SHRINIDHI
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PERSONAL PROFILE

Master's student with a focus on aerodynamics, with hands-on experience in CFD, turbulence modeling, and simulation-driven design. Skilled in optimization and analysis of complex systems, motivated to apply theory to practical aerospace projects and deliver innovative solutions in interdisciplinary teams.

EDUCATION

Master of Science | ***Computational Sciences in Engineering*** Oct. 2022 – Present
Technische Universität Braunschweig Braunschweig, Germany
Relevant Coursework: ***Fluid Mechanics, Finite-Volume-Method, High Lift Aerodynamics, Fluid-Structure Interaction, Flow-Induced Vibrations, Multidisciplinary Design Optimization (MDO), Applied Topics in MDO, Thermodynamics & Statistics, Aerothermodynamics.***

Summer School | ***Advanced Sustainable Aviation Technologies*** Aug. 2023
Technische Universität Braunschweig Braunschweig, Germany
Relevant Coursework: ***Overall Aircraft Requirements, Aircraft Aerodynamics, Active Flow Control for Aircraft, Advanced Propulsion Systems, Advanced Systems Engineering.***

Bachelor of Engineering | ***Mechanical Engineering*** Aug. 2018 – June 2022
Visvesvaraya Technological University Mysuru, India
Relevant Coursework: ***Fluid Mechanics, Heat Transfer, Basic & Advanced Thermodynamics, Engineering Graphics, Computer Aided Machine Drawing, Computer Aided Modelling and Analysis.***

WORK EXPERIENCE

Research Assistant (HiWi) Mar. 2025 – Present
Technische Universität Braunschweig - Institut für Flugzeugbau und Leichtbau Germany

- Contributing to the **UNICADO - UNIversity Conceptual Aircraft Design and Optimization** framework by supporting the testing and documentation of Python-based optimization loops leveraging Design of Experiments (DoE) and Surrogate Modelling techniques.
- Extending WuFoil, a Python-based aerodynamic analysis tool integrating Gmsh, SU2, and ML-based airfoil shape optimization.

Research Assistant (HiWi) June 2024 – Feb. 2025
Technische Universität Braunschweig - Institut für Flugzeugbau und Leichtbau Germany

- Supported the redevelopment of lecture materials for "Entwerfen von Verkehrsflugzeugen I," covering aircraft sizing, aerodynamics, performance, and cost estimation in early-stage aircraft design.

Research Assistant (HiWi) Dec. 2024 – Jan. 2025
Technische Universität Braunschweig - Institut für Strömungsmechanik Germany

- Assisted in setting up a droplet velocity and size measurement rig in the icing wind tunnel for optical characterization of multiphase flow.

Research Assistant (HiWi) Aug. 2023 – Apr. 2024
Technische Universität Braunschweig - Institut für Flugzeugbau und Leichtbau Germany

- Extended PyAeroSweep, a Python-based tool for aircraft analysis and conceptual design, by implementing Spalart–Allmaras and k-ω SST turbulence models for various high-lift configurations.
- Enhanced automated mesh generation (structured and unstructured) and CFD simulation pipelines using Fidelity Pointwise and SU2 on Linux.
- Authored technical documentation and supported integration of the tools into aircraft design studies.

Intern Aug. 2021 – Sept. 2021
Hindustan Aeronautics Limited - Aerospace Division India

- Gained exposure to satellite launch vehicle assembly, welding, CNC machining, tool design, quality control, and cross-departmental operations.

PROJECTS

Aerodynamic Design of a Fowler Flap for a Hybrid Laminar Flow Control Airfoil Jan. 2025 – Apr. 2025
Studienarbeit - in association with Sustainable and Energy-Efficient Aviation (SE²A) Cluster Germany

- Designed and Optimized a Fowler flap for a hybrid laminar flow control (HLFC) airfoil using SU2 with the k-ω SST turbulence model and an automated Python-CFD workflow (PyAeroSweep), achieving up to **4.5% gain** in lift ($C_{L_{max}}$).
- Conducted Mesh and Parameter sensitivity studies, and applied One-At-a-Time optimization to refine flap geometry for takeoff and landing conditions.

