# Kai Asaoka

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## EDUCATION

**University of British Columbia** **Sep. 2021 – May 2027**

*BASc, Engineering Physics* *Trek Excellence Scholarship for Top 5% GPA in Faculty*

- Engineering Physics is UBC's most competitive engineering discipline, combining mechatronics and honors physics.

## EXPERIENCE

**Controls Software Engineer Intern** **Jan. 2026 – May 2026**

*Marathon Fusion* *San Francisco, CA*

- Proposed and implemented full-stack PVAccess-based Python solution to replace LabVIEW, architecting backend server, REST/websocket API gateway, and front-end UI to overhaul laboratory data acquisition and control systems.
- Developing controls software in LabVIEW and designing and fabricating electrical control system hardware for next-generation plasma centrifuge system to enable automated control of advanced plasma-based experiments.

**Full-Stack Software Developer Intern** **May 2025 – Dec. 2025**

*D-Wave Quantum Systems* *Burnaby, BC*

- Developed scalable asynchronous Python server for cryogenic fridge control, interfacing 10+ SCPI/Modbus devices via REST API to automate test procedures and log telemetry to InfluxDB time-series database.
- Designed 3+ front-end UI apps in Plotly Dash for remote monitoring, data visualization, and control of server operations.
- Implemented unit tests using Pytest and Mock framework, increasing test coverage and refactoring for maintainability.
- Contributed to open source PVAccess for Python (P4P) library on Github, extending NTTable normative type to support flexible field initialization and unifying API behavior with NTScalar.

**Quantum Experimentation Research Intern** **May 2024 – Dec. 2024**

*Nippon Telegraph and Telephone (NTT)* *Atsugi, Kanagawa*

- Led fiber-based multi-party quantum communication experiments and improved quantum interference visibility between heralded single photon and weak coherent pulse sources (published in JJAP).
- Built Python automation tool to control serial devices and automate experiments, reducing run-time by 80%.
- Developed data processing and time-to-event sorting algorithms in Python with simulation model predicting optical filtration effects on quantum interference visibility.

**Systems Engineer Intern** **Jan. 2023 – Apr. 2023**

*VIA Rail Canada* *Vancouver, BC*

- Led 7 Lean process improvement projects using data-driven analysis, increasing workplace task completion rate by 10%.
- Managed operations using Azure DevOps and presented productivity data using Power BI during weekly meetings.
- Provided stakeholder consultation and technical documentation to directors, communicated with equipment suppliers, proposed projects, and implemented training initiatives modeling the Toyota Production System.

## PROJECTS

**Self-balancing 2 DOF Inverted Pendulum** **Sep. 2024 – Apr. 2025**

- Led controls software for self-balancing 2 DOF inverted pendulum, implementing real-time C++ firmware on ESP32 microcontroller with nested PID control algorithm in MATLAB Simulink.

**Self-Driving Car Simulation with Image Recognition** **Sep. 2023 – Dec. 2023**

- Implemented autonomous driving in Gazebo using Python and ROS with ML-based sign reading, license plate recognition, pedestrian detection, and path planning.
- Developed contour-based road boundary smoothing algorithm and trained CNN for optical character recognition.

**All-Terrain Self-Driving Racing Robot** **Apr. 2023 – Aug. 2023**

- Designed autonomous racing robot as lead mechanical designer to compete in Mario Kart-themed robotics competition.
- Developed steering and chassis architecture in CAD using Onshape, fabricated with 3D printers and laser/waterjet cutters.
- Prototyped H-Bridge motor driver circuit on breadboard and soldered high-performance infrared detector circuits.

## SKILLS

- **Languages:** Python, C/C++, Java, VHDL, LabVIEW, MATLAB.
- **Tools & Frameworks:** Linux, Git, REST/websocket API, EPICS/PVAccess, InfluxDB, Plotly Dash, Pytest, Agile/Scrum.
- **Hardware:** KLayout, KiCad, Onshape, SOLIDWORKS, Soldering, Oscilloscopes, 3D Printing, Laser/Waterjet Cutting.
- **Robotics & ML:** Computer Vision (OpenCV), Machine Learning (PyTorch, TensorFlow), ROS, Simulink, Gazebo.