# Aswin D Menon

Bachelor of Technology
Aerospace Engineering
Indian Institute of Technology, Kharagpur

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## INTERESTS

**Aircraft Control Systems | Bio-Inspired Systems | Autonomous Flight | Missile Guidance | Helicopter Controls**

## EDUCATION

| Degree | Institute | CGPA/Percentage | Year |
|---|---|---|---|
| Bachelor of Technology | Indian Institute of Technology, Kharagpur | 8.64 | 2025 |
| Higher Secondary | Govt. Model HSS, Calicut (KBPE) | 97.17% | 2020 |
| High School | Bharatiya Vidya Bhavan, Chevayur, Kerala (CBSE) | 95.67% | 2018 |

## EXPERIENCE

- **Undergraduate Research | Unmanned Aerial Vehicles Lab | Prof. Sikha Hota** *August 2024 - Present*
  - Implemented **Biased PNG**, **Two-Stage PNG**, and **Time-to-go Polynomial Guidance** laws for 2D missile interception scenarios
  - Affirmed that the guidance algorithms achieved **desired impact angles** while satisfying **acceleration and FOV constraints**
  - Adopted **multi-planar** guidance laws for **3D interception** and working to eliminate lateral acceleration profile discontinuities
- **Research Intern | RWR&DC | Hindustan Aeronautics Ltd** *May 2024 - July 2024*
  - Analyzed, in-depth, the **AFCS** (Automatic Flight Control System) and actuator mechanisms of a semi-autonomous helicopter
  - Integrated **Pitt-Peters** dynamic inflow model into the helicopter dynamics simulator to improve transient response predictions
  - Validated simulation results against flight test data, for **collective dump** input, identifying areas for future developments
- **Summer Intern | Aircraft Division | Hindustan Aeronautics Ltd** *June 2023*
  - Gained hands-on exposure to processes from machining to final assembly of various **Hawk**, **Jaguar**, and **LCA Tejas** aircrafts
  - Acquired in-depth knowledge of system integration through immersive training in aircraft hangars and production facilities

## PROJECTS

- **Aerial 2D Mapping and Estimation of Forest Area Cover | Prof. Sandeep Saha** *Jan 2024 - Apr 2024*
  - Constructed orthorectified 2D maps from aerial images, having GPS and altitude data, by stitching using **Pix4Dmapper**
  - Enhanced the map resolution using **EDSR** and estimated average forest canopy height for sample data by creating a **DSM**
  - Automated forest cover estimation using a **U-Net CNN** model trained on labeled aerial imagery and diverse public datasets
- **CFD Analysis of Sports Ball Aerodynamics | Prof. Sunil Manohar Dash** *Jan 2024 - Apr 2024*
  - Simulated flow around golf ball & basketball (with & without spin) in **ANSYS Fluent** and analyzed aerodynamic coefficients
  - Investigated **dimple effects** on golf ball aerodynamics by varying size parameters and **Magnus effect** on basketball's trajectory
- **Design and Analysis of a Quad-Wing Flapping Prototype | Prof. Sandeep Saha** *Aug 2023 - Nov 2023*
  - Designed and built a **dragonfly-inspired** quad-wing flapping prototype with a **gear-slider** mechanism for **variable wing phase**
  - Integrated a **passive joint** to allow wing rotation for realistic lift generation and conducted smoke visualization experiments
  - Gauged force changes with varied wing beat frequencies and front-wing-hind-wing phase differences, using **precision sensor**
  - Analyzed spanwise and chordwise wing flexibility effects on lift using **3** different wing materials, utilizing a high-speed camera
- **Aerial Carbon Emission Monitoring System | Prof. Srinibas Karmakar** *Aug 2023 - Nov 2023*
  - Designed a drone-deployed module equipped with **MQ7** and **MQ135** sensors and measured **CO** and **CO2** emissions real-time
  - Developed a method for ascent time calculations, intended for a **helium-balloon-lifted setup**, adopting an atmospheric model
  - Administered an altitude tracking system using **BMP280** sensor data and employed **nRF24L01** modules for data transmission
- **Qualitative study on Worthington Jets | Prof. Sandeep Saha** *Mar 2023 - Apr 2023*
  - Experimentally investigated the effects of **hydrophobicity**, **impact velocity**, and **sphere size** on Worthington jet characteristics
  - Captured high-frame-rate video recordings to observe the **surface closure** phenomenon and recreated the **Manu bomb** effect
- **Smart Irrigation System | Prof. Manjunatha Mahadevappa** *Feb 2022 - Mar 2022*
  - Implemented an automated irrigation system, using **Arduino**, optimizing water usage based on **soil moisture** and **temperature**
  - Integrated and calibrated moisture sensor, **LM35** and a water pump, and developed embedded software to control irrigation

## TECHNICAL SKILLS

- **Languages**: Python | C | MATLAB | Arduino | Visual Basic | LaTeX
- **Software**: MATLAB/Simulink | Ansys Fluent | Fusion 360 | Pix4Dmapper | Photoshop | Premiere Pro

## RELEVANT COURSEWORK

Automatic Control of Aircraft | Flight Stability and Control | Introduction to Flight Vehicle Controls | Mechanics of Flight
Embedded Control Systems | Systems Laboratory | Introduction to Helicopter Engineering | Dynamics for Aerospace Engineers

## ACHIEVEMENTS

- **AIR 5855** (top **0.55%**) in **JEE Advanced** | **AIR 8532** (top **0.8%**) in **JEE Mains** | **Rank 28** (out of **70000**) in **KEAM** *(2021)*
- Awarded departmental transfer to Aerospace Engineering based on a strong freshman-year academic performance *(2022)*

## EXTRA-CURRICULARS

- Won overall **gold** at the Inter IIT Cultural Meet, 2023; Secured **3rd** (2023) & **5th** (2024) for Inter-Hall Short Film Making
- Member of RadhaKrishnan Hall soccer team (2022 to present), qualifying for Inter-hall GC **quarterfinals** in 2023 & 2024