Randy Zhu

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Education

University of British Columbia September 2023 – April 2027
Bachelor of Science, Honours Computer Science, Option in Software Engineering, Minor in Math *GPA: 88%*

Technical Skills

Languages: Python, Swift, C++, C#, TypeScript, C, SQL, HTML/CSS
Developer Tools: Git, Docker, Linux, Claude Code
Testing Frameworks: Playwright, JUnit, NUnit, Swift Testing, PyTest
Technologies: React.js, Unity Game Engine, Express.js, Google Cloud Run, Power BI

Work Experience

Research Assistant May 2025 – September 2025
University of British Columbia *Vancouver, BC*

- Secured a $6000 grant to develop and research a tool to create unit tests from integration tests.
- Implemented graph algorithms for static and dynamic program analysis in Python for automated unit test generation
- Identified external dependencies to functions by extracting docstrings from objects for analysis with an open source LLM, Gemma 3n on ollama
- Developed the tool using Agile methodologies like Kanban; managed source code collaboration using Git
- Caught 76% of bugs and covered 85% of code base using test-driven-design by writing over 300 unit tests in PyTest, mocking expensive API calls using pytest_mock and monkeypatch

Software Developer Intern September 2024 – April 2025
Teck Resources *Vancouver, BC*

- Created calendar component used by teams across the org using the Power Apps Component API, React.js, TypeScript and the Microsoft Fluent UI React toolkit
- Tested web apps, catching 87% of bugs before reaching user acceptance tests using Playwright and NUnit and C#
- Saved over 100 hours for site engineering teams by creating a data ingest tool using the Microsoft Dataverse REST API in C#
- Presented Power BI dashboard of on-site safety events across business units by unifying data from legacy databases, using SSMS, to wrangle data using SQL, then finer transformations using M, DAX and pandas for the final dashboard

Teaching Assistant July 2024 – Present
University of British Columbia *Vancouver, BC*

- Achieved a 98% favourable rating from students for debugging their event-driven Swing code in Java
- Lectured during seminars on low-level programming fundamentals like MIPS Assembly, stack frames, and POSIX pthreads
- Explained and solved parallel programming problems as a part of office hours using spinlocks, mutexes, and threading

Projects

Sasquatch | *Swift, ARKit, LiDAR, Detectron2, Open3D, Python, FastAPI, PostgreSQL, GCP*

- Built an ML pipeline combining Detectron2 instance segmentation with LiDAR point cloud processing to detect climbing wall holds and generate routes of varying difficulty
- Implemented PCA-based wall orientation detection to automatically position a virtual pinhole camera, projecting 3D point clouds to 2D for inference and back-projecting detections to world coordinates
- Integrated Google Gemini for hold classification, Open3D for 3D processing, and FastAPI for a real-time API consumed by an iOS capture app implemented in Swift with SwiftUI

iSCSI Driver for macOS | *Swift, C++, DriverKit, iSCSI*

- iSCSI is a storage protocol similar to Windows File Sharing (SMB) or NFS, but at a lower level. This project aims to create an free and open-source alternative that uses the new DriverKit API instead of kernel modules.
- Working around limitations of DriverKit by implementing the networking client in user space with Swift
- Improved performance by designing and using a ring buffer to forward driver SCSI data to user space

Lisp Compiler | *x86 assembly, Linux ABI, C, Lisp, gdb, LLVM IR*

- Implemented register allocation using graph colouring algorithms to minimize memory reads
- Working towards support for first class functions via closure conversion, and tail call optimization to enable efficient recursion
- Designed an LLVM IR backend for the project to make the compiler platform-agnostic