Da Ma

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Education

McMaster University *Sept. 2024 – Present*
PhD, Electrical and Computer Engineering

University of Toronto *Sept. 2019 – May 2024*
BASc (with Honours), Computer Engineering

Experience

Teaching Assistant *Hamilton, ON CA*
COMPENG 4SP4 - High-Performance Programming *Sept. 2025 – Dec. 2025*
COMPENG 4TN4 - Image Processing *Jan. 2025 – May 2025*
McMaster University

- Prepared course materials and led tutorial and laboratory sessions.
- Provided technical advising for student projects, offering guidance on implementation and debugging.
- Assessed and evaluated student performance on assignments, laboratory reports, projects, and exams.

Software Engineer *San Jose, CA USA*
Intel Corporation *May 2022 – May 2023*

- Optimized FPGA memory controller performance by fine-tuning parameters through experimental evaluation.
- Implemented embedded firmware algorithms to meet specification requirements, validated functionality through simulation frameworks and performed debugging based on test results using waveform inspection.
- Developed and maintained project tracking dashboards and technical documentation for the FPGA team, visualizing progress metrics and facilitating cross-team communication.
- Performed FPGA signal tracing and protocol analysis, documenting anomalies and providing actionable feedback for design improvements.

Publications

Sparsified Preconditioned Conjugate Gradient Solver on GPUs Nov. 2025
SC '25, St. Louis, MO, USA (doi:10.1145/3712285.3759796)
Da Ma, Khalid Ahmad, Kazem Cheshmi, Hari Sundar, Mary Hall

Projects

Transforming Loop-Carried Dependence for Parallelism in GPUs In Preparation
Da Ma*, Mahdi Salehi*, Amirmohammad Tavakkoli, Mary Hall, Kazem Cheshmi

Active-Set-based QP Solver for Quadrotor Model Predictive Control In Preparation
Da Ma, Kazem Cheshmi

Enumerate-and-Sparse-Coarsen for Matrix Multiplication in GPUs Submitted
Under Review at PLDI '26
Hossein Albakri, **Da Ma**, Mahdi Salehi, Kazem Cheshmi

Software Memory Cache Replacement in Data Centre with LSTM Apr. 2024
Bachelor Capstone, supervised by Prof. Mark C. Jeffrey
Rudy Jin*, **Da Ma***, Haoran Yin*, Chengyi Zhou*

FSM-Augmented Stride Prefetcher with Adaptive Aggressiveness Control Nov. 2023
Competitive Course Project on Prefetching (Awarded Bonus Marks)
Da Ma*, Haoran Yin*

Extended TAGE-Based Branch Predictor Oct. 2023
Competitive Course Project on Branch Prediction (Awarded Bonus Marks)
Da Ma*, Haoran Yin*

From FPGAs to High-End Reconfigurable and Adaptive Computing June 2022
External Research Project
Da Ma

Presentations

Sparsified Preconditioned Conjugate Gradient Solver on GPUs Nov. 2025
At the session of "Performance: Sparse Matrix and Tensor Computation" in SC '25

Progress Report on Sparsified Preconditioned Iterative Linear Solver May 2025
At 40th Southern Ontario Numerical Analysis Day

Skills

Programming & Scripting:
C/C++, Python, Rust, Bash, Verilog, ARM Assembly, SQL, HTML/CSS.

High Performance Computing:
CUDA, CuPy, Triton, Numba.

Compiler Frameworks:
LLVM, MLIR.

Hardware Knowledge:
x86/ARM CPUs, NVIDIA GPUs, bare-metal ARM Cortex-M MCUs (Teensy 4.1, Crazyflie), FPGA (DE1-SoC).

Modeling, Simulation, and Profiling Tools:
NVIDIA Nsight Compute, Quartus, ModelSim, MATLAB, Simulink, ROS, Gazebo, NVIDIA Isaac Sim.

Mathematical Foundations:
Linear Algebra, Numerical Methods, Calculus, Engineering Mathematics.

Technical Course History

High Performance Computing: Graduate
- High Performance Programming
- Compiler Design for HPC

Advanced Applied Mathematics:
- Matrix Computations for Signal Processing

Computer Vision:
- 3D Image Processing

Mathematics: Undergraduate
- Calculus I–III
- Applied Linear Algebra
- Signals & Systems
- Advanced Engineering Mathematics

Computer Science:
- Programming Fundamentals
- Programming Languages
- Algorithms & Data Structures
- Operating Systems
- Databases
- Computer Organization
- Computer Networks
- Computer Security
- Software Design

Electrical & Hardware:
- Circuit Analysis
- Digital Systems
- Electromagnetics
- Electronics
- Robotics Modeling & Control

Machine Learning:
- Applied Fundamentals of Machine Learning