Christopher Kang

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EDUCATION

University of Washington, Seattle, WA — 9/2018-present
Bachelor of Science in Computer Science — GPA: 3.95/4.0
Bachelor of Science in Economics

RESEARCH INTERESTS

- Quantum Hamiltonian simulation, including matrix product formulas and realizing simulation algorithms on real-world hardware
- NISQ hardware, including algorithm co-design and application discovery
- Hybrid quantum-classical algorithms and quantum-inspired algorithms

RESEARCH EXPERIENCE

Communication Complexity — *3/2021-present*
Advised by Paul Beame — *UW*
Working to show fundamental properties in communication complexity, like the psuedorandomness of the index function, as an exploration of classical TCS

Novel Control Schemes for Boson-Qubit Devices — *9/2020-present*
Advised by Nathan Wiebe — *UToronto, C2QA*

- Used matrix product formulas (Trotter, Baker-Campbell-Hausdorff) to design new control schemes for hybrid boson-qubit quantum devices
- Collaborated with physicists and computer scientists to explore potential near-term applications of hybrid boson-qubit devices
- Publication currently being prepared for submission

Quantum-Inspired Classical Hamiltonian Simulation — *6/2020-present*
Advised by Sriram Krishnamoorthy and Karol Kowalski — *PNNL*

- Co-led the design/creation of a quantum-inspired algorithm for ab initio molecular simulations based on Trotterization/phase estimation
- Implemented a new simulation algorithm with asymptotically improved space complexity. Traditional approaches scale exponentially, while our approach scales super-polynomially
- This algorithm enables further study into three distinct areas: high-scale ab initio simulations, error scaling of quantum simulation algorithms, and further quantum-inspired algorithms
- Publication currently being prepared for submission

Hamiltonian Reordering for Optimal Circuit Depth — *Summer 2019*
Advised by Sriram Krishnamoorthy — *PNNL*
Implemented a software pipeline in Q# taking Hamiltonians and reordering terms to optimize for circuit depth.

Reinforcement Learning — *Winter 2019-Summer 2019*
Advised by Willie Agnew and Pedro Domingos — *UW*
Supported grad student with evaluating models in different environments.

Graph-Based Semi-Supervised Learning for Cybersecurity — *Summer 2018*
Advised by Mahantesh Halappanavar — *PNNL*
Investigated the use of graph-based semi-supervised neural networks to classify the severity of computer vulnerabilities.

RECOGNITION

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

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

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

Microsoft Endowed Scholarship, UW CSE *9/2019*
Awarded 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

TALKS

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

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

TEACHING

TA: Undergraduate Quantum Computing, UW CSE *Fall 2020*
Taught a special topics class on quantum computing and quantum algorithms. 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

Ugrad Research Coordinator/Consultant, UW CSE *9/2021-present*
Engaged in a special, year-long appointment to improve the undergraduate research experience

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

Board Member, Q++ (LGBTQ+ @ UW CSE) *9/2018-present*
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

WORK EXPERIENCE

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

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