

# Brian Chen

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## EDUCATION

### Computer Engineering

University of Toronto

2020 – 2024

Toronto, ON

- Third year B.A.S.c in Engineering Science; Computer Engineering major, Robotics minor. Dean's list, 3.51 cGPA
- **Coursework:** Computer Security, Operating Systems, Advanced Algorithm Design, Machine Learning, Software Engineering, Foundations of Computing, Computer organization, Control Theory, Semiconductor Devices, Signal Analysis, Electronics, Economics, Engineering & Law

## EXPERIENCE

### Software Engineering Intern

[ c, c++, python, ROS2, open source, Linux, distributed systems ]

May 2022 – September 2022

Open Source Robotics Foundation

Mountain View, CA

- Developed **60+ features and bugfixes** in collaboration with **NASA** while balancing open source community feedback for the **ROS2** and **Gazebo** packages powering the **VIPER lunar rover's** critical ground control and autonomy systems – *leaving earth in 2024!*
- Co-authored **REP2012: Service Introspection** standard proposing new core functionality for **runtime introspection and recording of ROS2 services**. Designed, built, and deployed reference implementation with few iterations to **unblock tens of thousands of users while balancing stakeholder priorities** from the open source community, Open Robotics, and the Technical Steering Committee.
- Onboarded quickly on ROS2 & Gazebo codebases; improved the development experience for **800,000+ users** by **fixing race conditions** in ROS2, starting a mypy compliance initiative, adding an AsyncParameterClient interface, and **improving test coverage**

### Autonomy Software Lead

[ c++, python, Simulink, PyTorch, TensorRT, CI/CD, ROS2 ]

September 2020 – June 2023

aUToronto (University of Toronto Self-Driving Car Team)

Toronto, ON

- **Leading 20+ students** across trajectory motion planning, automated simulation testing, and deep learning acceleration teams to build a Level 4 autonomous vehicle for **aUToronto's** entry to the **AutoDrive Challenge**. **Our team has won 1st place for the past 5 years**
- **Worked to a leadership position** through proactive self-learning, mentoring new members, and taking on ownership of projects
- Designing and implementing **time-critical trajectory motion planning** solution for our vehicle. **Led solution convergence process** to pick design through decision matrices weighing literature review, compute restrictions, failure modes, and team buy-in
- Accelerated YOLOv5 by 20x with a TensorRT ML pipeline to **detect objects in real-time** across 4 cameras with **millisecond latency**
- **Reduced developer testing time by 10x** by developing "aUToTest", a parallelized automated simulation integration test framework.
- Built AI sensor noise modelling tool on CycleGAN to improve Sim2Real transfer, build test confidence, and **deliver simulation value**

### Fullstack Software Developer

[ python (Django), PostgreSQL, Vue.js, fullstack, GIS ]

July 2020 – September 2021

BC Parks Foundation

Vancouver, BC

- **Translated multiple stakeholder needs into functional requirements and practical tasks** to build fullstack 'DiscoverParks' webapp and data collection solution. I was responsible for the internal content management interface, backend, and front-end experiences
- Applied profiling to rearchitect database to better model user data and remove cycles; **improved code health and query speed**

### Teaching Assistant

[ c, python ]

September 2021 - June 2022

Division of Engineering Science - University of Toronto

Toronto, ON

- **Taught ~50 undergrads computer science** from 'Hello World' to dynamic programming and Dijkstra's algorithm (**ESC180, ESC190**)

### Co-Founder & Developer

[ python (Django), PostgreSQL, aws ]

April 2020 – December 2020

GrocerCheck Foundation

Vancouver, BC

- **Created [grocercheck.ca](https://grocercheck.ca)**, a webapp that leverages big data to **help 20,000+ daily users #ShopSafeStaySafe** by finding the least busy place to shop for groceries in **15,000+ stores** across North America in response to the COVID-19 pandemic
- Founded GrocerCheck Foundation, a **registered non-profit** to better scale project; secured support valued at **\$200,000+**
- **Architected and deployed horizontally scalable distributed system architecture** to meet unexpected growth and demand

### Research Intern

[ python (PyTorch), neuromorphic computers, supercomputers ]

Feb 2021 – September 2021

Intelligent Sensory Microsystems Lab - University of Toronto

Toronto, ON

- Innovated novel 'thresholding' concept which **improves longevity and power consumption** characteristics of neuromorphic **memristor** crossbar **machine learning accelerators** during in-situ training by **up to 90%**. **First author paper** under review

## SKILLS

- **Languages:** c++, python, c, go, rust, lua, javascript, html5, css, java, bash, SQL, verilog, MATLAB/simulink, assembly
- **Frameworks & Libraries:** ROS, ROS2, numpy, scipy, OpenCV, Pandas, Jenkins, CI/CD, Docker, LXD, flask, Django, Android, PyTorch, Tensorflow, Keras, TensorRT, CUDA, PostgreSQL, MySQL, MongoDB, NodeJS, VueJS, ThreeJS, FPGA, Cloud, AWS, GCP, git
- **Other:** Linux, UNIX, vim, debugging, object-oriented programming, embedded, systems software, infrastructure, databases, REST APIs, MapReduce, user experience, Fusion360, Googling, technical writing and communication

## PROJECTS, AWARDS, & MORE

For demos, please see [chenbrian.ca/posts/projects](http://chenbrian.ca/posts/projects)

- **"butternut":** Implementing **gltr** on **CTRL** to combat AI-generated text. nwHacks bronze, KPMG Data Analysis & Salesforce Award.
- **"the Humerus Bot":** Directed project with **UTMIST** to build a NLP bot designed to **win Cards Against Humanity**
- **Teaching:** Review content I prepared for my students, including a **custom Jupyter notebook** with c kernel for interactive learning
- **Awards:** Schulich Leadership Scholarship nominee, Bert & Greta Quartermaine Badminton Scholarship Recipient, BC District Scholarship & BC Achievement Scholarship Recipient, Canada Service Corps Student Service Grant, ESROP-UofT research grant
- **Badminton:** ClearOne Nationals Team, 2018 Junior Nationals Finalist, Eric Hamber Provincial Team Captain, **UTBC** Exec
- **Theatre:** Wrote and directed full-length show: *'To Bleach a Pigeon'*. Oversaw actors, crew, set design, and creative process