

P UPENDRA TARAKA SAI

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Profile

Mechanical Engineering student with hands-on experience in CAD design, 3D printing, and simulation-driven product development. Skilled in leveraging generative design and topology optimization to create lightweight, manufacturable components, validated through FEA. Experienced in design iteration, prototyping, and developing performance-driven mechanical systems for real-world applications.

Education

AMRITA SCHOOL OF ENGINEERING

B Tech/Mechanical Engineering/Semester VI/CGPA: 7.87
2023 – present | Bengaluru, India

FIITJEE

TGBIE Grade 12/ Percentage: 83.9%
2021 – 2023 | Hyderabad, India

KENDRIYA VIDYALAYA

Class X/ Percentage: 94.6%
2020 – 2021 | Khammam, India

Skills and Softwares

Core Engineering skills

- CAD-based mechanical design & iteration based on FEA.
- Generative design & topology optimization
- Design for manufacturability (DFM)
- 3D printing & rapid prototyping of optimized geometries.

Design & Analysis Tools

- **CAD:** SolidWorks, Autodesk Fusion
- **CAE:** ANSYS Mechanical, SolidWorks Simulation
- **Engineering Computation:** MATLAB, Python

Professional & Soft Skills

Problem Solving, Critical Thinking, Teamwork, Leadership, Time Management

Internships

Research and Design Intern

HYPSTUMA

Present | Online

- Developed generative design-driven drone frames using Fusion 360, optimizing material distribution along load paths
- Translated organic geometries into 3D-printable, manufacturable designs, validated through FEA for structural performance
- Supported rapid design iteration and prototyping workflows for improved component efficiency

Project Intern

Research Centre Imarat(RCI)-DRDO

05/2025 – 06/2025 | Hyderabad, India

- Developed a MATLAB-based tool to generate force–stroke characteristics for disc spring–based load systems.
- Enabled load validation and safety margin evaluation through repeatable computational analysis supporting actuator performance verification.

International Conferences/Seminars

Enhancing the Longevity of Drill Pipes: The Role of Nanoparticle-Enhanced Drilling Muds in Erosion Control

ICAMGT Conference 2025, Presenter

07/2025

- Predicted the **erosion of drill muds** using **MATLAB** for Theoretical/Numerical analysis and **ANSYS FLUENT** for Experimental analysis

Advanced Metallic Materials for Aircraft & Engines

HAL, Attendee

07/2025

- Gained insights on **aerospace material innovations and challenges** in engine design.

Student Design Challenges

BAJA SAEINDIA 2026 - CV CATEGORY

Chassis team member

Present

- Reduced roll cage mass by 16.7% through iterative FEA while maintaining required safety margins under impact and rollover load cases.
- Evaluated driver field-of-view against design constraints to ensure regulatory compliance without structural compromise

FKDC SEASON 9 - EV CATEGORY

Design Lead

- Modified chassis geometry to reduce wheelbase by 23% and overall length by 21%, improving handling without reducing structural safety margins.
- Ensured a minimum factor of safety (FoS ≥ 2.09) under critical impact conditions through iterative structural validation.

GKDC SEASON 13 - CV CATEGORY

Design and Fabrication lead

Present

- Increased frame factor of safety by 75% through safety-oriented geometry refinement and load-path optimization based on failure mode analysis.

Projects

Suspension Bracket Optimization Using Topology Optimization Techniques

- Applied topology optimization in SOLIDWORKS under defined load cases and constraints, achieving ~58.6% mass reduction while maintaining structural stiffness and strength
- Optimized material distribution along principal load paths, incorporating manufacturing constraints to ensure a 3D-printable, CAD-feasible design
- Validated performance using SolidWorks Simulation, preserving critical functional interfaces and improving overall strength-to-weight ratio

Aerodynamic Performance Analysis of Organic Structural Design of Drone Canopies

Present

- Generated organic canopy geometries using generative design in Fusion 360, based on structural and spatial constraints.
- Performed CFD analysis in SolidWorks Flow Simulation to evaluate airflow, pressure distribution, and drag across multiple design iterations.

Courses and Certifications

Post Graduation Programme in Product Design and Analysis

SkySkill Academy, IIT Guwahati

Present

Specialization: AI for Mechanical Engineers

Coursera, University of Michigan

Applied AI for design optimization, autonomous systems, and engineering decision-making

Co-Curricular Activities

Membership Chairperson - SAEINDIA Student Chapter, Amrita School of Engineering, Bengaluru (2025-26)

Senior Executive of Raaga - The Music Club

Executive of Ingenium - The Mechanical Forum of Amrita School of Engineering, Bengaluru

Executive of Kala - The Art club

Winner in Kalakriti, the music competition at Amrita School of Engineering, Bengaluru

Instrument category, Instrument: Keyboard

Rajya Puraskar awardee in Bharat Scouts and Guides (BS&G)