Phanindra Dewan

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Education

2022 – · · · · **Integrated Ph.D. in Physical Sciences, Indian Institute of Science, Bengaluru**
CGPA : *9.5*.
PH 250A project title: *Molecular Communication with Active Transport*
Project guide: *Dr. Sumantra Sarkar*.
PH 250B project title: *Competition and Segregation in Active Vertex Model*
Project guide: *Dr. Sumantra Sarkar*.

2019 – 2022 **B.Sc.(Hons.) in Physics, St. Xavier's College (Autonomous), Kolkata**
CGPA: *8.65*.
Final year project title: *Symmetries and Conservation Laws in Classical Mechanics: Space-Translational Symmetry and Conservation of Linear Momentum*.
Project guide: *Dr. G. P. Das*.

2019 **ISC, St. Joseph's School, Darjeeling**
Percentage obtained in Final Exams: *95.4*.

2017 **ICSE, St. Joseph's School, Darjeeling**
Percentage obtained in Final Exams: *93.17*.

Research Experience

Interests: Biological Physics, Soft Condensed Matter Physics, Statistical Physics

2024 – · · · · Research Topic: **Competition and Segregation in Active Vertex Model**
Advisor: Dr. Sumantra Sarkar, IISc.

- Numerically simulated vertex model with cell division and shape-tension coupling to explain the jamming of oncogenic cell clusters in a monolayer culture of epithelial cells, as seen in recent experiments.

2023 – · · · · Research Topic: **Molecular Communication with Active Transport**
Advisor: Dr. Sumantra Sarkar, IISc.

- Numerically investigated the effect of the following on the information transmission by diffusing molecules on a one-dimensional lattice: relays on the lattice, active particles and active particles with barriers on the lattice.

Research Publications

Pre-Prints

1. A. Datta, P. Dewan, A. Anto, *et al.*, *Differential interfacial tension between oncogenic and wild-type populations forms the mechanical basis of tissue-specific oncogenesis in epithelia*, 2025. DOI: 10.1101/2025.03.14.643229. eprint: https://www.biorxiv.org/content/early/2025/03/16/2025.03.14.643229.full.pdf.

2. P. Dewan and S. Sarkar, *A potpourri of results on molecular communication with active transport*, 2024. arXiv: 2410.19411 [cond-mat.stat-mech]. URL: https://arxiv.org/abs/2410.19411.

Skills

Languages — English, Nepali, Hindi.

Coding — Python, Mathematica.

Teaching Experience

Jan - April 2024 — **Teaching Assistant for Statistical Mechanics Course PH-202**, Department of Physics, Indian Institute of Science.
Instructor: Prof. Aveek Bid, IISc.

Miscellaneous Experience

Conferences/Symposiums Attended

2025 — **Frontiers in Non-Equilibrium Physics (FNEP) II**, at IMSc, Chennai

2024 — **Symposium on Non-equilibrium and Active matter Physics (SNAP) 2024**, at IISc, Bengaluru

Biomembranes 2024, at IISc, Bengaluru

Posters Presented

2025 — *Role of interfacial tension in the outcome of cell-competition during cancer initiation across tissues*, **Frontiers in Non-Equilibrium Physics (FNEP) II**, at IMSc, Chennai

2024 — *A potpourri of results on molecular communication with active transport*, **In-House Symposium 2024, Department of Physics**, at IISc, Bengaluru

Schools/Summer Courses Attended

Bangalore School of Statistical Physics XV, at RRI, Bengaluru

2023 — **Fascinating World of Flows (Summer Course)**, at ICTS, Bengaluru

Awards and Achievements

2019 — **The Kalyani Bharti Trust Award for All-Round Excellence, Certificate of Merit**, The Telegraph School Awards for Excellence.

2023 — **Professor M A Viswamitra Memorial Award - Best 1st Year Int. PhD Student**, Department of Physics, Indian Institute of Science.

2024 — **Best TA Award 2024 (PH 202 Statistical Mechanics)**, Department of Physics, Indian Institute of Science.

Results in National Examinations

2022 — **IIT-JAM (Indian Insititute of Technology - Joint Admission Test for Masters)**, All India Rank: 75.

JEST (Joint Entrance Screening Test), All India Rank: 15, Percentile: 99.63.