

Tarek Ibrahim

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EDUCATION

Carleton University

Ottawa, Ontario

Bachelor of Engineering, Software Engineering (Co-op) — Final Year

Graduation: April 2027

Relevant Courses: Algorithms and Data Structures, Computer Architecture, Software Design, Operating Systems, Software Requirements, Advanced C++ Programming, Computer Networks, Real-Time Embedded Systems, Database Management

SKILLS

Languages: C++, Embedded C, Python, Go, TypeScript, HTML/CSS, Java, SQL, Bash
Libraries: CUDA/HIP, OneAPI, Boost, GTest, OpenCV, JAX, PyTorch, Gymnasium, React, Next.js, Gin, gRPC
Development Tools: CMake, Valgrind, Wireshark, Docker, Conda, Kafkacat, SLURM, GitLab, GCloud, Atlassian Suite

RELEVANT EXPERIENCE

Google Summer of Code Contributor

May 2026 – Aug 2026

The Apache Software Foundation, Apache HTTP Server Project

Remote

- Developed `mod_http3`, an HTTP/3 module for the Apache HTTP Server on OpenSSL 3.5 QUIC and nghttp3 (6,409 lines of C); extended `httpd`'s process management to track QUIC connections; two patches under upstream review ([#699](#), [#709](#)).

Research Assistant

Aug 2024 – Present

CUBIC Lab, Carleton University (Advisor: Dr. James Green)

Ottawa, ON

- Co-authored "LookWhere? Efficient Visual Recognition by Learning Where to Look and What to See from Self-Supervision," accepted at [NeurIPS 2025](#) ([arXiv](#)).
- Developed transformer-based peptide property predictors (hemolysis, solubility, non-fouling, permeability) from SMILES and ESM2 inputs, trained on a TPU v4-32 pod.
- Enabled large-scale Vision Transformer training by deploying JAX and PyTorch codebases on Cloud TPU pods.

Software Developer

May 2025 – Dec 2025

Searidge Technologies (SRT)

Ottawa, ON / Hybrid

- Developed and maintained safety-critical C++ microservices for air traffic control systems, ensuring high reliability and performance in real-time environments while conforming to [ED-109A](#) software integrity assurance standards.
- Researched and prototyped real-time video stabilization algorithms using OpenCV and CUDA, implementing a multithreaded microservice with Kafka for streaming video processing in airport surveillance systems.
- Rewrote and modularized a multithreaded logger using idiomatic modern C++ practices to improve throughput, maintainability, and concurrency safety for airport software systems deployed in 21 countries and 56 sites across the globe.

Software Developer

Jan 2025 – Apr 2025

Agriculture and Agri-Food Canada (AAFC)

Ottawa, ON / Hybrid

- Deployed Nextflow bioinformatics pipelines (RNAseq, Ampliseq, Sarek) on the 2 most powerful supercomputers in [Canada](#).
- Engineered an in-house solution to enable flexible LLM inference by deploying Ollama via Apptainer on 8x NVIDIA A100 Tensor Core GPUs, overcoming previous limitations, and serving researchers across multiple Canadian departments.
- Improved documentation and technical guides for HPC workflows, including CUDA, SLURM, TBB, and OpenMP.

Software Developer

May 2024 – Aug 2024

James Evan & Associates (JEA)

Victoria, BC / Remote

- Migrated 500+ tests to React Testing Library and upgraded core TypeScript dependencies to resolve breaking changes and ensure CI/CD pipeline integration with Jenkins.

Teaching Assistant

Sep 2024 – Present

Carleton University

Ottawa, ON

- Digital Systems:** Mentored and graded 90+ students in weekly labs; taught circuit design (flip-flops, ALUs, and counters).
- Foundations of Programming:** Taught C programming, memory management, pointers, and abstract data structures.
- Computer Architecture:** Assessed students on assembly, finite state machines, databus management, and peripheral I/O.

PROJECTS

CuMind: Reinforcement Learning Library | Python, JAX, Flax NNX, Gymnasium, Google Cloud TPU

- Built a modular JAX-based RL library integrating Gymnasium environments for training on Google Cloud Platform (GCP).
- Added configurable profiling, tracing, logging, checkpointing, and PRNG controls to support CPU/GPU/TPU backends.
- Reimplemented Google DeepMind's [MuZero](#) algorithm by combining representation, dynamics, and prediction networks with Monte Carlo Tree Search (MCTS) for model-based planning across diverse domains (discrete and continuous).

Capstone: Efficient Visual Recognition with Test-Time Adaptation | Advisor: Dr. James Green, In Progress

- Investigating efficient visual recognition through three phases: (1) developing a high-performance classifier with reduced compute, (2) implementing TENT (Test-Time Entropy Minimization) for distribution shift adaptation, and (3) extending to continuous test-time adaptation for streaming scenarios.