(240) 496 0590
zim3@duke.edu

Zachary I. Maldonado

https://www.zachmaldo.com

EDUCATION

Duke University **Aug 2023 - May 2027**
B.S. in Mechanical Engineering; Aerospace Engineering Certificate
GPA: 3.93/4.00

Relevant Coursework/Expertise: Control Systems, Fluid Mechanics, Thermodynamics, Electromagnetism & Optics, Dynamics, Struc/Prop. of Solids, Mechatronics, Modern/Quantum Physics, Aircraft Performance, Space Systems Design, Heat Transfer, Product Design, Computational Fluid Dynamics

KEY COMPETENCIES

- Soldering & Electronics
- MATLAB, Python, LabVIEW
- 3D printing & Rapid Prototyping
- Machining + CNC Milling
- 3D CAD (e.g. SolidWorks)
- Composite Structures
- Mechanical Design
- Finite Element Analysis

RELEVANT PROFESSIONAL EXPERIENCE

Mechanical Systems Engineering Intern (Secret Clearance), AEDC Hypervelocity Wind Tunnel 9 **May - Aug, 2026**

- Worked in aero-optical lab to support Mach 7-18 reentry testing at Tunnel 9 by bringing Mach 5-7 pulsed tunnel online
- Designed control system for fast-acting valves, sensors, and pressure vessels and implemented it with LabVIEW
- Managed large CAD assemblies; designed + 3D printed electrical housings and mounts
- Analyzed electrical drawings and built circuit board for MOSFET control
- Built high-pressure infrastructure, serviced vacuum environment, integrated pressure transducers & thermocouples
- Designed future active nozzle automation of Mach number adjustments; analyzed thermal and structural environment
- Planned & designed for thermal implications of future heater integration to address liquefaction from nozzle expansion
- Experience running design reviews and corresponding with proffessionals

Lighting & Electrical Intern, Energy Select Solar + Solutions **May - Aug, 2025**

- Worked with the interior lighting team to integrate various kinds of energy-efficient LED lighting systems
- Experience managing onsite operations; contracts across private businesses, universities, schools
- Assembled, tested, and installed a large array of fixtures; responsible for changes to existing building electrical layouts

OTHER TECHNICAL & LEADERSHIP EXPERIENCE

President, Duke Combat Robotics **Aug 2026 - Present**

- Manage + mentor several other subteams to rapidly design lightweight robotic systems; compete throughout semester
- Lead design, structural & dynamics analysis, manufacturing of Duke's first 12 lb battlebot
- Utilize impact-resistant materials for 3D printed parts; machine structural and weapon components
- Package control electronics, weapon + drive motors, and wiring harnesses into lightweight designs
- Directing a team of EGR 101 students to construct a new state-of-the-art test enclosure

Mechanical/Structures Subteam, Duke Electric Vehicles (DEV) **Sep 2025 - May 2026**

- 2026 Shell Ecomarathon Competition
- Used SolidWorks surface modeling + flow simulation to design an aerodynamic profile for vehicle exterior structure
- Utilized resin infusion techniques and foam core material to manufacture structural & aerodynamic carbon fiber pieces
- Design door layouts, locking mechanisms; worked with vehicle dynamics and electrical subteams to integrate designs

Electric Hydrofoil Kayak Study **Aug 2024 - Dec 2024**

- Group advised by Duke professor to design levitating kayak using lift from hydrofoils and vectored aquatic thrust
- Integrated remote control capability; designed and waterproofed wiring harness
- 3D printed + coated airfoils & aerodynamic profiles to fit over aluminum hydrofoil frame & thruster adapter
- Analyzed & built mechanically self-adjusting canard system to investigate methods of passive lift control + stability
- Recieved Fall 2026 innovation grant from Duke University Co-Lab to evolve the project

Structures Subteam, Duke Aero **Jan 2024 - April 2025**

- Duke's high power rocketry team. Used SolidWorks to model fairings, structural components; Integrated into rocket
- Experience with the applications of FEA using ANSYS software
- Experience with CNC milling, waterjet cutting, carbon-fiber wet-layups for body structures