ADITYA TUSHAR PHADNIS

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SUMMARY

Mechanical engineer with 1 year of internship experiences seeking Summer Internships in Mechanical Design, Fluid Mechanics, CFD, and Automotive Engineering.

EDUCATION

University of Michigan — **Ann Arbor, MI**
Master of Science in Engineering in Mechanical Engineering — *Expected Graduation: Apr 2027*
Coursework: Automotive Body Structures, Fundamentals of Vehicle Dynamics

Indian Institute of Technology Roorkee — **Roorkee, India**
Bachelor of Technology in Mechanical Engineering (GPA: 3.90/4.00) — *May 2025*
Coursework: Manufacturing Technology, Strength of Materials, Heat and Mass Transfer, Fluid Mechanics
Awards/Honors: Awarded the Ajit Singh Yadav Memorial Proficiency Prize for exceptional academic performance.

Technical University of Munich, Germany — **Munich, Germany**
Study Abroad (Coursework: Turbulent Flows, Boundary Layer Theory) — *Apr 2024 – Sep 2024*

WORK EXPERIENCE

DeployNXT | Mechanical Design Intern | Gujarat, India — *May 2025 – Aug 2025*
- Conceptualized and designed deployable solar panel mechanisms using SolidWorks and motion studies to achieve compact, aesthetically integrated deployment.
- Engineered synchronized petal deployment by developing planetary gear and custom cam-slot linkage assemblies, improving system reliability and manufacturability for high-cycle outdoor use.

Khageshvara Aviation Technology | UAV Aerodynamics Intern | Jaipur, India — *Jan 2025 – May 2025*
- Performed aerodynamic stability analysis of a fixed-wing UAV using XFLR5 and VSPAero, optimizing center of gravity location and dynamic modes to enhance flight stability and control predictability.
- Simulated propeller–wing interaction in ANSYS Fluent using rotating zones to analyze downwash in distributed propulsion, quantifying a 17% lift reduction critical for wing design considerations.

Forbes Marshall | Research Intern | Pune, India — *Nov 2024 – Jan 2025*
- Developed Python models implementing IAPWS-IF97 and the SBTL methods to accelerate evaluation of steam thermodynamic properties, reducing calculation time by 20% and improving responsiveness for process monitoring.
- Validated the developed steam property models using data from pressure, temperature, and velocity sensors, ensuring reliability for real-world plant operating conditions.

PROJECT EXPERIENCE

Formula Student Electric Vehicles | IIT Roorkee Motorsports | Roorkee, India — *May 2022 – Apr 2025*
- Developed and validated aerodynamic components (rear wing, front wing, and bodywork) using ANSYS Fluent CFD and wind tunnel testing, achieving a 17% lap time reduction through improved downforce-to-drag ratio.
- Optimized battery thermal management system by conducting heat load and pressure drop calculations in MATLAB and Simulink, selecting and validating cooling fans to enhance efficiency and cell reliability under race conditions.
- Led fabrication of carbon-fiber composites using ANSYS ACP and vacuum bagging, reducing structural mass by 30% while meeting stiffness and FSAE safety targets.

Thermal Design and Optimization of Starter Generator | Hindustan Aeronautics Ltd. | India — *Jan 2024 – May 2024*
- Performed steady-state CFD and energy modeling in ANSYS Fluent to evaluate cooling performance of HAL's Starter-Generator centrifugal fan, identifying thermal hotspots and flow inefficiencies.
- Designed and optimized an axial fan through a parametric inlet flow study, reducing peak surface temperature by 45% and improving thermal safety margins under continuous operation.

Aero map Generation | IIT Roorkee Motorsports | Roorkee, India — *Jun 2023 – Aug 2023*
- Performed CFD sweeps (yaw, pitch, roll, ride height, steer angles) to generate aero maps for lap-based force prediction.
- Visualized aerodynamic force trends across operating envelope, aiding driver tuning and aero-balance setup decisions.

Crash Test Analysis | Society of Automotive Engineers (SAE) | Roorkee, India — *Dec 2022 – Feb 2023*
- Engineered a rule-compliant formula-style chassis and performed ANSYS Structural/Explicit Dynamics simulations for 30g frontal impacts, ensuring crashworthiness, torsional stiffness, and mass efficiency.
- Reinforced high-stress regions identified via FEA, achieving 5 kg mass reduction without compromising structural integrity and occupant safety.

Design and Analysis of a Bullet Proof Vest | Design Course Project | Roorkee, India   *Aug 2022 – Nov 2022*
- Modeled impact performance of Kevlar, Spectra, BCN, and graphene composites and identified optimum layups based on impact resistance, mass, and heat dissipation.
- Simulated ballistic impacts using ANSYS Explicit Dynamics, confirming 100% stoppage under test load conditions.

Wind Tunnel Testing | Wind Lab, IIT Roorkee | Roorkee, India   *Jun 2022 – Oct 2022*
- Manufactured scaled Selig S-1223 airfoil using 3D printing and conducted force/moment measurements in wind tunnel.
- Validated ANSYS Fluent CFD predictions against experimental data, achieving <7% deviation across key aerodynamic coefficients.

RESEARCH EXPERIENCE

University of Michigan | Research Associate | Ann Arbor, MI   *Aug 2025 - Present*
- Conducting multiphase flow particle-tracking experiments using laser illumination and robotic positioning to quantify inner-ear canal flow patterns for vestibular research.
- Designed precision mechanical mounts and fixtures to improve tracking, enabling high-fidelity flow measurements.

Phase-Field Modeling of Material Fracture | Prof. Manish Joglekar | Roorkee, India   *Aug 2024 – Aug 2025*
- Developed Abaqus UEL in Fortran for phase-field fracture simulations and automated parametric studies in MATLAB, enabling efficient analysis of crack propagation.
- Investigated instabilities in dielectric elastomer actuators under electrical loading, informing design guidelines for soft-actuator reliability.

Design of Hydrogen ICE Fuel Tank | Prof. Akshay Dvivedi | Roorkee, India   *Aug 2023 – Nov 2023*
- Modeled hydrogen ICE drivetrain in Simulink to determine fuel-tank sizing requirements to maximize vehicle range.
- Performed analytical pressure-vessel calculations and validated via static FEA, verifying 100% compliance with stress/strain limits and selecting optimum material for reliability.

CFD Analysis of Centrifugal Pump | Prof. Ankit Bansal | Roorkee, India   *Mar 2023 – Sep 2023*
- Simulated water flow and cavitation across varying RPM, impeller shapes, and roughness values in ANSYS CFX.
- Correlated pressure-head trends to geometric parameters and identified key cavitation onset conditions, recommending design mitigations.

LEADERSHIP EXPERIENCE

IIT Roorkee Motorsports | Team Leader | Roorkee, India   *Mar 2024 – Feb 2025*
- Led a cross-functional team of 110+ engineers to design, integrate, and test a Formula Student electric race car.
- Directed project planning, procurements and budget management to deliver a competition-ready vehicle on time.

SKILLS

Design and Simulation: CATIA, SolidWorks, NX, ANSYS Workbench/Fluent, Abaqus, MATLAB, Simulink, CarSim
Fabrication: Composite manufacturing, 3D printing, GD&T, Engineering Drawings, DFM/DFA, CNC Machining, Laser cutting, Lathe, Workshop tools
Programming: Python, C++, Fortran