David Tran

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Education

Honors in Computer Science, Double Major in Mathematics — London, ON, Canada
Western University, National University of Singapore (Exchange) — *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 + Complex Analysis, Group Theory, Machine Learning, Parallel Programming, Statistics

Technical Skills

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

Experience

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

- Created a novel text rendering algorithm for enhancing typographic beauty on the iPhone, iPad, Apple Watch, Mac, and Apple Vision Pro, including features not seen in other leading engines, such as Google's Blink, Mozilla's Gecko, and TeX
- Reduced latency in the WebKit engine by integrating portable SIMD assembly into real-time (<16ms) algorithms
- Implemented a cache-optimal Bloom filter supporting SIMD operations into Apple's internal C++ standard library
- 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.
- Accepted to give a talk at CppCon 2024, the annual worldwide conference supported by the Standard C++ Foundation

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
- Engineered a static-analysis code refactoring tool and integrated it with Jenkins, eliminating stale feature flags and dead code in the Java codebase, reducing technical debt and improving code maintainability for future projects.
- 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