BRIAN TSOI

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Education

University of Toronto Expected May 2026
Bachelor of Applied Science in Computer Engineering (Completed Third Year) GPA: 3.65/4.00

Skills

Prgramming: C, C++, Rust, Java, Python, HTML, CSS, JavaScript, Assembly, Go, SQL, Git, Github
Embedded/Hardware: STM32 microcontrollers, RTOS, Arduino, UART, I2C, SPI, FPGAs (Verilog)
Languages: Chinese (native in Cantonese, fluent in Mandarin), English (fluent)

Professional and Technical Experience

Backend Software Engineer | Mozilla May 2024 – Present
OS Integration Team for the Firefox Browser
- Contributing to the **21M line C++/Rust** codebase of **Firefox**
- Enhancing the **Rust-minidump** crash report analyzer by interpreting **x86 Assembly** instructions
- Adding a crash reason inconsistency detection feature to enhance over **2.6M crash analysis** per day
- Working in a **globally distributed** team accross 3 time zones through effective communication skills

Software Developer | UTAT Space Systems Sept 2022 – Present
University of Toronto Aerospace Team Space Systems
- Developed an adaptive **Python** compression algorithm based on Golomb-Rice coding
- Achieved **2:1 compression ratio** (50% reduction) for hyperspectral images
- Improving algorithm runtime performance by **18 times** through reimplemenation written in **C**
- Outlined high level architecture of **FreeRTOS**-based multithreaded satellite software for **STM32**

Team Lead and Software Developer | UofT Spark Sept 2022 – Present
University of Toronto Spark Design Club
- Building a 48"x36"x30" **pinball machine** for the engineering community of over 4000 students
- Incorporated a **Python OpenCV** and **I2C**-based ball tracking system with latency of under **79ms**
- **Collaborating** with 8 other electrical/mechanical team leads, brainstorming new projects ideas

Projects

Distributed Key-Value Database Jan 2023 – Apr 2023
- Architected a leader-based concurrent distributed NoSQL database in **Java** with a team of 3
- Tested with the Enron dataset of **over 2.6 GB**, attained **99.3% reliability** and below **5ms of latency**
- Augmented ring-based **consistent hashing** mechanism with **virtual nodes** for even data distribution

AI Ray Tracing Image Denoising Filter May 2023 – Aug 2023
- Trained a **Pytorch** autoencoder neural network that denoises low-sampling rate ray tracing images
- Optimzied to reach **83% image quality improvement** and outperform conventionl filters by **47%**
- Reduced high quality 3D graphics rendering time by **97%**

Google Maps Clone Jan 2023 – Apr 2023
- Rendered OpenStreetMap data at over **60 fps** by writing efficient **C++** graphics algorithms
- Reduced path routing time to under **23ms** by utilizing **A* path finding** algorithm
- Crafted a GUI using the **GTK** library, enabling users to drag, zoom and search for map locations

Terminal Text Editor Sep 2022 – Present
- Constructed a terminal text editor utilizing **C**, **POSIX API** and **VT100** terminal sequences
- Implementing Vim-like keyboard bindings and **modal editing** functionality