

## EDUCATION

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### University of Maryland, College Park

Computer Science PhD Candidate

College Park, MD

2020–present

- Advised by Alexander Barg and Matthew Coudron
- Member of the Equity, Diversity, and Inclusion Senate Committee, 2023—present

### SUNY Brockport

B.S. in Mathematics and Physics

Brockport, NY

2016–2020

- Thesis: “Spectral properties of quaternionic unit gain cycles.”
- Advised by Nathan Reff
- Member of the Honors College

## PROGRAMS/WORKSHOPS

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### Simons Institute for the Theory of Computing

Visiting Graduate Student

Berkeley, CA

Spring 2024

- Semester-long program: Quantum Algorithms, Complexity, and Fault Tolerance.

### Institute for Pure & Applied Mathematics

Attendee

Los Angeles, CA

Fall 2023

- Week-long workshop: Topology, Quantum Error Correction, and Quantum Gravity.

### Park City Mathematics Institute

Attendee

Park City, UT

Summer 2023

- Three week long graduate summer school which focused on both new developments and foundational results in quantum computing and information.

## PUBLICATIONS

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- [1] N. J. Coble, M. Coudron, J. Nelson, and S. S. Nezhadi, “Hamiltonians whose low-energy states require  $\Omega(n)$  T gates”, Preprint, 2023. arXiv: 2310.01347 [quant-ph].
- [2] N. J. Coble, M. Coudron, J. Nelson, and S. S. Nezhadi, “Local Hamiltonians With No Low-Energy Stabilizer States”, in *18th Conference on the Theory of Quantum Computation, Communication and Cryptography (TQC 2023)*, 2023. arXiv: 2302.14755 [quant-ph].
- [3] Z. Holmes, N. J. Coble, A. T. Sornborger, and Y. Subaşı, “Nonlinear transformations in quantum computation”, *Phys. Rev. Res.*, vol. 5, p. 013105, 1 Feb. 2023.
- [4] F. Belardo, M. Brunetti, N. J. Coble, N. Reff, and H. Skogman, “Spectra of quaternion unit gain graphs”, *Linear Algebra and its Applications*, vol. 632, pp. 15–49, Jan. 2022, ISSN: 00243795.
- [5] K. Srinivasan, N. J. Coble, J. Hamlin, T. Antonsen, E. Ott, and M. Girvan, “Parallel machine learning for forecasting the dynamics of complex networks”, *Phys. Rev. Lett.*, vol. 128, p. 164101, 16 Apr. 2022.
- [6] N. J. Coble and M. Coudron, “Quasi-polynomial time approximation of output probabilities of geometrically-local, shallow quantum circuits”, in *Conference on Quantum Information Processing (QIP)*, and *Symposium on Foundations of Computer Science (FOCS)*, 2021. arXiv: 2012.05460.

- [7] N. J. Coble and N. Yu, “A reservoir computing scheme for multi-class classification.”, in *Proceedings of the 2020 ACM Southeast Conference*, ser. ACM SE '20, Tampa, FL, USA: Association for Computing Machinery, 2020, pp. 87–93, ISBN: 9781450371056.

## EXPERIENCE

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### Los Alamos National Laboratory

Quantum Computing Summer School Fellowship  
Advisor: Dr. Yigit Subasi

Los Alamos, NM  
Summer 2021

– Project title: Generating Polynomials of Density Matrices

### University of Maryland

Training and Research Experiences in Nonlinear Dynamics (TREND) REU  
Advisors: Dr. Michelle Girvan, Dr. Ed Ott, Dr. Thomas Antonsen

College Park, MD  
Summer 2019

– Project title: Predicting Network Dynamics with a Parallel Machine Learning Approach

### University of Rochester

Photonics REU  
Advisor: Dr. Benjamin Miller

Rochester, NY  
Summer 2018

– Project title: Finite-Element Modeling of Waveguide Structures Using COMSOL Multiphysics

## TALKS

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- [1] *Hamiltonians whose low-energy states require  $\Omega(n)$   $T$  gates*, Presented to the IQC Math & CS Seminar, 2024.
- [2] *Divide-and-conquer method for approximating output probabilities of geometrically-local, shallow quantum circuits*, Presented to the IQC-QuICS Math and Computer Science Seminar, 2021.

## LANGUAGES

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**Intermediate:** MATLAB, Python  
**Some:** C++, Rust, Java, Bash

## TEACHING ASSISTANTSHIPS

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Quantum Information Processing, Fall 2023  
Precalculus, Fall 2020, Spring 2022

## GRADUATE COURSEWORK

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**Computer Science:** Intro to Quantum Information Processing, Quantum Algorithms, Quantum Error Correction and Fault-Tolerance, End-to-End Quantum Applications, Scientific Computing, Advanced Numerical Optimization, Applications of Zero-knowledge Proofs, Quantum Complexity

**Mathematics:** Algebra I and II, Brauer Groups, Complex Analysis, Differential Geometry

## COURSE PROJECTS

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Brauer Groups: Division algebras and space-time block coding.	Spring 2022
End-to-End Quantum Applications: Applications of block encodings in quantum computing.	Fall 2021
Quantum Error Correction and Fault-Tolerance: QKD and error-correcting codes.	Fall 2021
Quantum Algorithms: Hidden subgroup problem for semi-direct product groups.	Spring 2021

## SCHOLARSHIPS AND AWARDS

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UMD Outstanding Graduate Teaching Assistant Award	2023
NSF GRFP Honorable Mention	2022
Aziz Osborn Gold Medal in Teaching Excellence	2021
University of Maryland Dean's Fellowship	2020
SUNY Chancellor's Award for Student Excellence	2020
School of Arts and Sciences Outstanding Undergraduate Award	2020
Brockport Honors College Scholar Award	2020
Robert E. Hall Memorial Scholarship for Mathematics	2020
Department of Computer Science Undergraduate Research Award	2020
Belva A. Waite Memorial Scholarship	2019, 2016
Interdisciplinary Award in Mathematics	2018
Harvard House Award	2018
Brockport Physics, Mathematics, and Computer Science Award	2018, 2017
Dean's Citation for Diversity, University of Rochester	2018