

Anna Cao

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EDUCATION

Electrical Engineering, Bachelor of Applied Science
University of British Columbia

2021 – 2026 | Vancouver, Canada

SKILLS

Embedded — Microcontrollers, , Raspberry Pi, Git, PlatformIO, STM32_HAL, ESP-IDF, FPGAs, Quartus, ModelSim

Electrical — Altium, LTSpice, Circuit Analysis/Design/Debugging, Soldering, Allegro System Capture & PCB Editor

Languages — C/C++, Python, Verilog/System Verilog, MATLAB

TECHNICAL EXPERIENCE

Hardware Design & Validation Engineering Intern

09/2024 – present

Intel

- Designed a central I2C interface board for streamline debugging using **Allegro Schematic Capture / PCB Editor**.
- Full stack development** in **Python** to support validation efforts of Integrated Circuits and products, including making a CLI and GUI I2C debug tool.
- Working on enhancing Intel's **testing software** to interface with thermal chambers via Modbus TCP to enable engineers to collect and analyze valuable data.
- Gaining exposure to **computer/system architecture**, board-level digital circuitry, and validation processes.

Electrical Product Design Intern

04/2024 – 08/2024

Dometic Marine

- Performed **PCBA debugging** for boat control systems by **analyzing schematics** and comparing expected circuit behaviour to measured signals such as **PWM** and **CAN** on the oscilloscope.
- Diagnosed and resolved motor calibration faults using various lab equipment, such as **DMMs**, **Bi-directional PSUs**, and **oscilloscopes** to identify root cause, leading to successful circuit correction.
- Designed and built a reverse polarity protection circuit following ISO standards using **Altium** and **LTSpice**, ensuring compliance with safety standards and increasing the system's operational lifespan.

Sensors and Communications Lead

05/2023 – present

UBC AeroDesign 🔗

- Leading a 9-member team in developing an avionics system for an aircraft, with the goal of competing in the annual **SAE Aero Design** Competition.
- Designed **STM32**-based **sensor hardware** optimized for signal integrity, carefully evaluating design options, and marking the team's first year implementing a custom sensor system.
- Building a STM32-based flight controller that takes both RC transmitter inputs and sensor data to fly the plane.
- Designing **firmware** system architecture in **C/C++**, and **reading datasheets** to write **sensor drivers** and integrate sensors using **SPI**, **I2C**, **UART**, and **CAN**.
- Teaching skills like PCB design and firmware development to members and presenting design reviews.

PROJECTS

Track-Attack

- Built a real-time target tracking system using **OpenCV** to detect targets and compute positional offsets for aim assist.
- Implemented a Flask-based communication system between a laptop for image processing and a **Raspberry Pi**, enabling real-time feedback.
- Programmed the Raspberry Pi to control two servos, dynamically aligning the gun to the target based on received coordinates.

Avionics System

- Developed aircraft sensor software in PlatformIO using C for the STM32F1, integrating **barometer**, **IMU**, **airspeed**, and **GNSS** modules using **freeRTOS** to provide **real-time** sensor readings and data logging to a micro SD card for post-flight analysis.
- Utilized **Altium** to design and construct a compact 4-layer PCB development board with integrated sensors, optimizing component placement and adhering to design rules - successfully collected data during this year's competition.
- Troubleshooted board issues by **reviewing schematics**, **analyzing circuit behavior** using an oscilloscope, and using a **DLA** for **debugging serial communication**.

2-DOF Laser Projector

- Built a 2-DOF laser projector PCBA featuring the STM32H7, that drives two encoded DC motors and laser to project images.
- Designed, prototyped, and validated a **motor driver** circuit with an **H-bridge**, achieving bi-directional motor control at 50kHz while optimizing propagation delay and rise time.
- Aided **hardware/software integration** by validating PWM and UART using C for precise motor control.