

Perrin Waldock

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Education

M.A.Sc. in Engineering Physics 2019.09–2022.11
University of British Columbia (UBC) GPA: 92.6%
Thesis Title: *Progress Towards Building a Portable Cold Atom Pressure Standard*

B.Sc. in Physics 2014.09–2019.04
University of the Fraser Valley (UFV) GPA: 4.32/4.33
Physics Honours Major, Computer Science Minor, Engineering Physics Diploma

Technical Experience

Automation Engineer, Kardium 2023.10–Present

- Designed custom PCBs and wrote software for automated manufacturing equipment.
- Developed event-driven HMIs using .NET/C# and Arduino/C++.

Research Assistant, UBC 2019.05–2023.10

- Created a novel portable cold atom-based vacuum pressure standard (PCAVS).
- Fabricated components using a mill, waterjet, 3D printer, and hand tools.
- Extended functionality of embedded linux server and FPGA bus controller, enabling conditional control based on external stimuli.
- Simulated and manufactured anti-helmholtz magnetic field coils that produce >400 G/cm while remaining within 1 C of room temperature.
- Designed mixed-signal PCBs for feedback control of coil temperature and laser intensity, and programmed their Teensy microcontrollers using C++.
- Designed a PCB and amplifier chain to control and power a 6.7 GHz EOM.
- Wrote automated apparatus control code and analysis pipeline in Python.

Guest Researcher, Physikalisch-Technische Bundesanstalt 2023.03–2023.06

- Transported the PCAVS to Berlin and installed it on PTB's state-of-the-art ultra-high vacuum pressure standard in order to directly compare the two.
- Repaired damage to electronics, optics, and vacuum sustained during shipping.

Verification Engineer (co-op), Kardium 2018.05–2018.08

- Tested the electronics of a novel cardiac mapping and ablation device to ensure compliance with IEC 60601.
- Updated and executed board- and system-level design validation test protocols to support regulatory submissions.
- Wrote board design verification test protocols for the catheter location system.
- Wrote MATLAB scripts to automate the analysis of test procedure data.

Electronics Engineer (co-op), Pacific Design Engineering 2017.05–2017.08

- Programmed a prototype cell tower fall detector in C, using an STM32 to synthesize sensor data and communicate it to masters using the AISG protocol.
- Wired two autonomous bingo machines and updated their electrical schematics.
- Developed a portable, threadsafe bit-banged driver for the OneWire protocol.

Teaching Experience

Teaching Assistant, UBC 2019.09–2022.06

- **Head TA:** Coordinated a team of 20 TAs for a 1000-student introductory engineering course and developed rubrics for assignments and exams.
- **Mentor TA:** Developed new TAs' teaching abilities through socratic questioning and facilitated discussion with peers.
- **Tutorial TA:** Led inquiry- and seminar-based tutorials, and graded submissions for 30- to 60-student sections of engineering and physics courses.

Volunteer Experience

Services Committee Chair, UBC Graduate Student Society 2021.05–2021.08

- Chaired monthly meetings to plan events and services for graduate students.
- Drafted policy and bylaw changes to address seasonal personnel shortages.

President/Vice-President, UFV Physics Student Association 2016.05–2019.05

- Organized monthly social events (hikes, board game nights, etc) for 20–40 students to promote campus engagement.
- Organized monthly academic lectures for 20–60 students to address missing sections in program curriculum.
- Arranged a 100-student year-end event to improve campus life with live music, games, and prizes while remaining under a \$500 budget.

Projects

3D Printing 2021.01–Present

- Modified a Creality Ender 3V2 to use direct drive, quieter fans with larger airflow, guides to reduce strain on filament, and remote monitoring.

Home Automation 2018.05–2021.05

- Designed humidity-controlled fan for bathroom using discrete components.
- Reverse-engineered IR communication protocol for RGB light strand.
- Interfaced a voice-activated controller hosted on a Raspberry Pi with IoT-controlled LED lights, IR-controlled RGB lights, and switch-controlled lights.

Quadcopter 2017.01–2017.04

- Designed a PID-based flight control system and interfaced it with a 9-axis IMU.
- Wrote custom communication protocol for tuning device on the fly.