

# YUHAO LIU

102 Moore Building  
Philadelphia, PA 19104  
Homepage  
Google Scholar

Email: liuyuhao@seas.upenn.edu  
Alt: yhliu2000@outlook.com

## Education

8/2023 – Now	<b>Ph.D. in Computer and Information Science</b> University of Pennsylvania, USA. Advisor: Dr. Gushu Li
8/2023 – 8/2025	<b>M.S. in Computer and Information Science</b> University of Pennsylvania, USA.
9/2019 – 5/2023	<b>B.E. in Computer Science and Technology</b> Tsinghua University, China. Advisor: Prof. Wei Xue

## Research Interests

- Quantum Computing; Quantum Information; Quantum Error Correction
- Programming Language; Formal Methods; Formal Verification
- High-Performance Computing; Compiler Optimization; Compiler Construction

## Publications (\* = equal contribution)

[HPCA'25]	<b>Yuhao Liu</b> , Kevin Yao, Jonathan Hong, Julien Froustey, Eral Rrapaj, Costin Iancu, Gushu Li, Yunong Shi, “ <i>HATT: Hamiltonian Adaptive Ternary Tree for Optimizing Fermion-to-Qubit Mapping</i> ”, the IEEE International Symposium on High-Performance Computer Architecture (HPCA), 2025.
[ASPLOS'24]	<b>Yuhao Liu</b> , Shize Che, Junyu Zhou, Yunong Shi, Gushu Li, “ <i>Fermihedral: On the Optimal Compilation for Fermion-to-Qubit Encoding</i> ”, the International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2024.
[ASPLOS'26]	Junyu Zhou, <b>Yuhao Liu</b> , Shize Che, Anupam Mitra, Efehan Kökcü, Eral Rrapaj, Costin Iancu, Gushu Li, “ <i>QTurbo: A Robust and Efficient Compiler for Analog Quantum Simulation</i> ”, International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2026.
[ASPLOS'25]	Spyros Pavlatos*, Xuting Liu*, <b>Yuhao Liu</b> , Vincent Liu, “ <i><math>\lambda</math>-trim: Reducing Monetary and Performance Cost of Serverless Cold Starts with Cost-driven Application Debloating</i> ”, International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2025.
[PLDI'25]	Xiuqi Cao*, Junyu Zhou*, <b>Yuhao Liu</b> , Yunong Shi, Gushu Li, “ <i>MarQSim: Reconciling Determinism and Randomness in Compiler Optimization for Quantum Simulation</i> ”, 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.
- [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.

## In Submission (\* = equal contribution)

- [To ASPLOS'26] **Yuhao Liu**, Shuohao Ping, Junyu Zhou, Ethan Decker, Justin Kalloor, Mathias Weiden, Kean Chen, Yunong Shi, Ali Javadi-Abhari, Costin Iancu, Gushu Li, “*AlphaSyndrome: Tackling the Syndrome Measurement Circuit Scheduling Problem for QEC Codes*”.

## Conference Presentations

- 2025 “*HATT: Hamiltonian Adaptive Ternary Tree for Optimizing Fermion-to-Qubit Mapping*”, APS Global Physics Summit 2025, Los Angeles, 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