Atharva Mahajan

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M.S. Mechanical Engineering, University of Michigan

Education

University of Michigan, Ann Arbor Aug 2025 - May 2027
M.S. in Mechanical Engineering, Focus: Computational Fluid Dynamics & ML *Michigan, USA*

Birla Institute of Technology and Science, Pilani Nov 2020 - May 2025
B.E. in Mechanical Engineering, CGPA 9.16/10; M.Sc. in Physics *Hyderabad, India*

Technical Skills

Languages: MATLAB, Python, C/C++, Fortran, LaTeX, Arduino **Tools:** SolidWorks, ANSYS Fluent, CUDA, PTC Creo, Fusion 360

Research Experience

Adaptive Flow Control using Deep Reinforcement Learning Aug 2025 - Present
Advisor: Prof. Ricardo Vinuesa, University of Michigan *Ann Arbor, MI, USA*
- **Driving innovation in autonomous flow control** via deep reinforcement learning to **maximize aerodynamic efficiency** and robustness.
- Integrating **Explainable AI** to ensure transparent, interpretable control strategies for **safer, trustworthy autonomous systems**.
- Developing **scalable architectures** for real-time applications in aerodynamic optimization and intelligent vehicles.

Research & Teaching Assistant – ML/AI for Fluid Mechanics Jan 2025 - Present
University of Michigan & Flowthermolab (Industry Collaboration) *Ann Arbor, MI, USA*
- Led **practical sessions** on deep learning models (MLP, RNNs, Autoencoders, CNNs) for graduate students and engineers.
- Developed interactive **Jupyter notebook codes** and demos for turbulence modeling and flow physics.
- Leveraged web platforms for hands-on exercises and conceptual mastery.

Effects of Upstream Pressure History on Adverse Pressure Gradient TBLs Jun 2024 - Jun 2025
Advisor: Prof. Ricardo Vinuesa, KTH Royal Institute of Technology *Stockholm, Sweden*
- Conducted **high-fidelity simulation analysis** on turbulence behavior.
- Utilized spectral density, Reynolds stresses, and pressure gradient metrics for evaluation.
- Published in Intl. Journal of Heat and Fluid Flow (2025).

Autophoretic Particle Dynamics at Fluid Interfaces May 2023 - May 2024
Advisor: Dr. Sayan Das, BITS Pilani *Hyderabad, India*
- Modeled **microparticle motion** for drug delivery and waste management.
- Used boundary element methods and COMSOL for multi-phase flow simulations.

CUDA-Accelerated Meshfree CFD Solver Development Nov 2022 - Dec 2023
Advisor: Dr. Anil Nemili, BITS Pilani *Hyderabad, India*
- Engineered a **3D Meshfree Euler CFD solver** in Fortran with **450× speedup** via CUDA optimization.
- Optimized memory and compute efficiency using NVIDIA Nsight Compute.

Experimental Study of Underwater Pitching Airfoil Propulsion Feb 2021 - Dec 2023
Advisor: Dr. Pardha Saradhi, BITS Pilani *Hyderabad, India*
- Built **underwater pitching airfoil rig** to investigate bio-inspired propulsion and hydrodynamics.
- Implemented flow visualization and MATLAB data acquisition for precision measurement.

Professional Experience

Applied Aero Labs Pvt Ltd – Co-founder Apr 2023 - May 2025

- Founded aerodynamic R&D firm building India's first portable **multi-velocity fan-array wind tunnel**.
- Secured $12,000 government funding with advanced FEA and fluid-structure analysis tools.

Leadership & Teaching Experience

BITS Pilani Aug 2023 - Dec 2023

- **President – SEDS BPHC:** Oversaw student space club operations and coordinated outreach and technical projects.
- **Structures Lead – Hyperloop India:** Led mechanical design for the Hyperloop India structures team.
- **Teaching Assistant – Fluid Mechanics:** Supported 200+ undergraduates by simplifying CFD concepts, grading, and mentoring lab sessions.