Developing Methodology for Model Fitting to be used in Fluid-Structure Coupled Problem Jan. 2025
Course Project - in association with Chair of Structural Analysis, TU München Germany

- Modeled fluid–structure interaction of a slender beam in a wind tunnel using Kratos Multiphysics with velocity and deformation sensor data at two points.
- Developed a system identification and optimization workflow to determine Young's modulus at multiple beam segments, evaluating coupling strategies (Gauss–Seidel, Jacobi) for accuracy and efficiency.

Design and Fabrication of Quad-Plane for All-Terrain applications Oct. 2021 – June 2022
Bachelor Thesis India

- Led a team of four to design and fabricate a fixed-wing eVTOL UAV (1.2 m wingspan, 3 kg MTOW) optimized for medical supply delivery.
- Performed initial aerodynamic design in XFLR5, CAD modeling in SolidWorks, and CFD-based aerodynamic optimization and structural validation in Ansys Workbench.
- Designed and 3D-printed propeller ducts to enhance propulsion efficiency and safety.

Finite Element Analysis of an Aircraft Wing using Aluminium Alloys and CFRP materials Apr. – Aug. 2021
Pre Final Year Thesis - Bachelor India

- Led a four-person team performing numerical mesh generation. finite element analysis and simulation of an ATR 72-600 wing under takeoff and landing loads using SolidWorks, XFLR5, and Ansys Workbench.

SAE International - SAE Aero Design West 2022 - CA, USA - Vymanika June 2021 – Apr. 2022
SAE Aero Design India

- Captain of a 14-member team, leading all project phases for an RC aircraft (1.2 m wingspan, 3 kg MTOW), including design, aerodynamic and structural analysis, simulation, fabrication, and competition.
- Managed full-scale build and integration while performing CAD in SolidWorks, aerodynamic modeling in OpenVSP/XFLR5, CFD and FEA in Ansys Workbench.
- Co-authored Technical Design Report and delivered Technical Presentation.

SAEINDIA - Aerothon 2021 - Virtual Aero Design Contest - Vymanika Apr. 2021 – June 2021
SAE Aero Design India

- Captain of a seven-member team leading all aspects of UAV design, aerodynamic and structural analysis, simulation (5.28 m wingspan, 25 kg MTOW).
- Lead CAD designer and aerodynamicist, developing designs in SolidWorks/XFLR5 and performing CFD & structural optimization in Ansys Workbench.
- Contributed to design optimization and co-authored Technical Reports and delivered Technical Presentations.

SKILLS

Languages: English (Fluent), German (DSH-1/B2), Hindi (Fluent), Kannada (Native).

Programming: Python, C & C++ (Basic), MATLAB & Simulink (Basic).

Mesh Generation: Ansys Workbench (Mesh), Fidelity Pointwise.

CFD & Aerodynamics: SU2, Ansys Fluent, XFLR5.

CAD & Parametric Design: CATIA V5, SolidWorks (Certified Professional), 3DEXPERIENCE (Basic), OpenVSP.

Post-processing & Visualization: Ansys CFD-Post, ParaView.

Process Automation & Tools: Python scripting, MS Office Suite, Google Workspace, LaTeX, Git, Windows, Linux.

VOLUNTEERING

Rotaract Club of Vidyavardhaka College of Engineering July 2021 – June 2022
Treasurer India

- Coordinated events and awareness campaigns on entrepreneurship, mental health, and other community initiatives.

NSS and Red Cross Youth Wing Dec. 2018 – July 2022
Volunteer India

- Coordinated outreach activities in needy villages, including surveys, awareness campaigns, and empowerment initiatives.