

Ben Mackert

(303) 551-4217 — benmackert@gmail.com — San Francisco, CA
[linkedin.com/in/ben-mackert](https://www.linkedin.com/in/ben-mackert)

Education

University of Colorado Boulder, Boulder, CO

B.S. Electrical and Computer Engineering

GPA 3.9, Dean's List

Expected May 2027

Technical Courses

- Circuits I (A), Circuits II (A), Electronics Design Lab (A–), Embedded Software Engineering (A)
- Linear Systems (A), Computer Organization (A), RTOS (A–), Probability Theory (A)
- Data Structures (A), Prog. Digital Systems (A–), Physics II (A)
- Calculus I (A, AP 5), Calculus II (A–), Calculus III (A–)

Skills

Languages: C, C++, Python, RISC-V Assembly, Verilog, LaTeX, Java, HTML, CSS

Software: OpenCV, MediaPipe, Altium Designer, SolidWorks, LTspice, STM32CubeIDE, GitHub, Bitbucket, Excel

Core Engineering Skills: Embedded Systems, Computer Vision, Machine Learning, Embedded Firmware, Circuit Design, Digital Logic, Sensor Interfaces, Data Logging

Hardware & Testing: PCB Design, Hardware Bring-Up, Sensor Integration, SMD, THT, Soldering, Oscilloscopes, Function Generators, DMMs, Power Supplies

Experience

Electrical & Software Engineering Intern – Medtronic

Boston, MA — Jun 2026 – Aug 2026

- Developed a surgeon head-pose tracking pipeline using Intel RealSense, OpenCV, MediaPipe Face Mesh, and solvePnP to analyze RGB/NIR camera tracking against a motion-capture reference system.
- Synchronized motion-capture head-pose data with camera frame timestamps over DDS for post-session and real-time comparison of stereo NIR, RGB, and reference tracking solutions.
- Built a Python GUI to manage capture metadata, log synchronized tracking data, and streamline computer vision analysis across test sessions.
- Supported STM32 board bring-up for a surgical robotics prototype, including debugging hardware issues, and developing I2C firmware for sensor data acquisition.

Electrical Engineering Intern – CONMED Corporation

Denver, CO — May 2025 – Aug 2025

- Designed and built an auto-calibration system using an Arduino Nano Every and digital potentiometer to map ESU voltages to resistance with a 4th-degree polynomial.
- Designed a custom PCB in Altium for the calibration hardware, integrating a resistor ladder with MCU control.
- Created a Python Tkinter GUI and serial/Matplotlib backend to display real-time calibration plots.
- Reduced calibration error by 92.5%, enabling full transformer compatibility and cutting manufacturing scrap.
- Simulated 3- and 4-point calibration in Python; achieved LMS errors as low as $1.76 \Omega^2$ across transformer models.
- Delivered three Python modeling tools and documented findings in an internal engineering report.

Projects

STM32 Microcontroller PCB – Bluetooth & USB-C

- Created a 4-layer STM32 PCB in Altium Designer for Bluetooth and USB-C integration.
- Achieved 480 Mbps USB-C data and BLE telemetry for wireless diagnostics between devices in testing scenarios.
- Optimized high-speed signal routing against EMI by collaborating with 3 engineers on layout constraints and PCB stack-up.
- Engineered oscilloscope-based test methods, boosting debugging efficiency by 20% and accelerating bring-up.

Restaurant Review Backend App

- Built a modular data store in C++ to manage structured reviews, enabling filtered queries in under 100 ms.
- Optimized search performance using hash maps and binary search trees; improved throughput and load handling by 40%.
- Managed feature branches; reviewed, tested, and merged 10 pull requests with clean commits.
- Refined user input and query handling across 4 iterative versions, cutting user-reported bugs by over 30%.