

# MASON W. DUNSMUIR



Daytona Beach, FL 2021 - 2025

GPA: 3.21/4.00

# AEROSPACE ENGINEERING

#### **EDUCATION**

#### **Embry-Riddle Aeronautical University**

Bachelor of Science, Aerospace Engineering Minor: Computational Mathematics

Concentration: Rocket Propulsion

# **SKILLS & CERTIFICATIONS**

CATIA V5 Specialist – Mechanical Designer (Dassault Systèmes) Credential ID: C-U6FH7JM9BP Mar 2025 - Present CATIA V5 Specialist – Mechanical Surface Designer (Dassault Systèmes) Credential ID: C-ERMX2F6SLU Mar 2025 – Present

Engineering Software: MATLAB 2025a, Simulink, Python, C++, CATIA V5 (5x Cert.), NX Siemens, NASTRAN, ANSYS, GD&T

Sensor & Connector Systems: Pressure Transducers, Signal Conditioning, DAQ, Harnessing, CFRP/Nylon Integration Modeling & Simulation: GNC Simulations, Monte Carlo Analysis, Hardware-in-the-Loop (HIL), Orbital Modeling, STK

Data Analysis & Illustration: Gantt Charts, Power BI, Tableau, Signal Processing, FMEA, Root Cause Analysis

Software & Embedded Systems: C, C++, MATLAB/Simulink, Control Algorithms, Avionics Bus Interface, Safety-Critical Logic Fabrication: FDM Printing (PLA/CF Nylon), Cura/G-code Tuning, CAD-to-STL Pipeline, Oven Annealing, Lost PLA Vacuum Casting, Composite Molds

#### RELEVANT WORK EXPERIENCE

# Federal Aviation Administration - Aviation Safety (AVS) Student Intern

Aug 2024 – Dec 2024

Assisted in robotic process automation (RPA) implementation for AIR-951 to maintain efficient certification processes. Supported in the implementation of a cloud-based database for tracking certification compliance and operational procedures. Shadowed activities in the Workforce Development Branch AIR-940 to expand skillset and understanding of federal workflows and procedures.

#### PROJECT EXPERIENCE

Shock Tube Optimization - "Design Build Test" Data Acquisition & Analysis | Shockwave Development Jan 2025 – Apr 2025 Designed and integrated pressure transducers and data acquisition systems for shockwave measurement. Collaborated with machinists to resolve CAD-to-CNC compatibility issues, price quoting, and delivery estimates during shock tube test section fabrication. Adapted CATIA models and design tolerances with manufacturing constraints. Conducted signal processing analysis for data extraction.

#### Senior Capstone: RCS (Reaction Control System) Lead | GNC & Thruster Configuration

Jan 2025 – Apr 2025

Led thruster placement, CATIA V5 subsystem design, and control optimization for the Reaction Control System (RCS) on a multi-stage Mars mission. Conducted orbital mechanics simulations to ensure precise maneuverability and docking capabilities. Integrated feedback control algorithms and assessed sensor placement for optimal attitude determination.

# Advanced Engine Assembly & CAD Optimization – CATIA V5 Specialist | Model-Based Systems

Jan 2025 – Apr 2025

Jan 2025 - Apr 2025

Designed and modeled parametric components for a four-cylinder combustion engine, utilizing Generative Shape Design (GSD). Implemented assembly optimization techniques to improve ease of manufacturing and design flexibility. Conducted FEA analysis on components to verify structural performance under varying loads and kinematic scenarios.

#### TECHNICAL LAB EXPERIENCE

#### AE 443L - Dynamics and Controls | Embedded Systems

Toolchain: MATLAB, Simulink

Focus: GNC system modeling and control law development

Tuned linear controllers for aerospace systems, verified response with root locus and Bode plots. Modeled state-space form and applied compensation techniques relevant to GNC.

## AE 316L – Aerospace Materials and Manufacturing Applications

Toolchain: MATLAB, Instron Testing System

Focus: Structural and thermal analysis of aerospace components

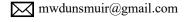
Evaluated aerospace-grade composites under fatigue, vibration, and thermal loading. Applied NDE/NDT methods including VT, PT, UT, and IR to assess material behavior under aerospace loading conditions.

### AE 315L – Experimental Aerodynamics

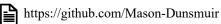
Aug 2023 – Dec 2023

Toolchain: MATLAB, Transonic Wind Tunnel Instrumentation Focus: Subsonic pressure distribution and aerodynamic loading

Collected wind tunnel data across airfoil geometries. Used MATLAB to generate Cp plots and identify boundary layer behavior.







Aug 2024 – Dec 2024

#### **INDEPENDENT ENGINEERING PROJECTS**

#### Additive Manufacturing & Functional Prototyping

Dec 2024 - Present

Designed and fabricated tolerance-sensitive components using CATIA-driven STL workflows and FDM printing. Projects include annealed frames, epoxy-impregnated lattice structures, and casting-ready geometries. Focused on thermal deformation, moisture behavior, and adhesion in PLA Pro, with research-based analysis of PLA+, CF Nylon, and composite polymers. Integrated lost PLA and vacuum casting workflows and applied material science principles to evaluate Inconel 625 for nozzle backing applications.

#### LEADERSHIP & INVOLVEMENT

#### Phi Delta Theta Fraternity

Fall 2024 – Present

Actively participated in chapter events, philanthropy for ALS, and student leadership development. Supported campus service initiatives and promoted the Fraternity's core values of friendship, sound learning, and rectitude. Advised newer students of opportunities and challenges in their upcoming semesters.

#### STEM Outreach Club ERAU – Public Relations & Community Engagement

Fall 2022 - Present

Led public relations for STEM engagement events at Embry-Riddle and Volusia County schools. Supported outreach through presentations, hands-on demos, and student-coordinated STEM initiatives.

#### CFBAA & NBAA YoPro – Business Aviation Engagement

Fall 2022 - Present

Attended networking events, safety symposiums, and professional development sessions with A&P technicians, engineers, pilots, and Gulfstream operations teams. Participated in NBAA YoPro activities focused on connecting young professionals with industry leaders in business aviation.

