Aditya Jaiswal

Bachelors in Mechanical Engineering
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GitHub Profile

Education

•Birla Institute Of Technology and Science Pilani, Pilani *2021-2025*

Bachelors in Mechanical Engineering

Experience

•ideaForge *October 2025 – Present*

R&D Sourcing

- Automated internal workflows, performance reports and documentation processes to streamline development cycles across the engineering team.
- Contributing to the design of an efficient in-house UAV propeller, taking ownership of concept generation, detailed CAD modelling and performance evaluation through CFD simulations.
- Coordinating with vendors and composite manufacturers to ensure efficent and timely fabrication of UAV components and propellers, and assisting in the technical assessment of motors and material quality.

•Indian Institute of Science, IISc *Aug 2024 - Jan 2025*

Undergraduate Thesis - Computational AeroSciences Lab under Dr. Aravind Balan

- Developed optimal mesh recombination algorithm converting triangular meshes into quad-dominant configurations to improve accuracy in anisotropic flow simulations, particularly boundary layer resolution.
- Implemented priority-based greedy selection algorithm in **Python** with **MPI** parallelization, reducing degrees of freedom by **23%** (from 3,114 to 2,391) for a test case while enabling scalable processing for large meshes.
- Achieved a **93%** quad-recombination efficiency (241 quads out of a theoretical maximum of 259) on a 519-triangle mesh test case through an optimized element-selection strategy, significantly improving mesh quality for capturing directional flow features.
- Built a custom mesh file format converter (**.su2** $\longleftrightarrow$ **.vol** extension), enabling seamless integration with simulation frameworks including **NETGEN** and **gmsh** for cross-platform validation.

•Indian Space Research Organization (ISRO) *May 2024 – July 2024*

Summer Intern - UR Rao Satellite Centre

- Contributed to the conceptualization and design of the novel indigenous **Roll-Out Solar Array (ROSA)** mechanism for future ISRO missions requiring compact, high-power deployment.
- Designed deployment mechanisms in Siemens NX and modeled tube dynamics in MATLAB to estimate motor torque and reduce the *"blossoming"* & *"telescoping"* effect.
- Developed tensioning and roller mechanisms that mitigated telescoping errors and improved deployment stability during stowage and retraction.

•Indian Institute of Technology Bombay, IITB *May 2023 - July 2023*

Research Intern — under Dr. Amol Subhedar

- Performed perturbation analysis of the Allen–Cahn phase-field equation to correct surface-tension forcing errors in Lattice Boltzmann multiphase simulations, and implemented the models in **C++**.
- Derived correction factors up to $O(\epsilon^2\alpha^2)$ and validated them on bubble tests, reducing Laplace pressure error from **1.7%** to $<$ **0.1%** (when using continuum surface tension scheme) and from **8%** to **0.5%** (when using chemical potential surface tension scheme).
- Work presented at CompFlu 2023, IIT Madras; manuscript currently under preparation.

Conference papers, Poster presentation & Publication

• Malyadeep Bhattacharya, **Aditya Jaiswal**, Amol Subhedar, Improved surface tension force scheme for two-phase flow in diffuse interface framework, **COMPFLU-2023**, 18th–20th Dec 2023, IIT Madras.

Projects

•aerFoLaB *Ocotober 2025 - Present*

Personal project.

- Working on developing Lattice Boltzmann Solver for simulating low Mach number flows past NACA Airfoils.
- Developing in C++ with openMP and MPI implementation.

•Analysis of flow past blunt bodies *August 2023 - October 2023*

Project done as a part of Gas Dynamics (MEF415) course.

- Simulated and analyzed the pressure, velocity, and the vortices developed in the flows varying Reynolds number, B and L/D ratio for low mach flows. Simulation performed and Written using Lattice Boltzmann Method.

Technical Skills and Interests

Languages: C, C++, Python, BASH (shell), MATLAB
Softwares: OpenFOAM, Ansys Fluent, Siemens NX, Mathematica, MATLAB, gnuplot, Netgen, gmsh

Positions of Responsibility

•**Core Member,** Student Faculty Council (SFC) *September 2022 - May 2023*
One of 9 students selected from the Mechanical Engineering cohort to serve as a student representative.

•**Mentor,** Peer Mentorship Program. *September 2022 - August 2023*

•**Team Lead,** Sally Robotics (Autonomous Car Development Team). *August 2022 - July 2024*

•**Joint Coordinator,** Photog (Photography club). *July 2023 - July 2024*

Achievements

•**JEE Mains Rank:** Top 1% amongst the candidates who took this exam. *2021*

•**JEE Advanced Rank:** Top 5% amongst the candidates who took this exam. *2021*

•**INSPIRE-SHE Scholarship:** Scholarship awarded to students scoring in top 1% of board exams. *2021*

•**AP Calculus BC:** grade 5 in the advanced placement exam which is the highest grade. *2021*