JON NELSON

+1(818) 534-6858 ⋄ nelson1@umd.edu

EDUCATION

Ph.D. Candidate in Computer Science, University of Maryland — Expected 2027
Co-advised by Prof. Michael Gullans and Prof. Daniel Gottesman

B.S. with Honors in Computer Engineering, Brown University — 2016 - 2020

EXPERIENCE

University of Maryland — Aug 2021 - Present
C.S. Ph.D. student — *College Park, MD*

- Spearheading multiple research projects in the fields of quantum error correction and quantum complexity theory

Los Alamos National Laboratory — Jun 2020 – Sep 2021
Post-Bacc Researcher — *Los Alamos, NM*

- Developed experimental protocol to precisely characterize the noise profile of a D-Wave quantum annealer.
- Demonstrated how to tune magnetic field to mitigate distortion effects in quantum experiments.

Scalable Computing Laboratory — Jun 2019 - Jun 2020
Undergraduate Research Assistant — *Brown University*

- Deployed neural network on wearable device that performs activity recognition
- Published paper proposing novel techniques for managing power-accuracy trade-off
- Proposed rotation-invariant feature extraction method for time-series data in Honors Thesis

Tripathi Biomedical Group — Oct 2018 - May 2019
Undergraduate Research Assistant — *Brown University*

- Developed actuator control software for microfluidic device that prepares DNA for sequencing

HONORS & AWARDS

- NSF Graduate Research Fellowship — 2023 - present
- Dean's Fellow — 2021 - 2023
- Outstanding Computer Engineering Senior Award — 2020
- Jayakumar Summer Research Award — 2019
- Member of Tau Beta Pi National Engineering Honors Society (Top eighth of Engineering Class) — 2019
- Freshman Chemistry Achievement Award for the highest score out of roughly 300 students — 2016

PUBLICATIONS

- J. Nelson, J. Rajakumar, D. Hangleiter, M. Gullans, "Polynomial-Time Classical Simulation of Noisy Circuits with Naturally Fault-Tolerant Gates," arXiv preprint arXiv:2411.02535, 2024.
- N. Coble, M. Coudron, J. Nelson, and S. Nezhadi *(Alphabetized)*, "Hamiltonians whose Low-Energy States Require $\omega(n)$ T Gates," arXiv preprint arXiv:2310.01347, 2023.
- J. Nelson, G. Bentsen, S. Flammia, M. J. Gullans, "Fault-Tolerant Quantum Memory using Low-Depth Random Circuit Codes," Phys. Rev. Research, 2025.
- N. Coble, M. Coudron, J. Nelson, S. Nezhadi *(Alphabetized)*, "Local Hamiltonians with no low-energy stabilizer states," Theory of Quantum Computing, Communication and Cryptography (TQC) 2023.

- J. Nelson, M. Vuffray, A. Y. Lokhov, T. Albash, and C. Coffrin, "High-Quality Thermal Gibbs Sampling with Quantum Annealing Hardware," Phys. Rev. Applied, 2022.
- J. Nelson, M. Vuffray, A. Y. Lokhov and C. Coffrin, "Single-Qubit Fidelity Assessment of Quantum Annealing Hardware," IEEE Transactions on Quantum Engineering, 2021.
- M. Neseem, J. Nelson and S. Reda, "AdaSense: Adaptive Low-Power Sensing and Activity Recognition for Wearable Devices," 2020 57th ACM/IEEE Design Automation Conference (DAC), 2020.

CONFERENCE PRESENTATIONS

- "High-quality Thermal Gibbs Sampling with Quantum Annealing Hardware," Talk at Adiabatic Quantum Computing Conference 2022. International Center for Theoretical Physics, Trieste, Italy.
- "Single-Qubit Fidelity Assessment of Quantum Annealing Hardware," Talk at Adiabatic Quantum Computing Conference 2021. Tokyo Institute of Technology, Tokyo, Japan.

TEACHING/MENTORING EXPERIENCE

Research Mentor Summer 2024
Program: REU-CAAR *University of Maryland*

- Mentored two undergraduate researchers and co-lead a research project on quantum and non-signalling graph planarity games, which was accepted as a poster for QIP 2025.

Graduate Teaching Assistant Fall 2021
Course: Algorithms *University of Maryland*

Undergraduate Teaching Assistant Spring 2020
Course: Design of Computing Systems *Brown University*

SERVICE

Subreviewer for Theory of Quantum Computing, Communication and Cryptography (TQC) 2025 Spring 2025
Subreviewer for Quantum Computing Theory in Practice (QCTiP) 2025 Winter 2025
Subreviewer for Theory of Quantum Computing, Communication and Cryptography (TQC) 2023 Spring 2023
Subreviewer for Quantum Information Processing (QIP) 2023 Fall 2022