Shashwat Patnaik

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EDUCATION

University of Michigan **Ann Arbor, MI**
Master of Science in Aerospace Engineering *May 2024*
GPA: 4.00 / 4.00
Coursework: CFD, Multidisciplinary Design Optimization, Thermal Engineering, Heat Transfer, Non-Linear Analysis

Delhi Technological University **Delhi, India**
Bachelor of Technology in Mechanical Engineering *June 2022*
Coursework: Design of Machine Elements, Kinematic and Dynamic of Machines, Mechanics of Solid, Mechanics of Material

SKILLS

CAD:	SolidWorks (CSWP), Catia V5, Fusion 360, Auto-desk Inventor, SpaceClaim
Simulation and Analysis Software:	ANSYS, Simulink, OpenFOAM, StarCCM+, OpenMDO, HyperMesh, Icepack
Language and Analysis:	Python, MATLAB, C++, Valgrind, Openmpi, Openmp, GIT, Linux, Cuda

WORK EXPERIENCE

DTU Altair **Delhi, IN**
Lead Mechanical Engineer *August 2019- July 2022*
- Engineered a small-scale satellite's payload wing, enhancing lift by 20% through MATLAB and XFOIL optimization..
- Led the full project lifecycle of deployment mechanisms, overseeing the design, integration, and testing of complex sub-assemblies and systems, improving structural rigidity by 7% and ensuring seamless integration.
- Led a team of 6 engineers in developing and validating micro-autonomous robots and UAVs, using Autodesk Fusion Lifecycle and SAP PLM to improve collaboration and cut development and review cycles by 15%.
- Supported project planning and resource allocation, increasing on-time delivery by 20% and cutting risks by 15%.

Maruti Suzuki India Limited **Delhi, IN**
Mechanical Engineering Intern *May 2019- July 2019*
- Assisted in conducting failure analysis on 20 automotive components, utilizing the design of experiments (DOE) to identify root causes and implement preventive measures, reducing component failure rate by 10%.
- Conducted material fracture analysis and developed a comprehensive database for failure topography mapping, enhancing the predictive accuracy of component lifespan by 8%.
- Collaborated with senior engineers in project planning and execution phases, including documentation and progress tracking.

DTU Super Mileage Vehicle **Delhi, IN**
Aerodynamics Lead-Engineer *August 2018– December 2018*
- Designed vehicle chassis and shell in SolidWorks, conducted flow analysis and wind tunnel testing, and performed structural analysis in ANSYS, reducing weight by 27% while maintaining structural strength.
- Led structural and thermal analysis in ANSYS, ensuring compliance with client's performance requirements.
- Partnered with the powertrain team on mechanical and thermal analysis, optimizing the design to contribute to a 15% reduction in costs and ensuring project success within budget and timeline constraints.

PROJECTS

Structural Mechanics - Structural Analysis of Composite Wishbone Structure (Upper-A Arm) **Delhi, IN**
- Performed 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 **Ann Arbor, MI**
- Implemented a non-gradient optimizer (IPOPT) in OpenMDO for fuselage shape optimization, adaptable to any payload, using Free Form Deformation (FFD) as computational geometry and adjoints for derivatives in ADFlow through scripting.