

Shashwat Patnaik

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EDUCATION

University of Michigan

Master of Science in Aerospace Engineering

GPA: 4.00 / 4.00

Coursework: CFD, Multidisciplinary Design Optimization, Thermal Engineering, Heat Transfer, Non-Linear Analysis

Ann Arbor, MI

May 2024

Delhi Technological University

Bachelor of Technology in Mechanical Engineering

Coursework: Design of Machine Elements, Kinematic and Dynamic of Machines, Mechanics of Solid, Mechanics of Material

Delhi, India

June 2022

SKILLS

<i>CAD:</i>	SolidWorks (CSWP), Catia V5, Fusion 360, Auto-desk Inventor, SpaceClaim
<i>Simulation and Analysis Software:</i>	ANSYS, Simulink, OpenFOAM, Star CCM+, OpenMDO, HyperMesh, IcePack
<i>Language and Analysis:</i>	Python, MATLAB, C++, PyTorch, Openmpi, OpenMP, GIT, Linux, Audrino, STM32

WORK EXPERIENCE

DTU Altair

Lead Mechanical Engineer

Delhi, IN

August 2019- July 2022

- Engineered a small-scale satellite's payload wing, enhancing lift by 20% through MATLAB and XFOIL optimization.
- Managed full life cycle of deployment mechanisms, overseeing the design, integration, testing, and validation of complex sub-assemblies and systems, improving structural rigidity by 7% and ensuring seamless integration.
- Developed micro-autonomous robots and UAVs, integrating actuators and electromechanical systems, and used SAP PLM to reduce development and review cycles by 15%.
- Prototyped micro-robots and satellite payloads using 3D printing, cutting development and fabrication time by 25%.

Maruti Suzuki India Limited

Mechanical Engineering Intern

Delhi, IN

May 2019- July 2019

- Executed failure analysis on 20 automotive components, using design review with design of experiments (DOE) to identify root causes and implement preventive measures, reducing component failure rate by 10%, based on quantification metrics.
- Conducted material fracture analysis and developed a comprehensive database for failure topography mapping, enhancing the predictive accuracy of component lifespan by 8%, and contributing to R&D efforts.

DTU Super Mileage Vehicle

Aerodynamics Lead-Engineer

Delhi, IN

August 2018– December 2018

- Designed vehicle chassis, prepared engineering drawings, and developed manufacturing processes, including building fixtures, to ensure precision; reduced weight by 27% while maintaining structural strength.
- Created CAD models in SolidWorks to design mechanical systems and vehicle aerodynamic components, decreasing drag coefficient by 0.05 through fluid simulation (Computational Fluid Dynamic) and wind tunnel testing.
- Coordinated with the powertrain team on mechanical and thermal analysis, optimizing design and achieving a 15% cost reduction.

PROJECTS

Structural Mechanics - Structural Analysis of Composite Wishbone Structure (Upper-A Arm)

Delhi, IN

- Performed Finite Element Analysis (FEA) fatigue analysis of a carbon fiber wishbone, analyzing compressive and bending loads, improving fatigue life by 1000 times compared to traditional aluminum wishbones for Formula Student.

Optimization of mono-blade pods to exhibit unconventional descent mechanism (DOI)

Ann Arbor, MI

- Optimized the coefficient of power by 28% in MATLAB using Blade Element Momentum Theory for Fluid-Structure Interaction and element-based computational methods as the physics simulation.
- Designed a 6-DOF dynamic pod model in SIMULINK to reduce drift in all axes by ~10%, showcasing industrial applications.

Fluid Mechanics - higher order finite volume and discontinuous galerkin numerical method solver

Ann Arbor, MI

- Programmed adjoint-based mesh adaptation and algorithms for local refinement, and developed functions for the flux-limiter
- Developed first and second-order Finite Element Method (FEM) and Finite Volume Method (FVM) to simulate compressible flow and turbulent flow over the multi-element airfoil using SSP-RK2 with local time stepping.

Aerodynamic shape optimization of small unmanned aerial vehicles (Project)

Ann Arbor, MI

- Designed and implemented a fuselage shape optimization algorithm in OpenMDO for aircraft design, utilizing FFD for geometry and adjoints for derivatives, ensuring adaptability to customer payload requirements.