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: Computational Fluid Dynamics, Turbulent Flows, Flight and Trajectory Optimization, Multidisciplinary Design Optimization, Thermal Engineering, Heat and Mass Transfer.

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

SKILLS

CAD:	SolidWorks (CSWP), Catia V5, Fusion 360, Auto-desk Inventor
Simulation and Analysis Software:	ANSYS, Simulink, OpenFOAM, STAR-CCM+, OpenMDO
Language and Analysis:	Python, MATLAB, C++, Valgrind, OpenMPI, and PX4

WORK EXPERIENCE

DTU Altair   **Delhi, IN**
Lead Mechanical Engineer   *August 2019- July 2022*
- Increased lift by 20% for a small-scale satellite's payload wing, through MATLAB and XFOIL optimization for CANSAT 2021.
- Led the development of deployment mechanisms, overseeing 3D/2D design and integration of complex sub-assemblies and systems.
- Coordinated 5-6 members in various competitions to create robots for micro-autonomous robots and UAVs.

Maruti Suzuki India Limited   **Delhi, IN**
Mechanical Engineering Intern   *May 2019- July 2019*
- Conducted failure analysis on 20 automotive components, identified root causes, and implemented prevention methods; reduced component failure rate by 10%.
- Analyzed fracture features and created a comprehensive database mapping the topography of fracture surfaces to root causes; improved failure prediction accuracy by 8%.

DTU Super Mileage Vehicle   **Delhi, IN**
Aerodynamics Lead-Engineer   *August 2018– December 2018*
- Designed and developed the vehicle's outer chassis and shell using SolidWorks, and ANSYS, reducing weight by 27%.
- Integrated two-cylinder engine and transmission to meet competition requirements.

PROJECT EXPERIENCE

First and second-order finite volume solver to simulate flow over the multi-element airfoil   **Ann Arbor, MI**
- Programmed adjoint-based mesh adaptation and local mesh refinement, and developed functions for the LCD limiter.
- Developed first and second-order Finite Element Method (FEM) and Finite Volume Method (FVM) to simulate compressible flow over the multi-element airfoil using SSP-RK2 with local time stepping.

Optimization of mono-blade pods to exhibit unconventional descent mechanism (DOI)   **Ann Arbor, MI**
- The coefficient of power as cost function was optimized by 28% in MATLAB by using an element-based computational method.
- Implemented 6-DOF dynamic model of the pod through SIMULINK to reduce drift in all axes by ~10%.

Aerodynamic shape optimization of small unmanned aerial vehicles   **Ann Arbor, MI**
- Implemented non-gradient optimizer (IPOPT) using OpenMDO for the shape of the fuselage, adaptable to any payload, utilizing Free Form Deformation (FFD) and adjoints for derivatives within ADFlow.

RESEARCH EXPERIENCE

Advance Fluid Dynamics Lab   **Delhi, IN**
- Established a RANS framework in OpenFOAM to exhibit the viability of riblets on nozzles to delay separation.
- Computed fluctuations in kinetic energy and wall shear stress of the flow, demonstrating riblets create higher momentum at near-wall flow, delaying the separation by 11%.

Computational Aerosciences Laboratory   **Ann Arbor, MI**
- Implemented a PDF stochastic Lagrangian model using the Generalized Langevin Model and quadratic 2-Stage least square regression method to model turbulent channel flow.