Ella Yan

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Education

University of British Columbia, 09/2022 – Present
BASc, Engineering Physics - Dean's Honour List

Skills

Electrical
Altium, LTspice, PCB Layout, Schematic Capture, FPGA, VHDL, Embedded Systems, Oscilloscope, Soldering

Software
Python, C++, C, Java, Git, Linux, MATLAB, PyQt, OpenCV, PyTorch, ROS, Scikit, Pandas, Flask

Technical Experience

Sensor Hardware Lead, *UBC AeroDesign* 05/2024 – Present
- Leading a team of 9 in developing sensor systems for autonomous aircraft in the SAE AeroDesign competition, integrating sensors such as GNSS modules, cameras, 9-axis IMUs, radios, barometers with custom hardware.
- Designed a 4-layer airspeed sensor **PCBA** in **Altium** with an **STM32** microcontroller and **CAN,** providing airspeed data to our custom flight controller for autonomous flight algorithms and mechanical analysis.
- Developed testing/calibration **firmware** in **C** for the airspeed sensor and performed calibration in the wind tunnel.
- Integrated RTK on ZED-F9P GNSS modules, improving accuracy from ~2.5m to 0.014m with 0.1mm precision on positional data to assist autonomous payload delivery.
- Recruited and mentored team members in PCB design, leading design reviews and writing clear documentation.

Power and Controls Lead, *UBC AeroDesign* 04/2023 – 04/2024
- Directed a team of 8 members in the design and testing of aircraft propulsion and power distribution systems.
- Collaborated on **buck converter** boards capable of stepping down 25V to 5V at 10A to power control surface actuators.
- Designed a **power monitoring** module, evaluating current sensing topologies in **LTspice** and optimizing component selection through datasheet analysis leading to a design capable of monitoring up to 750W.
- Coordinated design reviews and meetings with mechanical teams to ensure seamless integration under tight deadlines.
- Served as the lead technician for aircraft circuitry setup, wiring, and control surface trimming, ensuring full system functionality during test flights and competition.

Plasma Diagnostics Engineer, *General Fusion* 01/2024 – 04/2024
- Streamlined data analysis pipelines for high-precision calibration and characterization of plasma diagnostics in state-of-the-art fusion reactor.
- Implemented interrupt service routines to ensure precise timing in plasma diagnostics, using **waveform generators** and **oscilloscopes** to measure trigger delays—critical for capturing data within the 20ms plasma lifetime.
- Designed a **Python GUI** to streamline temperature calibration, saving $20k by eliminating need for external software.
- Developed multithreaded scripts to process and present key insights from a database of 20,000 plasma shot records.
- Applied data analysis techniques using **Scipy** to extract Compton edges used to calibrate neutron energy spectra

Projects

Autonomous "Cooking" Robot Competition, *UBC Engineering Physics* 06/2024 – 08/2024
- Built autonomous robots capable of collaborating to assemble various recipes of plastic food, reaching semi-finals.
- Designed and tested **H-bridges** and power distribution circuits involving **switching regulators** and **LDOs**, calculating expected power losses and junction temperatures to ensure reliable performance.
- Developed a **GUI** for wireless parameter tuning using HTTPs requests, increasing testing efficiency by 85%.
- Implemented motor driver and state machine firmware on **ESP32** microcontrollers in **C++**.

Multistage Coil Gun 01/2023 – 05/2023
- Designed and built a powerful multistage coil gun with **400V** capacitors, custom-wound solenoids, and **ESP32s**.
- Built an IR speedometer with interrupts for precise projectile velocity measurement to optimize solenoid placement.
- Selected thyristors for high-voltage switching and used optocouplers to safely isolate high/low voltage sections.
- Final design capable of accidentally putting a small hole in the wall of the shared engineering workspace.