# Raymond Chang

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## Skills

- Proficient: Python, C++, C, Java, SQL, TypeScript
- Technologies: Git, SQLite, GNU Make, Spring, CMake, PostgreSQL,
- Selected course work: Design & Analysis of Algorithms, Performance Engineering, Information Retrieval, Compiler Construction, Operating Systems, Databases, Artificial Intelligence, Language Design and Implementation

## Education

**University of Waterloo** September 2022 - Present
Masters of Mathematics in Computer Science (Thesis)

**University of Ottawa** September 2016 - April 2021
Honours Bachelor of Science in Computer Science (CO-OP)
Deans Honours List
Honours project - Modelling and verifying distributed leader election algorithms with TLA+.

## Work Experience

**Blackberry QNX** June 2020 - August 2020
CoreOS Software Development Student

- Developed a program to detect illegal instructions in the kernel binary by using binary analysis tools
- Wrote Unit tests for the QNX Neutrino RTOS and QNX Hypervisor

**Blackberry QNX** September 2019 - December 2019
CoreOS Software Development Student

- Worked on a program to test and track new commits to Review Board
- Setup a QNX Hypervisor System with an Ubuntu guest to demonstrate its abilities to other teams
- Wrote Unit tests for the QNX Neutrino RTOS and QNX Hypervisor

**Ford Motor Company** January 2019 - April 2019
Telematics Control Unit Software Developer

- Developed features and Unit tests for C and C++ multi-threaded Linux applications
- Fixed bugs and mutithreading related issues found by code analysis tools such as Thread Sanitizer and Clang Static Analyzer

**Canadian Border Services Agency** May 2018 - August 2018
Junior Programmer

- Worked in a team of three to create a web application for the management of software development using Java, JSP, Hibernate, jQuery, SQL and Spring MVC
- Developed functional UI Mock-ups for the web application using HTML, CSS and JavaScript
- Wrote JUnit Tests for a separate reporting application
- Acquired the Enhanced Reliability Status level of security clearance

## Projects

**Juice - Java Compiler - Course project for Compiler Construction** January 2023 - April 2023

- Developed a Java compiler targeting x86 with two teammates
- Consisted of 28753 lines of TypeScript and passed the majority of course provided test cases
- Ported and upgraded an existing Intermediate Representation (IR) interpreter from Java to TypeScript to improve the debugging process
- Made major design decisions about the IR and closely consulted with group members
- Wrote hundreds of Jest unit tests with final code coverage of 80% and total test count of 628 Jest unit tests
- Source code available upon request

**Lettuce - New Programming Language and LLVM based compiler** July 2023 - August 2023

- Worked with a partner to create a new programming language and corresponding compiler using the LLVM compiler infrastructure
- Developed compiler in C++ and added an interpreter mode
- Created a new IR using MLIR
- Source code: https://github.com/rkchang/mlidk

**Document Search Engine - Course project for Information Retrieval** January 2020 - April 2020

- Worked with a partner to create a search engine and UI for searching through a collection of course listings and news articles by using the Flask web framework
- Source code: https://github.com/rkchang/search-engine, Final report available upon request

**DNS Server** December 2021 - Now

- Currently writing a DNS server in C++ using the ASIO library
- Source code: https://github.com/rkchang/rcdns