Ayush Singh

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Education

- **Pandit Deendayal Energy University** Gandhinagar, India
  Bachelor of Technology in Mechanical Engineering Engineering, CPI: 9.92/10 (WES GPA: 3.98/4) *2023 - Present*

Skills

CFD (Python/MatLab, Ansys Fluent, OpenFOAM), FEA (Ansys Mechanical), CAD (SolidWorks, NX, Fusion 360), Welding (GTAW, GMAW, LASER, Ultrasonic, Friction, FSW, Resistance, Plasma, Gas), CNC Turning (Siemens), Advanced Manufacturing (EDM, WAAM, LPBF), MatLab, Model Rocketry, Programming & Full Stack Web Development, LaTeX

Experience

- **Core Technical Engineer & Treasurer - Apogee** June 2023 - Present (On-site)
  Systems Engineering at National Rocketry Team and Aerospace Society of PDEU
  - **Fluids and Control**: Designed experimental test rig and performed CFD to develop active fin roll control system
  - **Propulsion**: Improved Efficiency of Motor by 25% by designing De Laval CD Nozzle & applying the propellant casting workflow
  - **Sponsorship**: Raised Sponsorship of ₹3,00,000 ($3,600)
- **Summer Research Intern (Report Link) - IIT Gandhinagar** May - July 2025 (On-site)
  Prof. Manish Kumar, IIT Gandhinagar
  - **CFD Simulation**: Simulated avalanche flow using VOF in Ansys Fluent; validated with experimental data (<5% error)
  - **Structural Testing**: Simulated 2 lattice structures; reduced impact force by up to 30%.

Projects

- **Increasing heat transfer rate in additively manufactured gyroid-based heat exchangers**
  Dr. Rahul Deharkar, PDEU
- **Optimized design of lattice-based structures to reduce avalanche impact by means of CFD modeling**
  Prof. Manish Kumar, IIT Gandhinagar
- **Real Time Monitoring System for LPBF and GTAW Systems**
  Dr. Ojas Satbhai, PDEU
  - **Orthopedic Implants**: Novel approach to capture acoustic data for crack mitigation in bio-compatible ZK60 alloy

Publications / Research Work

- **Property and Composition Dependence of hot cracking in LPBF for different materials**
  Prof. Vishvesh Badheka, PDEU - Accepted for publication - IMECE, ASME
- **Predictive Analysis of Multi-Effect-Distillation System using ANN**
  Dr. Rahul Deharkar, PDEU - Accepted for publication - ICAWTM-25 (Springer)
- **Additive Manufacturing of Batteries: Recent Trends and Challenges**
  Dr. Ojas Satbhai, PDEU - Under Review - ICTEA
- **High-Precision Launch Mount for Small Rockets Featuring Gear-Driven Angular Control**: Under Review
- **Aircraft Wing Spar comprising Honeycomb I-beam with supports**: Under Review

Achievements

- Bhalodia-Khetan Summer Research Excellence Award, ₹50,000 ($570) prize, Summer Research Internship, IIT Gandhinagar
- Merit Scholarship Recipient (100% Tuition Fee Waiver - ₹1,30,000 ($1,480) per semester), PDEU, 2023-2025
- 1st Rank in Mechanical Engineering, 2023-2025
- Selected at Prestigeous Student Research Internship Program at IIT Gandhinagar, 2025
- 3rd Rank at Mech-A-Thon 2025, A 5-day Mechanical Hackathon, 2025
- 10-day Residential Model Rocketry Training (55 students selected in India), Bengaluru (IN-SPACe, ISRO), 2024

Certifications

Metal 3D printing (Michigan), Launch Vehicle Analysis & Design (IIT Bombay), Essentials of Model Rocketry (IN-SPACe, ISRO), Java SE 8 Fundamentals (Oracle)

Leadership / Outreach

- Astronomy Outreach via Instagram: @atroyush: Created and actively manage a dedicated Instagram account for astronomy.
- Lawn Tennis Secretary, PDEU, 2024 - 2026
- Coordinated CFD (FDM) Python workshops at PDEU, training 100+ BTech, MTech, and PhD students
- Coordinated the 1st International Battery Symposium (ICTEA 2024) with McMaster, Toronto Met, Yalova Univ. & PDEU
- Founding President - SciKnowTech VIPNET Club, 2021 - 2023

Interests

- **Technical Interests**: Computational Fluid Dynamics, Welding, Additive Manufacturing, Astronomy, Model Rocketry and Aerospace
- **Personal Interests**: Fine Arts and Painting, Sports (Lawn Tennis, Karate)