

# JOTHIKA KUMAR

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🌐 [LinkedIn](#) | 🌐 [Portfolio Website](#)



## EDUCATION

### Delft University of Technology, Netherlands

Sept 2024 - Present

*Master of Science in Aerospace Engineering*

GPA: 8.5/10

- **Track:** Aerospace Structures and Materials (Design and Safety of Structures Profile)
- **Research Interests:** FEM, Computational Mechanics, Lightweight Structures, Sustainable Aviation

### National Institute of Technology, Tiruchirappalli

Aug 2020 - May 2024

*Bachelor of Technology in Mechanical Engineering*

CGPA: 9.56/10

- **Department Rank:** 2/133
- **Related Coursework:** Structural Mechanics, Finite Element Method, Fluid Mechanics, Computational Modelling

### D.A.V Public School, Velachery, Chennai

April 2019 - March 2020

*Class XII CBSE Board*

Percentage: 97.6%

## WORK EXPERIENCE

### Teaching Assistant, Delft University of Technology

April 2025 - Present

- Working as Teaching Assistant for Computational Modelling (AE2220-II) course offered part of Bachelor's curriculum in Aerospace Engineering.

### Research Project, Delft University of Technology

Jan 2025 - Present

*Project: Parametric Finite Element Analysis of Structures with Inclusions*

*Under Prof. Christos Kassapoglou*

- Working on creating a **parametric finite element model in Abaqus** to examine a plate under far-field tension containing circular inclusions to gain insights about stress distribution in a composite matrix with circular fibers.

### Bachelor Thesis, National Institute of Technology, Tiruchirappalli

Dec 2023 - May 2024

*Project: Numerical Modeling and Analysis of Flexible Heat Pipe for Space Applications*

*Under Prof. Dr. Suresh S*

- Simulated **boiling and condensation** in thermosyphon using ANSYS FLUENT with multiphase models, extending to heat pipes with porous media model to analyze evaporation, condensation, and **capillary action**.
- Investigated the **impact of pipe bending** (0°–90°) on performance under varying water **fill levels** and **power inputs**.
- Validated numerical results against experimental data, achieving a close match (**17% difference**), highlighting reduced thermal conductivity with increased bending angles.

### Summer Research Internship, RWTH Aachen University, Germany

May 2023 - Sept 2023

*Project: Analysis of Thermal protection system of reusable launch vehicles*

*Under Prof. Dr.-Ing. Kai-Uwe Schröder*

- Performed structural and thermal simulations in **OpenFOAM** for a **composite** of **PCM** and **lattice structure** sample by varying conditions to determine the **effect of convection** on thermal performance.
- Updated the **custom PCMLattice solver** to the latest OpenFOAM version using C++ in Ubuntu.
- Analyzed Temperature-Time-Liquid Fraction plots, observed **reduced melting time** with increased gravity, and investigated Rayleigh-Bénard convection cells using ParaView, Python, and Julia scripts.

### Research Internship, Indian Institute of Technology, Bombay

May 2022 - Dec 2022

*Project: Design and Analysis of Amphibian Aircraft*

*Under Dr. Dhwanil Shukla*

- Carried out an extensive literature review on **amphibian systems** capable of takeoff and landing on water and land.
- **Led a team** of six students working on design, analysis, propulsion, control, and communication aspects.
- Designed CAD model of **telescopic wing** with a retracting mechanism for various wing planforms in SOLIDWORKS.
- Modeled an **fuselage integrated with a one-step hull design** and performed **structural analysis** in ANSYS.

## SKILLS

**Programming Languages & Computer Tools:** Python, MATLAB, Julia, C, C++, Simulink, SQL, MS Office

**Engineering Software:** ABAQUS, CATIA, ANSYS, OpenFOAM, Paraview, SOLIDWORKS, COMSOL Multiphysics, Fusion 360, AutoCAD, XFLR5

**Languages:** English (professional), Tamil (native), Hindi (regional), French (beginner), German (beginner)

## PROJECTS & COMPETITIONS

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### Cyclocopter Bin | *Sangam, Pragyan Techfest '23*

Dec 2022 - May 2023

- Engineered a **waste collection drone** with four **cyclorotors**, utilizing **image processing techniques** to map regions of high floating waste and remove it from the surface water effectively.
- Designed a detailed CAD **assembly of the cyclocopter** and analyzed the flow-lift and drag attributes in ANSYS.
- **Fabricated the model** and successfully tested the cyclorotor technology with **3D-printed materials**.

### Multirotor Drone | *SAE AeroTHON '22*

April 2022 - Nov 2022

- Developed a **quadcopter** with **targeted payload delivery** capabilities and integrated image processing for advanced **surveillance** applications.
- Designed CAD model of **Hybrid X frame**; performed **topology optimization** and **structural analysis** in ANSYS.
- Fabricated the drone using **carbon fiber-balsa composite structure** using the **vacuum bagging technique** and successfully tested it.

### Albatross | *Sangam, Pragyan Techfest '22*

Nov 2021 - March 2022

- Developed a self-sustainable, efficient **glider that detects forest fires** using image processing and alerts base station.
- Spearheaded a six-membered team and worked on the CAD Model of the **wing and curved fuselage**, fabrication of the plane and successfully **published** as a research article in **AIP Conference Proceedings**.

## POSITIONS OF RESPONSIBILITIES

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### Events Commissioner | **Enlightness** | *TU Delft*

Oct 2024 - Present

- Responsible for organizing technical workshops, mentorship programs, and the **annual career event** to aid master's students in the faculty of Aerospace.
- **Skills:** Teamwork, Organizational abilities, Problem-Solving

### Vice President | **The Third Dimension Club** | *NIT Trichy*

Aug 2021 - May 2024

- Led a team of **45 aviation** enthusiasts to undertake research projects and participate in nationwide competitions.
- **Senior lead** in projects involving structural mechanics, material analysis, composites and design of UAVs.
- **Skills:** Leadership, Decision-Making, Strong Communication, Critical-thinking, Positive Mindset

### Senior Graphic Design Manager | **Graphique** | *NIT Trichy*

Aug 2021 - May 2024

- Worked on projects, posters, and competitions **as a digital artist** in the university's official graphic design club.
- **Graphic Design Tools:** Adobe Photoshop, Adobe Illustrator, Autodesk Sketchbook, Procreate

## AWARDS

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### Prestigious Scholarships

- **NL Scholarship (TU Delft)** - Awarded for academic merit to cover first-year **living expenses**.
- **DAAD WISE** - Fully funded research internship in **Germany**, ranking among the top 150 students in India.
- **KC Mahindra** - Interest-free loan scholarship for **top 90 students** nationwide based on overall excellence.

### Academic Excellence & Recognition

- **Institute Award** - Achieved **1st rank in Mechanical Engineering & 2nd in the university** (2020-21).
- **RSI-C IITM Summer Program** - Selected among **top 2** from 250 students, organized with **MIT & CEE**.
- **Gold Medals (10th grade)** - First Rank in District, Best Outgoing Student, Best in Cultural & Young Scientist.

## PUBLICATIONS

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### Autonomous Multi-Rotor UAVs: A Holistic Approach to Design, Optimization, and Fabrication

In Press

- Presented paper at the International Conference on Advances in Mechanical and Aerospace Engineering (ICAMAE).

### Albatross: Unmanned self-sustainable glider for forest fire detection | *Link*

Sept 2022