Christopher Kang

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EDUCATION

University of Chicago, Chicago, IL — 9/2022-present
PhD in Computer Science
Advised by Fred Chong

University of Washington, Seattle, WA — 9/2018-6/2022
Bachelor of Science in Computer Science — GPA: 3.95/4.0
Bachelor of Science in Economics
Phi Beta Kappa member

RESEARCH INTERESTS

Practical Hamiltonian simulation via improved algorithms and architectures.

I am a full-stack quantum computer scientist. At the physical level, I designed methods for pulse-level calibration [2]. At the logical level, I designed algorithms for Hamiltonian simulation [3] and am currently compiling chemistry algorithms to QEC primitives [1] and designing architectures for utility-scale simulations.

PUBLICATIONS & PREPRINTS

[1] **Christopher Kang** and Tanuj Khattar. *End-to-end compilation of a chemistry simulation to a fault-tolerant quantum computer*. In: (2026).

[2] Yulong Dong, **Christopher Kang**, and Murphy Niu. *In situ calibration of analog pulses via qubitized dynamics*. In: (2025).

[3] **Christopher Kang** and Yuan Su. *Quantum matrix arithmetics with Hamiltonian evolution*. 2025. arXiv: 2510.06316 [quant-ph]. URL: https://arxiv.org/abs/2510.06316.

[4] Alexander Barg, Nolan J. Coble, Dominik Hangleiter, and **Christopher Kang**. *Geometric structure and transversal logic of quantum Reed–Muller codes*. In: *IEEE Transactions on Information Theory* (2025), pp. 1–1. DOI: 10.1109/TIT.2025.3592631.

[5] Jason D. Chadwick, **Christopher Kang**, Joshua Viszlai, Sophia Fuhui Lin, and Frederic T. Chong. *Averting Multi-Qubit Burst Errors in Surface Code Magic State Factories*. In: *2024 IEEE International Conference on Quantum Computing and Engineering (QCE)*. Vol. 01. 2024, pp. 1089–1101. DOI: 10.1109/QCE60285.2024.00128.

[6] Han Zheng, **Christopher Kang**, Gokul Subramanian Ravi, Hanrui Wang, Kanav Setia, Frederic T. Chong, and Junyu Liu. *SnCQA: A hardware-efficient equivariant quantum convolutional circuit architecture*. In: *2023 IEEE International Conference on Quantum Computing and Engineering (QCE)*. Vol. 01. 2023, pp. 236–245. DOI: 10.1109/QCE57702.2023.00034.

[7] **Christopher Kang**, Micheline B Soley, Eleanor Crane, Steven M Girvin, and Nathan Wiebe. *Leveraging Hamiltonian simulation techniques to compile operations on bosonic devices*. In: *Journal of Physics A: Mathematical and Theoretical* 58.17 (Apr. 2025), p. 175301. DOI: 10.1088/1751-8121/adb5df. URL: https://doi.org/10.1088/1751-8121/adb5df.

[8] Timothy J Stavenger, Eleanor Crane, Kevin C Smith, **Christopher T Kang**, Steven M Girvin, and Nathan Wiebe. *C2QA - Bosonic Qiskit*. In: *2022 IEEE High Performance Extreme Computing Conference (HPEC)*. 2022, pp. 1–8. DOI: 10.1109/HPEC55821.2022.9926318.

Best paper awards:
[5] (1st Place Best Paper, QCE 2024),
[6] (1st Place Best Paper, QCE 2023)

WORK EXPERIENCE

Intern, Xanadu Quantum Technologies *Fall 2025*
Fault-tolerant quantum architecture design.

Student Researcher, Google *Summer 2025*
Fault-tolerant quantum compilation.

Research Intern, Microsoft *Summer 2024*
Algorithms for Hamiltonian simulation.

Special Assistant, UW CSE *Summer 2022*
Consulted Director of External Outreach on digital transformation efforts and pricing models for affiliate engagement.

