

MENG WANG

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SUMMARY

I am currently a 4th-year Ph.D. candidate in Computer Engineering at the University of British Columbia, where my research focuses on practical quantum computing for the NISQ era and beyond. My academic journey has involved building advanced quantum circuit simulators and optimizing the execution efficiency of variational quantum algorithms. During my previous internship at Pacific Northwest National Laboratory, I gained valuable experience in high-performance computing for quantum simulations and also engaged in interdisciplinary collaboration with experts in Chemistry and Physics.

EDUCATION

Ph.D in Electrical and Computer Engineering

The University of British Columbia
Advisor: Dr.Prashant Nair

September 2020 - Present
Vancouver, BC, Canada

BASc in Computer Engineering

The University of British Columbia
Graduated with Distinction

September 2017 - June 2020
Vancouver, BC, Canada

Associate of Science

Langara College

September 2015 - July 2017
Vancouver, BC, Canada

AWARDS

Faculty of Applied Science Graduate Award

The annual award, subject to annual review and criteria fulfillment.

2021, 2022, 2023, UBC

APSC Capstone Faculty Award

May 2020, UBC

Dean's Honour List

Jun 2019, UBC


Special Progressing Award

Feb 2016, Langara College


Entrance Scholarship



Jul 2015, Langara College

CONFERENCE PUBLICATIONS




-  **ASPLOS'24** **Meng Wang**, Bo Fang, Ang Li, and Prashant Nair
Red-QAOA: Efficient Variational Optimization through Circuit Reduction
International Conference on Architectural Support for Programming Languages and Operating Systems, 2024

ARXIV PREPRINTS

-  **Meng Wang**, Rui Huang, Swamit Tannu, and Prashant Nair
TQSim: a case for reuse-focused tree-based quantum circuit simulation
arXiv preprint arXiv:2203.13892

2.  Chenxu Liu, **Meng Wang**, Samuel A. Stein, Yufei Ding, and Ang Li
Quantum Memory: A Missing Piece in Quantum Computing Units
arXiv preprint arXiv:2309.14432
3.  Fei Hua, **Meng Wang**, Gushu Li, Bo Peng, Chenxu Liu, Muqing Zheng, Samuel A. Stein, Yufei Ding, Eddy Z Zhang, Travis Humble, and Ang Li
QASMTrans: A QASM-based Quantum Transpiler Framework for NISQ Devices
arXiv preprint arXiv:2308.07581
4.  Ang Li, Chenxu Liu, Samuel Stein, In-Saeng Suh, Muqing Zheng, **Meng Wang**, Yue Shi, Bo Fang, Martin Roetteler, and Travis Humble
TANQ-Sim: Tensorcore Accelerated Noisy Quantum System Simulation via QIR on Perlmutter HPC
arXiv preprint arXiv:2404.13184

WORKSHOP PUBLICATIONS

1.  **QCS'23** **Meng Wang**, Fei Hua, Chenxu Liu, Nicholas Bauman, Karol Kowalski, Daniel Claudino, Travis Humble, Prashant Nair, Ang Li
Enabling Scalable VQE Simulation on Leading HPC Systems
The International Conference for High Performance Computing, Networking, Storage, and Analysis Workshop: Quantum Computing Softwares, 2023
2.  **QCS'23** Fei Hua, **Meng Wang**, Gushu Li, Bo Peng, Chenxu Liu, Muqing Zheng, Samuel A. Stein, Yufei Ding, Eddy Z Zhang, Travis Humble, and Ang Li
QASMTrans: A QASM Quantum Transpiler Framework for NISQ Devices
The International Conference for High Performance Computing, Networking, Storage, and Analysis Workshop: Quantum Computing Softwares, 2023
3.  **QCCC'23** **Meng Wang**, Bo Fang, Ang Li, and Prashant Nair
Efficient QAOA Optimization using Directed Restarts and Graph Lookup
The Second International Workshop on Quantum Classical Cooperative Computing

WORK EXPERIENCE

Pacific Northwest National Laboratory *October 2022 - August 2023*
Ph.D. Research Intern. Mentor: Ang Li, Bo Fang Richland, WA, USA

- Participated in developing simulation frameworks leveraging leading HPC systems including Frontier, Summit, and Perlmutter to simulate large-scale quantum circuits on GPU clusters. The simulation framework is open-sourced at <https://github.com/pnnl/NWQ-Sim>.
- Led research improving the efficiency of classical optimization in Quantum Approximated Optimization Algorithm (QAOA), yielding two publications: Red-QAOA (accepted at **ASPLOS'24**) proposing a circuit reduction technique, and INFORMR (in progress for **ISCA'24**) introducing an informed restart approach.

TEACHING EXPERIENCE

Teaching Assistant at UBC Vancouver, BC, Canada
CPEN 312 - Digital Systems and Microcomputers *January 2024 - April 2024*
CPSC 322 - Introduction to Artificial Intelligence *July 2022 - August 2022*
APSC 160 - Introduction to Computation in Engineering Design *January 2022 - April 2022*
CPEN 411 - Computer Architecture *September 2021 - December 2021*
CPSC 340 - Machine Learning and Data Mining *January 2021 - April 2021*

SKILLS

Programming skills:

Verilog, C, C++, CUDA, HIP, MPI, Java, Python, ARMv7 Assembly, Racket.

Software Packages:

Qiskit, Qulacs.

Hardware:

System-on-Chip (SoC) FPGA, Raspberry Pi, Arduino.