

Education

University of Waterloo - BAsC, Systems Design Engineering

Sept 2023 – Apr 2028

Experience

Electrical Engineering Intern – [Waterloo Aerial Robotics Group](#) – Waterloo, ON

Sept 2024 – Present

- Designed a mixed-signal PCB integrating a 12-5V buck converter, LDO, ESP32, and impedance-matched RF transceiver in Altium Designer for an ExpressLRS-based RC plane, supporting up to 6 PWM outputs for servo and ESC control.
- Simulated input filtering on buck converters with LTspice to prevent transient voltage spikes from source impedance.
- Designed a USB-C source to arbitrate up to 20V 5A for stationary drone debugging, complying with USB-PD & 3.2 spec.
- Assembled and reworked PCBAs using stencils and hotplate while validating with DMM, oscilloscope, and e-load.

Team Co-Lead – [Waterloo Reality Labs](#) – Waterloo, ON

Jan 2024 – Present

- Founded the world's first collegiate engineering design team developing open-source, hackable VR and AR headsets.
- Leading [Varifocal](#), a custom VR headset with real-time focal length adjustment using voice coils and eye tracking.
- Created onboarding projects for 30+ new students, with Altium for EDA and Unity (Meta XR SDK) for software.
- Reached 500+ interested students, and raised over \$10000 in sponsorship value for the team's first year.

IT Infrastructure & Operations Intern – [Grand & Toy](#) – Vaughan, ON

Jan 2024 – Apr 2024

- Managed 250+ computer users through Microsoft AD and Group Policies, using MMC to manage DHCP settings.
- Led deployment project for 100+ custom-imaged laptops using Microsoft Deployment Toolkit and Windows Server.
- Utilized Trend Micro Apex One to identify and remediate multiple cases of malware infection on employee PCs.

Projects

VR Headsets: Waterloo Reality Labs – PlatformIO, C++

- Built an open-source, DIY [VR headset](#) with compatible eye-tracking that interfaces with SteamVR.
- Made a real-time camera-based eye tracker with an ESP32, OV2640, IR LEDs, and open-source tracking software.
- Upgrading to over 63% higher horizontal FOV by using custom-cut wide fresnel lenses and canted displays.
- Improving accessibility by solving vergence-accommodation conflict in VR headsets with automatically adjustable focal length, using real-time eye-tracking in Unity, voice coil motors, and custom driver board ([Varifocal](#)).

3S 20A ESC – Altium Designer

- Designing a compact 3-phase motor driver board with an STM32 MCU to control BLDCs on drones with 3S batteries.
- Optimized MOSFET selection with calculations for power loss and maximum temperature in weighted decision matrix.

Testing Contributor: Ryzen Controller – Linux, Clover Bootloader

- Dumped DSDT from laptops and edited ACPI to modify AMD STAPM power limits, sideloading with Clover.
- Benchmarked slow and fast power targets for the Ryzen 5 2500U using AMD uProf (now part of Ryzen Master).

3D Modelling & Automation – Blender, Python

- [Scripted](#) in Python to automate the import, scaling, and positioning of 30+ 3D models within a scene to train ML models.
- Designed 10+ [3D scenes](#) with Blender, using Stable Diffusion for procedural & seamless UV-mapped textures.

Skills

- **Hardware:** Power Electronics, Analog/Digital Design, PCB Layout, Schematic Capture, Simulation & Validation
- **Applications & Tools:** Altium Designer, LTspice, SOLIDWORKS, Blender, PlatformIO, Arduino, Git, Linux
- **Languages & Protocols:** C, C++, Python, HTML, CSS, JavaScript, MATLAB, I2C, SPI, UART, USB-PD, USB 3.2