Saurav Dutta

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Research Interests

Architected Materials, Phase Transformation in Materials, Multiscale Multiphysics, Data-Driven Mechanics, Vibrations, and Soft Robotics

Education

National Institute of Technology, Silchar, India [July 2019 - June 2023]

Bachelor of Technology (B.Tech.) | Department of Civil Engineering

- *Cumulative GPA:* ***9.03/10*** *(Honours)*

Research Experience

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland

Research Intern | *Civil Engineering* | *Advisor: Prof. Konstantinos Karapiperis* [Aug 2025 - Present]

- Surveying literature on architected granular materials.

Indian Institute of Science (IISc), Bengaluru

Research Associate | *Mechanical Engineering* | *Advisor: Prof. Akshay Joshi* [Aug 2024 – July 2025]

- Extended the Bayesian-EUCLID framework to perform unsupervised segmentation and model discovery in multi-phase hyperelastic materials
- Developed a Python-based growth algorithm to identify material interfaces using interpretable priors, enabling automated boundary recognition in complex geometries

Research Assistant | *Aerospace Engineering* | *Advisor: Prof. Rajesh Chaunsali* [June 2023 – July 2024]

- Designed and simulated a non-reciprocal lattice model using odd springs and dampers in MATLAB; derived dispersion relations and conducted finite-chain analysis to study wave propagation.
- Independently built a programmable 1-DOF pendulum system with time-periodic stiffness characteristics using integrated motors and custom Python control, aimed at realizing discrete-time crystals experimentally.

National Institute of Technology (NIT), Silchar, India

Undergraduate Researcher | *Civil Engineering* | *Advisor: Prof. Atanu Sahu* [Jan 2023 - May 2023]

- Simulated the thermal and dynamic response of laminated composite plates in ABAQUS under varying boundary and thermal conditions.
- Gained foundational expertise in FEM analysis, meshing strategies, and interpreting complex post-processing data from multilayered structures.

Indian Institute of Technology (IIT) BHU, Varanasi

Summer Research Intern | *Civil Engineering* | *Advisor: Prof. Vishwajit Anand* [May 2022 - July 2022]

- Developed MATLAB routines for analyzing ground motions and estimating over 30 seismic parameters.
- Adapted and extended the OpenSeismoMatlab framework to support new ground motion metrics for seismic fragility analysis.

Scholastic Achievements & Invited Talks

- **Invited talk**: Guest Lecturer, *Wave Propagation in Designed Materials*, IISc, Bangalore [Nov 2023]
- Achieved **AA** grade in Bachelors thesis Project I and II in 7^{th} and 8^{th} semester based on exceptional performance [May 2023]
- Attained **AA** grade in **17** out of **27** department courses based on exceptional performance [May 2023]
- Selected as an Undergraduate Research Student under one of the Undergraduate Research Council Funded Project in 7^{th} semester at NIT, Silchar [Dec 2022]
- **Top 5 Percentile Achievement in JEE Mains**: Honored by **Glorius NGO** for outstanding performance among Barak Valley students [Aug 2019]
- Cleared Pre-Regional Mathematical Olympiad and Regional Mathematical Olympiad [2017]

Publications

Peer-reviewed Journal

(***Equally contributing first authors*)

1. H. K. Sandhu, **S. Dutta**, R. Chaunsali, "Wave propagation in an elastic lattice with non-reciprocal stiffness and viscous damping," *Journal of Acoustical Society of America* **(under review)**
2. K. L. Chaurasiya**, **S. Dutta****, S. Kumar, A. Joshi,"Hetero-Bayesian-EUCLID: Interpretable model discovery for heterogeneous hyperelastic materials using stress-free unsupervised learning," *Computer Methods in Applied Mechanics and Engineering* **(under review)**
3. S. Singh, M. Kumar, **S. Dutta**, V. Anand, "Identification of critical ground motion features for seismic fragility studies considering soil-structure interaction," *Journal of Earthquake Engineering* **(under review)**

Conferences

1. A. Joshi, **S. Dutta**, S. Kumar, "Hetero-EUCLID: Simultaneously segmenting and discovering hypereleastic constitutive models of all components of a heterogenous hyperelastic material using EUCLID," 12^{th} *European Solid Mechanics Conference, Lyon, France* [July 2025]
2. **S. Dutta**, V. Anand, "Framework for Ground Motion Characterization," 8^{th} *International Conference On Recent Advances in Geotechnical Earthquake Engineering and Soil Dynamics (8ICRAGEE)* [Dec 2024]

Leadership Activities

Social	• Served as **Head** at the **Razzmatazz** organized by **Incandescence, NIT, Silchar** [2023] • Served as **Head** at the **School Genius** organized by **Tecnoesis, NIT, Silchar** [2022]

Technical Skills

Languages : MATLAB, Python, Mathematica, LaTeX, HTML, CSS, C++, C;

Software : CATIA, ANSYS, COMSOL Multiphysics, AutoCAD, Abaqus, Dynamixel Wizard 2.0;

Hardware : Motor Control, Arduino, U2D2, Laser Doppler Vibrometer, 3D Printing

References

Prof. Konstantinos Karapiperis
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