

Jaden Xander Hernandez

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EDUCATION

Purdue University

August 2022 – May 2026

Bachelor of Science in Aeronautical and Astronautical Engineering

GPA: 3.27 / 4.00

Awards: Northrop Grumman S.P.A.C.E. Award, Purdue University Presidential Scholarship

Relevant Coursework: Rocket Propulsion, Spacecraft Electric Propulsion, Nuclear Thermal-Hydraulics, Aerodynamics, Control Systems Analysis, Thermal Sciences, Dynamics and Vibrations, Fluid Mechanics, Structural Analysis

EXPERIENCE

Nak-seung Hyun Research Program

February 2025 – Present

Undergraduate Research Assistant (Design Engineer)

West Lafayette, IN

- Evaluated aerodynamic performance of varying ranges of wing motion and flapping frequencies for a biomimetic ornithopter robot by conducting unsteady vortex lattice method analysis with Ptera Software.
- Improved coefficient of lift by 50% over traditional NACA airfoils by designing biomimetic airfoil profiles in MATLAB.
- Estimating airfoil and wing performance for gliding with XFOIL and XFLR5 before designing wing spars in SolidWorks.
- Developing parametric elliptical wing profiles in SolidWorks to accelerate prototyping and laser cutting fabrication.
- Manufacturing 6-10 mm shaft and linkage connectors via stereolithography with less than a 3% defect rate.
- Programming FFT MATLAB scripts to filter hundreds of force transducer data sets and evaluate lift and moment trends.

Purdue University INSPIRE Institute

September 2023 – November 2023

Undergraduate Researcher (Reviewer)

West Lafayette, IN

- Coauthored the annual “Engineering Gift Guide” with informative reviews detailing key product features and learning outcomes for 6 out of 27 educational toys aimed at developing STEM skills in children.

PROJECTS

Five Dynamics – Ultra-Lightweight Rocket Design

August 2025 – Present

- Leading the design of a 10,000 ft apogee, ultra-lightweight rocket (<200 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 200%.
- Modeling preliminary airframe geometries in SolidWorks and utilizing FEA to ensure a safety factor of over 1.25.

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 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 Finite Wings

April 2025

- Designed a 12 inch span wing using the NACA 0012 airfoil geometry in Autodesk Inventor to be manufactured via FDM.
- 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 for -4° to 16° angles of attack.
- Verified correlation between lift force and trailing edge deformation up to 0.1 inches through FEA in Autodesk Inventor.

Purdue SIGBots – VEX Robotics Competition Robot Design

August 2022 – May 2024

- Oversaw design of an award-winning, holonomic 15” robot in 2024, achieving a record of 6 wins and 4 losses at tournaments.
- Coordinated documentation and time management via Gantt charts to assure timely robot development across subteams.
- 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

CAD & Analysis: Siemens NX, Autodesk Inventor, SolidWorks, Autodesk Fusion 360, Ansys Fluent (CFD)

Programming & Simulation: MATLAB, Simulink, Python, C, OpenRocket, XFLR5, XFOIL, Ptera Software

Project Tools: Aras Innovator, Jira, Gantt Charts

Fabrication: Fused Deposition Modeling, Stereolithography, Laser Cutting

Data Acquisition: Subsonic/Supersonic Wind Tunnels, Dual Column Tensile Tester, Force Transducers