# Brian Chen

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## EXPERIENCE

**Uber** [*site reliability engineering, distributed systems, go, java, garbage collector, autoscaling*] September 2023 – August 2024
Production Engineering Intern *San Francisco, CA*

- I help ensure reliable and efficient operation of Uber's mapping and core services via participating in on-call rotation, incident response, and service ownership on the mapping production engineering (SRE) team, primarily focusing on capacity safety, efficiency, and performance
- Designed & delivered extension to CRE to build CPU & throughput-informed rectangular auto-scaling system for Uber's stateless microservices to improve failover safety and reduce cost. Approximately half of Uber's stateless compute is managed by this system.
- Diagnosed and fixed severe memory allocation issue causing excess garbage collector load, service degradation, and outages in a critical core service (>2.5 mil RPS) via 'hacking' the go runtime; reduced service compute cost by >$700,000 while improving latency and reliability
- Worked with language foundation teams to improve go and java service observability into garbage collector performance. For example, I identified a non-linear relationship in GC signals for use to predict service performance degradation under high load
- Developing end-to-end memory leak detection system including Go & JVM garbage collector monitoring, auto-scaling, and load-testing tooling

**Tesla** [ *autonomous vehicles, c, c++, signal processing, embedded systems* ] May 2023 – September 2023
Autopilot Intern *Palo Alto, CA*

- Owned vision park assist ultrasonic sensor replacement v2 project; architected and implemented pipeline from GPU kernel and vision schedule optimization, to spatial-temporal filter design and performance tuning. Features developed in close collaboration with leadership and deployed to global Tesla fleet
- Developed selfie-based driver drowsiness and attention system, enabling a transition from torque sensor to vision-based driver monitoring as well as limited user hands-off driving, while meeting IIHS compliance specs
- Re-designed camera heater defogging control algorithm, extending vehicle range by up to 10 miles in nominal conditions.
- Developed high-speed shared-memory transport communication system to enable tracking verbose logs in production vehicles

**Kortex** [ *a little bit of everything* ] July 2023 – Present
Founding Engineer *Remote*

- Building kortex, a second brain for creators. I oversee and develop infra, backend, networking, devops, machine learning (LLMs), and more

**Open Source Robotics Foundation** [ *c, c++, python, ROS2, open source, Linux, distributed systems* ] May 2022 – September 2022
Software Engineering Intern *Mountain View, CA*

- 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 while balancing stakeholder priorities
- Supported NASA contract in developing ROS2 and Gazebo packages powering the VIPER lunar rover's systems

**Toronto Intelligent Systems Lab** June 2024 - May 2025
Student Researcher *Toronto, ON*

- Undergrad thesis jointly supervised by Prof. Igor Gilitschenski and Nvidia research on autonomous vehicle simulation (in-progress)

**Intelligent Sensory Microsystems Lab** [ *python (PyTorch), neuromorphic computers, supercomputers* ] Feb 2021 – September 2021
Student Researcher *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%. Second author paper published in *Neurocomputing*

**BC Parks Foundation** [ *python, django, PostgreSQL, Vue.js, fullstack, GIS* ] July 2020 – September 2021
Fullstack Software Developer *Vancouver, BC*

- Built discoverparks.ca, a website that helps Canadians discover nature experiences in parks. Owned backend, CMS, and GIS integration

**Division of Engineering Science - University of Toronto** [ *c, python* ] September 2021 - June 2023
Teaching Assistant *Toronto, ON*

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

## EDUCATION

**Computer Engineering** 2020 – 2025
University of Toronto *Toronto, ON*

- B.A.S.c in Engineering Science; Electrical & Computer Engineering + PEY co-op. Honours.
- Coursework includes OS, ML, algorithm design, compilers, semiconductors, distributed systems, electronics, control theory, law, and more

## PUBLICATIONS

1. X. Dong, **B. Chen**, R. Genov, Mostafa Rahimi Azghadi, and Amirali Amirsoleimani, 'SITU: Stochastic input encoding and weight update thresholding for efficient memristive neural network in-situ training' *Neurocomputing*, pp. 128275–128275, Jul. 2024, doi: https://doi.org/10.1016/j.neucom.2024.128275

## OTHER

*For demos, please see chenbrian.ca/posts/projects*

**aUToronto (UofT Self-Driving Car Team)** [ *c++, python, Simulink, PyTorch, TensorRT, CI/CD, ROS2* ] September 2020 – June 2023
Autonomy Software Lead *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 placed 1st for the past 6 years
- Designed and implemented real-time motion planning systems and algorithms for our vehicle to navigate complex urban environments
- Accelerated YOLOv5 by 20x via an Nvidia TensorRT ML pipeline to detect objects in real-time across 4 cameras with millisecond latency
- Other projects include: automated simulation integration test framework, simulation noise modelling via CycleGAN, lanelet mapping libraries, and more

**GrocerCheck Foundation** [ *python (Django), PostgreSQL, aws* ] April 2020 – December 2020
Co-Founder & Developer *Vancouver, BC*

- Created and scaled grocercheck.ca, a webapp that leverages big data to help 20,000+ shoppers #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

**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
- **chenbrian.ca/posts/2021/Teaching**: Review content I prepared for my students, including a custom Jupyter notebook for teaching c