FAZLE RABBI ZAKI

jakiu@umich.edu | Detroit, MI | linkedin.com/in/fazlerabbizaki | Portfolio

EDUCATION

University of Michigan   Ann Arbor, MI
B.S.E. in Aerospace Engineering   *Expected May 2026*
- **Dean's Honor List:** Fall 2025
- **Coursework:** Attitude Determination & Control Systems (grad), Engineering for the Space Environment (grad), Automatic Control, Space System Design, Spacecraft Dynamics, Propulsion, Aerodynamics, Aerospace Lab

TECHNICAL SKILLS

- **GNC/ADCS:** Rigid-body dynamics, quaternion kinematics, B-dot detumble, PID/LQR control, state estimation (TRIAD, EKF), momentum management
- **Software:** Python (NumPy, SciPy), MATLAB/Simulink, C++, Git
- **Tools:** SolidWorks, CATIA, STAR-CCM+ (CFD), oscilloscope, DAQ systems, multimeter

ENGINEERING PROJECTS

CubeSat ADCS Imaging Testbed — ADCS & Systems Lead   Sep 2025 – Present
University of Michigan (Graduate-Level Course)   *Ann Arbor, MI*
- Designed and integrated a **1U CubeSat** (<1 kg) with reaction wheel, magnetorquers, IMU, magnetometer, and star/IR cameras to enable autonomous detumble-to-pointing operations for Earth imaging.
- Implemented **TRIAD/EKF** attitude estimation and **B-dot/PID/LQR** control algorithms in Python/MATLAB, achieving **0.2 mrad** pointing accuracy on 1-axis hardware-in-the-loop testbed.
- Led systems engineering for 15-member team: derived Level-1 requirements from mission objectives, built mass/power/volume budgets, and authored interface control documents (ICDs) to coordinate subsystem integration.
- Designed and built a **Helmholtz coil testbed** generating $\geq 3\times$ Earth field strength for repeatable ADCS mode testing and sensor calibration.

Horizontal-Axis Wind Turbine Generator   Jan 2024 – Apr 2024
University of Michigan   *Ann Arbor, MI*
- Designed and built a self-yawing **1.54 m HAWT** with three 80 cm blades, achieving **6.45 V peak output** and successful power delivery under test conditions.
- Verified structural integrity through **5 safety inspections** including 300 N lateral load test and high-wind disassembly, enabling rooftop deployment approval.
- Instrumented and analyzed performance: measured **TSR up to 7.2**, identified efficiency bottlenecks, and recommended 1:3 gearing ratio to improve shaft speed.

Titan Air Puck — Aerospace Systems Design   Jan 2023 – Apr 2023
University of Michigan   *Ann Arbor, MI*
- Modeled hexagonal lift platform in CATIA and validated with **STAR-CCM+ CFD** to optimize lift-to-power ratio, simulating 1.41 N lift at 1.51 W input.
- Demonstrated **6.68 s hover time** (no payload) and carried **80 g payload** in competition while maintaining mass under 800 g.

Low-Altitude Hovercraft — Aerospace Systems Design   Jan 2023 – Apr 2023
University of Michigan   *Ann Arbor, MI*
- Performed internal/external **CFD analysis** in STAR-CCM+ on Milano geometry, predicting 4.22 N lift and $C_D = 1.09$.
- Demonstrated **18.2 s straight-line** and **60.7 s maneuvering** course times; retrieved **36 payloads** in competition.

Seam Carving Algorithm — C++ Implementation   Aug 2023 – Dec 2023
University of Michigan   *Ann Arbor, MI*
- Implemented content-aware image resizing using $O(NM)$ **dynamic programming**, reducing runtime **25%** vs. baseline.
- Developed comprehensive unit tests with edge-case coverage and applied RAII memory management to eliminate memory leaks and ensure robustness.

ACTIVITIES

Michigan Aeronautical Science Association (MASA)   Ann Arbor, MI
Member — Avionics Subteam   *2025 – Present*
- Supporting avionics integration for hybrid rocket targeting 30,000 ft apogee; participating in coldflow test campaign and hardware-in-the-loop (HITL) test infrastructure development.
- Assisting with ground support equipment (GSE) setup and EBox sensor checkout for propulsion system testing at MCity facility.