

Jagrut Brahmhatt

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Portfolio: <https://jagrut-brahmbhatt-portfolio.vercel.app/>

EDUCATION:

Georgia Institute of Technology, Atlanta, GA

May 2026 (Expected)

Master of Science in Mechanical Engineering | GPA – 3.87

Relevant Coursework: Finite Element Analysis, Machine Learning for Mechanical Engineers, Computational Fluid Dynamics, Modeling & Simulation, Glasscore Semiconductor Packaging, Introduction to MEMS devices

Gujarat Technological University, India

Jul 2021

Bachelor of Engineering in Mechanical Engineering | GPA – 3.85

PROFESSIONAL EXPERIENCE:

MPCF Laboratory – Georgia Institute of Technology, USA

Mar 2025 – Present

Graduate Research Assistant

- Pioneering fretting wear and fatigue failure model development using Finite Element Analysis and Experimental methods for jet engine turbines.
- Simulating fretting damage of turbine disc with oscillating blade using ANSYS Mechanical, exploring crack nucleation and propagation through Linear Elastic Fracture Mechanics (LEFM).
- Developing parametric geometry and finite element mesh using C++ and Gmsh, streamlining preprocessing for fracture and fatigue simulations.

CaSPAR Laboratory – Georgia Institute of Technology, USA

Aug 2024 – Mar 2025

Graduate Assistant – electronic packaging design

- Developed multiphase CFD simulation models and precision 3D CAD assemblies for capillary-driven microchannel heat exchangers using multiphase flow models to optimize thermal performance under varying boundary conditions, improving thermal reliability.
- Developed detailed 2D/3D CAD models in SolidWorks for capillary systems, integrating precision assembly constraints and rapid prototyping tolerances.
- Validated thermal performance and cooling strategies through LabVIEW-controlled experiments, identifying package failure paths and deciding appropriate thermal interface material (TIM).
- Gained hands-on experience in PCBA packaging and microfabrication processes including photolithography, CVD, femtosecond laser ablation, and chip bonding techniques.
- Participated in early-stage design through test procedure development, sensor placement strategy, and post-fabrication analysis.

Larsen & Toubro Limited (Heavy Engineering Works), India

Aug 2021 – Jun 2024

Senior Mechanical Design Engineer | Large-Scale High-Pressure Systems

- Spearheaded mechanical design and analysis of high-pressure vessels and reactors for national & global clients, applying FEA (ANSYS), seismic/buckling/fatigue assessments, and Geometric Dimensioning & Tolerance analysis (GD&T) in compliance with ASME Section VIII, Div 1&2.
- Engineered DFM-driven redesigns of support structures and clad plates, achieving \$335,000+ in cost savings while enhancing performance under complex pressure and thermal loads leveraging ANSYS-based FEA for pressure, buckling, fatigue, and hydrostatic test analysis to deliver code-compliant, high-integrity systems to renewable energy sector clients.
- Directed fatigue life assessment using ANSYS Mechanical and custom load case analysis for PTFE-sector agitator vessels, ensuring structural integrity against operational stress scenarios.
- Orchestrated end-to-end design documentation, including detailed BOMs, 3D models (SolidWorks/UG-NX), fabrication drawings, and PLM integration, accelerating release timelines and change order responsiveness.
- Managed and mentored a cross-functional CAD team, facilitating interdepartmental design reviews to align design intent with manufacturability, procurement, and compliance goals.
- Presented technical solutions directly to international stakeholders; synthesized feedback into optimized design iterations meeting QA, safety, and performance standards.

ACADEMIC AND RESEARCH PROJECTS:

Parametric thermomechanical analysis of a glass substrate flip chip electronic assembly

Jan 2025 – Apr 2025

- Formulated and validated thermomechanical reliability of a glass substrate electronic package with 50 µm connection pitch using ANSYS Mechanical, incorporating viscoplastic solder behaviour and mesh convergence with <1% error.
- Prepared 3D models using SolidWorks and applied heat transfer principles and element birth/death to effectively capture manufacturing induced stresses.
- Conducted parametric studies and optimised glass thickness and underfill fillet, improving solder joint fatigue reliability by 37% & reducing assembly deflection by 210%.

Machine Learning using Python

Jan 2025 – Apr 2025

- Built Random Forest and Neural Network models in Python to predict composite stiffness from image-derived microstructural features.

Development of Computational Fluid Dynamics (CFD) Solvers in MATLAB.

Aug 2024 – Dec 2024

- Programmed a custom CFD solver in MATLAB for internal channel flow simulations using vorticity-stream function formulation.
- Validated the results in ANSYS Fluent by preparing geometry and carrying out meshing using C++ & Gmsh.

Parametric Computational Fluid Dynamics (CFD) analysis of Pulse Tube Cryocoolers.

Dec 2020 – Jul 2021

- Optimized Pulse Tube Cryocooler design through CFD analysis and parametric modeling, achieving 43% reduction in cooldown time (120s vs. 210s) and 15% lower operating temperature (70K vs. 82K)

PUBLICATIONS:

- A Cognitive Chatbot for Intelligent Engineering Analysis Decision Support: A Case of Optimizing Computational Fluid Dynamics of Cooling Server Stacks. 2025, February. <https://doi.org/10.46254/AN15.20250535>.

SKILLS:

CAD & Modeling Tools: SolidWorks, AutoCAD, UG-NX, CATIA, PTC Creo

Simulation & Analysis: ANSYS Mechanical, ANSYS Fluent, ANSYS Workbench, CFD-Post, Staad.PRO

Programming & Scripting: Python (NumPy, pandas, scikit-learn, matplotlib), MATLAB, C++, GitHub, LabVIEW, Excel VBA

Mechanical Design & Standards: FEA, CFD, DFM, Tolerance Stack-up, ASME Section VIII Div. 1 & 2, GD&T (ISO 2768, ANSI Y14.5)

Fabrication & Manufacturing: Microfabrication (Photolithography, DRIE, CVD, Laser Ablation), Lathe, Mill, BOM Creation, PLM Tools

Testing & Prototyping: Semiconductor Packaging Validation, Functional Test Plans, Experimental Validation.