

# BRIAN TSOI

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## Education

### University of Toronto

Bachelor of Applied Science in Computer Engineering (Completed Third Year)

Expected May 2026

GPA: 3.65/4.00

## Skills

**Programming:** 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 Intern | Mozilla

May 2024 – Present

*OS Integration Team for the Firefox Browser*

- Ongoing **year-long** full-time internship, contributing to the **21M line C++/Rust** codebase of **Firefox**
- Augmenting **Rust-minidump**, the industry-leading crash reporter (used by Microsoft, Sentry)
- Adding faulty hardware crash detection feature by interpreting **x86 Assembly** instructions
- Enhancing over **2.3M crash analysis** and capable of detecting over **9000 inconsistencies** monthly
- Working in a **globally distributed** team across 15 time zones through effective communication

### Student 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 reimplementing written in **C**
- Outlined high level architecture of **FreeRTOS**-based multithreaded satellite software for **STM32**

### Student Project 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**
- **Mentoring** team members on software development tools usage and best practices

## Projects

### Distributed Key-Value Database

Jan 2024 – Apr 2024

- 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
- Optimized to reach **83% image quality improvement** and outperform conventional 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