Jacob Lancaster

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EDUCATION

The University of Michigan, Ann Arbor, MI   **Jan. 2024-Dec. 2025**
Master of Science, Aerospace Engineering   GPA: 3.775/4.00
The University of Georgia, Athens, GA   **Dec. 2021**
Bachelor of Science, Mechanical Engineering   GPA: 3.39/4.00

WORK EXPERIENCE

Co-Founder, Director of Engineering   **March 2024-Present**
Washtenaw Precision Engineering, Ann Arbor, Michigan

- Facilitated meetings and negotiations with domestic and international clients, government organizations, and investors, fostering strong relationships and ensuring successful outcomes
- Directed engineering operations for the design, development, and production of and ordinance systems, ensuring compliance with industry standards and safety regulations.
- Co-founded and grew ordinance manufacturing company, establishing a niche in the defense sector specializing in advanced rocket launcher technology
- Led the design and testing of advanced rocket systems, integrated telemetry data for performance optimization, and utilized FEA for structural analysis and CFD for aerodynamic improvements

Mechanical Design and Analysis Engineer   **June 2021-Jan. 2024**
MAHLE Powertrain, Plymouth, Michigan

- Worked within a systems engineering framework to design and develop complex components, ensuring seamless integration with overall system architecture and meeting performance, safety, and regulatory requirements.
- Engaged in cross-disciplinary research, spearheading investigations into the synergies and contrasts between Electric Vehicle (EV) and Internal Combustion Engine (ICE) systems, fostering a comprehensive understanding of the interplay between these technologies to drive innovative engineering solutions
- Engineered an optimized electrical powertrain system capable of efficiently delivering high electrical loads while leveraging convection cooling techniques to minimize thermal stress on the hybrid engine system
- Utilized design software and tools, such as Creo Parametric, SolidWorks, and MATLAB, to create detailed engineering simulations, models and drawings for complex powertrain systems
- Drove the design and integration of prechamber systems, utilizing CFD simulations to optimize cooling flow and ensure efficient thermal management, and applied FEA to analyze material stress and deformation, ensuring structural integrity while minimizing cost and maximizing packaging efficiency.

COLLEGIATE ENGINEERING EXPERIENCE

Graduate Assistant in Research- MagLab   **May 2024-Present**
University of Michigan, Ann Arbor, MI

- Torque Rod Assembly & Characterization: Designed, fabricated, and tested μ-metal torque rod assemblies and drive electronics a; quantified magnetic moment during "firing," measured residual dipoles, and evaluated AC degaussing efficacy to minimize remnant magnetization
- Search Coil Sensor Development: Developed and built three-axis search-coil magnetometer sensors and ground-based electronics for ULF signal detection (0–2 kHz), optimizing core geometry, winding count, wire gauge, and amplifier design to meet stringent noise-floor and sensitivity targets
- Integrated Mode-Switching Electronics: Engineered "switch" circuitry and on-board firmware to seamlessly toggle torque rods between attitude-control firing and AC sensing modes; implemented AC degauss pulses to reset rod magnetization between operations

Graduate Student Instructor: Introduction to Gas Dynamics   **Jan. 2025 – May 2025**
University of Michigan, Ann Arbor Michigan
- Hosted weekly office hours and recitations for class of 100+ students
- Created practice problems and Homework assignments

Graduate Assistant in Research-Aerospace Control Systems Lab   **May 2024-Jan 2025**
University of Michigan, Ann Arbor, MI
- Applied Predictive Cost Adaptive Control (PCAC) to fighter aircraft simulations, demonstrating innovative approaches to adaptive control without relying on prior modeling or training, accommodating unpredictable changes in aircraft dynamics.
- Pioneered control strategies for a bio-inspired rotating empennage (BIRE) aircraft, addressing novel aerodynamic challenges and demonstrating feasibility for previously uncontrolled flight configurations.
- Contributed to technical reports and publications and presented findings on the effectiveness of PCAC integration in advancing aircraft system efficiency

Cube Sat Flight Laboratory   **Jan 2025-Present**
GNC Team Member
- Led testing and validation of critical GNC hardware—including reaction wheels, IMUs, and magnetorquers—ensuring their seamless integration within the overall spacecraft architecture.
- Developed and executed comprehensive hardware-in-the-loop (HIL) test protocols that simulated space environment conditions, incorporating system-level requirements and interfaces to verify robust attitude control performance.
- Collaborated with cross-functional engineering teams to refine test plans, calibrate sensors, and integrate component data into the overall systems engineering process, enhancing CubeSat reliability and mission success.

UGA Formula SAE Team, Athens, GA   **Sep. 2018-Dec. 2021**
2021 Club Vice President and FSAE Powertrain Design Team Lead
- Led team of 60+ engineers to design, prototype, and manufacture vehicle suspension, powertrain, frame, and controls systems
- Communicate with manufacturing teams and professional machine shops to ensure feasibility of designs
- Developed MAT-Lab program to optimize cooling system for any vehicle engine using Effectiveness-NTU method resulting in the publication of a research paper

CONFERENCE PAPERS

Lancaster, J.A., Pasumarthy, Y., Fertig, I., *et al.* "Conceptual Single Launch Lunar PNT Architecture with Sub-Meter Accuracy and Continuous South Pole Coverage for Lunar and Cis-Lunar Operations" (Accepted) AIAA SciTech Forum, Orlando, FL. January 2026

Lancaster, J.A., Richards J.R., Bernstein, D.S., "A Data-Driven Autopilot for a Fighter Aircraft without Prior Modeling or Training" (Abstract Submitted) AIAA Aviation 2025 Forum July 2025

Lancaster, J. A., J.M. Mativo. "Lessons Learned in Engine Temperature Control Through Radiator Configurations: A Formula SAE Design" (Published) American Society of Engineering Education, Engineering Libraries Division Conference, MN. Minneapolis. June 2022