Samik Mukhopadhyay

Graduate Student

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Education

Brown University School of Engineering **2024 – PRESENT**
Ph.D. in Mechanics of Solids
Advisor: Miguel A. Bessa

Indian Institute of Technology (IIT) Kharagpur **2019 – 2024**
Bachelor of Technology (Hons.) in Civil Engineering & *CGPA: 8.73/10*
Master of Technology in Structural Engineering

Research Interest

Multi-scale Mechanics of Materials | Data-Driven Approaches in Computational Mechanics | Finite Element Methods

Research Experience

Flow Map Learning for Unknown Dynamical Systems **Aug 2023 – Apr 2024**
Supervisor: Dr. Puneet Kumar Patra | MTech Project *Indian Institute of Technology, Kharagpur*

- Designed an Artificial Neural Network (ANN) model to predict the state variables of a dynamical system that evolve according to a system of unknown governing equations.
- Aiming to tune the model to predict more accurately, with the help of **Physics-Informed Neural Networks** by using the Hamiltonian of the system in the model to calculate the loss function.

Analysis of Bird Collision Impact on Composite Materials **May – Jul 2023**
Supervisor: Dr. Puneet Kumar Patra | Summer Internship *Indian Institute of Technology, Kharagpur*

- Simulated delamination tests on composites of various numbers of layers using the Finite Element Software **ABAQUS**.
- Examined Force-Displacement characteristic curves for different specimens, including **Double Cantilever Beams**, using Traction-Separation Law.
- Modeled the bird projectile impacting the composite laminate with **Smooth Particle Hydrodynamics** and verified the deflection and deformation with existing literature.

Modelling of Oceano-Dynamical properties in Estuarine Area **May – Jul 2022**
Supervisor: Dr. Jun Sasaki | Summer Internship *University of Tokyo, Japan*

- Modified a model to simulate the estuarine area using **Unstructured Grid Finite Volume Community Ocean Model** (FVCOM) and modified the model according to the physical parameters of Tokyo Bay.
- Resolved various issues in the code of the model and was a part of the Documentation team.
- Plotted the output **netCDF** data using PyFVCOM and explored another approaches to visualise the data.

Relevant Coursework

Brown University: Data-Driven Design & Analysis of Structures & Materials | Continuum Mechanics | Numerical Solution of Partial Differential Equations I

IIT Kharagpur: Fracture Mechanics | Numerical Methods in Structural Engineering | Theory of Elastic Stability | Behaviour of RC Structures | Finite Element Analysis | Theory of Elasticity and Plasticity | Structural Dynamics and Earthquake Eng. | Solid Mechanics | Structural Analysis

Technical Skills

- Python (TensorFlow, Scikit-Learn, Numpy, Scipy, Matplotlib, Pandas, OpenCV), C, MATLAB, GNU Octave.
- OpenMP, ABAQUS, LAMMPS, VMD, Ovito, Ubuntu, STAAD.Pro, AutoCAD, Revit.
- MS Excel (Macros), Git, LaTeX , Adobe Photoshop.

Awards and Achievements

- Received the prestigious **E. Paul Sorensen Graduate Endowment Fellowship (2025)** at Brown University.
- Secured a Summer Research Internship through **University of Tokyo Summer Internship Program in Kashiwa – UTSIP 2022** in Japan, which selects **only 15 participants** all over the world.
- Recipient of Jagadish Bose National Science Talent Search (JBNSTS) Senior (2019) and Junior (2017) Scholarship funded by the **Government of India**.
- Secured 4472 Rank in Joint Entrance Examination Advanced (JEE ADV) and 4231 Rank in Joint Entrance Examination Mains (JEE MAINS) among 1.2 million students nationwide (**99.66 percentile**).
- Secured 30 rank in West Bengal Joint Entrance Examination (WBJEE) among 90,000 participants (**99.96 percentile**).

Teaching Experience

Concrete Laboratory | *Dr. Puneet Kumar Patra and Dr. Aritra Chatterjee* **Aug – Nov 2023**

- Helped professors organize weekly lab sessions, graded the lab reports, and assisted students in conducting experiments.

Structural Analysis | *Dr. Puneet Kumar Patra* **Jan – Apr 2024**

- Prepared lesson plans, presented course material, and arranged doubt-clearing sessions for students.

Extracurricular Activities

- Led the student organization **Technology Environment Society**, IIT Kharagpur, which aims at creating a more sustainable socio-ecological space within the campus for the tenure of Academic Year 2022-23.
- Worked and contributed as a V-Force volunteer under the **UNV-India** (United Nations Volunteers) for one month (August 2021) on the theme of **"Transforming Food Systems: Youth Innovation for Human and Planetary Health"**.
- **Founder**, **Author**, and **Co-Editor** of a student-run Online Bilingual (Bengali and English) Science Magazine, **Tiyas**, with an aim to make school and college students more attracted towards pursuing science.