Gaurav **Gupta**

Senior Undergraduate, Aerospace Engineering

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Summary

A senior undergraduate student majoring in aerospace engineering at IIST, I'm focused on bio-inspired flight, aerodynamics, and control systems. My research blends nature's ingenuity with cutting-edge aerospace technologies. Motivated to learn new skills and take on challenges, I have strong expertise in aerodynamics, computational fluid dynamics, programming, and aircraft design. Additionally, I excel in leadership, teamwork, and management, driving innovative and collaborative project outcomes.

Education

Indian Institute of Space Science and Technology
Thiruvananthapuram, India

B.Tech. in Aerospace Engineering — *Dec. 2021 - Present*

- Current Cumulative Grade Point Average (CGPA): 8.07
- Interested courses: Aerodynamics, Computational Fluid Dynamics, Aircraft Design, Flight Dynamics & Control and Programming
- Extracurricular Activities: Aeroclub and Basketball

Kendriya Vidyalaya No.1 AFS Kalaikunda
Kharagpur, India

High School (XI & XII) — *Jul. 2019 - May. 2021*

- Graduated as the topper of school with 97.4% in the CBSE AISSCE examination.
- Served as the School Vice Captian and School Captian in XI and XII grade respectively.
- Courses: Mathematics, Physics, Chemisty, Computer Science, and English.

Kendriya Vidyalaya No.1 AFS Kalaikunda
Kharagpur, India

AISSE (Xth Board) — *Apr. 2018 - May. 2019*

- Graduated as the topper of school with 98.8% in the CBSE AISSE examination.
- Rank 1 in West Medinipur district and Rank 4 in West Bengal state.
- Courses: Mathematics, Science, Social Science, English, Hindi, and Information Technolgy.

Experience

Incompact3D
GitHub

Open-Source Contributor — *Jul. 2024 - Present*

- Developed a fortran subroutine to calculate lift and drag forces for a 3D immersed body simulations using Incompact3D.
- Working on improving the performance of importing STL files for high-fidelity simulations using Incompact3D.

Indian Institute of Technology, Kharagpur
Kharagpur, India

Research Intern — *Mar. 2022 - Present*

- Investigating the aerodynamics of birds through computational methods with implementation in aircraft design under the guidance of Dr. Sandeep Saha, IIT KGP and Dr. Manu KV, IIST.
- Conducted high-fidelity direct numerical simulations on Paramshakti and Virgo clusters of IIT KGP and IIST respectively using Incompact3D and NEK5000.

Conscientia, IIST
Thiruvananthapuram, India

Chief Coordinator — *Mar. 2023 - Nov. 2023*

- Organized and managed the 14th edition of IIST's technical and astronomical festival, Conscientia, from September 22nd to 25th, 2023.
- Conducted competitions and workshops, attracting over 1,000 student participants from across India.
- Oversaw a budget of approximately 22 lakhs, generating a profit of 4 lakhs.

Conscientia, IIST
Thiruvananthapuram, India

Website Coordinator — *Aug. 2022 - Nov. 2022*

- Developed and managed the website of 13th edition of IIST's technical and astronomical festival, Conscientia 2023.
- Designed the front-end of the website using Vanilla and Django.

AeroClub, IIST
Thiruvananthapuram, India

Student Member & Student Coordinator — *Mar. 2022 - Nov. 2023*

- Designed and built fixed-wing and rotor-based model aircrafts.
- Conducted workshops on "UAV Design" for school students with a pratical glider building session.
- Conducted sessions for junior members of the club on UAV Design including glider and water-rocket design competitions.

Skills

Modelling and Computer Aided Design	DS Solidworks, DS Catia, Autodesk Fusion 360, Autodesk Autocad, Blender
Computational Fluid Dynamics	Incompact3D, NEK5000, Ansys Fluent, XFLR5, GMSH, Coreform Cubit, Paraview, HPC
Programming	Python, MATLAB, FreeFEM++, Fortran, Julia, C++, LaTeX, Linux, GitHub
Creative	Adobe Illustrator, Inkscape and Powerpoint
Soft Skills	Passionate, Hardworking, Determined, Motivated, Punctual, Organized, Focused
Language	English, Hindi, Bengali

Certificates

Dec, 2022 **Machine Learning with Python (Honors),** IBM and Coursera
Oct, 2022 **Design of Fixed Wing Unmanned Aerial Vehicle (Topper),** IIT Kanpur and NPTEL
Nov, 2022 **Aircraft Design,** IIT Bombay and NPTEL
May, 2022 **Mastering Programming with MATLAB,** Vanderbilt University and Coursera

Publications

Base and Exponent Prediction in Mathematical Expressions using Multi-Output CNN *arXiv*
Salam, Md. Laraib, Balsaraf, Akash S., **Gupta, Gaurav** *2024*

Determining surface tension of various liquids and shear modulus of paper using crumpling effect *Journal of Emerging Investigators*
Gupta, Gaurav, Salam, Md. Laraib *2021*

Formation and sticking of air bubbles in water in d-block containers. *Journal of Emerging Investigators*
Gupta, Gaurav, Salam, Md. Laraib *2021*

Projects

Design and devlopement of a Loitering Munition *Aircraft Design, Python*
AE412: Aerospace Vehicle Design *Aug 2024-Present*

- A low-cost loitering munition with a payload capacity of 2 KG is being designed and developed.
- Undertaken conceptual and preliminary design of the loitering munition.

Developement of 3D Force calculation subroutine for Incompact3D *CFD, Fortran, HPC*
IIT Kharagpur *May 2024*

- A fortran subroutine was developed to enable 3D forces calculation in Incompact3D, a finite difference solver for N-S equations.
- The subroutine was developed and merged with the original code as an open-source contribution on GitHub.
- Open-source and available on GitHub.

FreeFEM-Euler *CFD, FreeFEM++, GMSH*
IIT Kharagpur *Jun. 2024*

- An incompressible flow solver based on Artificial Compressibility Method was developed using FreeFEM++.
- The code is capable of solving 2D and 3D problems based on in-built FreeFEM++ and GMSH meshes.
- Open-source and available on GitHub.

Performance Analysis of Boeing C17 Globemaster *Aircraft Performance*
AE111: Introduction to Aerospace Engineering *Feb. 2022*

- The performance of C17 Globemaster was analyzed in this project.
- The various performance parameters presented by the manufacturer and experimentally tested by operators were analysed using theoretical analysis.

Thrust Vectoring Nozzles of Sukhoi Su30-MKI *Mechanisms, CAD*
AE131: Basic Engineering Lab *Feb. 2022*

- The mechanism of the Thrust Vectoring Nozzles of Sukhoi Su-30 MKI was studied under this project as mechanical report.
- A CAD model of the mechanism was also made in Fusion 360 and it was simulated.

UHF/VHF Standalone Antenna Mast Retraction Mechanism *Mechanisms, CAD*
SSPACE Labs *Dec. 2022*

- The institute's SSPACE Labs have been using an UHF/VHF Standalone antenna for establishing communication with the INSPIRESAT-1 satellite.
- A retraction mechanism for the antenna was designed such that it can be retracted easily for maintainence purposes.