

Tianyi Hao

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Updated April 2025

EDUCATION

Sep. 2022 – Present	University of Wisconsin–Madison Ph.D. in Computer Sciences, supported by JPMorganChase PhD Fellowship	ADVISOR: SWAMIT TANNU GPA: 3.90/4.00
Sep. 2020 – Jun. 2022	Stanford University M.S. in Computer Science, Theoretical Computer Science specialization	GPA: 3.94/4.00
Aug. 2016 – Jun. 2020	University of Illinois at Urbana–Champaign B.S. in Computer Science, Intelligence and Big Data concentration, Summa Cum Laude B.S. in Physics, Computational Physics concentration, Summa Cum Laude	ADVISOR: EDGAR SOLOMONIK GPA: 3.96/4.00 GPA: 3.96/4.00

PROFESSIONAL EXPERIENCE

Aug. 2022 – Present	QUEST Lab, UW–Madison • Research near-term and fault-tolerant quantum computing algorithms and architectures.	RESEARCH ASSISTANT
Summers 2023 – 2025	JPMorganChase • Quantum optimization-related research at the JPMC Global Technology Applied Research center.	RESEARCH TECHNOLOGIES ASSOCIATE
Summer 2022	Argonne National Laboratory • Proposed a novel objective function for constrained variational quantum optimization.	W.J. CODY ASSOCIATE
Jan. 2021 – Jun. 2021	Stanford–IBM Research Collaboration • Designed a tensor network algorithm framework for solving constrained optimization problems.	RESEARCH ASSISTANT
Spring 2021	Stanford–UnitaryFund Open–Source Program • Significantly improved Mitiq’s probabilistic error cancellation circuit sampling performance.	CONTRIBUTOR
Jan. 2019 – Sep. 2020	Laboratory for Parallel Numerical Algorithms, UIUC • Developed a quantum circuit simulator based on 2D tensor networks with novel contraction methods.	UNDERGRADUATE RESEARCH ASSISTANT

HONORS AND AWARDS

2024 – 2025	JPMorganChase PhD Fellowship	JPMORGANCHASE
2024	DAC Young Fellow	DESIGN AUTOMATION CONFERENCE
2024	Distinguished Artifact Award	ISCA '24
2023	The Hiran Mayukh Award	UNIVERSITY OF WISCONSIN-MADISON
2020, 2023, 2024	NSF Student Travel Awards, QIP '20, ISCA '23, QCE '24	NSF
2020	Graduated Summa Cum Laude	UNIV. OF ILLINOIS AT URBANA-CHAMPAIGN
2016 – 2020	James Scholar	UNIV. OF ILLINOIS AT URBANA-CHAMPAIGN
2016 – 2020	Dean’s List	UNIV. OF ILLINOIS AT URBANA-CHAMPAIGN

SERVICE

TECHNICAL PROGRAM COMMITTEE MEMBER

QCE 2025 IEEE Quantum Week

EXTERNAL PROGRAM COMMITTEE MEMBER

ISCA 2025 International Symposium on Computer Architecture
MICRO 2025 International Symposium on Microarchitecture

REVIEWER

2024-2025	Quantum Information Processing Journal
QCNC 2025	International Conference on Quantum Communications, Networking, and Computing
QCE 2024	IEEE Quantum Week

