Blacksburg, Virginia
(703) 953-6963
hunterellis@vt.edu

# Hunter Ellis

## Electrical & Computer Engineer

ellishw.tech
github.com/hunterwellis
linkedin.com/in/ellishw

Electrical/Computer Engineer interested in the intersection of control systems, signal processing, and embedded systems. Currently working on my master's thesis in an accelerated program at Virginia Tech.

## Education

**Master of Science in Computer Engineering** (Accelerated Master's Program) — May 2025
Virginia Tech – Software and Machine Intelligence — *Blacksburg, Virginia*
*Advisers: Dr.Thinh Doan (UT Austin)* and *Dr.Michael Hsiao (Virginia Tech)*

**Bachelor of Science in Electrical & Computer Engineering** (double major) — May 2024
Virginia Tech – Control Systems and Machine Learning — *Blacksburg, Virginia*

## Technical Experience

**Virginia Tech · Robotics Research**

***Graduate Teaching Assistant*** — Aug 2024 – Present, *Blacksburg, Virginia*
- Teaching fundamental concepts in linear systems theory and digital signal processing, including Laplace Transforms, Z-Transforms, system stability, and FIR & IIR filter design.
- Assisting with hands-on projects to illustrate and integrate analog and digital filter design and application on breadboards and TI MSP432 development boards.

***Graduate Researcher*** — Aug 2023 – Present, *Blacksburg, Virginia*
- Developing a 6-axis robotic manipulator and an accompanying ROS2–Gazebo & MuJoCo simulation using Gymnasium for deploying custom reinforcement learning algorithms.
- Integrating CNN-based object detection (YOLOv8), RNN-based language parsing, symbolic reasoning, and a DDPG-based reinforcement learning policy for robotic manipulation tasks.

**Jacobs Space Exploration Group · Mars Ascent Vehicle (MAV)**

***Thrust Vector Control Intern*** — May 2024 – Aug 2024, *Huntsville, Alabama (Merrit Island, Florida)*
- Developed thrust vector control testing hardware and software for NASA's Active Inertial Load Simulator at the Marshall Space Flight Center.
- Created and ran tests to develop a mathematical model of an electro-mechanical actuator – used Python, MATLAB, and LabView.
- Derived control algorithms for a load-simulating actuator, in Simulink, to simulate external loads placed on the Mars Ascent Vehicle's thrust vector control actuators during flight.
- Designed and integrated a $8^{th}$ order IIR filter to remove high frequency noise from a load cell and linear variable differential transformer (LVDT).

**Grenoble Electrical Engineering Laboratory · Microgrid Inverters**

***Control Systems Research Intern*** — Jun 2023 – Aug 2023, *Grenoble, France*
- Researched inverter control systems – designed to be robust to islanding events and avoid future infrastructure problems on the French power grid.
- Simulated neutral point capacitive and balancing topologies using 4-leg inverters in Simulink. Tested PI control, PR control, Clarke and Park Transforms with HIL simulations.

**Naval Surface Warfare Center (Carderock Division) · Hospital Sea Trains**

***Concept Research Intern*** — Jun 2022 – Aug 2022, *West Bethesda, Maryland*
- Developed concept hospital sea-train designs at the Center for Innovation in Ship Design and estimated fuel consumption and electrical power loads of the concept sea-trains.

## Skills

**Software:** C/C++, Python, MATLAB, Simulink, GNU/Linux, Git, ROS2, Gazebo, Make, CMake, Labview, Qt, PyTorch, OpenCV, LaTeX, Verilog, FreeRTOS, Autodesk Inventor (Certified), SolidWorks, Rhino

**Hardware:** PCB Design and Assembly, Breadboarding, Computer Architecture, Oscilloscope, Multimeter, 3D-Printing

## Projects

**6-Axis Robotic Arm** — Aug 2024 – Present
- 3D printed robot arm, built using stepper motors and pulleys.
- ROS2 Jazzy control and Gazebo Harmonic simulation.

**LQI Rocket Landing Simulation** — Aug 2023 – May 2024
- Landing a *very simplified* simulated rocket in MATLAB using optimal control.
- Designed a LQI controller for full-state feedback and setpoint tracking of a landing trajectory.

**Closed Loop Stepper Motor** — Dec 2023 – May 2024
- Backdrivable stepper motor driver using closed loop control and a magnetic encoder for feedback.
- 4-layer PCB mounts to the back of the motor with CAN and power connections.

**Design Teams | Solar Car & Human Powered Submarine** — Oct 2020 – Mar 2023
- Overall E/E architecture of the Solar Car.
- Single board computer and LCD to display relevant data to the submarine pilot.