

Software Development

- C, C++
- MATLAB, Simulink
- Linux, MacOS, Windows
- Python
- Git, GitLab
- Jira

Space

- Radiation testing of electronics
- Understanding of SAR image formation
- Spacecraft AI&T and operation

Embedded and FPGA

- VHDL, Verilog, SystemVerilog
- Xilinx System Generator and Vivado
- FreeRTOS, PetaLinux

Hardware

- Xilinx UltraScale+, STM32, NVidia Jetson
- Schematic capture and PCB layout (Altium)
- Board bringup

Experience

Software Engineer, SpaceAlpha Insights

May 2021 – Present

- Wrote firmware for SAR range compression (DSP) and data path control using Xilinx System Generator and VHDL
- Verified firmware using MATLAB to generate test data and compare with a floating-point reference
- Wrote embedded software in C++ with PetaLinux to configure IP blocks on a Xilinx RFSoc
- Developed test software and control GUIs (PyQT) for interacting with embedded platforms
- Maintained product specifications for real-time synthetic aperture radar processor with 4 FPGAs
- Key contractor liaison on SAR High Speed On-Board Processing project for CSA ([RFP, pg. 96](#))
- Analyzed electronic components for spaceflight compatibility

Firmware and Electronics, Zaber Technologies

September 2019 – May 2021

- Wrote embedded software in C++ for ARM microcontrollers used in high-precision motion control products with an agile team
- Developed integration tests (Python, pytest), unit tests (C++), and test infrastructure (hardware)
- Worked with product managers to define new features and write public-facing documentation

SoC Verification Software Developer Co-Op, Intel

January 2018 – December 2018

- Designed and implemented an SSD controller block testbench with SystemVerilog and UVM
- Performed verification planning, microarchitecture review, and bringup testbench development

Product Engineering Co-Op, Ballard Power Systems

May 2016 – December 2016

- Wrote software in MATLAB to integrate fuel cell models into a single tool to quickly evaluate fuel cell designs
- Verified simulation results against test data and managed tool releases

Command and Data Handling Co-Lead, ORCASat

May 2018 – Present

[ORCASat](#) is a CubeSat for telescope calibration that deployed in December of 2022 from the International Space Station. It is currently operational.

- Wrote embedded software in C with FreeRTOS for telemetry collection, file download, command scheduling, and subsystem interfacing
- Implemented ground control and testing GUI application in Python with pytest
- Implemented telemetry database API and apps for [telemetry timeline](#) and [plotting](#) with Python
- Presented at key gate reviews and wrote the data budget and concept of operations
- Planned software and hardware development for a team of 5-10 people

Projects

“Houston” - ORCASat Testing and Ground Control App

May 2018 - Present

Desktop application (Python) for mission operations, telemetry processing, and automated testing.

- Designed overall system architecture and integrations with services such as the telemetry database
- Implemented an automated test framework using pytest to run tests on the entire spacecraft
- Developed simulators for GPS and TT&C subsystems to use for benchtop testing
- Wrote, maintained, and executed tests over wired and RF links ([demo](#))

ORCASat Onboard Computer

May 2018 - Present

Onboard computer for ORCASat. More information can be found [here](#) and [here](#).

- Wrote low-level drivers and application software using C and FreeRTOS for TMS570 microcontroller
- Selected electronic components and did schematic capture (Altium)
- Managed OBC integration with radio subsystem, GPS, power system, and payload (interface control documentation and software)
- Requirements definition, timelines, test plans, concept of operations planning, and risk analysis

FPGA-based Camera Module (Capstone Project)

January 2019 - August 2019

Camera module using Xilinx Artix-7 FPGA with custom image pipeline to acquire, process, and store images. Intended as a prototype for a CubeSat payload.

- Implemented and verified core imaging pipeline IP in Verilog
- Designed system architecture: imaging pipeline, MicroBlaze soft processor, and external hardware
- Managed software (C++), firmware and hardware integration to prototype a working imager
- Synthesized RTL and managed timing closure

Other Projects

- **Image classifier:** trained a neural network to classify images in real-time, deployed on NVidia Jetson
- **alphaTX radio:** developed PCB with STM32 MCU and CC1101 transceiver, implemented communications protocol and hardware drivers in C++

Publications

- Software for Testing and Mitigating Radiation-induced Effects in Commercially Available Integrated Circuits ([IAC 2020](#))
- Development of Automated Testing Infrastructure for a CubeSat On-Board Computer ([CSME 2020](#))
- Hardware and Software Project Management Best Practices for Small Satellite Systems ([CSME 2020](#))

Certifications and Experiences

- Amateur Radio Operator Certificate (Basic With Honours & Advanced) VA7RGO
- UBC ELEC 400S - “Spacecraft Systems Engineering” audited and completed all coursework (2019)
- Attended spacecraft testing and operations workshops at Canadian Space Agency (May 2019)