Zachary Selzman

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Summary

Senior Aerospace Engineering student at California Polytechnic State University with hands-on experience in field testing, engineering design and analysis, manufacturing, and data analysis through Department of Energy research and multidisciplinary engineering projects. Skilled in CAD, Python, MATLAB, experimental testing, and hardware development, with experience in composite fabrication, data acquisition, and system validation. Proven ability to collaborate in a team-focused environment, communicate technical results, and solve complex engineering problems. Seeking opportunities to apply technical and analytical skills to the development, testing, and manufacturing of innovative engineering systems.

Education

California Polytechnic State University — San Luis Obispo, CA

Bachelor of Science, Aerospace Engineering — *Sep 2023 — Expecting Jun 2027*

- Multiple time Dean's List Recipient, member of the AIAA, Wind Power, and Alpine Clubs

Relevant Coursework: Gas Dynamics, Composite Manufacturing, Mechanics of Materials, Materials Science, Aerospace Strucutral Analysis, Thermodynamics, Fluid Dynamics

Technical Skills

Manufacturing & Fabrication: Engineering drawings, Metrology, Carbon Composite Fabrication, CNC Milling, Manual Machining, GD&T

CAD & Design: SolidWorks, Fusion 360, AutoCAD

Programming & Analysis: MATLAB, Python, ANSYS Fluent, QBlade, Julia

Testing & Data Acquisition: Labview, Arduino, Sensors, Experiment Design, Sensor Integration, Test Engineering

Work Experience

Aerodynamics & Structural Test Team Member — Sep 2024 — Present

Cal Poly Wind Power — *San Luis Obispo, CA*

- Designed turbine blade hardware in SolidWorks and supported integration with turbine pitch control systems.
- Conducted pre-test planning and risk assessment discussions to support safe execution of test campaigns.
- Modeled and evaluated aerodynamic performance of turbine blade airfoils using QBlade and Python across varying operating conditions and flow regimes.
- Create and analyze turbine blades using CAD and FEA to ensure that the blades structurally perform well under expected loads and with integration into other mechanical components.
- Fabricate multiple carbon-fiber composite turbine blades for competition-scale wind turbines using forged composite and additive manufacturing techniques.
- Conducted structural and aerodynamic validation testing, analyzed results, and documented findings to support iterative design improvements.

Grader — Sep 2026 — Present

California Polytechnic State University — *San Luis Obispo, CA*

- Grade assignments and exams for 100+ students taking Aerospace Structural Analysis I

SULI Intern — Jun 2025 — Aug 2025

National Laboratory of the Rockies, US Department of Energy — *Arvada, CO*

- Analyzed the impact of obstacle-induced turbulence on small wind turbine power production using field-collected wind data
- Used Python and Excel macro tools to process turbine performance data in accordance with international testing standards.
- Research findings were submitted to an international committee that revised certification requirements for small wind turbines, helping reduce certification cost and testing burden.
- Authored technical reports and presented research findings through a technical poster and formal research paper submitted to the U.S. DOE Office of Science.

Instructional Student Leader — Sep 2024 — Jun 2025

California Polytechnic State University — *San Luis Obispo, CA*

- Led weekly tutoring workshops for 10+ undergraduate students in physics, statics, dynamics, and multivariable calculus.
- Supported students with exam preparation, assignments, and project work across multiple core engineering courses.
- Adopted teaching strategies to accommodate varying student skill levels and learning styles.

Rental Technician — Jun 2022 — Aug 2022

White Pine Touring — *Park City, UT*

- Rented out and performed basic maintenance on the store's bike fleet in addition to assisting in sales operations.
- Provided trail-side customer assistance to clients that needed mechanic services during their rides.

Engineering Projects

Ice Screw
- Machined a screw intended for ice climbing using a manual lathe out of Aluminum.
- Designed and grinded a custom cutting tool for the single point threads.

Carbon Fiber Wing
- Designed and manufactured a 20 inch wing out of carbon fiber for a final project in my Aerospace Structures course
- Designed the ply orientation and layup sequence, relying on two molds to create a top and bottom skin
- Post-processed the wing, ensuring it conformed to a NACA 0012 geometry with a uniform 3° taper.

Air Motor
- Designed, machined, assembled, and tested a pneumatic air motor using SolidWorks, CNC milling, and manual machining.
- Produced engineering drawings, verified component fit and tolerances, and evaluated performance through testing.

Screwdriver
- Produced engineering drawings and machined a modular screwdriver.
- Used manual lathe operations while maintaining dimensional tolerances and manufacturing requirements.

Aerodynamic Code Adventure
- Simulated unsteady viscous flow using `Waterlily.jl` to analyze Strouhal number variation across Reynolds numbers.
- Implemented boundary conditions and flow visualization techniques to characterize vortex shedding behavior.

Certifications

- FCC Amateur Radio License (Technician Class)
- P3 USHPA License