Falak Mandali

Email: falak8112.mandali@gmail.com **Cell Phone**: +17653894460
LinkedIn: https://www.linkedin.com/in/fmandali/ **Portfolio:** https://fmandali82.github.io/portfolioApp/

Hands-on experience in robotics and aerospace has shaped my passion for system modeling, optimization, and control design. I bring a strong foundation in bridging theoretical methods with hardware implementation, and I am eager to expand my skills in both high- and low-level control system design, while supporting cross-team integration and system development.

EDUCATION:

PURDUE UNIVERSITY, West Lafayette, Indiana
MS in Mechanical Engineering (ME) ***Dec 2026***
Relevant coursework*: dynamics, classical estimation & control theory, reinforcement learning, statistics*
BS in Aeronautical and Astronautical Engineering (AAE) ***Dec 2024***
Relevant coursework*: flight dynamics, optimal estimation & control, embedded programming*

RESEARCH EXPERIENCE:

PURDUE UNIVERSITY, West Lafayette, Indiana
TERRAIN ROBOTICS ADVANCED CONTROL AND EXPERIMENTATION (TRACE) LAB
Graduate Research Assistant ***Jan 2025 – present***

- Implemented an invariant extended Kalman filter (InEKF) on a bipedal humanoid robot for state estimation to facilitate robot control on a moving surface.
- Spearheaded perception module design for ball tracking using cameras and robot localization using motion capture technology, to provide observation with an accuracy of 2 cm for RL-driven locomotion control of a bipedal humanoid robot.

Skills: *Python* | *C/C++* | *ROS2* | *Docker* | *Ubuntu OS* | *Vicon MoCap* | *Agility Robotics "Digit"*

JAIN RESEARCH LABORATORY
Undergraduate Research Assistant ***Sept 2022 – Dec 2022***
Summer Undergraduate Research Fellow (SURF) ***May 2022 – Aug 2022***

- Demonstrated effectiveness of the control co-design process in simultaneous optimization of geometric design of a phase-changing thermal energy storage (TES) device and its controller.
- Validated robustness of the proposed TES design with 52% higher phase-changing material by volume, in its ability to mitigate a transient heat load for longer without needing to be recharged.
- Received ITherm 2023 Best Poster Award in the System Level Thermal Management Track by IEEE.

Published: *F. Mandali, M. Shanks and N. Jain, "Control Co-Design of a Thermal Management System with Integrated Latent Thermal Energy Storage and a Logic-based Controller," 2023 22nd IEEE ITherm, Orlando, FL, USA, 2023, pp. 1-10, doi: 10.1109/ITherm55368.2023.10177617.*
Skills: *MATLAB* | *LaTex*

INDUSTRY EXPERIENCE:

MAGLEV AERO Inc., Boston, Massachusetts
Aeromechanical Engineering Intern ***Jan 2023 – Aug 2023***

- Contributed to formulation of flight dynamics and simulation of an eVTOL in MATLAB.
- Optimized 13 design parameters of the propulsion system to reduce power consumption and weight.
- Established a connection between MATLAB and AWS to reduce optimization computation time to 2 hrs.
- Conducted scalability analysis of propulsion system to understand its performance with increasing size from a test hub of 600 mm diameter to the proposed full-scale hub of 2000 mm diameter.

Skills: MATLAB | *Simulink* | *Amazon Web Services EC2* | *GitHub*