

Jason Chadwick

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EDUCATION

Ph.D. Candidate, Computer Science, University of Chicago 2022–present

Studying quantum computer architecture, advised by Fred Chong

Interests: Quantum optimal control, compilation, high-radix computation, neutral atom devices, variational algorithms, surface codes

B.S. Physics, Carnegie Mellon University 2018–2022

Minor in Computer Science

GPA 3.95

Coursework: Quantum Computing, Advanced Quantum Physics, Artificial Intelligence, Parallel Data Structures and Algorithms, Functional Programming, Discrete Differential Geometry, Computer Systems

AWARDS

Crerar Fellowship, University of Chicago 2022

University Honors, Carnegie Mellon University 2022

College Honors, Mellon College of Science 2022

Dean's List, High Honors, Mellon College of Science 2018–2022

SKILLS

Programming: Python, Julia, C/C++, C#/Unity, Java, Clojure, Common Lisp, SML, Bash

Python libraries: QuTiP, qiskit, Cirq, Pulser, pandas, TensorFlow, PyTorch, SciPy

Julia packages: QuantumOptics.jl, DataFrames.jl, Juqbox.jl

Software: L^AT_EX, Unix, slurm, Mathematica

EXPERIENCE

Undergraduate researcher, University of Chicago 2021–2022

Optimized short-duration control pulses for high-radix quantum logic gates, motivating a new compiler design that takes advantage of mixed-radix operations. Presented papers at QCE 2022 and ASPLOS 2023 (under review).

Research intern, Princeton Plasma Physics Laboratory 2020

As part of the Department of Energy SULI program, designed a neural network to predict fusion plasma cross-sectional properties in real time, for use in control systems. Published work in *Nuclear Fusion*.

FEATURED PROJECTS

visit my [github](#) to see all public projects

Chronodrifter, primary author 2021–present

2D platformer game in Unity where the player must solve puzzles by slowing and reversing the flow of time. A live web version is [available](#) (mobile currently not supported).

Quops, primary author 2021–present

Board game based on the rules of quantum mechanics. Players take turns applying quantum logic operations to a board of qubit tiles, aiming to create specific superpositions of states.

Juqbox.jl, contributor 2022

Julia package for solving optimal control problems in closed quantum systems.

SERVICE

Physics Steering Committee, CMU Physics Department

2019–2021

Collaborated with physics department leadership to guide programs and policy.

PUBLICATIONS

Year	Title and Authors	Publisher	Category
2023	<i>(under review) Qompress: Efficient Compilation for Ququarts Exploiting Partial and Mixed Radix Operations for Communication Reduction</i> A. Litteken, L.M. Seifert, J. Chadwick , N. Nottingham, J.M. Baker, F.T. Chong	28th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)	Refereed conference paper
2022	<i>(to appear) Time-Efficient Qudit Gates through Incremental Pulse Re-seeding</i> L.M. Seifert [†] , J. Chadwick [†] , A. Litteken, F.T. Chong, J.M. Baker arxiv.org/abs/2206.14975	2022 IEEE International Conference on Quantum Computing and Engineering (QCE)	Refereed conference paper
2022	<i>Synthesizing Efficient Pulses for Practical Qudit Circuits</i> J. Baker, J. Chadwick , L.M. Seifert, A. Litteken, N. Nottingham, A. Petersson, S. Guenther, F.T. Chong	25th Annual Conference on Quantum Information Processing (QIP)	Refereed poster
2021	<i>Prediction of electron density and pressure profile shapes on NSTX-U using neural networks</i> M.D. Boyer, J. Chadwick doi.org/10.1088/1741-4326/abe08b	<i>Nuclear Fusion</i> 61 046024	Article
2020	<i>Machine learning modeling and analysis of density and pressure profiles on NSTX and NSTX-U</i> J. Chadwick , M.D. Boyer	62nd Annual Meeting of the APS Division of Plasma Physics	Poster

[†] indicates equal contribution