Twinkle Kothari

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Summary

Ph.D. student in Aerospace Engineering at UTA, specializing in beam lattice metamaterials, experimental mechanics, and computational modeling. Experienced in finite element analysis (Abaqus), mechanical testing (MTS systems), and Python scripting for automation. Seeking an R&D internship in materials science, structural analysis, or computational modeling.

Relevant Skills

Programming: Python, Abaqus scripting, MATLAB, Patran Command Language (PCL)
Simulation and Analysis: Abaqus FEA, MSC Patran Nastran, HyperWorks, SolidWorks
Data Analysis & Visualization: Plot interpretation, statistical modeling, image processing, MATLAB/ Python plotting libraries (Matplotlib)

Experience

UTA Research Institute **Sept. 2021 – Current**
Graduate Research Assistant *Fort Worth, Texas*

- Investigated the mechanical behavior of beam lattice metamaterials using compression tests and finite element analysis (FEA).
- Performed tensile tests of dogbone specimens on an in-house micro-UTM machine for material property characterization.
- Developed Python scripts in Abaqus to automate model generation and simulation.

University of Texas at Arlington **Jan. 2023 – Current**
Graduate Teaching Assistant *Arlington, Texas*

- Proctored exams, guiding students, and grading assignments for Probability & Statistics course.
- Led lab sessions, supported student learning, provided detailed feedback on lab reports and graded quizzes for Introduction to Aerospace Engineering Lab.

Indian Institute of Science **Nov. 2018 – May. 2020**
Project Assistant *Bangalore, India*

- Conducted fabrication and SEM imaging of C/BN/SiC ceramic matrix composites to study fiber orientation and microstructural properties.
- Developed MATLAB scripts for automated defect characterization using image processing, enhancing flaw detection accuracy.

Redeem Systems Private Limited **Aug. 2017 – Oct. 2018**
Engineer I, Aerospace division *Bangalore, India*

- Contributed to CATIA-based mechanical design for a thermal printer, focusing on precision component modeling and system integration.

Mercedes-Benz Research & Development **Jan. 2017 — July 2017**
Intern, Car Aerodynamics *Bangalore, India*

- Numerical approach to fuel sloshing in rectangular tanks with baffle system using OpenFOAM analysis
- Performed and validated multiphase slosh analysis in car fuel tanks, reducing probe pressure through optimized baffle design.
- Built an in-house OpenFOAM model to support future fuel system studies, reducing cost on licensed software.
- Compiled findings into a comprehensive thesis project at Manipal Institute of Technology.

University of Novi Sad **Jun. 2016 — Aug. 2016**
Student Research Intern, Faculty of Technical Sciences *Novi Sad, Serbia*

- Selected by IAESTE for a technical research internship at the University of Novi Sad, Serbia.
- Flow analysis in single-hole and multi-hole orifices using OpenFOAM and StarCCM+.

Research Projects

NASA-funded Project Phase I | *UTA Research Institute* **Sept. 2021 – May 2022**

- Developed a high-fidelity structural analysis tool for composite laminates using Abaqus Python scripting, in collaboration with Purdue University, and AnalySwift Inc.
- Automated simulation workflows through a custom GUI, enabling efficient and repeatable composite laminate analysis within Abaqus.
- Created comprehensive tutorial videos and user manuals to support tool adoption and ease of use.

NASA-funded Project Phase II | *UTA Research Institute* **Jan. 2023 – Dec. 2023**

- Extended Phase I tool in collaboration with Purdue University, and AnalySwift Inc.
- Developed GUI tools on MSC Patran/Nastran and Abaqus for thermoelastic structural analysis, parametric study and optimization of tow-steered composite laminates, using Patran Command Language and Python respectively.
- Authored comprehensive documentation and produced step-by-step tutorial videos to facilitate effective usage and knowledge transfer of the developed GUI tools.

Education

University of Texas at Arlington **Jan. 2023 – Dec. 2026 (Expected)**
PhD student in Aerospace Engineering *GPA 3.563*

University of Texas at Arlington **Aug. 2020 – Dec. 2022**
Master of Science (Thesis) in Aerospace Engineering *GPA 3.625*

Manipal Institute of Technology **Aug. 2013 – Dec. 2017**
Bachelor of Technology in Aeronautical Engineering *GPA 3.276*

Achievements

- Won Judges' Choice Award for Graduate Project Paper Presentation on "Design and Analysis of Reinforced I-Beam with Enhanced Energy Absorption" at UTA Innovation Day 2024.
- Awarded the Schafrik Endowment Fellowship at UTA Research Institute, Summer 2022 for outstanding research contributions.

Publications

- T. Kothari, X. Liu, M. H. Kobir, Y. Yang, and F. Tao, "Design and analysis of reinforced I-beam body-centered cubic lattices for enhanced energy absorption," *Composite Structures*, Vol. 355, 2025, Art. 118841
- X. Liu, T. Kothari, F. Tao, M. H. Kobir, and Y. Yang, "Multiscale modeling of quasi-static crushing behavior of body-centered cubic lattices with I-shape beams and reinforced joints," *AIAA SciTech Forum*, Orlando, FL, 2024. doi: 10.2514/6.2024-2290
- X. Liu, M. H. Kobir, Y. Yang, F. Jiang, and T. Kothari, "Improving stiffness and strength of body-centered cubic lattices with an I-shape beam cross-section," *Mechanics of Materials*, Vol. 182, 2023, Art. 104665. doi: 10.1016/j.mechmat.2023.104665
- T. Kothari, "An integrated design tool for tow-steered composite laminate in Abaqus," *University of Texas at Arlington Libraries*, Arlington, TX, 2022. doi: 10106.31044
- X. Liu and T. Kothari, "An integrated design tool for tow-steering composites in Abaqus and MSC.Patran/Nastran," *AIAA SciTech Forum*, National Harbor, MD, 2023. Paper No. AIAA 2023-2594. doi: 10.2514/6.2023-2594