Anna Cao

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EDUCATION

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

SKILLS

Electrical — Circuit Analysis, Oscilloscope, DMM, Soldering, Raspberry Pi, Microcontrollers (STM32, ESP32), FPGA

Tools/Platforms — Altium, LTspice, Cadence Allegro (System Capture & PCB Editor), Git, VS Code, STM32CubeIDE, PlatformIO, SolidWorks-CSWA, Quartus

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

TECHNICAL EXPERIENCE

Hardware Design & Validation Engineering Intern 09/2024 – present
Intel
- Designed an interfacing **PCB** for streamlined debugging of I2C devices using **Allegro Schematic Capture** / **PCB Editor**.
- Full stack development in **Python** to operate the I2C board and control it via GUI or CLI.
- Created a Python script to control a thermal chamber via Modbus TCP to test on-board temperature sensors.
- Gaining exposure to **computer/system architecture**, board-level **digital and analog circuitry**, and validation processes.

Electrical Product Design Intern 04/2024 – 08/2024
Dometic Marine
- Debugged boat control system PCBs, comparing performance with schematics and expected circuit behavior to diagnose issues with **power distribution** and **communication signals**.
- Successfully diagnosed and resolved motor calibration faults using lab equipment - such as **DMMs**, **Bi-directional PSUs**, and **oscilloscopes** - to identify root causes.
- Designed and tested a reverse polarity protection circuit using **LTspice simulations** and **Altium** to improve system reliability and meet ISO standards for safe operation.

Sensors and Communications Lead 05/2023 – present
UBC AeroDesign
- Leading a team of 9 to develop an avionics system for RC aircraft competing in the annual **SAE Aero Design** Competition.
- Designed and improving **hardware** and **firmware system architecture** in **Altium** and **STM32CubeIDE** for a custom flight controller that takes RC transmitter inputs and sensor data to fly the plane.
- Wrote **custom sensor drivers in C** - utilizing **SPI, I2C, UART,** and **CAN** in a **FreeRTOS-based** embedded system.
- Presenting in team **design reviews** to review system design and writing clear design reports to communicate design decisions.

Power and Controls Member 09/2022 – 05/2023
UBC AeroDesign
- Conducted wind-tunnel tests on motor-propeller combinations using Arduino and Python for thrust and current draw measurements to validate design specifications.
- Designed a compact ~2 x 2 cm custom 5 V **buck converter PCB** using Altium.

PROJECTS

2-DOF Laser Projector
- Built a 2-DOF **laser projector PCBA**, featuring the STM32H7, that drives two encoded DC motors and a laser to project images.
- Designed, prototyped, and validated a **motor driver** circuit capable of bi-directional motor control at 50 kHz.
- Used an oscilloscope to validate propagation delay and rise time were optimal for motor driver functionality.
- Designed a power system to handle 12 V input and 5 V/3.3 V output using a **buck converter** and **LDO.** Selected all components to meet voltage and current draw requirements.
- Aided **hardware/software integration** by validating PWM and UART using C for precise motor control.

Aircraft Sensing System
- Developed an aircraft data acquisition system 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 **data analysis**.
- Utilized **Altium** to design and construct a compact **4-layer PCB** with integrated sensors, optimizing component placement and adhering to design rules.