# Austin Jiang

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## SKILLS

**Languages**: C++, C, Python, Java, Bash, TypeScript, Rust
**Tools/Libraries**: Linux, Git, CUDA, CMake, PyTorch, TensorFlow, SQL, Docker, Nginx, Flask, FastAPI, Express
**Concepts**: GPU Programming, Concurrency, Lock-Free Data Structures, Multithreading & Synchronization,
High-Performance Computing, Distributed Systems, Compilers, Database Systems

## EXPERIENCE

**Multicore Lab, University of Waterloo**                                       Waterloo, ON, Canada
*Undergraduate Research Assistant (supervised by Dr. Trevor Brown)* | **C++, CUDA**          *Sep 2025 – Present*

- Implemented a **CPU lock-free data structures** baseline for controlled performance comparison.
- Migrated the build to the **CUDA toolchain (nvcc)** to resolve host-device and compiler compatibility issues.
- Developed a **VerlibAdapter abstraction** to support both **versioned and non-versioned** data structures.
- Benchmarked Verlib (PPoPP'24) extension with **10M-key** range queries under **100+ threads** on GPU.

**Wolfram Research**                                                            Remote
*Research Intern* | **Mathematica, Wolfram Kernels**                            *Sep 2025 – Present*

- Built a **parallel engine** automata handling $10^{10}$ **cells** across **8 CPU cores**, achieving **1.4x speedup**.
- Developed sparse frontier updates and dense scans, achieving a **127% speedup** via load-balancing strategies.
- Designed a **benchmark harness** measuring updates per second, active ratio, and scheduling overhead.

**Wolfram Research**                                                            Remote
*Research Intern* | **Mathematica**                                            *Sep 2024 – Jan 2025*

- Designed a pipeline voxelizing $10^{6}$ 3D meshes into binary grids for cellular automata, achieving **3x GPU speedup**.
- Developed algorithms to detect unsupported and overhanging regions, increasing infill stability by **55%**.
- Designed **benchmarking metrics** to measure density, connectivity, and printability of generated infills.
- Produced a first-author research paper, presented at the **Wolfram Technology Conference 2025**.

## PROJECTS

**Lambda Calculus Interpreter** | **C++**: Built a Lambda Calculus interpreter with a parser, AST, and normal order
evaluator, using de Bruijn indices to avoid variable capture and supporting curried forms.

**LookAround AI, AdventureX (Multimodel Track Winner)** | **Python, React**: Built a voice-controlled
multi-agent tour guide using the TEN Framework, integrating Google Maps Street View API for route narration.

**Zebra Giraffe Swap** | **Google Cloud Platform, PyTorch**: Built a concept-swapping fine-tuning model via selective
UNet training, implemented in PyTorch with Hugging Face Diffusers, using a preprocessing pipeline on COCO 2017.

**Stock Explain, Cal Hacks** | **Python, React**: Built a full stack AI platform with an autonomous web browsing agent,
integrating BrightData APIs and adaptive search strategies to actively fetch, unlock, and reason over live market data.

**Personal Infrastructure & Services** | **Linux, FastAPI, SQL**: Built & maintained a personal Linux server hosting a
full-stack website behind Nginx, Cloudflare DNS, cloud storage, OpenVPN, email service, and FastAPI + SQL backends.

## EDUCATION

**University of Waterloo**                                                      Waterloo, ON, Canada
*Bachelor of Computer Science (Honours)* | *Major GPA: 4.0/4.0*                *Expected May 2028*

- **Scholarships**: Mathematics National Scholarship ($25,000), President's Scholarship of Distinction ($2,500)
- **Coursework**: Data Structures, Algorithms, Development Tools

## AWARDS

**Meta Hacker Cup Round 2**: Ranked 813th out of 13,779 participants overall, top 6% worldwide.
**Generation Google Scholarship**: Google's flagship undergraduate scholarship for impact in technology (1 of 55).
**Canadian Computing Olympiad 2024 & 2025**: Silver medalist x2 (6th and 7th out of 10,000+ participants).
**USACO 2024 (Platinum)**: Achieved the highest division, ranked top 100 out of 15,564 participants.