Summer Scholar, Deloitte Consulting, LLP *Summer 2021*
Supported a large public sector healthcare client with an enterprise-level digital transformation effort

Outreach Ambassador, UW CSE *Winter 2019-Fall 2020*
Supported CSE outreach efforts to diverse K-12 students across the Puget Sound

Student Assistant, UW CSE *Fall 2018-Fall 2020*
Assistant to Director of External Outreach

TALKS

Reviewing Innovations in Fermion-Qubit Mappings *11/2023*
University of Maryland QuICS Special Seminar

Topological Quantum Error Correction for Classical Theorists *9/2023*
University of Washington Theory Seminar, University of Chicago Theory Seminar

Leveraging Hamiltonian Simulation Techniques to Compile Higher Order Block-Encodings on Bosonic Devices *3/2023*
QIP 2023, APS March Meeting 2023, UMD RQS Institute

Quantum-Inspired Classical Hamiltonian Simulation *9/2020*
Northwest Quantum Nexus / UW Workshop

Building a Variational Quantum Eigensolver in Q# *3/2019*
Northwest Quantum Nexus

RECOGNITION

Crerar Fellowship, UChicago *9/2022*
Awarded to select incoming PhD students ($5000)

Outstanding Scholar in Economics, UW Economics *6/2022*
Awarded to a senior in Economics based on academic merit

Hellmut Golde Endowed Scholarship, UW CSE *9/2021*
Awarded to a student in Computer Science based on academic merit ($1750)

George and Pearl Corkery Scholarship, UW Economics *5/2021*
Awarded to an exceptional junior in Economics based on academic merit ($2500)

Campus Nomination for Goldwater Scholarship, UW *12/2020*
Campus nomination for the national Goldwater scholarship

Microsoft Endowed Scholarship, UW CSE *9/2019*
Awarded to a student in Computer Science based on academic merit ($500)

Honors Calculus Award, UW Department of Mathematics *6/2019*
Top student in the 1st year Honors Calculus Class ($200)

Honors Undergraduate Scholars Award, UW Honors Program *9/2018*
Awarded a four-year merit-based tuition waiver ($47000)

TEACHING

TA: Quantum-inspired linear algebra, PCMI IAS *Summer 2023*
Taught a PhD-level course on quantum linear algebra and quantum singular value transformation.

TA: Intro to Quantum Computing, UChicago CS *Winter 2023*
Taught an Intro to Quantum Computing course intended for a general undergraduate CS audience.

TA: Graduate Quantum Computing, UW CSE *Winter 2022*
Taught a special topics grad class on quantum computing and quantum algorithms. Graded homework assignments and held office hours.
Received highest TA rating from faculty instructor, "*Truly Exceptional*"

TA: Undergraduate Quantum Computing, UW CSE *Fall 2020*
Taught a special topics class on quantum computing and quantum algorithms. Wrote and presented three lectures on Hamiltonian simulation.
Received highest TA rating from faculty instructor, "*Truly Exceptional*"

TA: Freshman Introductory Seminar, UW CSE *Summer, Fall 2019*
Taught an introductory class for freshmen on inclusive leadership

SERVICE

Reviewer, Various journals
IEEE QCE (2025, 2024), TQC (2025), QCTiP (2025), FOCS (2024), QSim (2024), Transactions on Architecture and Code Optimization (2024), IEEE Transactions on Quantum Engineering (2022)

Co-organizer, Theory Lunch UChicago *9/2022-present*
Organize a weekly Theory Lunch to bring together members of the TCS community.

Member, ACM's US Tech Policy Council (USTPC) *2/2021-present*
Principal author for USTPC's Statement on Remote Test Administration

Organizer, Theory Lunch UW *6/2022-9/2022*
Organize a weekly Theory Lunch to bring together members of the TCS community.

Special Assistant for Undergraduate Research, UW CSE *9/2021-6/2022*
Year-long appointment to improve the undergraduate research experience

Board Member, Q++ (LGBTQ+ @ UW CSE) *9/2018-6/2022*
Built an LGBTQ+ community in UW CSE and supported LGBTQ+ peers

Co-Chair, CSE Student Advisory Council *Spring 2019-Summer 2021*
Served as head undergraduate representative to faculty and staff in the department

Representative, CSE Student Advisory Council *Fall 2018-Spring 2019*
Represented undergraduates in the CSE School