

Gaurav Gupta

SENIOR UNDERGRADUATE, AEROSPACE ENGINEERING

Indian Institute of Space Science and Technology, Thiruvananthapuram

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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
- Relevant coursework: Aerodynamics, Computational Fluid Dynamics, Aircraft Design, Flight Dynamics & Control, Optimization Techniques, Aerodynamics Lab, Modelling and Simulation Lab, Flight Mechanics Lab, Propulsion Lab, and Programming
- Extracurricular Activities: Aeroclub, Conscientia 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 AISSE 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.

Engineering Research 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.

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

SALAM, MD. LARAIB, BALSARAF, AKASH S., GUPTA, GAURAV

arXiv

2024

Determining surface tension of various liquids and shear modulus of paper using crumpling effect

GUPTA, GAURAV, SALAM, MD. LARAIB

Journal of Emerging Investigators

2021

Formation and sticking of air bubbles in water in d-block containers.

GUPTA, GAURAV, SALAM, MD. LARAIB

Journal of Emerging Investigators

2021

Projects

Design and developement of a Loitering Munition

AE412: AEROSPACE VEHICLE DESIGN

Aircraft Design, Python

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.

Development of 3D Force calculation subroutine for Incompact3D

IIT KHARAGPUR

CFD, Fortran, HPC

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

IIT KHARAGPUR

CFD, FreeFEM++, GMSH

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.

UHF/VHF Standalone Antenna Mast Retraction Mechanism

SSPACE LABS

Mechanisms, CAD

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 maintenance purposes.

Performance Analysis of Boeing C17 Globemaster

AE111: INTRODUCTION TO AEROSPACE ENGINEERING

Aircraft Performance

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

AE131: BASIC ENGINEERING LAB

Mechanisms, CAD

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.

Leadership and Extracurricular

Conscientia, IIST

CHIEF COORDINATOR

Thiruvananthapuram, India

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

WEBSITE COORDINATOR

Thiruvananthapuram, India

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

STUDENT MEMBER & STUDENT COORDINATOR

Thiruvananthapuram, India

Mar. 2022 - Nov. 2023

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