANT COURSEWORK

- Classical Mechanics
- Electrodynamics
- Statistical Mechanics
- Quantum Mechanics
- Non-linear Dynamics and Chaos
- Condensed Matter Theory
- Cell and Cellular Techniques
- Basic Biophysics
- Computational Physics
- Machine Learning & Statistics