

Gagan Acharya

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Professional Summary

Aerospace Engineer with an M.Tech in Aerospace Engineering (CGPA: **8.25**) and expertise in aerodynamics, propulsion, and aircraft structures. Hands-on experience through an internship at ISRO, research on Pulse Detonation Engines, and aerospace design and simulation using ANSYS, CATIA, MATLAB, and FEAST. Passionate about teaching, research, and mentoring students while contributing to academic excellence and innovation.

Internship

Vikram Sarabhai Space Centre, ISRO

May 2023 - July 2023

Completed training in '**Dynamic characterization of HAWA WING using FEAST software**'

- Served as a Structural Analyst, Finite Element Modeling Engineer, and Vibration & Aeroelasticity Analyst, working on the dynamic analysis of the HAWA wing using ISRO's FEAST software.
- Developed high-fidelity finite element models with accurate meshing, material properties, and boundary conditions; performed modal and harmonic response analyses under simulated real-world conditions.
- Identified critical dynamic characteristics such as natural frequencies and mode shapes, supported aeroelastic stability assessment, and contributed to design optimization for improved flight safety and performance.

IISc. Bangalore

Nov 2022 – Nov 2022

Participated in the skill training program '**DO DRONE**' under **HAL/IISc Skill Development Centre**.

- Assisted as a Drone Dynamics Analyst and UAV Systems Trainee, contributing to the modeling, simulation, and testing of drone performance and autonomy.
- Participated in the development of flight dynamics models, conducted stability analysis, and gained hands-on experience with UAV technologies, control algorithms, and real-time sensor integration.
- Strengthened understanding of autonomous flight systems, improved UAV performance under varying flight conditions, and contributed to the enhancement of navigation and control capabilities.

System Tool Kit (STK), Mangalore

Aug 2021-Oct 2022

- Completed a certified workshop on Systems Tool Kit (STK), gaining proficiency in aerospace mission modeling, satellite orbit simulation, ground station analysis, and sensor coverage planning.
- Designed and executed hands-on scenarios in STK involving satellite constellations, RF link analysis, and real-time access evaluation for space and defense applications.
- Integrated STK with MATLAB and Python for automated mission analysis, enhancing capabilities in system-level simulation and data-driven decision-making.

Projects

IMPROVEMENT OF PULSE DETONATION ENGINES FOR HIGH SPECIFIC IMPULSE AEROSPACE APPLICATIONS 2024-2026

- Developed a coupled reduced-order MATLAB optimization framework for compact pulse detonation engine (PDE) design by integrating DDT, blowdown, and nozzle optimization.
- Optimized Shchelkin spiral geometry, blockage ratio, blowdown fraction, and nozzle area ratio to minimize total engine length while preserving propulsion performance.
- Achieved approximately 30.97% reduction in total PDE length through integrated thermodynamic and geometric optimization.
- Performed reduced-order thermodynamic analysis, compressible-flow modeling, and nozzle performance evaluation for pressure-gain propulsion systems.
- Presented research at the *International Conference on Modern Sustainable Engineering and Technology (ICMSET 2026)*.

DESIGN, FABRICATION AND SIMULATION OF UNMANNED AERIAL VEHICLE-DASSAULT RAFALE

Nov 2024-Nov 2024

- Developed a high-fidelity external model of the Dassault Rafale, focusing on precise wing geometry, tail configuration, and fuselage profile; ensured dimensional accuracy to support aerodynamic analysis.
- Performed aerodynamic and structural simulations in ANSYS on wing and tail sections across varying angles of attack; analyzed pressure distribution, lift, and flow separation to inform design optimization.
- Fabricated a scaled prototype using fine grade depron sheets, achieving a smooth surface finish; minimized drag and improved aerodynamic performance for wind tunnel testing and validation.

DESIGN AND FABRICATION OF CO-AXIAL CONTRA- ROTATING ROTARY WING AIRCRAFT

Jan 2024-Apr 2024

- Designed and fabricated a rotary-wing UAV featuring a co-axial contra-rotating rotor system.
Developed a tail-less helicopter prototype by integrating a rear-mounted thrust propeller and optimizing the aerodynamic and mechanical layout for simplified, efficient VTOL operation.
- Achieved improved stability, control, and thrust efficiency while reducing mechanical complexity and drag, showcasing the effectiveness of co-axial systems in compact UAV designs.
- **Software used:** CATIA, ANSYS.

