

# Thomas Propson

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## EDUCATION

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<b>University of Chicago</b> B.S. Physics, Computer Science GPA: 3.89 / 4.0	2017-2021
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## RESEARCH EXPERIENCE

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<b>Experimental Control of Superconducting Qubits</b> University of Chicago, Department of Physics, Advisor: David I. Schuster	2019-Present
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- Perform control, spectroscopy, and readout on superconducting qubits
- Develop numerical techniques using control theory and trajectory optimization to engineer high fidelity quantum gates in the presence of decoherence and systematic errors

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<b>Quantum Hardware and Algorithm Optimization</b> University of Chicago, Department of Computer Science, Advisor: Frederic T. Chong	2018-2019
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- 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

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<b>Hyperparameter Optimization</b> Argonne National Laboratory, Division of Math and Computer Science Advisors: Stefan Wild, Prasanna Balaprakash	2018
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- 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

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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). [[arxiv:2008.09503](https://arxiv.org/abs/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). [[arxiv:1909.07522](https://arxiv.org/abs/1909.07522)]

## PATENTS

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

## TALKS

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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

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Grainger Scholarship, Full-tuition senior year, UChicago Physics 2020

Barry Goldwater Scholarship 2020

Enrico Fermi Scholar, major 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

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**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

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**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