Yuhao Liu

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Education

2023 – Now | **Ph.D. in Computer and Information Science**
University of Pennsylvania, USA.
Advisor: Dr. Gushu Li

2019 – 2023 | **B.E. in Computer Science and Technology**
Tsinghua University, China.
Advisor: Prof. Wei Xue

Research Interests

Quantum Computing; Quantum Information; Quantum Compiler
Programming Language; Formal Methods; Formal Verification
High-Performance Computing

Publications (* = equal contribution)

[PLDI'25] Xiuqi Cao, Junyu Zhou, **Yuhao Liu**, Yunong Shi, Gushu Li, "*MarQSim: Reconciling Determinism and Randomness in Compiler Optimization for Quantum Simulation*", ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI), 2025.

[CAV'25] Kean Chen, **Yuhao Liu**, Wang Fang, Jennifer Paykin, Xin-Chuan Wu, Albert Schmitz, Steve Zdancewic, Gushu Li, "*Verifying Fault Tolerance of Quantum Error Correction Codes*", International Conference on Computer Aided Verification (CAV), 2025.

[HPCA'25] **Yuhao Liu**, Kevin Yao, Jonathan Hong, Julien Froustey, Ermal Rrapaj, Costin Iancu, Gushu Li, Yunong Shi, "*HATT: Hamiltonian Adaptive Ternary Tree for Optimizing Fermion-to-Qubit Mapping*", the IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2025.

[ASPLOS'24] **Yuhao Liu**, Shize Che, Junyu Zhou, Yunong Shi, Gushu Li, "*Fermihedral: On the Optimal Compilation for Fermion-to-Qubit Encoding*", the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024.

[ISCA'24] Junyu Zhou, **Yuhao Liu**, Yunong Shi, Ali Javadi-Abhari, Gushu Li, "*Bosehedral: Compiler Optimization for Bosonic Quantum Computing*", the IEEE/ACM International Symposium on Computer Architecture (ISCA), 2024.

[DAC'24] Shize Che, Seongwoo Oh, Haoyun Qin, **Yuhao Liu**, Anthony Sigillito, Gushu Li, "*Fast Virtual Gate Extraction For Silicon Quantum Dot Devices*", the Design Automation Conference (DAC), 2024.

Conference Presentations

2025 "*HATT: Hamiltonian Adaptive Ternary Tree for Optimizing Fermion-to-Qubit Mapping*", Global Physics Summit 2025, Los Angelos, USA.
2025 "*HATT: Hamiltonian Adaptive Ternary Tree for Optimizing Fermion-to-Qubit Mapping*", 2025 IEEE Symposium on High-Performance Computer Architecture (HPCA), Las Vegas, USA.
2024 "*Fermihedral: On the Optimal Compilation for Fermion-to-Qubit Encoding*", the 29th International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), San Diego, USA.
2022 "*High-Performance Stencil Computation DSL Inside Python*", SOLVER 22, Chongqing, China.

Teaching and Service

Spring 2025 **Teaching Assistant**, Computer Organization and Design, CIS 4710, UPenn, PA
Fall 2024 **Teaching Assistant**, Introduction to Quantum Computing, CIS 3990, UPenn, PA