GOPAL AGARWAL

PhD Student in Engineering Mechanics, Columbia University

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🎓 Google Scholar | 📓 ResearchGate

RESEARCH INTERESTS

Topology Optimization, Finite Element Analysis, Machine learning, Algorithms, Computational algebra, Stochastic Analysis

ACADEMIC DETAILS

Columbia University, New York, USA *Expected Dec 2026*
PhD, Engineering Mechanics; Advisor : Prof. Haim Waisman; Grade: **3.97/4.0**

Columbia University, New York, USA *Dec 2025*
M.Phil, Engineering Mechanics; Advisor : Prof. Haim Waisman; Grade: **3.97/4.0**

Leibniz Universität Hannover, Hannover, Germany *Sep 2023*
MSc. Computational Methods in Engineering; Grade: **1.4/5.0** (Best: 1.0)

Jadavpur University, Kolkata, India *Apr 2019*
B.E. Mechanical Engineering; Grade: **8.52/10**

PROFESSIONAL EXPERIENCE

Continental Reifen Deutschland GmbH, Hannover *Oct 2022 – Sep 2023*
Student Researcher
Developed automatic hexahedral mesh generation for tire tread patterns; integrated framework into FEM for improved tire footprint simulation.

IBNM, Leibniz Universität Hannover, Germany *May 2022 – Nov 2023*
Research Assistant (HiWi)
Worked on poroelasticity and reduced-order modeling (POD) of hydrogels using FEnics and Python.

Reliance Industries Ltd., Jamnagar, India *Jul 2019 – Mar 2021*
Maintenance Engineer
Designed maintenance strategies, prepared reports, and optimized costs with improved production.

Indian Institute of Science (IISc), Bangalore, India *May 2018 – Jul 2018*
Research Intern
Worked under Prof. Saptarshi Basu on "Acoustic Characterization of a High Shear Injector."

PUBLICATIONS

Elastoplastic Topology Optimization with Global Enrichment for Thin-Walled Structures *2026*
G Agarwal, A Marzok, H Waisman; *In work*

Crack Propagation in Elastoplastic Thin-Walled Structures using Global-local XFEM Formulation *2025*
G Agarwal, H Waisman; *Submitted: Journal of Engineering Mechanics*

Global-local XFEM approach for the analysis of cracked thin-walled beams *2025*
G Agarwal, A Marzok, H Waisman; *Engineering Fracture Mechanics*

Parameter identification and uncertainty propagation of hydrogel coupled diffusion-deformation using POD-based reduced-order modeling *2024*
G Agarwal, JH Urrea-Quintero, H Wessels, T Wick; *Computational Mechanics (CM)*

Free Vibration Analysis of Functionally Graded Sandwich Conical Shell Using FSDT   2022
TD Singha, A Das, G Agarwal, T Bandyopadhyay, A Karmakar; *Recent Advances in Computational and Experimental Mechanics, Vol—I: Select Proceedings of ICRACEM 2020*

Compression, tension & lifting stability on a meter gauge flat wagon: An experimental approach   *2022*
A Das, G Agarwal; *Australian Journal of Mechanical Engineering 20 (4), 1113–1125*

Free Vibration Characteristics of Sandwich Conical Shells With FGM Face Sheets: A Finite Element Approach   *2020*
AK Tripuresh Deb Singha, Apurba Das, Gopal Agarwal, Tanmoy Bandyopadhyay; *ASME'19 Gas Turbine Conference*

Optimization of the stress discontinuity value at the interface of a cylindrical stainless steel substrate and electroless Ni-P coating   *2019*
RK Baranwal, T Hassan, G Agarwal, S Sarkar, G Majumdar; *Materials Research Express 6 (11), 116421*

Time dependent low velocity impact response of turbomachinery blade made of porous exponential FGM   *2019*
A Das, G Agarwal, K Inaba, A Karmakar; *Gas Turbine India Conference 83525, V001T05A022*

TECHNICAL SKILLS

TensorFlow, PyTorch, FEnics, PyCUDA/PyOpenCL, Python, MATLAB, Simulia, Gmsh, AutoCAD, Solidworks, ANSYS, ABAQUS, LaTeX, GitHub, Microsoft Office.

COURSES

Algorithms, Heterogeneous computing, Stochastic engineering, Optimization-I, Applied machine learning, Finite element analysis II, and Computational mechanics with AI.

TEACHING EXPERIENCE

- **TA, ENMEE3332: A FIRST CRSE/FINITE ELEMENTS**, *Columbia University.*   *Sept 2025 – Dec 2025*
- **TA, ENMEE3114: EXP MECH OF MATERIALS**, *Columbia University.*   *Jan 2025 – May 2025*
- **TA, ENMEE3105: MECHANICS**, *Columbia University.*   *Sept 2024 – Dec 2024*
- **TA, Mechanics of Solids**, *Leibniz Universität Hannover.*   *Oct 2022 – March 2023*

HONORS & AWARDS

- Completed Machine Learning Specialization (Coursera): Developed skills in supervised/unsupervised learning, model evaluation, and applied ML techniques.
- Completed Supervised Machine Learning: Regression and Classification (Coursera): Gained expertise in regression models, classification methods, and performance metrics.
- Completed Advanced Learning Algorithms (Coursera): Acquired knowledge in neural networks, deep learning architectures, and optimization strategies.
- Completed FEM – Linear, Nonlinear Analysis & Post-Processing (Coursera): Built skills in finite element modeling, structural analysis, and computational simulations.
- Lead Teaching Fellow, 2025, Center for Teaching and Learning, Columbia University.
- Finalists for the EMI CMC 2025 student paper competition.
- Calatrava Fellowship, Columbia University, 2024.
- INAE Summer Fellowship holder, 2018.
- State Rank 101, WBJEE 2015 (150,000 candidates).
- Gold medalist, FTRE exam (Zonal topper in Physics, Kolkata region, 2014).