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
Julia packages: QuantumOptics, DataFrames,
Software: LaTeX, Unix, slurm, Mathematica
Techniques: Machine learning, linear programming, functional programming

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 at QCE 2022 and ASPLOS 2023.

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

see my github for all public projects

Chronodrifter 2021–
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.

Quops 2021–
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.

Publications

† *indicates equal contribution*

Year	Title and Authors	Publisher
2023	*(under review) Qompress: Efficient Compilation for Ququarts Exploiting Partial and Mixed Radix Operations for Communication Reduction* A. Litteken, L.M. Seifert, **J. Chadwick**, N. Nottingham, J.M. Baker, F.T. Chong	ASPLOS
2022	*(to appear) Time-Efficient Qudit Gates through Incremental Pulse Re-seeding* L.M. Seifert†, **J. Chadwick**†, A. Litteken, F.T. Chong, J.M. Baker	QCE
2022	*Synthesizing Efficient Pulses for Practical Qudit Circuits* J. Baker, **J. Chadwick**, L.M. Seifert, A. Litteken, N. Nottingham, A. Petersson, S. Guenther, F.T. Chong	QIP Poster
2021	*Prediction of electron density and pressure profile shapes on NSTX-U using neural networks* M.D. Boyer, **J. Chadwick**	Nucl. Fusion
2020	*Machine learning modeling and analysis of density and pressure profiles on NSTX and NSTX-U* **J. Chadwick**, M.D. Boyer	APS DPP Poster