Anna Cao

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EDUCATION

Electrical Engineering, Bachelor of Applied Science, 2021 – 2026 | Vancouver, Canada
University of British Columbia

SKILLS

Embedded
Microcontrollers, Communication Protocols, Git, PlatformIO, STM32CubeIDE, STM32_HAL, ESP-IDF, FPGAs, Quartus, ModelSim

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

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

TECHNICAL EXPERIENCE

Hardware Design Engineering Intern, *Intel* 09/2024 – present
- Designing 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.
- Testing board hardware, including the validation of an FTDI chip using UART communication and PuTTY.
- Gaining exposure to **computer/system architecture**, board-level digital circuitry, and validation processes.

Electrical Product Design Intern, *Dometic Marine* 04/2024 – 08/2024
- Performed **PCBA debugging** for marine electronics by reading **electrical schematics**, **analyzing circuit behavior**, and using an **oscilloscope** to evaluate signals such as **PWM** and **CAN**.
- Diagnosed and resolved a motor calibration failure by studying datasheets and comparing expected vs. actual signal behavior, 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, *UBC AeroDesign* 05/2023 – present
- 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.
- Designing **firmware** system architecture, utilizing **C/C++** and **reading datasheets** to write **sensor drivers** and integrate sensors using **SPI**, **I2C**, **UART**, and **CAN**.
- 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.
- Teaching skills like PCB design and firmware development to members and presenting design reviews.

Academic Assistant - Junior Developer, *UBC Okanagan* 05/2023 – 08/2023
- Collaborated in developing an open-source bank of nearly 900 questions in introductory physics.
- Worked with a team to create scripts; converting existing academic resources to **Markdown**, **Python**, and **HTML**, testing them through Docker and using **Git** with a **Branch and Pull Request** method to review contributions.

Power and Controls Member, *UBC AeroDesign* 09/2022 – 05/2023
- Conducted wind-tunnel tests on motors-propeller combinations using Arduino and Python for thrust and current draw measurements to validate designs, resulting in up to 12 pounds of thrust.
- Spearheaded the setup of the plane's **telemetry** system and LiPo batteries in test flights.

PROJECTS

Aircraft Sensor System, *C, Circuit Design, Altium*
- Developed aircraft sensor software in PlatformIO using C for 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, *Circuit Design, Altium, C*
- Designed the circuit, **selected PCB components**, and developed a 2-DOF laser projector PCBA featuring the STM32H7, that drives two encoded DC motors and a laser to project reflected images.
- Aided **hardware/software integration** by validating PWM and UART using C for precise motor control.
- Researched, 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.