# Graham Wilson

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Lexington, KY

## WORK EXPERIENCE

**University of Kentucky - Dr. Muaho Chen PhD.** **Jan. 2025 - Present**
**Position:** Aerospace Engineer, Project Lead Lexington, KY

- Project OMEGA (Orbital Mass Ejection via Gaussian Architecture): Led the full-cycle design and execution of a coilgun electromagnetic launch system capable of propelling a 1 kg projectile at 100 m/s. Designed and integrated solar-powered capacitor banks and optimized coil designs for high-efficiency energy discharge.
- Engineered deployable tensegrity structures using custom designed automated topology optimization for lightweight, stowable architectures suitable for space transport.
- Designed and built custom PCBs and electromagnetic coils; implemented real-time fiber-optic break detection for high-speed projectile tracking.
- Authored advanced Python and MATLAB scripts for electromagnetic field modeling, Lorentz force computation, and Maxwell stress tensor evaluation.
- Fabricated components using FDM/SLA 3D printing, utilizing CAD tools and simulation software for system design validation.
- Integrated system telemetry pipelines for remote control, diagnostics, and data acquisition.
- AIAA Publication (Pending)

**University of Kentucky - Dr. Sean Bailey PhD.** **Jun. 2022 - Mar. 2025**
**Position:** Unmanned Aerial Vehicle Researcher Lexington, KY

- Designed and tested multiple UAV platforms, including fixed-wing, multi-rotor, and hybrid VTOLs, for autonomous environmental sensing, aerial photogrammetry, and formation flight.
- Developed a PID-controlled 3-axis articulating antenna tracker to enhance communication range and reliability utilizing custom designed hardware and flight controllers.
- Established a dual-band communication network (915 MHz and 2.4/5 GHz mesh) using onboard telemetry radios and a networked fleet of UAVs.
- Modified ArduTracker firmware to support custom sensor inputs and servo feedback control. Built and debugged custom circuit boards for power delivery and ethernet systems.
- Employed Mission Planner Software and QGroundControl for mission planning and live telemetry. Used MATLAB, Python, and Lua for signal processing, data analysis, and control scripts.
- Manufactured UAV components using FDM 3D printing, CNC machining, and laser cutting to meet structural and aerodynamic design constraints.

## EDUCATION

**University of Kentucky** **05, 2025**
Degree (BSAE), Aerospace Engineering Lexington, KY

- Team Lead of 6 person Capstone Project – Autonomous Recovery Vessel: Led development of a solar-powered, dual-motor electric catamaran (4.5 x 8.5ft 500lbs) with differential thrust control and Starlink satellite communication for full autonomous operation. Mission objective: navigate from San Diego or New Zealand to Point Nemo (~3000miles) for NASA funded KRUPS capsule retrieval from the ISS.
    - ☐ Designed and 3D printed asymmetric hulls for improved hydrodynamic stability; performed CFD and FEA simulations.
    - ☐ Integrated NVIDIA Jetson, ArduRover firmware, and custom Linux/Python-based control

architecture. Executed FMEA, budgeting, and full system testing.

- Project Singularity – Autonomous Rocket System (Extracurricular): Founded and directed a student-led team to design an autonomous, compressed-gas rocket with self-landing capability.
  - ☐ Simulated aerodynamic and structural behavior using CFD tools. Designed carbon fiber airframe and articulated nozzle capable of +/-45° control in XY plane.
  - ☐ Wrote and presented funding proposals, securing sponsorships and university support. Created detailed CAD models and control logic in preparation for flight hardware production.

- Relevant Coursework and Labs: Propulsion, CFD, Flight Dynamics, Tensegrity Engineering, Orbital Mechanics, Structures, Fluid Mechanics, Controls, Technical Writing.
  - ☐ Hands-on experience with flight simulators, wind tunnels, supersonic nozzle rigs, tensile/bending testers, airfoil labs, and multi-rotor control tuning platforms. Produced formal lab reports and statistical data analysis under ABET-aligned aerospace engineering standards.

**Lafayette Senior High school** **05, 2021**
Pre-Engineering Lexington, KY

- First Kentucky Student to attend MIT Beaver Works Summer Institute (Lead engineer on CubeSat project, designed, programmed, and built to detect ocean debris using image recognition)
- Founded and was President of, Bobcat Works, in-partnership with MIT for autonomous vehicles

## SKILLS & INTERESTS

- **Skills:** CAD (Fusion 360, Inventor, NX, Creo, Solid Works), OpenFOAM, ANSYS (Fluent, FEA, Maxwell, and STK), 3D Printing (FDM and SLA), CNC, GD&T, PID, MPC, LQR, Linux, MATLAB, SIMULINK, SIMSCAPE, Python, Rust, Swift, Lua, C++. Wind tunnels, Supersonic Nozzle testing, Airfoil Test Stand, Tensile Tester, Soldering, Leading teams, Problem Solving, Time efficiency, Excel.

- **Interests:** Rocketry, CubeSats, Software Development, Baseball, Sporting Clays, Pyrotechnics.