Omkar Pawar

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EDUCATION

North Carolina State University, *Masters of Science in Mechanical Engineering*   August 2024 – May 2026
GPA: 3.77/4.0
Coursework: AI-Driven Engineering Design, Metal Additive Manufacturing, Design of Electromechanical Systems

MPSTME, NMIMS University, *Bachelor of Technology in Mechanical Engineering*   August 2020 – May 2024
GPA: 3.13/4.0
Coursework: Design of Machine Elements, Computational Fluid Dynamics, Additive Manufacturing, Machine Design

SKILLS

Technical Skills: 3D CAD design, 3D modelling, 3D Scanning, 3D Printing, Finite Element Analysis, Advance Precision Manufacturing, Additive Manufacturing, Reverse Engineering, Computational Fluid Dynamics, Python

Software Skills: SolidWorks, CATIA, ANSYS Mechanical, ANSYS Maxwell, nTopology, AutoCAD, FEMM, Forming Suite, Automated Costing Software, Siemens TCUA (Data analysis), VISI Reverse, MATLAB

EXPERIENCE

Mechanical Airframe Designer Intern | Hindustan Aeronautics Limited | Nashik, India   December 2023 – April 2024

- Coordinated fastener design with **CATIA** using company design standards and designed the aircraft air intake by solving differential equations using **M.S. Excel**, **generated 70%** of the outer skin for manufacturing readiness
- Applied **3D scanning** and **3D modeling** with **reverse engineering** techniques using **VISI Reverse** to improve **model generation efficiency by over 65%** by generating 3D CAD model
- Delivered over **20+ aircraft parts** and skin models using a **smart-scan scanner**, enhancing the design portfolio for a future project

Costing Engineer Intern | Tata Motors Limited | Pune, India   May 2023 – July 2023

- Contributed to the Should Cost estimation techniques with around 5% cost reduction Body and Trim by calculating the **maximum yield %** of the metal parts using the best profile which has **more than 80% yield**
- Directed the implementation of **FTI ACS software** from Hexaware Technologies, improving project workflow **efficiency by 30%**
- Leveraged **FTI Forming suite**, **TCUA, and PLM** to generate detailed cost reports, boosting **efficiency by 10%** and **reducing costs by $30,000** through accurate 'should cost' calculations for sheet metals and body trims

PROJECTS

Design of Integrated EAHE system for reduction of power consumption from Air Conditioners   January 2025 – April 2025

- Engineered and fine-tuned an Earth Air Heat Exchanger system for a 50 m³ room, leveraged **Python and Differential Evolution**, minimizing pipe area while **reducing** fan power consumption by **70%** vs. traditional AC
- Predicted cooling loads using a machine learning model trained on 15 years of climate data, validating EAHE performance across 5 future summers in **Raleigh, NC**

Production of LPBF-based Schwarz-P Heat Sink   January 2025 – April 2025

- Designed a liquid-cooled heat sink using **nTopology** and **SolidWorks**, incorporating a Schwarz-P TPMS lattice to enhance surface area and isotropic heat transfer
- Simulated steady and transient heat dissipation using **FEA in SolidWorks**, showing a 10.5°C water outlet-inlet temperature difference over 300 s and 12°C lower surface temperature vs. natural convection
- Fabricated and demonstrated the feasibility of the heat sink using **LPBF with GR Copper 42**, optimizing print parameters (325 W, 825 mm/s, 0.1 mm hatch) for high conductivity and defect minimization

Electromechanical Actuation of a Fuel Rod Fretting Test Rig   January 2025 – April 2025

- Created and performed simulations of a non-contact electromagnetic actuator using **SolidWorks, FEMM, and ANSYS Maxwell**, achieving precise 50 μm lateral rod vibration with a force of 1.126 N, replicating coolant-induced fretting in nuclear fuel rods
- Optimized actuator configuration by conducting **analytical beam calculations**, static structural FEA, and transient electromagnetic simulations, resulting in **accurate magnetic force generation** and resonance-safe operation at 153.55 Hz
- Modeled a 3-part electromagnet system with a 0.35 mm air gap and 232-turn coil, validating force consistency across simulation platforms (**<2% deviation**) and enabling reliable fretting behavior studies under lab conditions

Structural and Numerical Analysis of Bladeless Wind Turbine   August 2023 – November 2023

- Engineered a bladeless wind turbine in **SolidWorks** using validated aerodynamic formulas, conducted **stress and bending load analysis**
- Vortex-induced vibrations in **ANSYS** at 15.6 m/s inlet velocity, obtaining Cd = 8.4, Cl = 8.18, and a deflection of 0.57 m in refined meshing
- Published results in the E2A Conference book (2023), demonstrating feasibility for Indian wind conditions-
  https://doi.org/10.1007/978-981-97-6802-8_18