DESIGNED AND FABRICATED A SCALED CONVERGENT-DIVERGENT (CD) NOZZLE FOR SUPERSONIC FLOW TESTING Aug 2023-Sept 2023

- Engineered a scaled convergent-divergent (CD) nozzle model tailored for supersonic flow studies and thrust optimization.
- Conducted controlled laboratory experiments to observe flow behavior, pressure variations, and shock formation using flow visualization techniques and pressure sensors.
- Verified nozzle performance metrics including Mach number distribution and thrust efficiency, providing experimental validation for CFD-based design assumptions.

PATENTS

Integrated Variable Control Thrust Nozzle for Pulse Detonation Engine

- Designed and developed a pulse detonation engine (PDE) integrated with a detachable variable thrust nozzle for adaptive exhaust expansion and thrust modulation.
- Engineered complete propulsion architecture including ignition stabilization cavity, helical DDT section, controlled blowdown divergence, and synchronized variable nozzle mechanism.
- Created detailed CATIA models, sectional engineering drawings, and technical documentation for institutional patent filing and innovation review.

Tools Used: CATIA V5, CAD Modeling, Propulsion Design, PDE Architecture, Technical Documentation

Design and Development of a Pulse Detonation Engine with an Integrated Chevron Nozzle

- Designed and developed a pulse detonation engine (PDE) incorporating a chevron nozzle to improve exhaust mixing, reduce shock-induced losses, and enhance exhaust flow characteristics.
- Engineered the complete propulsion configuration comprising the ignition section, helical DDT section, blowdown section, and an integrated chevron nozzle using CATIA V5.
- Developed detailed 3D CAD models, engineering drawings, and design documentation for nozzle geometry optimization and propulsion performance evaluation.

Tools Used: CATIA V5, CAD Modeling, Nozzle Design, Propulsion System Design, Engineering Documentation

HONORS & AWARDS

Best Paper Award

International Conference on Materials Science, Engineering and Technology (ICMSET)- Chennai

2026

- Received the **Best Paper Award** for presenting outstanding research on the design, simulation, and optimization of Pulse Detonation Engines (PDEs).
- Developed and validated a CFD-based methodology for geometric optimization of detonation tube components, including DDT enhancement devices, blowdown sections, and nozzle configurations.
- Demonstrated significant improvements in engine compactness and performance through physics-based optimization and detonation analysis.

Best Outgoing Student Award

Karavali Institute of Technology, Mangalore

2024

- Awarded the prestigious **Best Outgoing Student** honor in recognition of outstanding academic performance, research contributions, leadership, technical achievements, and overall contribution to the institute.

Best Sportsperson Award

Karavali Institute of Technology, Mangalore

2024

- Recognized as the institute's **Best Sportsperson** for exceptional achievements in intercollegiate and university-level sports competitions, demonstrating leadership, discipline, and consistent athletic excellence

Certificates

International Conference on Modern Sustainable Engineering and Technology (ICMSET 2026).
Panimalar Engineering College-Chennai

May 2026

AEROBOTIX Bootcamp

Mar 2026

COGNITIA'25 – Intra-University Techfest
Lovely Professional University, Punjab

Feb 2025

Dynamic Characterization of HAVA WING using FEAST^{SMT}
VSSC/ISRO, Trivandrum

Sept 2023

“Do Drone”
IISc Bangalore

Nov 2022

Diploma In Computer Application
Sarva Computer Saksharta Mission, Koppa

Dec 2021

CATIA BASICS
Great Learning Academy

Sept 2023

Technical Skills:-

CATIA, ANSYS, STK, AutoCAD, Solid Edge, FEAST by ISRO, Microsoft Office (Word, Excel, PowerPoint), LaTeX, FEA, CFD, Technical Report Writing, Research Paper Writing

Soft Skills:

Communication, Problem-Solving, Attention to Detail, Decision-Making, Teamwork, Leadership, Adaptability, Time Management, Ethical Awareness

Education

Lovely Professional University, Punjab Aerospace Engineering — CGPA: 8.25 (PG)	Phagwara, Punjab 2024-
Karavali Institute of Technology / Visvesvaraya Technological University Aeronautical Engineering — CGPA: 8.3 (UG)	Mangalore, Karnataka 2020 – 2024
Diploma In Computer 88% with A+ Grade	Koppa, Chikmaglur 2021-2021
GJC KOPPA PCMB — 82.16%	Koppa, Chikmaglur 2018 – 2020

