

Charles Zhang

University of Waterloo | B. Computer Science 2023
4.0 GPA | President's Scholarship of Distinction

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Summary of Qualifications

- Professional real time embedded C / C++ development experience
- Experience in Autonomous Vehicle Planning and Controls, enrolled in ECE493 (Autonomous Vehicles)
- Strong knowledge of TCP-IP networking through internship at Cisco Systems
- **Programming:** C++, C, Python, Bash, Swift, Typescript, JavaScript, HTML, CSS, DXL, Scala
- **Technical:** Unix, ROS, Eigen, MATLAB, Simulink, Git, Docker, Jenkins, Angular, Bootstrap, Jira, DOORS

Work Experience

Apple Inc. | *Software Engineer* | *Cupertino, California*

May 2020 – August 2020

- Incoming intern in the Wi-Fi Peer-to-Peer team.

Cisco Systems | *Software Engineer in Test* | *Ottawa, Ontario*

May 2019 – August 2019

- Created unit tests for Cisco ASR9000 edge routers, used by Verizon, Bell, Google Cloud for routing major internet traffic
 - Wrote 100s of testcases for Layer 3 MPLS, GRE packet forwarding using the C XTF framework
 - Improved test coverage by 35% (25% line, 40% branch) for over 50,000 lines of code
- Improved Jenkins test infrastructure stability, reducing flaky testcases from 15% to < 1%
- Experience with embedded C, TCP-IP stack, Cisco CEF, networking protocols (BGP, GRE, MPLS, SRv6)

Ciena Networks | *Software Automation* | *Ottawa, Ontario*

July 2018 – August 2018

- Automated migration of Ciena's requirement database from IBM DOORS to Jama with Python, DXL
- Updated Ciena's Budgeting Website's frontend using Angular 6, Angular Material, and TypeScript
- Created responsive web templates with Node.js, Bootstrap, CSS Flexbox, and Jasmine unit testing

Waterloo Design Teams

Watonomous | *Path Planning Lead* | *Waterloo, Ontario*

January 2019 – Present

- Software manager leading 15 students in a 100-student project, converting a Chevy Bolt into a level 4 autonomous car for the GM SAE Autodrive Competition using ROS C++
- Spearheaded behavioural planner implementation handling pedestrians, construction, lane changing
- Currently implementing a Frenet trajectory planner and Model Predictive Control feedback controller
- Created a ROS vehicle dynamics simulation node using MATLAB and Simulink
- Improved obstacle avoidance costmap efficiency by 80% using the C++ Eigen matrix library, triple shear rotation algorithm, optimized ray-tracing, and a singleton graphics cache

Projects

Article Generator iOS App

July 2018 – January 2019

- Created an iOS app in Swift that generates style-mimicking text using a Recurrent Neural Network
- Used Python, Keras, Tensorflow to train the model, CoreML to integrate the model into the app
- Trained the model on Amazon Web Services using Docker Swarm
- Gained experience with web scraping, data collection, and data sanitization

Tetris Neural Network

March 2018

- In a week, developed a Neural Network from scratch that plays Tetris using a Genetic Algorithm
- Built a Tetris game simulator with a standardized API to allow programmatic interaction
- Used Pygame for graphical display and NumPy for game-state representation and computation

EzJigsaw iOS App

August 2017 – October 2017

- Built an iOS app that allows users to build customized Jigsaw games from their own images
 - Downloaded over 300 times in 6 different countries within the first month
- Used the SpriteKit graphics library to create the user interface
- Practiced the model-view-controller design pattern, project management, and version control

Arduino Development

October 2016 – January 2017

- Made an autonomous maze-solving robot based on the Arduino Microcontroller
- Implemented a custom depth-first-search algorithm to map and solve a physical maze

Education

University of Waterloo | *Waterloo, Ontario*

Expected April 2023

- 92% Cumulative GPA, Dean's Honours List, President's Scholarship of Distinction
- **Relevant Courses:** ECE 493 Autonomous Vehicles (computer vision, SLAM, state estimation, path planning and controls), CS246E Advanced C++ Object Oriented development, CS240 Data Structures, STAT240 Advanced Probability and Markov Chains.