# Abhinav Singh

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Portfolio: abhinavsingh1176.github.io/abhinav-portfolio/

## Summary

Sophomore Mechanical Engineering student passionate about R&D, design, and simulation. Experienced in CAD, thermal-fluid simulations, and fabrication with a strong foundation in collaboration, documentation, communication, and leadership.

## Education

**Purdue University** — West Lafayette, IN
*Bachelor of Science in Mechanical Engineering* — *Aug. 2024 – Dec. 2027*

Cumulative GPA: 3.6/4.0 — Dean's List — Junior by Credit

Relevant Coursework: Thermodynamics, Statics, Dynamics, Controls, MATLAB, CAD

## Experience

**Heat Transfer Undergraduate Researcher** — Apr. 2025 – Present
*Cooling Technologies Research Center, Purdue University* — *West Lafayette, IN*

- Executed end-to-end simulation pipeline in ANSYS Fluent and Mechanical: geometry creation, meshing, case setup, and post-processing to analyze heat transfer and pressure drop across micro pin-fin heatsinks.
- Optimized pin-fin designs by comparing 2D vs. 3D models, symmetry layouts, and mesh resolutions to balance accuracy and computational cost.

**Mechanical Engineering Research Intern** — Jul. 2023 – Aug. 2023
*Department of Mechanical Engineering, Maharaja Sayajirao University* — *Gujarat, India*

- Researched parabolic solar concentrators and thermocouple-based heat flux sensors. Drafted thesis manuscript and conducted comparative thermal analysis to evaluate sensor and system performance.
- Led data acquisition and experimental validation to assess thermal conductivity, sensor sensitivity, and solar concentrator efficiency using graph-based visualization techniques.
- Collaborated with Dr. Amit Patel and graduate researchers on patent drafting, research methodology, and intellectual property processes.

## Projects

**Powertrains Member** | *American Society of Mechanical Engineers Racing* — Jan. 2025 – Present

- Designed Purdue's first in-house CVT mount in Autodesk Fusion, coordinating with chassis and engine teams to optimize transmission packaging, weight, and cost.
- Fabricated a custom metal shroud using bandsaw, brake, and drill press to reduce heat exposure and improve drivetrain protection.
- Engineered a repositionable exhaust mount to correct misalignment issues, ensuring secure fit and improving stability.

**Project Archivist, Kart Manual Team** | *Electric Vehicle Event Infrastructure, EPICS* — Jan. 2025 – May. 2025

- Produced a beginner-friendly kart assembly manual for the MSTEM3 EV Kart, presented design reviews, and coordinated with stakeholders to streamline processes for the Purdue EV Grand Prix.
- Partnered with Purdue Motorsports and TopKart USA to create detailed instructional templates for chassis, rear axle, and brake module assembly.
- Created CAD visuals using SolidWorks and integrated customer feedback from high school teams to improve clarity and reduce assembly time.

**Custom Wheel Rim & Exhaust Manifold Design** | *ME29700GC Coursework* — Jan. 2025 – May. 2025

- Designed a 17-inch steel wheel rim meeting Toyota Prius V AW60 specifications in Siemens NX, applying GD&T and precise engineering drawings for fitment and safety.
- Developed a multi-branch exhaust manifold for the BB6 header set on the 1955-57 Chevy, emphasizing airflow optimization and thermal performance with detailed GD&T and manufacturing-ready drawings.

## Technical Skills

**CAD & Design:** Siemens NX, Autodesk Fusion, SolidWorks, GD&T, Drafting

**Simulation & Analysis:** ANSYS Fluent, ANSYS Mechanical, MATLAB, Simulink

**Programming:** Python, Arduino, C++, HTML, SQL, JavaScript

**Fabrication:** CNC, Woodworking, Bandsaw, Drilling, 3D Printing

**Productivity & Communication:** Excel, GitHub, LaTeX, MS Office, Google Suite, Design Reviews, Stakeholder Collaboration