

Kaustav Pal

☎ +91 798 026 3623 | @ kaustavpal1612@gmail.com | 🔗 LinkedIn | 🐙 GitHub | 📁 Portfolio | 📍 Kolkata, India

RESEARCH INTERESTS

My research interests lies at the of membrane mechanics, focusing on: **Fluctuations in cell membranes:**

- Investigating and modeling the fluctuations observed in cell membranes.
- Analyzing the interplay between surface tension and bending rigidity in driving successful vesiculation events.

EXPERIENCE

Cell Biophysics Lab, IISER Kolkata

Undergraduate Member

Mohanpur, Nadia, India

Jan 2024 – Present, Full-time

- Employing super-resolution imaging to analyze the formation of large plasma-membrane TNFR1 cluster aggregates under different transfection conditions. Utilizing machine learning algorithms to classify these clusters based on their morphological characteristics.
- Detection and classification of clusters of membrane proteins in high resolution TIRF images using trajectory based approach.

Soft Matter & Biophysics Laboratory, Jadavpur University

Undergraduate Intern

Jadavpur, Kolkata, India

Jul 2023 – Present, Part-time

- Engaged in a computational project under Dr. Sanat Karmakar involving the solution of the non-linear Poisson-Boltzmann Equation for diverse charged membrane systems. This effort aims to simulate and analyze alterations in electrical potentials arising from surface and bulk charges within the membrane.
- Altering various conditions and observing the changes in various system of biological system (eg. Spherical charged surface, Flat charged membrane.)

Biophysical Chemistry Laboratory, University of Calcutta

Undergraduate Intern

Kolkata, India

May 2023 – Jul 2023, Full-time

- Collaborated with Prof. Dr. Sudipta Bhowmik and his team of PhD scholars on the research project titled 'Investigating the Interactions Between Human Hemoglobin and Polyethylene Microplastics Using Multi-Spectroscopic Approaches'.
- Employed a range of spectroscopic techniques, including UV, Circular Dichroism, as well as steady-state and time-resolved fluorescence methodologies. These approaches were applied to elucidate the interactions induced by polyethylene microplastics, as evidenced by observable spectral shifts.

EDUCATION

Indian Institute of Science Education & Research Kolkata

5 Year BS-MS Majoring in Biological Sciences, Semester 7 GPA: 7.64/10.00

Mohanpur, India

Aug 2021 – Present

St. Xavier's Institution

High School Diploma, GPA: 9.3/10

Sodpur, India

Jun 2019 – May 2021

SKILLS

Programming: I have intermediate-level proficiency in C programming, substantiated by a library management project. In Python, I am at an intermediate level and proficient in using packages like matplotlib, numpy, pandas, and others. I extensively apply numerical methods in both Python and MATLAB, specifically within the Soft Matter Lab. Furthermore, tasks related to image analysis are primarily carried out in MATLAB

Machine Learning: Experienced in various machine learning techniques and neural networks. Actively applying learned algorithms for data analysis and predictive modeling. Engaged in ongoing cellular biophysics lab work.

Languages: Bengali (Native), Hindi(Non-native), English (Professional)

RELEVANT COURSEWORK

Biophysics & Biochemistry: Fundamental understanding of molecular mechanisms in biological systems.

Spectroscopic & Microscopy Techniques: Adept in applying theoretical principles of techniques for molecular and cellular analysis.

Cell Biology & Biostatistics: Advanced knowledge of cellular processes and data analysis methods.

Introductory Quantum Physics: Basic insight into nano-scale particle behavior.

Classical, Statistical & Soft Matter Physics: Capable of comprehending the fundamental principles of classical physics alongside gaining insights into the thermodynamics of complex systems, including phase transitions and statistical ensembles.

Mathematical Methods of Physics I, II & III: Providing a strong grasp of foundational mathematical concepts essential for application across diverse areas within the physical sciences.