Jonathan Zak

Boston, MA| (781)-296-5804| jonathan.w.zak@vanderbilt.edu | LinkedIn

EDUCATION

Vanderbilt University, Nashville, TN
M.S in Mechanical Engineering, Expected Spring 2026
GPA: 4.00 / 4.00
B.E in Mechanical Engineering, Minor in Material Science, May 2024
GPA: 3.91 / 4.00, Cum Laude
Coursework: FEA, Structural Mechanics, Instrumentation, Statistical Thermodynamics, Mechatronics

ENGINEERING EXPERIENCE

Vanderbilt Aerospace Design Laboratory, Nashville, TN **January 2023 – Present**

Graduate Projects

Dynamic Strain Drop Tower

- Designed and built drop tower test facility for monitoring dynamic strains in carbon fiber vehicle sections
- Integrated Fiber Bragg Grating strain gauges into carbon fiber test facilities for comparison between traditional and fiber optic strain sensing
- Presented preliminary results at AIAA SciTech Masters Student Conference

Carbon Fiber Shock Tube

- Adapted shock tube test facility to integrate carbon fiber cylindrical sections for the study of dynamic pressure induced strain response of carbon fiber
- Utilized Multiphysics FEA modeling to predict dynamic strain response of carbon fiber subjected to shock loading

Novel Drone Design

- Designed a novel 5-motor drone architecture decoupling thrust and pitch/roll control to enable more efficient flight dynamics
- Conducted flight testing to evaluate energy efficiency; early results informed control refinement and patent submission

Autorotative Lander

- Designed and built a foldable passively stable autorotative lander for low-drift payload delivery
- Conducted aerodynamic modeling using CFD and MATLAB to optimize blade geometry, descent rate, and stability
- Performed 400 ft drop tests; validated descent velocity at 14 ft/s and minimal lateral drift, confirming performance targets for autorotation and deployment reliability

Undergraduate Projects

NASA USLI Competition Team, Payload Engineer, Vice President

- Performed design, testing, and fabrication of novel in-air deployable co-axial drone for NASA Competition
- Developed payload failure analysis and mitigation matrices, led design of corresponding testing protocols
- Designed in-air drone detachment system for ensuring stable deployment of drone out of a rocket nose cone at a 400 ft during rocket descent

Daimler Truck North America, Detroit, MI **May 2023 –August 2023**

Innolab Mechanical Test Engineering Intern

- Commissioned climatic test chamber and developed testing procedures for electric truck batteries
- Designed battery cell test fixtures to ensure proper electrostatic isolation, electrical connection, and stability
- Used additive manufacturing and NX CAD software to protype test fixtures and determine needed design iterations

ADDITIONAL EXPERIENCE

Laser Diagnostics of Combustion Laboratory, Nashville, TN **August 2022- December 2023**

Research Assistant

- Investigated experimental data of hydrogen enriched ammonia combustion to determine viability as a fuel source

Vanderbilt School of Engineering, Nashville, TN **August 2024 – Present**

Teaching Assistant

Energetics Laboratory

- Led 3 fluids and thermodynamics labs focused on experimental methods and data analysis. Graded corresponding lab reports

Finite Element Analysis

- Taught undergraduate and graduate students ANSYS FEA software and math concepts necessary for understanding FEA

TECHNICAL SKILLS

- Software: MATLAB, Simulink, LabVIEW, FEA, Python, SolidWorks, NX
- CNC, additive manufacturing, carbon fiber, mechatronics, CAD