Brian Chen

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EDUCATION

Computer Engineering 2020 – 2024
University of Toronto *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 Engienering Intern [*production engineering,*] September 2023 – Current
Uber *San Francisco, CA*

- hello world

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

- Rubberband vision park assist lidar replacement integration; butterworth filtering design & post processing, performance tuning, vision schedule optimization, QA optimization via gpu kernel, impl decoder, integration w/ rest of system; inform chimes, frontback, auto-present MX doors, viz: difficult problem because of low frequency and extremely high noise while requiring it to look very steady and still – double filter design w/ switching. Weekly w/ ashok :')
- HVAC: AP camera defogging algorithm control using dew point & fine pwm integration.
- Driver drowsiness & monitoring: infra for shadow mode drowsiness, IIHS compliance, allowing for hands off wheel during nominal condition, allowing for vision-based handson instead of torque, assorted tickets – work w/ QA team & triaging issues, iterating on feedback, testing in prod via flags, etc
- Assorted tickets: CAN bus integration, slog_disk SMS<->A72 shared memory transport for greater log fidelity/throughput,
- chassisparameters off by 8.4cm

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, 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

- ***"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