# Bob Pham

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## Education

**University of British Columbia** — Vancouver, BC

*Bachelor of Science in Computer Science – 87% Average* — *Sep. 2020 – May 2025*

- Teaching assistant for CPSC 310 – Introduction to Software Engineering
- Dean's Honour List (2021, 2022, 2024)

## Experience

**Software Engineer Intern** — May 2024 – Aug. 2024

*Invinity Energy Systems* — *Vancouver, BC*

- Led and engineered the migration of battery control applications to **React**, reducing initial load times by **50%**
- Launched a hierarchical alert system using **TypeScript**, improving fault detection and response efficiency by **50%**
- Designed access tokens in a **Express.js**/**TypeScript** backend, reducing unauthorized access incidents by **75%**
- Built a **Python** test automation framework for battery modules, reducing manual testing by **90%**, and enabling real-time cloud monitoring via **Azure Monitor**
- Reduced runtime of **Jenkins** CI pipeline by **90%** by caching common dependencies between runs

**Firmware Engineer Intern** — Sep. 2022 – Sep. 2023

*Intel* — *Vancouver, BC*

- Spearheaded the development of the X.509 certificate generation for SPDM compliant device attestation for IPU SoC security modules using **assembly**
- Developed a unified set of **Python** applications for generating, verifying and analyzing web certificates, improving automation by **60%** and data transparency by **75%**
- Implemented and validated next-gen cryptographic algorithms in **C** and **assembly**, achieving a **2x** speedup in processing operations, significantly enhancing security module throughput
- Developed a custom **Python** library for encoding/decoding **DER/ASN.1**, enhancing integration with cryptographic tools and improving parsing efficiency by **50%**
- **Halved** developer effort by developing a **Python** wrapper for a **TCL + SV** test suite
- Refactored testing infrastructure to parallelize test execution, reducing total runtime by upwards of **80%**

## Projects

**UBC Orbit** | *Python, C, Docker* — Sep. 2023 – Present

- Firmware developer on university satellite design team, developing systems for command and data handling
- Developed MibSPI driver for MRAM chip in **C**, improving resistance to transient faults, enhancing reliability
- Automated platform-agnostic builds for command & control software via **Docker** & **Python** CI/CD pipeline
- Migrated build systems to **CMake**, improving build efficiency, maintainability, and cross-platform compatibility

**FindingBarrelOS** | *C, ARMv8, QEMU, Docker* — Sep. 2024 – Dec. 2024

- Designed FindingBarrelOS, a micro-kernel operating system inspired by *Barrelfish* from ETH Zurich
- Developed a **hierarchical capability permission system** using explicit, resource-bound tokens to enforce fine-grained access control and prevent privilege escalation
- Engineered a **thread-safe memory management system** optimized for page tables, CPU caches, and memory de-fragmentation to ensure efficient physical and virtual memory delegation
- Designed efficient **message-passing** using **LMP/UMP protocols**, for low-latency, high-bandwidth communication across processes and cores

**Bermuda** | *C++, CMake, OpenGL, SDL2* — Sep. 2024 – Dec. 2024

- Built a **cross-platform game engine** with **C++** featuring a rendering pipeline and physics simulation
- Designed a memory-safe **Entity-Component-System** architecture managing **500+** entities per room
- Engineered **procedural world generation** using **Prim's Algorithm**, able to produce **12k+** maps
- Optimized rendering with frustum culling, batching, and multi-threaded loading, reducing draw calls by **60%**

## Technical Skills

**Languages**: Python, C/C++, Java/TypeScript, Rust, Java, HTML + CSS, Assembly (x86), C#, SQL, Go
**Technologies**: React, Django, Express, Flask, Next.js, Node.js, OpenGL, NumPy, Pandas, MySQL, MongoDB
**Tools & Testing**: AWS, Docker, CMake, Git, Linux, Vite, Jenkins, Mocha, Jest, JUnit, PyTest, GoogleTest