Jaden Xander Hernandez

U.S. Citizen | ITAR Eligible | (925) 200-3824 | hernandezjaden4@gmail.com | jadenhernandez.com

Education

Purdue University — *Bachelor of Science in Aeronautical and Astronautical Engineering* *West Lafayette, IN*
GPA: 3.29 / 4.00 Expected May 2026
Awards: Northrop Grumman S.P.A.C.E. Award, Purdue University Presidential Scholarship
Relevant Coursework: Rocket Propulsion, Spacecraft Electric Propulsion, Aerodynamics, Thermal Sciences

Work Experience

Purdue University School of Electrical and Computer Engineering February 2025 – Present
Undergraduate Research Assistant *West Lafayette, IN*

- Evaluated lift and thrust capabilities from 3 to 5 Hz flapping frequencies to verify wing sizing for a 300 g, 1.2 m span bird-scale flapping wing vehicle by conducting unsteady vortex lattice method analysis using the Ptera Software library in Python
- Estimating flapping torque requirements using an Ansys Fluent k-ω transient solver to streamline wing servo selection
- Modeling parametric elliptical wings in SolidWorks, reducing assembly time by 14% by predicting wing rib locations
- Predicted gliding performance for 8 wing geometries with XFOIL and XFLR5 to streamline airfoil selection for wing design and improve peak coefficient of lift by 50% over traditional NACA airfoils by selecting bird-like airfoils
- Producing linkage connectors for wing-driving mechanisms via fused deposition modeling with less than a 3% defect rate

Projects

Solid Rocket Motor Design and Analysis October 2025 – November 2025

- Formulated a three-point star port geometry to produce a 4.6 inch by 1.2 inch, H91 class propellant grain in SolidWorks
- Estimated chamber pressure in openMotor within 3% of actual data, ensuring a 1.39 safety factor for an 800 psi pressure rating
- Programmed a MATLAB trajectory analysis to predict an apogee of 1327 ft, within 2% of apogee obtained from altimeter
- Constructed a model rocket to validate openMotor ballistics and MATLAB trajectory, reaching a 1302 ft apogee in 20 mph winds

Five Dynamics: Ultra-Lightweight Rocket Design August 2025 – Present

- Leading the design of a 10,000 ft apogee, ultra-lightweight rocket (<250 g) powered by a G-class solid rocket motor
- Optimized motor selection by estimating propellant/inert mass in MATLAB, meeting specific impulse requirements
- Leveraging OpenRocket to optimize airframe features and overall stability to increase predicted apogee by 73%
- Modeling preliminary airframes in SolidWorks and utilizing finite element analysis to ensure a margin of safety of over 0.25

Workflow to Estimate Heat Transfer for High Altitude Flight March 2025 – May 2025

- Developed a MATLAB-based UI to estimate convective heating on high-altitude sounding rockets, achieving results within 10% of Ansys simulations while reducing simulation time by over 90% compared to typical finite element methods
- Streamlined the workflow for approximating insulation thickness based on desired internal temperature and intended insulation material, allowing users to make design considerations for insulation earlier in a rocket's design process

Analyzing the Aerodynamic Performance of Flexible Wings April 2025

- Designed a 12 inch span wing using the NACA 0012 airfoil in Autodesk Inventor to be fabricated via fused deposition modeling
- Additively manufactured and tested 3 wings made of TPU filament with differing flexibility to analyze trends between wing flexibility and lift coefficient from subsonic wind tunnel data collected with LabVIEW for -4° to 16° angles of attack
- Verified correlation between lift and trailing edge deformation up to 0.1 inches via Autodesk Inventor finite element analysis

Purdue SIGBots: VEX Robotics Competition Robot Design February 2024 – March 2024

- Oversaw design of an award-winning 15" robot with a holonomic drivetrain, achieving a record of 5 wins and 4 losses
- Coordinated documentation and time management via Gantt charts to assure timely robot development
- Designed components in Autodesk Inventor and additively manufactured them with consideration for durability, manufacturability, and fabrication time to be easily implemented and sustainably used in head-to-head competition

Mars Sample Retrieval Mission Design August 2023 – December 2023

- Created MATLAB models using the patched conics method for a hypothetical Mars sample retrieval mission to design an 11,000 kg, three-stage spacecraft with a mission delta-V budget of 19 km/s
- Researched and selected launch vehicles capable of meeting a 9 km/s delta-V budget to achieve a 500 km low Earth orbit
- Authored and presented a 72-page design report detailing mission parameters and design specifications, leading to the group's recognition for the Northrop Grumman S.P.A.C.E. Award for excellence in design communication

Skills

Design Tools: SolidWorks, Autodesk Inventor, Siemens NX, Autodesk Fusion 360, ASME Y14.5
Simulation and Analysis: Ansys Fluent (CFD), MATLAB, Simulink, Python, C, OpenRocket, openMotor, XFLR5, XFOIL, NASA CEA
Project Tools: Aras Innovator, Jira, Gantt Charts, Microsoft Office Suite
Fabrication: Fused Deposition Modeling, Stereolithography, Laser Cutting
Data Acquisition: LabVIEW, Subsonic and Supersonic Wind Tunnels, Dual Column Tensile Tester, Force Transducers