

Braden Farrell

Aerospace Engineer | GNC & Flight Controls | Autonomous Systems | Modeling, Simulation & Test | Human Spaceflight

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EDUCATION

Master of Science in Aerospace Engineering

Expected May 2027

- Texas A&M University, College Station | GPA: 3.83/4.00
- Focus: Guidance, Navigation & Control; Autonomous Systems; Spacecraft Dynamics & Simulation
- Thesis: Autonomous AI-Assisted Spacecraft Maneuver Planning and Control | Advisor: Dr. Gregory Chamitoff

Bachelor of Science in Aerospace Engineering

May 2025

- Texas A&M University, College Station | Awards: Dean's Honor Roll (2x), Distinguished Student (2x).

TECHNICAL SKILLS

Programming: Python, C++, MATLAB, Git/GitHub, Linux, GitHub Actions.

GNC & Dynamics: PID, LQR, successive convexification (SCvx), flight dynamics, trajectory tracking, orbital mechanics, system modeling

Modeling & Simulation: Simulink, Simscape, Space Teams Pro, Unreal Engine, CFD, digital-twin modeling, data analysis

Embedded & Test: Pixhawk, Arduino, IMU sensors, motor drivers, data acquisition, hardware/software integration, simulation V&V

Engineering Tools: SolidWorks, Tableau, Excel, Jira, Confluence, Microsoft Project, EDMS

ENGINEERING & RESEARCH EXPERIENCE

AeroSpace Technology, Research & Operations (ASTRO) Lab | Graduate Research Assistant

Aug 2025 – Present

- Developing an M.S. thesis architecture for hybrid rule-based and AI-assisted spacecraft maneuver planning; defined interfaces from mission state and constraints through modular GNC tool selection, candidate evaluation, STP execution, and performance scoring.
- Develop and integrate Python/C++ guidance, control, command-mapping, and state-monitoring components for lunar-lander operations in Space Teams Pro (STP).
- Lead an 8-student GNC team integrating lunar-lander guidance, control, manual flight, and state-monitoring subsystems; define work packages and coordinate technical interfaces across contributors.
- Led an 11-student Space Operations team translating ISS cargo-transfer tasks, flight scenarios, and astronaut procedures into executable STP missions.
- Served as a Graduate Teaching Assistant for Human Spaceflight Operations and Orbital Mechanics.

Lockheed Martin Aeronautics | F-16 Project Engineer | Three Internships and part-time support

May 2024 – Present

- Support project engineering and performance tracking for a multibillion-dollar portfolio of F-16 contracts serving 17+ international customers; coordinate hardware configurations, engineering changes, and program status.
- Built Tableau and Excel based centralized metric tracking that consolidated program performance data from dispersed documents and spreadsheets, enabling faster status lookup and cross-program comparison.
- Executed F-16 simulation test cases for software compatibility studies; exported aircraft-response data to Excel, analyzed results, and documented findings for engineering review.
- Evaluated fault-tolerant flight-control software under simulated jammed-control-surface scenarios by varying inputs, analyzing aircraft response, and comparing results with baseline behavior.
- Prepared hardware configurations and technical data supporting production readiness, design reviews, and cross-functional decisions across engineering and manufacturing teams.

NUA2NCED Lab | Undergraduate Research Assistant

Jan 2023 – May 2024

- Performed CFD analysis on 50+ airfoil geometries to evaluate aerodynamic performance for hydrofoil, wind-energy, vertical-flight, and RC-aircraft applications.
- Designed and tested an electrically propelled hydrofoil demonstrator, iterating airfoil geometry using simulation and experimental data.
- Created SolidWorks models and 3D-printed prototypes and supported rapid design-build-test cycles across multidisciplinary aerospace research projects.

TECHNICAL PROJECTS

Lunar Lander Terminal Descent Controller

ASTRO Lab

- Implemented Python/C++ terminal-descent software that loaded a time-stepped reference trajectory generated through successive convexification (SCvx) and interfaced it with STP vehicle-state and actuation systems.
- Applied a combination of LQR and PID feedback to track the reference trajectory through powered descent and correct deviations from the commanded state history.
- Demonstrated closed-loop trajectory tracking and successful touchdown in STP's Unreal Engine-based real-time physics simulation.

Lunar Lander Manual Flight Controls

ASTRO Lab

- Built Python/C++ manual-control software that converted keyboard and controller inputs into desired throttle and rotational commands for a simulated lunar lander.
- Mapped fixed-axis main-engine thrust to body-Z forces and RCS attitude commands to body torques, enabling real-time translation and rotation without main-engine gimbal.
- Created input handling, main-engine command logic, and a state monitor tracking vehicle position, velocity, attitude, angular rates, and commanded states during operation.
- Separated user-input processing, actuator mapping, and state tracking into modular components to support testing, debugging, and future controller extensions.

Return-to-Launch-Site Rocket Vehicle

Chief Engineer, Aug 2024 – May 2025

- Led the end-to-end design, manufacturing, integration, and test of an autonomous vertical-flight vehicle intended to hover 5 ft, translate approximately 5 m, return, and land for a team of 9 engineers.
- Developed flight-dynamics models and MATLAB/Simulink control simulations and coordinated mechanical, electrical, propulsion, controls, and systems interfaces.
- Integrated a Pixhawk 6X, 105 mm 12S electric ducted fan (approximately 7.4 kgf thrust), 150 A ESC, 12S 5000 mAh battery, custom structure, actuators, sensors, and power electronics.
- Completed subsystem and integrated propulsion, power, actuation, and control testing and successfully demonstrated autonomous hover.
- Led formal design reviews and a 50-page Flight Readiness Review covering system architecture, verification status, hazards, and integrated test readiness.

Autonomous Self-Balancing Robot

Independent Project

- Designed and built a two-wheeled embedded control platform using Arduino, IMU feedback, and motor drivers; prototyped a PID controller in Python and deployed real-time control in C++.
- Modeled and manufactured the chassis, logged sensor response, and iteratively tuned controller gains through repeated hardware testing.

AI/AR for Extreme Environments

Graduate Team Project, Fall 2025

- Co-developed concepts for low-visibility perception, lunar distance cues, and AI-adaptive augmented-reality overlays to improve operator awareness in extreme environments.
- Co-designed a roughly 100-square-meter lunar terrain test environment and co-authored a five-page technical paper and presentation on human-performance applications.

LEADERSHIP & SERVICE

The Church of Jesus Christ of Latter-day Saints, Oregon | Missionary / Zone Leader

Jul 2020 – Jul 2022

- Led and coached 40+ missionaries across geographically dispersed teams; set performance goals, conducted individual development meetings, and coordinated weekly operations.
- Designed and delivered training workshops for groups of 70+ on communication, leadership, collaboration, and community service.