Mark Sedek

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Education

Vanderbilt University Expected May 2027
Nashville, TN

B.S. in Mechanical Engineering, *Minor in Digital Fabrication*

- Relevant Coursework: Aerospace Propulsion, Subtractive Manufacturing, Rapid Prototyping, Additive Manufacturing, Mechatronics

Skills

CAD/CAM: SolidWorks |Autodesk Fusion 360 (Design/Manufacture) |Onshape |OpenRocket |SimScale
Fabrication: 3D-Printing |CNC Lathe |CNC Milling |CNC Gantry |Laser Cutting |Welding |Soldering
Programming: MATLAB |Python |C/C++ |LabVIEW |Excel

Experience

Vanderbilt Aerospace Design Laboratory Sep 2025 – Present
Vehicle Engineer

- Fabricate jig for improving carbon fiber airframe (pre-rolled tubes/couplers) development
- Fabricating full scale rocket airframe prototypes
- Contribute to full-scale vehicle build of rocket for 2026 NASA Student Launch Competition

Lipscomb Engineering Undergraduate Researcher Sep 2023 – May 2024
Undergraduate Researcher

- NSF PFE: RIEF Award 2024525
- Co-authored a published research paper on engineering diversity, equity, and inclusion, to be implemented into engineering firms to create more inclusive environments within the engineering workforce
- Independently created MATLAB script to organize large sets of text-based response data from multiple interviews
- Coded diagrams displaying data from interviews to illustrate the frequency of codes mentioned during interviews used in poster
- Poster presented at the Lipscomb Student Scholars Symposium and ASEE Conference

Projects

Generative Designed Drone |Fusion360, ANSYS, Additive Manufacturing, STM-32 Present

- Designing lightweight draone airframe in Autodesk Fusion360 using topology studies and verify its strength with FEA under thrust and hard landing loads to measure saftey of design.
- Integrate an STM32 drone flight controller, Betaflight, with motors, ESCs, and IMU, and perform fluid analysis using ANSYS to assess drag and control performance.

Recyclable Plastic Filament Device |SolidWorks, Additive/Subtractive Manufacturing, Arduino/C++ Present

- Designing a small scale extruder to convert waste plastic into usable filament
- Developing arduino based control of heater and drive motor to maintain consistent extrusion and filament diameter

Medical Syringe Pump |3D Printing, Arduino/C++, Fusion 360 May 2025

- Implemented Arduino control with AccelStepper, limit-switch endstop, tri-color status LED, latching start/pause and jog buttons; converted user flow-rate inputs to motor step rates; used 1/16 microstepping for smooth motion
- Developed enclosure for syringe pump in Fusion 360, including mounts for the physical syringe to be mounted on in assembly

Rocket Telemetry Simulator |Python (NumPy, Matplotlib, Tkinter) Present

- Building a telemetry system that simulates multi-stage rocket flight using user defined mass, thrust, payload, and ISP parameters
- Creating a GUI to visualize flight plots such as velocity, mass, and acceleration versus time, and trajectory

Instrumentation Accelerometer Project |LabVIEW, Laser Cutting, Soldering, Sensors May 2025

- Collected acceleration data with an ADXL335 on a DC-motor car via NI USB-6221 DAQ + LabVIEW; built a plywood gear-train test car and laser-cut guides
- Analyzed wheel material effects (rubber, polypropylene, TPU) on acceleration and slip; derived a first-order motor model and compared measured traces to the ideal response; documented vibration/noise mitigation through dampening factors, and wiring-tension fixes

Certifications

CITI Responsible Conduct of Research
Computational Fluid Mechanics: *SimScale: Spoiler Airflow Simulation*