Thomas Propson

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EDUCATION

University of Chicago 2017-2021
B.S. Physics, Computer Science
GPA: 3.89 / 4.0

RESEARCH EXPERIENCE

Experimental Control of Superconducting Qubits 2019-Present
University of Chicago, Department of Physics, Advisor: David I. Schuster
- Perform control, spectroscopy, and readout on superconducting qubits
- Develop an open-source software package that performs quantum optimal control on open systems, and achieves experimental robustness
- Assess and implement numerical techniques to achieve efficient and accurate quantum system simulation

Quantum Hardware and Algorithm Optimization 2018-2019
University of Chicago, Department of Computer Science, Advisor: Frederic T. Chong
- Developed a method for compiling variational quantum algorithms that achieves a 30x latency reduction
- Developed an operation scheduling algorithm for frequency-tunable qubits that mitigates cross-talk
- Investigated properties of near-term quantum hardware and algorithms to optimize quantum architecture for fidelity and latency

Hyperparameter Optimization 2018
Argonne National Laboratory, Division of Math and Computer Science
Advisors: Stefan Wild, Prasanna Balaprakash
- Developed a software package to evaluate hyperparameter optimization algorithms that exposes a novel search space definition system
- Deployed neural network experiments on high-performance computing infrastructure

PUBLICATIONS

1. **T. Propson**, B. Jackson, Z. Manchester, D. I. Schuster, "Robust Control of a Fluxonium Qubit." In preparation (2020).
2. Y. Ding, P. Gokhale, S. F. Lin, R. Rines, **T. Propson**, F. T. Chong, "Systematic Crosstalk Mitigation for Superconducting Qubits via Frequency-Aware Compilation." Proceedings of the 53rd Annual IEEE/ACM International Symposium on Microarchitecture (2020). [arixv:2008.09503]
3. P. Gokhale, Y. Ding, **T. Propson**, C. Winkler, N. Leung, Y. Shi, D. I. Schuster, H. Hoffmann, F. T. Chong, "Partial Compilation of Variational Algorithms for Noisy Intermediate-Scale Quantum Machines." Proceedings of the 52nd Annual IEEE/ACM International Symposium on Microarchitecture, 266-278 (2019). [arixv:1909.07522]

Patents

1. P. Gokhale, Y. Ding, **T. Propson**, F. T. Chong, "System and Method for Partial Compilation of Variational Algorithms in Quantum Computers." Pending.

Talks

Commercial Outlook for Quantum Computing
    University of Chicago, Booth School of Business, 2019
Benchmarking Hyperparameter Optimization Algorithms on Deep Neural Networks
    University of Chicago, Undergraduate Research Symposium, 2018
    Argonne National Laboratory, Summer Student Symposium, 2018

Honors and Awards

Grainger Scholarship, Full-tuition senior year, UChicago Physics	2020
Barry Goldwater Scholarship	2020
Enrico Fermi Scholar, GPA in top 5% from past 5 years, UChicago PSD	2020
Liew Family College Research Fellowship, UChicago	2018
Jeff Metcalf Research Fellowship, UChicago	2018
University Scholarship, UChicago	2017-2021

Service

Uncommon Hacks   2018-Present
Technology Team Lead
- Organize an annual MLH endorsed hackathon to provide a platform for 300+ students to develop technical skills, collaborate with peers to create innovative projects, and network with employers
- Lead a 10-person team of designers and software developers to build websites that reach 1000+ users

Work Experience

PanorArt Inc.   2018
Full-Stack Web Developer
- Built front-end web components using Angular.js to provide users with a platform to buy and sell art that achieves greater price transparency than competing platforms
- Improved online presence by implementing search engine optimization techniques
- Implemented Node.js to handle server-client communication via HTTP as well as to manage relational and non-relational databases in order to ensure user data security and support mission-critical operations