SHANAYA BARRETTO

2021 Schulich Leader | UWaterloo Mechatronics Engineering | (647) 262-8157 |

SKILLS AND PROFICIENCIES

Programming Languages: C, C++, Assembly Language, Python, Java, HTML, VHDL, JS, SQL, YAML, MATLAB
Tools/Skills: Linux, Altium, Eagle, SPICE, soldering, lab equipment use, AutoCAD, SolidWorks, 3D printing, ANSYS

PROFESSIONAL WORK EXPERIENCE

Rocket Lab – Electrical Engineer Upcoming (September – December 2024)
- **Hardware design**, verification, and evaluation of **reaction wheels** and **star trackers** produced for use in satellites.

Harvard Microrobotics Laboratory (Project CETI) – Embedded SW / Electrical Engineer January – April 2024
- Designed **RF hardware** to interface with L1 band **GPS** antennas that were characterized with a **VNA** as suitable for **marine** use and implemented frontend amplification through the addition of an **LNA** to maintain signal lock.
- Developed firmware for a **MAX17320 fuel gauge** to monitor **LiPo** batteries and drive mission critical decisions.
- Collaborated on **audio localization** algorithms using cross correlation to gain context around whale communication.

onsemi – Embedded Systems Developer May – August 2023
- Developed a **Bluetooth Low Energy (BLE) scan and connect** sample app for the SDK of an **ARM Cortex-M3** based dual mode **radio/Bluetooth SoC** used in hearing aids and cochlear implants with the **CEVA** Bluetooth stack.
- Introduced streamlined testing of parameter sets using **UART,** the **JLink debugger**, and associated **GDB** commands.
- Exposed functionality of alternate **DMA** and UART channels and resolved issues related to **NVIC** implementation.

Miovision – Firmware Developer September – December 2022
- Created a fixture using an NVIDIA Rudi-AGX that allows for rapid **IMU calibration** over I2C via the **particle swarm optimization** algorithm and validation of 8 camera streams simultaneously using **OpenCV** and **GStreamer**.

DESIGN TEAMS & PROJECTS

UW Orbital (3U CubeSat Design Team) – Electrical Lead / Advisor (Since August 2024) January 2022 - Present
- Designed and performance tested the **electrical power system** (EPS) which includes hardware to implement a **battery management** system, max power point tracking (**MPPT**) algorithms, and low latency load switch circuits.
- Lead development of the **attitude determination and control system** (ADCS) including in-house fabrication of **magnetorquers**, as well as integration of space grade **reaction wheels**, **sun sensors**, a GPS system, and an IMU.
- Created a **digital twin** of the Canadian Satellite Design Challenge winning CubeSat hardware using **SPICE**.
- Managed integration of UW Orbital's technical subteams comprised of 60+ members for a low earth orbit launch.

UW Deep Blue (AUV Design Team) – Electrical Lead July 2024 - Present
- Designing and testing an **FPGA** centered system for audio digital signal processing (**DSP**) from three **hydrophones**.
- Creating a custom **sonar** transmitter to facilitate intervehicle communication, operating between 60kHz and 65kHz.

CPR Guidance Tool 2021
- Designed, fabricated, assembled, and tested iterations of a **PCB** created on **Eagle** that informs users whether their **CPR compressions** are of the correct speed and pressure, with the help of onboard pressure sensors and LEDs.
- Programmed the **PIC16F690** microcontroller in **Assembly Language** to respond in real-time to chest compressions.

EDUCATION

University of Waterloo 2021-2026
Candidate for BASc, Honours Mechatronics Engineering (Dean's Honours List 2021, 2022, 2023)
Courses: Linear Systems & Signals, Power Electronics & Actuators, Microprocessors & Interfacing, RTOS (STM32)

NOTABLE DISTINCTIONS

- 2021 Schulich Leader Scholar
- Canadian Satellite Design Challenge 6 Winner (UW Orbital, 2023)
- Shortlisted: ESA's Fly Your Satellite 4 (UW Orbital, 2024)
- Certified Amateur Radio Operator
- 2021 Ontario Volunteer Service Award
- 2023 Brooke Owens Fellowship Finalist