

Brian Tsoi

437-991-5356 | brian.s.tsoi@gmail.com | brianshtsoi.github.io | linkedin.com/in/brian-tsoi

Education

University of Toronto

Bachelor of Applied Science in Computer Engineering

Expected May 2026

GPA: 3.65/4.00

Relevant Coursework: Operating Systems, Algorithms & Data Structures, Computer Networks I, Distributed Systems, Introduction to Artificial Intelligence, Applied Fundamentals of Deep Learning

Experience

Mozilla Corporation

May 2024 – Present

Backend Software Engineer Intern - Operating Systems Integration Team

- Contributing to the **C++/Rust** backend of **Firefox** as a full-time year-long intern
- Validated **2.3M+ crash reports** monthly by adding inconsistency detection via **x86-64 ASM** parsing to the **open source** crash analyzer **Rust-minidump**, used by Mozilla, Microsoft and Sentry
- Developed and maintained an **open source library** for memory testing, with **15+** test algorithms written using **low-level Rust** features, reaching over **1,000 downloads** on crates.io in 2 months
- Integrating memory testing into the Firefox crash reporter to detect potentially faulty hardware

UofT Spark Design Team

Sep 2022 – Present

Student Software Project Lead

- Spearheading a **Raspberry Pi/C++** 12"x12"x48" arcade game community project with a **team of 10**
- Designed a **Python/OpenCV** ball-tracker with **79ms** latency for a 48"x36"x30" pinball machine
- Reviewed **10+ pull requests**, providing constructive feedback to uphold code quality across project
- Organized workshops for **15+ members** on use of **Git** and **linters** to streamline teamwork process

UofT Aerospace Team

Sep 2022 – Present

Student Software Engineer

- Implemented a **Python** compression algorithm for satellite images, achieving **50% compression rate**
- Improving runtime performance by **18 times** with rewrite in **C** and ported to **STM32** MCUs
- Engineered a **multi-threaded** framework in **FreeRTOS** to orchestrate satellite subsystems seamlessly

Projects

Toy Programming Language Interpreter and Compiler

Jun 2024 – Present

- Created a **Rust-based interpreter** for LoxLang, supporting expressions, conditionals, loops etc
- Implemented lexical analysis, **recursive descent parsing**, **abstract syntax tree** and tree-walking
- Designing a **compiler** that converts Lox to bytecode to be run on a **virtual machine** written in **C++**

Deep Learning 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%**, enabling smooth gameplay experience

Google Maps Clone

Jan 2023 – Apr 2023

- Rendered OpenStreetMap data at **60 fps** with **GTK** by writing efficient **C++** graphics algorithms
- Reduced path routing time to under **23ms** by utilizing **A* path finding** algorithm

Skills

Programming: C, C++, Python, Rust, Java, Go, x86-64 Assembly, HTML, CSS, JavaScript, SQL, Git
Embedded/Hardware: STM32 microcontrollers, RTOS, Arduino, Raspberry Pi, UART, I2C, SPI