PUBLICATIONS**PUBLISHED**

TQC 2025	S. Chakrabarti*, D. Herman*, G. Ozgul*, S. Zhu*, B. Augustino, T. Hao , Z. He, R. Shaydulin, and M. Pistoia, <i>Generalized Short Path Algorithms: Towards Super-Quadratic Speedup over Markov Chain Search for Combinatorial Optimization</i> . The Conference on the Theory of Quantum Computation, Communication and Cryptography, 2025.
QCE 2024	T. Hao , Z. He, R. Shaydulin, M. Pistoia, and S. Tannu, <i>Variational Quantum Algorithm Landscape Reconstruction by Low-Rank Tensor Completion</i> . IEEE International Conference on Quantum Computing & Engineering, 2024.
ISCA 2024	Y. Jin, Z. Li, F., Hua, T. Hao , H. Zhou, Y. Huang, and E. Zhang, <i>Tetris: A Compilation Framework for VQA Applications in Quantum Computing</i> . International Symposium on Computer Architecture, 2024. Distinguished Artifact Award .
DAC 2024	Z. Liang*, Z. Song*, J., Cheng*, H. Ren*, T. Hao* , R. Yang*, Y. Shi, and T. Li, <i>Combining Parameterized Pulses and Contextual Subspace for More Practical VQE</i> . Design Automation Conference, 2024.
DAC 2024	Z. Liang, G. Liu, Z. Liu, J. Cheng, T. Hao , K. Liu, H. Ren et al. <i>Graph Learning for Parameter Prediction of Quantum Approximate Optimization Algorithm</i> . Design Automation Conference, 2024.
ISCA 2023	T. Hao* , K. Liu*, and S. Tannu. <i>Enabling High Performance Debugging for Variational Quantum Algorithms using Compressed Sensing</i> . International Symposium on Computer Architecture, 2023.
QCS at SC 2022	T. Hao , R. Shaydulin, M. Pistoia, and J. Larson, <i>Exploiting In-Constraint Energy in Constrained Variational Quantum Optimization</i> . IEEE/ACM Third International Workshop on Quantum Computing Software in conjunction with the International Conference for High Performance Computing, Networking, Storage, and Analysis, 2022.
Frontiers in Physics 2022	T. Hao , X. Huang, C. Jia, and C. Peng, <i>A Quantum-Inspired Tensor Network Algorithm for Constrained Combinatorial Optimization Problems</i> . Frontiers in Physics, 2022.
SC 2020	Y. Pang, T. Hao , A. Dugad, Y. Zhou, and E. Solomonik, <i>Efficient 2D Tensor Network Simulation of Quantum Systems</i> . International Conference for High Performance Computing, Networking, Storage, and Analysis, 2020.

PREPRINTS

2025	Y. Jin, Z. He, T. Hao , D. Amaro, S. Tannu, R. Shaydulin, and M. Pistoia, <i>Iceberg Beyond the Tip: Co-Compilation of a Quantum Error Detection Code and a Quantum Algorithm</i> .
2025	T. Hao , A. Xu, and S. Tannu, <i>Reducing T Gates with Unitary Synthesis</i> .
2025	S. Omanakuttan, Z. He, Z. Zhang, T. Hao , A. Babakhani, S. Boulebnane, S. Chakrabarti, D. Herman, J. Sullivan, M. Perlin, R. Shaydulin, and M. Pistoia, <i>Threshold for Fault-tolerant Quantum Advantage with the Quantum Approximate Optimization Algorithm</i> .
2024	T. Hao* , Z. He*, R. Shaydulin, J. Larson, and M. Pistoia, <i>End-to-End Protocol for High-Quality QAOA Parameters with Few Shots</i> .

TEACHING**CO-INSTRUCTOR**

Spring 2025	System Architecture for Quantum Computers	UNIVERSITY OF WISCONSIN-MADISON
Spring 2025	Quantum Computing Seminar	UNIVERSITY OF WISCONSIN-MADISON

TEACHING ASSISTANT

Fall 2022	Introduction to Bioinformatics	UNIVERSITY OF WISCONSIN-MADISON
Spring 2022	The Modern Algorithmic Toolbox	STANFORD UNIVERSITY

MENTORING

2024, 2025	CS Graduate Student Mentoring Program	UNIVERSITY OF WISCONSIN-MADISON
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TALKS

Mar. 2025	APS March Meeting	ANAHEIM, CA
	Circuit Synthesis for Early Fault-Tolerant Quantum Computers	
Oct. 2024	WQI Colloquium Short Presentation	MADISON, WI
	Facilitating Variational Quantum Algorithm Design with Reconstructed Landscapes	
Sep. 2024	IEEE Quantum Week (QCE '24)	MONTREAL, CANADA
	Variational Quantum Algorithm Landscape Reconstruction by Low-Rank Tensor Completion	
Aug. 2023	Quantum Computer Systems Lecture Series	ONLINE
	Enabling High Performance Debugging for Variational Quantum Algorithms using Compressed Sensing	
Mar. 2023	APS March Meeting	LAS VEGAS, NV
	Improving Performance and Debuggability of Variational Quantum Algorithms using Compressed Sensing	
Dec. 2022	Invited Talk, Department of Physics, University of Florida	ONLINE
	Exploiting In-Constraint Energy in Constrained Variational Quantum Optimization	
Nov. 2022	Supercomputing Conference (SC '22)	DALLAS, TX
	Exploiting In-Constraint Energy in Constrained Variational Quantum Optimization	