Quinn Leo Pham

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Education

Sep 2023 – Present **M.Sc. Thesis, Computing Science**
University of Alberta, Edmonton, Canada
- GPA: 4.0 / 4.0
- Supervisor: José Nelson Amaral

Sep 2018 – Apr 2023 **B.Sc. Honors, Computing Science, Science Internship Program**
with Gold Medal in Computing Science, Dean's Silver Medal in Science, and First Class Honors
University of Alberta, Edmonton, Canada
- GPA: 3.8 / 4.0

Research Experience

May 2023 – Present **Graduate Researcher**
University of Alberta, Edmonton, Canada
- Decoupled Triton: a domain-specific language and compiler that allows users to define Triton kernels with decoupled computation and schedule to leverage expert knowledge and automatic compiler optimizations.
- Routed and Cascaded Deep Neural Network: a routed dynamic deep neural network architecture that reduces inference time over an early-exit cascaded deep neural network by reducing wasted computation.
- Tensor Shape-Specialized Adaptive Cache: a kernel compilation and caching system that improves performance by adaptively compiling shape-specialized or shape-generic kernels.
- Code Generation for Branch Prediction Literature Review: a literature review of code generation strategies for improving branch prediction accuracy.

May 2021 – Apr 2023 **Compiler Researcher**
IBM, Toronto, Canada
- Dynamic Adaptive Sub-Target Specialization: a compiler system that utilizes a fat-binary and dynamic compilation to access optimization opportunities available on new architecture versions that are inaccessible by a generic static compilation.

May 2020 – Aug 2020 **Undergraduate Researcher**
University of Alberta, Edmonton, Canada
- Active Lane Consolidation: Developed a compiler pass to identify loops with divergent control flow as targets for a vector instruction optimization that consolidates the active vector lanes of multiple vector registers into a single vector register.

Teaching Experience

Sep 2023 – Dec 2023 **Compiler Design**
Teaching Assistant
University of Alberta, Edmonton, Canada
- Received 100% positive feedback from students about the instructional approach and class climate, guided student teams in completing the course project, prepared and presented tutorials and presentations, monitored and resolved intra-team conflicts, answered questions on the course forums, and evaluated and provided feedback to students.

Sep 2020 – Dec 2020 **Computer Organization and Architecture I**
Teaching Assistant
University of Alberta, Edmonton, Canada
- Led help sessions, answered questions on the course forums, evaluated and provided feedback to students, and investigated possible academic integrity violations.

Awards

Sep 2024 – Aug 2025 **Science Graduate Scholarship**, $2,000

Sep 2023 – Aug 2024 **NSERC Canada Graduate Scholarship - Master's Program**, $17,500

Sep 2023 – Aug 2024 **Walter H Johns Graduate Fellowship**, $7,100

Sep 2023 – Aug 2024 **Graduate Recruitment Scholarship**, $5,000

Apr 2023 **Gold Medal in Computing Science**
Highest average in courses taken in the last three years of the program.

Apr 2023 **Dean's Silver Medal in Science**
Superior academic achievement.

Apr 2023 **First Class Honors**

Nov 2022 **LLVM Foundation Travel Grant**

Nov 2021 **Jason Lang Scholarship**, $1,000

Sep 2020 **Louise McKinney Post-Secondary Scholarship**, $2,500
Superior academic achievement (top 1.5-2% of faculty).

Sep 2020 **University of Alberta Undergraduate Scholarship**, $2,000
Superior academic achievement.

Sep 2020 **CIPS Stan Heaps Memorial Scholarship**, $2,500
Superior academic achievement.

May 2020 – Aug 2020 **NSERC Undergraduate Student Research Award**, $4,500

Jul 2020 **Jason Lang Scholarship**, $1,000

Aug 2018 **Alexander Rutherford High School Achievement Scholarship**, $2,500

Publications

Peer-Reviewed

1. T. Gobran, **Q. Pham**, J. P. L. de Carvalho, J. N. Amaral, C. Barton, and N. Ivanovic, "DASS: Dynamic Adaptive Sub-Target Specialization," *2023 International Symposium on Computer Architecture and High Performance Computing Workshops (SBAC-PADW)*, Porto Alegre, Brazil, 2023, pp. 36-45, doi: 10.1109/SBAC-PADW60351.2023.00016.

Conference Abstracts

Posters

1. **Q. Pham**, D. Seliayeu, P. Chatarasi, and J. N. Amaral, "Decoupled Triton: Exploring Coupled and Decoupled Machine-Learning Kernel Languages," *2024 Collaborative Advances in Software and COmputiNg (CASCON)*, Toronto, Canada, 2024, link: webdocs.cs.ualberta.ca/ qpham/posters/DT-CASCON24.pdf.
2. D. Seliayeu, **Q. Pham**, P. Chatarasi, and J. N. Amaral, "Mixture of Shared Experts," *2024 Collaborative Advances in Software and COmputiNg (CASCON)*, Toronto, Canada, 2024.
3. D. S. Hira, **Q. Pham**, T. Gobran, J. P. L. de Carvalho, N. Ivanovic, C. Barton, and J. N. Amaral, "Specializing Code to New Architectures via Dynamic Adaptive Recompilation," *2022 LLVM Developers' Meeting (LLVMDev)*, San Jose, USA, 2022, link: webdocs.cs.ualberta.ca/ qpham/posters/DAR-LLVMDev22.pdf.

Presentations

Lectures

1. **Q. Pham**, "Code Generation for Branch Prediction: a review", *Machine Learning in Compiler Design (CMPUT 680)*, Edmonton, Canada, 2023, link: webdocs.cs.ualberta.ca/ qpham/decks/CGFBP-CMPUT680.pdf.
2. **Q. Pham**, "Neural Branch Predictors", *Computer Systems and Architecture (CMPUT 429)*, Edmonton, Canada, 2023, link: webdocs.cs.ualberta.ca/ qpham/decks/NBP-CMPUT429.pdf.
3. **Q. Pham**, "Using LLVM and MLIR", *Compiler Design (CMPUT 415)*, Edmonton, Canada, 2023, link: webdocs.cs.ualberta.ca/ qpham/decks/ULAM-CMPUT415.pdf.
4. **Q. Pham**, "What is LLVM (and MLIR)?", *Compiler Design (CMPUT 415)*, Edmonton, Canada, 2023, link: webdocs.cs.ualberta.ca/ qpham/decks/decks/WILAM-CMPUT415.pdf.

Service

Reviewing

Oct 2024 **Parallel Architectures and Compilation Techniques (PACT)**
Long Beach, USA

Jun 2024 **International Symposium on Computer Architecture (ISCA)**
Buenos Aires, Argentina

Volunteering

Nov 2024 **Collaborative Advances in Software and COmputiNg (CASCON)**
Toronto, Canada

Nov 2022 **Conference of the Center for Advanced Studies on Collaborative Research (CASCON)**
Toronto, Canada

Professional Development

Sep 2023 – Dec 2023 **Teaching and Research Methods**
University of Alberta, Edmonton, Canada

Additional Information

Research Interests: Compiler Optimization, Compiler Design, Decoupled Languages, Accelerators, Deep Learning Compilers, Dynamic Deep Neural Networks, Code Generation for Branch Prediction, Neural Branch Predictors, Dynamic Compilation, Binary Optimization, Computer Architecture

Technical Skills: C, C++, Python, Bash, Javascript, Triton, Pytorch, Halide, CUDA, LLVM, MLIR, Git, UNIX, CMake, ANTLR4, OpenMP, WebGL

Languages: Fluent: English, French
Beginner: Japanese

Nationality: Canadian Citizen