Anna Cao

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EDUCATION

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

SKILLS

Electrical — Schematic Capture, PCB Layout, Microcontrollers (STM32, ESP32), FPGA, Lab Equipment, Soldering, Raspberry Pi

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

Programming — C, Python, C++, MATLAB, Verilog/SystemVerilog

TECHNICAL EXPERIENCE

Sensors and Communications Lead 05/2023 – present
UBC AeroDesign
- Leading a team of 9 in the design, development, and integration of an avionics system for an RC aircraft, including power, embedded, and firmware components, for the SAE Aero Design Competition.
- Designed the flight controller PCBA in **Altium**, which processes RC transmitter inputs and sensor data (IMU, barometer, GNSS, airspeed sensor, camera) for flight control.
- Developed firmware architecture in **STM32CubeIDE** and wrote custom sensor drivers in **C** for a **FreeRTOS**-based embedded system using SPI, I2C, UART, and CAN protocols for communication.
- Leading system architecture design, developing engineering documentation (timelines, requirements, ConOps), facilitating team meetings, and coordinating with avionics and mechanical teams to ensure smooth system integration.

Hardware Design & Validation Engineering Intern 09/2024 – present
Intel
- Working with the Validation Hardware team to help design electronic equipment used to support the validation and characterization of Integrated Circuits.
- Designed a modular interfacing PCB using **Allegro Schematic Capture / PCB Editor** to streamline testing and integration of multiple I2C devices.
- Developed a **Python** application with PyQt (GUI) and Aardvark API for efficient I2C device control and monitoring.
- Created a Python script to control a thermal chamber via Modbus TCP to test on-board temperature sensors.

Electrical Product Design Intern 04/2024 – 08/2024
Dometic Marine
- Designed and tested a reverse polarity protection circuit using **LTspice** simulations and **Altium** to improve system reliability under specified conditions.
- Conducted bring-up tests, troubleshot, and reworked PCBAs for boat control systems, such as electric actuators and sensor (IMU) systems, diagnosing power distribution and communication issues.
- Diagnosed and resolved motor calibration faults, including improper movement, using lab equipment, such as **DMMs,** bi-directional **PSUs**, and **oscilloscopes** to identify root causes.

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 optimize design specifications.
- Made a modular ~2 x 2 cm buck converter PCB using Altium, delivering 5 V at up to 5 A.

PROJECTS

2-DOF Laser Projector
- Designed and built a 2-DOF laser projector PCBA with STM32H7, controlling two DC motors via quadrature encoders and a 650nm 1mW laser diode driven by a low-side NPN switch.
- Prototyped and validated a 50 kHz bi-directional motor driver using an H-bridge with four N-channel MOSFETs and a gate driver, powering a 12 V, 0.3 A motor.
- Designed a power system to convert 12 V input to 5 V/3.3 V output using a buck converter and LDO, selecting components to meet voltage and current requirements.

Aircraft Sensing System
- Developed an aircraft data acquisition system in PlatformIO using C for the STM32F1, integrating the BMP390, BNO055, MS4525DO, and ZEDF9P 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 performing soldering and rework.