Curriculum Vitae
Shantanu S. Gulawani
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1 Contact Information

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2 Education

M.Tech. Aerospace Engineering (Aerodynamics), Indian Institute of Technology Bomby, 2023.

B.E. Aeronautical Engineering, Annasaheb Dange College of Engineering and Technology, Ashta, 2019.

3 Work Experience

Assistant Professor, MVJ College of Engineering, Bengaluru, April 2025 – Present.

Project Engineer, IIT Madras – Deputed at Aeronautical Development Agency (ADA), Bengaluru, Oct 2023 – present.

- Supported algorithm testing and software integration of data fusion suit, including C-code generation and post-processing tools for data analysis.
- Set up a prototype framework combining OpenFOAM and LibTorch for PINN-based CFD simulations, focusing on hybrid learning-simulation workflows.
- Explored optimal control problems using OpenMDAO and Dymos for combat maneuvering.

Project Engineer, Indian Institute of Technology Bombay, Sep 2019 – Mar 2022.

- Contributed to an ISRO-sponsored project on Multidisciplinary Design Optimization (MDO) of Lighter-Than-Air (LTA) systems for planetary exploration.
- Developed core analysis modules for heat transfer, atmospheric modeling, and trajectory simulation.
- Supported balloon system design using a custom MDO framework for conceptual mission planning to Venus.

4 Academic Positions

Teaching Assistant, IIT Bombay, Jan 2023 – May 2023.

Introduction to Lighter-than-Air Systems, Post-graduate elective.

Teaching Assistant, NPTEL, Jul 2022 – Dec 2022.

Introduction of Aerospace Engineering.
Introduction to Aircraft Design.

Mentor, Summer of Code event, IIT Bombay, Mar 2021 – Jun 2021.

Introduced first-year students to Machine Learning and programming fundamentals.

5 Awards and Distinctions

- Department's Distinguished Alumni award, ADCET, Dec 2024.
- Academic Excellence award, ADCET, 2016 & 2017.

6 Research Projects

[R1] **Conceptual Design of Hybrid Airship for Venus Exploration.**
Feasibility analysis, flight performance evaluation, and multi-point design optimization for long-endurance missions.

[R2] **Development of Expert System for Combustion Monitoring using Neural Networks.**
Built a test-rig and trained neural networks (MATLAB) using experimental data for open-system combustion diagnostics.

[R3] **Flutter velocity prediction of Cantilever Plate by Similitude Method.**
Theoretical and experimental study of fluid-structure interaction; derived empirical flutter velocity formula.

[R4] **Laminar to Turbulent Transition Analysis on Flat Plate and Zhiyuan-I airship.**
Automated laminar–turbulent transition simulations on HPC for flat plate and airship geometries.

[R5] **Portfolio Optimization using Evolutionary Algorithms.**
Implemented GA, PSO, and Simulated Annealing; applied framework to S&P500 with historical validation.

7 Conference Presentations

[C1] S. S. Gulawani and R. S. Pant. Conceptual Design and Optimization of Airship for Venus Exploration. *6th National Conference on Multidisciplinary Design Analysis and Optimization*, Guwahati, Dec 2023.

[C2] S. S. Gulawani, K. M. Kiran Babu, R. S. Pant and P. Priyadarshi. Design of Buoyant Platforms for Venus Exploration. *Venus Science Conference*, Ahmadabad, Sep 2022.

[C3] S. S. Gulawani, A. Magar, K. M. Kiran Babu and R. S. Pant. Numerical Investigation of Laminar to Turbulent Boundary Layer Transition over Airship Envelopes. In *Design and Engineering of Lighter-Than-Air Systems*. June 2022.

[C4] S. S. Gulawani, K. M. Kiran Babu, R. S. Pant. Study of Distributed Architectures for Multidisciplinary Design Optimization using OpenMDAO. *ECCOMAS Thematic Conference on Multidisciplinary Design Optimization of Aerospace Systems (Aerobest)*. Lisboa, Portugal, July 2021.

[C5] S. S. Gulawani, A. Magar, K. M. Kiran Babu. Laminar to Turbulent Transitional flow Over Flat Plate. *OpenFOAM and Scilab Conference*. Pune, Aug 2018.

8   Invited Presentations

[P1] *Introduction to Computational Fluid Dynamics.* Annasaheb Dange College of Engineering and Technology Sangli, Maharashtra, Jan 2023.

[P2] *How to prepare for GATE-Aerospace examination.* Annasaheb Dange College of Engineering and Technology Sangli, Maharashtra, Jan 2023.

[P3] *Introduction to Python Programming.* Sandip University, Nashik, Maharashtra, May 2021.

9   Leadership & Organizational Roles

Team Lead, Solar Powered Airship Racing Team, Jul 2021 – Jan 2023.

Lead mechanical and aerospace subsystem for development of airship technology.

Fabricated and demonstrated indoor airships at various competitions and technical events.

Conference organizing committee member, June 2021 – Jun 2022.

International conference on Design and Engineering of Lighter Than Air Systems - 2022. Coordinated the organization of a regatta competition attended by international participants.

Managed logistics, budgeting, and communication, ensuring smooth execution of the conference.

10   Certifications

1. NPTEL – MATLAB programming for numerical computation
2. NPTEL - Introduction to Haskell Programming
3. NPTEL - Nonlinear programming
4. NPTEL - Aircraft Stability and Control
5. ISNT Pune Chapter - Non-destructive testing

11   Technical Skills

OpenFOAM: Open-source C++ library for continuum mechanics, used for Computational Fluid Dynamics study of boundary layer transition analysis, parallel computing and for Physics-Informed Neural networks implementation.

OpenMDAO: Open-source python library for multi-disciplinary optimization, was utilized to develop design optimization framework.

Dymos: Open-source python library for optimal control, used to formulate and solve complex simultaneous trajectory and design optimization problems in aerospace engineering.

MATLAB & Simulink: Demonstrated experience in using following toolboxes – Aerospace Toolbox, Matlab & Embedded Coder for automatic code generation for target hardware, Deep Learning Toolbox, App Designer.

C & C++: Familiar with Object-Oriented programming, file IO, scientific computing, and compilation of large complex projects in linux and Visual Studio.

Python: Professional experience in developing and maintaining packages for scientific computing. Familiar with object-oriented programming and pep8 style for programming.

Haskell: Fundamental knowledge of Functional Programming using Haskell and familiar with tooling for software development.

Github: Experienced with software development using git version control.

Linux: Familiar with installing and building from source the complex open-source solvers, packages and libraries. Utilized open-source tooling for coding and application development

12   Research Interests

Functional programming paradigm for scientific computing.

Numerical analysis and computational methods.

Optimization algorithms and strategies.