

Hayden Geiger

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EXPERIENCE

BEARCATS ELECTRIC RACING

EV Electronics — FSAE EV

Aug. 2025 – Present

Cincinnati, OH

- Built a four-wire test jig for cylindrical cells, rated for 100 amps, with temperature sensors on the cells to track heat under load; ran tabless 21700 cells on a BK Precision 8601 electronic load to measure internal resistance, capacity, and maximum continuous discharge current
- Assembled and reflow-soldered the accumulator's BMS sense boards and high-voltage sense board, along with the vehicle-level shutdown board that de-energizes the tractive system
- Designing the schematic and 4-layer PCB layout for an STM32H723-based data-acquisition system, integrating three FDCAN buses, GPS, a BNO085 9-axis IMU, microSD logging, and a USB-C debug interface; an ESP32 Wi-Fi HaLow telemetry link adds live viewing of pack voltage, cell temperatures, current, and state of charge
- Built an ESP32-based reflow oven controller on perfboard with a 12 V to 5 V LDO supply, a rotary-encoder HMI, hand-wired temperature-sensor leads, and a 3D-printed enclosure, so the team could populate and reflow its own boards in-house, avoiding outside PCBA cost

ELECTRIC GO-KART

Independent Engineering Project

Apr. 2026 – Present

Cincinnati, OH

- Converted a used rolling go-kart chassis from a gas engine to electric drive, fitting a 5 kW PMSM on a custom adjustable mount machined for the frame; chose 14/60 gearing (4.29:1) to favor torque and limit battery current in early testing
- Designing a 22s6p, 1.22 kWh pack from prebuilt 1s6p Samsung INR18650-25R modules, rated 120 A and 9.8 kW continuous, with an active-balancing CAN BMS; sized the copper busbars and had them waterjet cut, and ran the HV path through a fuse, precharge resistor and contactor on the positive side with the BMS switching the negative, so both ends of the stack open with the low-voltage system off
- Designed a CAN vehicle control unit in Altium that replaces the FarDriver ND72450's dash switches, driving each of its switch inputs — speed select, reverse, boost, cruise, ignition, brake/regen — from the vehicle bus instead; bench-tested controller and motor at 60 V from a current-limited supply to confirm commutation and hall feedback

DUAL-AXIS STAR TRACKING MOUNT

Independent Engineering Project

Jun. 2025 – Aug. 2026

Cincinnati, OH

- Built a lithium-ion pack from Samsung 50E cells with a Daly BMS handling overcurrent, over-discharge, and passive balancing; an onboard divider reads pack voltage to report state of charge on the web interface
- Designed a custom ESP32 control PCB with TMC2209 stepper drivers, AS5600 magnetic encoders for closed-loop position feedback, and onboard power regulation; a web interface hosted on the ESP32 controls it over Wi-Fi
- Designed and built the battery-powered alt-azimuth mount on two NEMA 17 steppers with 71:1 planetary gearboxes for sidereal tracking

THE KROGER CO.

Pickup Associate

Jul. 2022 – Present

Centerville, OH

- Fulfill online grocery pickup orders accurately and on time while meeting productivity targets

EDUCATION

University of Cincinnati

Bachelor of Science, Electrical Engineering

May 2030

Cincinnati, OH

AWARDS

Altium Global Scholarship

Mar. 2026

- Completed Altium Professional Training and earned Altium Designer certification

Kroger Scholarship

Jul. 2025 – Present

- Awarded to associates continuing their education

SKILLS & INTERESTS

- **Languages:** C++, Python, MATLAB
- **Software:** Altium Designer (certified), STM32CubeMX, PlatformIO, Fusion 360 (certified), LTspice, Arduino IDE, Git, VS Code
- **Microcontrollers & Buses:** STM32, ESP32, CAN/FDCAN, SPI, I2C, UART
- **Battery & Power:** Li-ion pack design, BMS integration, precharge and contactor HV topology, cell characterization
- **Lab & Fabrication:** Oscilloscope, electronic load, four-wire Kelvin measurement, SMD reflow & hand soldering, spot welding
- **Interests:** Battery technology, electronics repair, 3D printing, golf, cooking

AVAILABLE TO CO-OP SPRING 2027