Saurav Dutta

Curriculum Vitae

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Research Interests

Architected Materials, Inverse Design of Materials, Geometric Computing, Deployable Structures

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***

Research Experience

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland
Research Intern | *Civil Engineering* | *Advisor: Prof. Konstantinos Karapiperis* [Aug 2025 – Present]

- Surveying literature on architected granular materials.
- Developing an algorithm for the automated creation of lattice structures in a periodic tessellation.

Indian Institute of Science (IISc), Bengaluru
Research Associate | *Mechanical Engineering* | *Advisor: Prof. Akshay Joshi* [Aug 2024 – July 2025]

- Extended EUCLID for unsupervised model discovery in nonlinear multiphase materials.
- Developed growth algorithm for material interface detection using interpretable priors.

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

- Modeled a non-reciprocal lattice in MATLAB; analyzed its dispersion and wave propagation.
- Built programmable 1-DOF pendulum with time-periodic stiffness for discrete-time crystals.

National Institute of Technology (NIT), Silchar, India
Undergraduate Researcher | *Civil Engineering* | *Advisor: Prof. Atanu Sahu* [Jan 2023 – May 2023]

- Simulated thermal and dynamic response of composite plates in ABAQUS.
- Learned FEM analysis, meshing strategies, and multilayered post-processing.

Indian Institute of Technology (IIT) BHU, Varanasi
Summer Research Intern | *Civil Engineering* | *Advisor: Prof. Vishwajit Anand* [May 2022 – July 2022]

- Developed MATLAB routines for seismic parameter analysis.
- Extended OpenSeismoMatlab for fragility analysis metrics.

Scholastic Achievements & Invited Talks

- **Invited talk**: Guest Lecturer, *Wave Propagation in Designed Materials*, IISc [Nov 2023]
- AA grade in Bachelor's Thesis I and II [May 2023]
- AA grade in 17 out of 27 department courses [May 2023]
- Selected for Undergraduate Research Council Funded Project, NIT Silchar [Dec 2022]
- Top 5 percentile in JEE Mains, honored by Glorius NGO [Aug 2019]
- Cleared Pre-Regional Mathematical Olympiad and Regional Mathematical Olympiad [2017]

Publications

Peer-reviewed Journals
(***Equal contribution*)

1. H. K. Sandhu, **S. Dutta**, R. Chaunsali, "Wave propagation in an elastic lattice with non-reciprocal stiffness and engineered damping," *arXiv preprint arXiv:2507.23761*, 2025. [Online]. Available: `https://arxiv.org/abs/2507.23761`
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," *Soil Dynamics & Earthquake Eng.* (under review)

Conferences

1. A. Joshi, **S. Dutta**, S. Kumar, "Hetero-EUCLID: Simultaneously segmenting and discovering hypereleastic constitutive models of all components of a heterogeneous hyperelastic material using EUCLID," 12^{th} *European Solid Mechanics Conference, Lyon, France* (Presentation) [July 2025]
2. **S. Dutta**, V. Anand, (2025), "Framework for Ground Motion Characterization," *In Seismic Hazard Analyses, Wave Propagation and Site Characterization, Springer Nature Singapore, pp. 355–366*. `https://doi.org/10.1007/978-981-96-1352-6_30`

Leadership Activities

Social

- Head, Razzmatazz - Incandescence, NIT Silchar [2023]
- Head, School Genius - Tecnoesis, NIT Silchar [2022]

Technical Skills

Languages :	Python, MATLAB, Mathematica, LaTeX, HTML, CSS, C++, C
Software :	CATIA, ANSYS, COMSOL, AutoCAD, Abaqus, Dynamixel Wizard
Libraries :	NumPy, pandas, Pytorch, TensorFlow, OpenCV, scikit-learn (K-means)
Hardware :	Motor Control, Arduino, Embedded Sensors, U2D2, LDV, 3D Printing

References

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