

Alexandra Veliche

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Education

University of Michigan, Ann Arbor, MI

PhD Pre-Candidate in Computer Science and Engineering

Advisor: Mahdi Cheraghchi

Expected Graduation Date: May 2025

GPA: 4.00 / 4.00

Relevant Coursework: Advanced Cryptography, Randomness & Computation, High-Dimensional Probability, Computer & Network Security, Foundations of Artificial Intelligence

Relevant Activities: Lattice Theory Crypto reading group, Theoretical Computer Science reading group

Northeastern University, Boston, MA

Bachelor of Science in Mathematics, Minor in Computer Science

Graduation Date: May 2020

Summa Cum Laude

Relevant Activities:

- ♦ Participated in the 6.875 Cryptography & Cryptanalysis course at the Massachusetts Institute of Technology taught by Yael Kalai and Noah Stephens-Davidowitz in Fall 2019.
 - ♦ Served as President of the Math Club between September 2017 – December 2019.
 - ♦ Participated in Putnam Mathematical Competition annually between September 2016 – December 2019.
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Research Experience

Shor's Algorithm and Its Impact on Present-Day Cryptography (Research Capstone)

Northeastern University

Quantum Computing

Fall 2018

- ♦ Advisor: Christopher King.
- ♦ Exposition of Shor's algorithm for factoring with focus on roots of unity in the quantum Fourier transform.

Nonlocality in Quantum Shallow Circuits (Junior-Senior Honors Thesis)

Northeastern University

Quantum Computing

Fall 2019

- ♦ Advisor: Christopher King.
- ♦ Proved some results in "Quantum Advantage of Shallow Circuits" [Bravyi-Gosset-König, 2017] for small examples and illustrated the role of nonlocality and graph states in solving the Hidden Linear Function Problem to separate the classes NC^0 and QNC^0 .

Randomness Extractors (Independent Research)

Northeastern University

Cryptography

Spring 2020

- ♦ Advisor: Daniel Wichs.
- ♦ Worked toward a proof that any good seeded extractor is a good two-source extractor.

Mean-Based Trace Reconstruction over General Repeat Channels

University of Michigan

Coding Theory

Fall 2020 – present

- ♦ Collaborators: João Ribeiro, Mahdi Cheraghchi, Joseph Downs.
- ♦ Proved upper bound for the number of traces needed for mean-based trace reconstruction for general repeat and repeat-insertion channels.
- ♦ Submitted to ISIT 2021.

Employment Experience

Cengage Learning <i>Cybersecurity Co-op</i>	Boston, MA January – July 2018
Mathematics Department of Northeastern University <i>Mathematics Tutor</i>	Boston, MA May 2017 – April 2019
Computer Science Department of Northeastern University <i>Teaching Assistant for Cryptography 4770</i>	Boston, MA January– April 2020

Volunteer Work

St. Herman of Alaska Christian School <i>Teacher's Assistant for Middle School Geometry Class</i>	Allston, MA September 2016 – Fall 2019
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Honors & Awards

High-school valedictorian Based on academic merit, one of the top three students in graduating class of 2016.	May 2016
Dean's List Given to students who maintain a GPA greater than 3.5 per semester.	Fall 2016 – Spring 2020
National Merit Scholarship \$250 per semester, merit-based scholarship sponsored by Liberty Mutual.	Fall 2016 – Spring 2020
Churchill Scholarship Nominee Nominated by Northeastern University to the national Churchill Scholarship competition, for a fully-sponsored year-long master's degree at Cambridge University, U.K.	November 2019
PEAK Shout-It-Out Award \$230 awarded for travel to present a poster at the NCUWM in February 2020.	January 2020

Conferences

Graduate Research Opportunities for Women in Mathematics (GROW) Conference <i>University of Michigan, Ann Arbor, MI</i>	October 2018
Nebraska Conference for Undergraduate Women in Mathematics (NCUWM) <i>University of Nebraska, Lincoln, NE</i> <ul style="list-style-type: none">Presented poster on "Shor's Algorithm and Its Impact on Modern Cryptography".	January – February 2019
Hudson River Undergraduate Math Conference (HRUMC) <i>Smith College, Northampton, MA</i> <ul style="list-style-type: none">Gave a talk on "Shor's Algorithm and Its Impact on Modern Cryptography".	March 2019
Nebraska Conference for Undergraduate Women in Mathematics (NCUWM) <i>University of Nebraska, Lincoln, NE</i> <ul style="list-style-type: none">Presented poster on "Nonlocality in Shallow Quantum Circuits".	January – February 2020

ACM Symposium on Theory of Computing (STOC)

June 2020

Online

IEEE Symposium on Foundations of Computer Science (FOCS)

November 2020

Online

IACR Theory of Cryptography Conference (TCC)

November 2020

Online

Extracurricular Activities

- ♦ Member of ECSEL+ (Ensemble of Computer Science and Engineering Ladies) at University of Michigan.
- ♦ Member of OCF (Orthodox Christian Fellowship) club at University of Michigan.

Other Interests: Orthodox Christian life, hiking, travelling, painting, drawing, experimental cooking and baking, solving logic puzzles, reading literature, fantasy, history, and nature books.