David Tran

CANADIAN CITIZEN (J-1, TN, H-1B VISA ELIGIBLE)
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Education

Honors in Computer Science, Double Major in Mathematics — London, ON, Canada
Western University, National University of Singapore (Exchange) — *September 2020 - April 2025*

- **GPA**: 4.0/4.0 ; Cumulative Average: 96%; Highest standing in Computer Science at Western University (1/300)
- RBC Scholarship in Data Science ($25000, 1 of 5), 2x National Undergraduate Student Research Award ($8400, $9268)
- 3x 1st place from Western University, International Collegiate Programming Contest (ICPC) NA Qualifier (2021, 2022, 2023)
- **Coursework**: Operating Systems, Distributed Systems, Networks, Computer Architecture, Compilers, Systems Programming, Algorithms, Real Analysis, Complex Analysis, Abstract Algebra, Group Theory, Machine Learning, Parallel Programming, Statistics, Linear Algebra

Technical Skills

Languages (Tools): C++ (CUDA), C, Python (pandas, NumPy, PyTorch), Java, TypeScript, SQL (Snowflake), Rust
Keywords: High-Performance Computing, Parallel Programming, Operating Systems, Machine Learning

Experience

Apple — Cupertino, CA, USA
Software Engineer Intern | `C++, ARM/x86 Assembly` — *May 2024 - September 2024*

- Reduced latency in the WebKit engine by integrating portable SIMD assembly into real-time (<16ms) algorithms
- Implemented state-of-the-art data structures supporting SIMD operations into Apple's internal C++ standard library
- Developed a new text layout algorithm balancing performance with beauty, adding new features over other leading browser engines (e.g. Google's Blink and Mozilla's Gecko)
- Performed an open-ended investigation into performance optimization opportunities through extensive profiling and benchmarking of hot codepaths throughout WebKit's layout and rendering engine

Ontario Research Centre for Computer Algebra — Remote
Algorithm Researcher | `C++ (CUDA)` — *April 2024 - December 2024*

- Designing high-performance parallel algorithms for fast polynomial multiplication over infinite fields.
- Implemented algorithms with GPU CUDA kernels, achieving SOTA performance beating libraries such as Maple and FLINT
- Awarded an $9268 Undergraduate Research Award from NSERC, a national award for research in Canada.

Snowflake — San Mateo, CA, USA
Software Engineer Intern | `Java, Python, SQL (Snowflake), C++` — *May 2023 - September 2023*

- Created a new framework from the ground-up to estimate the potential impact of performance optimization ideas, using statistical analysis of query compiler and execution platform performance data
- Developed a static-analysis code refactoring tool and a corresponding Jenkins build pipeline to remove stale feature flags and dead code throughout the Java codebase, reducing current and future technical debt
- Added profiling to the execution platform to extract operator-level performance statistics of each query to diagnose causes of slow query execution and inefficient query compilation

Western Centre for Brain and Mind — London, ON, Canada
Computational Neuroscience Researcher | `Python (PyTorch)` — *March 2022 – April 2023*

- Helped design a novel ML model for generating functional parcellations of the cerebellum from low signal-to-noise fMRI data
- Researched hidden Markov model training algorithms, Bayesian unsupervised learning, approximate inference problems
- Implemented and optimized training algorithms on CUDA GPUs using PyTorch, reducing runtimes by 23%
- Awarded an $8400 Undergraduate Research Award from NSERC, a national award for research in Canada

Solana Labs — San Francisco, CA, USA
Software Engineer Fellow (MLH) | `Rust` — *June 2022 – August 2022*

- Deployed a smart contract using Anchor to whitelist transactions on the Solana blockchain
- Reduced deployment cost by 50% by designing a data structure that is 2x as space-efficient using program-derived addresses

Projects

davOS | `C, C++, x86 Assembly`

- A monolithic POSIX-compliant operating system built from scratch supporting the Intel x86_64 architecture
- Implemented a physical and virtual memory manager using protected paging, free lists and an LRU page-replacement policy

QtBoy | `C++ (Qt, SDL), GBZ80 ASM (Gameboy Assembly)`

- Reverse-engineered Nintendo's hardware docs to build a Game Boy emulator, disassembler, debugger, and memory analyzer
- Wrote GBZ80 assembly programs to test the CPU, GPU, audio processing unit, timing, and display components
- Optimized frames-per-second performance by 100% by using multi-threading and detecting inefficiencies using perf/Valgrind

Other

Canada Swimming National Medalist, Olympic Trials Qualifier; ARCT Diploma in Piano Performance; Violin Provincial Finalist