

NICK CARPENTER

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EDUCATION

Northeastern University, Boston, MA Expected May 2029
Candidate for Bachelor of Science in Electrical Engineering, Minors in Mechanical Engineering & Business Administration GPA 3.89
Coursework: Embedded Design, Differential Equations and Linear Algebra, Computing Fundamentals for Engineers, Cornerstone of Engineering 2, Physics 2, Calculus 3, Statistics, Chemistry (1 & 2)
Activities & Honors: IEEE-HKN Treasurer, Tau Beta Pi, John Martinson Honors Program, Dean's List, Forge Hardware & Software Product Lab, Entrepreneurs Club Husky Startup Challenge (2nd Place, NU Oakland)
Study Abroad: Global Scholars Program: NU Oakland (Fall 2024), NU London (Spring 2025)

SKILLS

Hardware: PCB design, circuit design, soldering, oscilloscopes, DMMs, Network Analyzers, Raspberry Pi, Arduino
Programming Languages: C/C++, Python, MATLAB
Engineering Software: OrCAD Capture, KiCad, LTspice, Altium, SOLIDWORKS, AutoCAD
Languages: Spanish (Massachusetts State Seal of Bilingual Proficiency)

EXPERIENCE

Electrical Engineering Co-op – CPI Electron Device Business, Beverly, MA Jun 2026 – Present

- Root-caused a component-fit failure on a production RF/microwave PCB to the board layout rather than the part, recovering 5 boards through documented rework and a formal ECO covering a second pin-mapping discrepancy.
- Redesigned the PCB in OrCAD X Capture, building a custom part library with class-correct component properties and validating connectivity with a digital multimeter (DMM).
- Designed, built, and tested a validation harness for the redesigned PCB, tracing a test failure to an incorrectly documented ground pin in the legacy schematic; corrected the schematic and validated the board's truth table.
- Troubleshooted a legacy-replacement board failing supply current validation, root-causing an overload to reversed-polarized components and tracing a supply current turn-on anomaly to inverted op-amp inputs.
- Managing vendor communication for all active and upcoming PCB layout designs, submitting ECRs and ECOs and deriving form-fit-function (FFF) part substitutes validated with program engineers.
- Screened and documented waveguide assemblies for an RF limiter test kit using a network analyzer (PNA), capturing S-parameters, through-path loss, and coupling factor, and performing worst-case analysis in Excel against unit specifications.

Spacecraft Technology Intern – NASA, Mountain View, CA (Remote) Jun – Aug 2025

- Structured spacecraft subsystem performance and design tables from NASA's Small Satellite Report into query-ready datasets, supporting a searchable system that reduced data retrieval time by 40%.
- Standardized 18 spacecraft data tables across 3 report chapters for cross-platform use, improving consistency for NASA researchers and external partners.

PROJECTS

Brushless Motor Controller & Reaction-Wheel Inverted Pendulum – Personal Project Jul 2026 – Present

- Architecting a custom field-oriented control (FOC) brushless motor controller for a reaction-wheel inverted self-balancing pendulum, spanning an STM32G4, three-phase inverter, gate driver, and shunt current sensing with encoder feedback.
- Designed the three-phase inverter power stage from first principles (six N-channel MOSFETs, bootstrap high-side drive, dead-time protection) and the half-bridge in LTspice, matching hand-calculated steady-state current within 1%.

DC Power Analyzer – Personal Project Feb – May 2026

- Built a working DC power measurement prototype (INA219, Raspberry Pi Pico, OLED) displaying live voltage, current, and power, validated within 1% against a calibrated multimeter.
- Completed the full Altium Designer schematic-to-Gerber workflow on the analyzer's RC filter stage as a standalone PCB, including custom symbol and footprint libraries built from scratch, routing, ground pour, clean DRC, and fabrication outputs.

Boxy: Assistive Communication Caddy – Forge: A Sherman Center Program Hardware Product Lab Jan – Jun 2026

- Designed and prototyped the electromagnetic lock subsystem for the Communication Caddy, an assistive classroom device for nonverbal students; built a 5V relay driver in KiCad 9 and wrote non-blocking Arduino control firmware.
- Built and verified the project's 6V battery pack (4 AA cells in series) and measured per-component current draw with a multimeter to size the team's shared power budget, coordinating integration with mechanical sub-team.

IR-Sensor Puzzle Controller – Cornerstone of Engineering 2 Project Jan – Jun 2026

- Designed and built the complete electronics system for an interactive escape-room puzzle, wiring a Raspberry Pi Pico with eight IR break-beam sensors, an I2C LCD, and a pushbutton across shared power and ground rails with pull-up resistors.